PC Senegal Community Health Manual

2014 Edition

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The PC Senegal Community Health Manual is a continual work in progress. As you read this manual and use it in the field, please make note of the information that is particularly useful, or any areas where your experiences are contradicted by information found here. For updates to the 2014 edition, please send any comments, critiques, corrections or praises to Health PTA Adji Thiaw at athaiw@peacecorps.gov

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1 Public Health and Senegal

Fundamentals of Public Health

Public Health is the science field dedicated to promoting health and well-being, and preventing disease within the human population to ultimately increase the quality of our livelihood and life span. Public Health does not focus on individual patients or diseases, but rather a given population and health system. The discipline is community-centered in its interventions and seeks to improve the health status of whole populations. Public Health interventions are multifaceted and interdisciplinary in their nature, as they permeate the health system at every level from local to international standards of care and protocol. Interventions include: policy revisions and implementation of new regulations; improvements in the relevancy of primary care and technical knowledge of health workers; and the adoption of healthy behaviors within a community. The arena for public health programs is within the whole community and not reserved just for the doctor's office. As a result, public health interventions require collaboration with various professionals from related fields such as Medicine, Law, Economics and Sociology. There are five main core subject areas of public health studies and methodology:

- **Epidemiology –** The study of the distribution and determinants of diseases and health-related behaviors
- **Biostatistics –** The application of statistical analysis of biological events to assess disease presence, cause and effect
- **Health Care Management and Policy –** The inquiry and improvement of the delivery, quality and cost of health care for individuals and communities
- **Health Promotion –** Addresses the social, cultural and behavioral factors as they relate to the presence of disease and uptake of health behaviors of individuals and whole populations throughout entire life spans
- **Environmental Health Sciences –** The study of biological, chemical and physical factors and their effects on the health status of populations

Examples of historical public health campaigns in the United States are: seatbelt laws, tobacco policies, mass media awareness campaigns for breast cancer and substance abuse, vaccination regulations for elementary school children, the food guide pyramid, Michelle Obama's Let's Move! Campaign, USDA and FDA regulations of meat and produce sold in grocery stores, etc.

Global Health Campaign examples: Polio Vaccination, Mosquito Net Distribution, HIV/AIDS ABC Campaign (Abstinence, Be Faithful and Use a Condom), School Lunch Programs, Food Security, Clean water and food.

Global Health is a facet of public health which recognizes public health methodology and approaches as a crucial component to the development of a country and its international relations. Due to globalization and the nature of development and aid relief, public health is not confined within state borders. Global Health mitigates the relationships and public health issues induced by globalization. The World Health Organization is a crucial stakeholder in overseeing international public health components for efficacy, safety, appropriateness and also ethical boundaries. Other key stakeholders in Global Health work include the United States Centers for Disease Control, United Nations (UNICEF, Women's, etc), the Global Fund and an overwhelming list of governmental (USAID) and non-governmental organizations (IntraHealth).

Community Health aims to study and improve the health of specific geographic communities. While general public health focuses on a top-down approach to interventions that encompass large areas and various target groups, community health utilizes resources within a geographically contained area to improve community level public health. All sub fields of public health, including Global Health and Community Health, use a combination of top-down and grassroots interventions. They require resources and field workers on all levels of implementation, from grassroots health education to large scale vaccination campaigns.

Historical Evolution of Public Health within the Western World

The Ancient Greeks (500 – 323 BC)

- Understood the importance of personal hygiene (washing hands, taking a bath), physical fitness (invented the Olympics), and eating good food.

The Roman Empire (27 BC – 476 AD)

- Built aqueducts to bring water into the city.
- Plumbing technology was very advanced.
- Removed human waste, especially in urban areas
- Collected taxes to support public services such as public baths and water and sewage systems

The Middle Ages (476 -1450)

- This era was also known as the "Dark Ages."
- Complete abandonment of Greek and Roman values of hygiene and sanitation
- Total decline of hygiene and sanitation
- Belief that physical body was less important than spiritual self and that faith and prayers would treat illness
- Some important public health discoveries occurred during this time including the development of quarantine and isolation of the sick to minimize the spread of infectious diseases.

The Plague (1348 – 1530)

- Also known as "The Black Death"
- Epidemic disease spread via rodent-borne fleas that hit Western Europe and killed about 1/3 of the population in Europe, or about 25 million people, and about 60 million people worldwide.
- During this period, people believed that removing dead bodies would further prevent the spread of infection. However, this made little difference since the plague was most likely spread by fleas that lived in rodents. The fleas would leap from dead rats onto humans where they delivered their deadly bite.
- In the end, burning parts of cities proved to be more effective in reducing the spread of the disease since it killed many of the rodents that were harboring the fleas.

The Renaissance (1400 – 1600)

- During this time, arts, literature, and global exploration flourished.
- Explorers and traders spread diseases like smallpox, measles, and typhoid and in doing so killed 90% of people in the New World.

The Age of Reason and Enlightenment (1650 – 1800)

- Encouragement of scientific exploration led to the birth of modern western medicine.
- Two English physicians made remarkable discoveries:

- William Harvey - demonstrated the function of the heart and circulatory system and was the first to suggest that humans and other mammals reproduced via the fertilization of an egg by sperm.
- Edward Jenner - laid the foundation of modern immunology as a science by creating the first vaccine. He proved that cowpox or swinepox provided immunity against smallpox. He coined the word vaccines from the Latin 'vacca' for cow.

Industrialization/Urbanization (1800s)

- This era was marked by a rise in slums, poverty, and disease.
- Spread of disease caused by large settlements around places of work and factories.
- Since settlements were very cramped and quite primitive, and there was no organized sanitation system, disease was rampant.

Great Sanitary Awakening (1800s – 1900s)

- Birth of modern public health
- Great strides in scientific knowledge to help understand the origin and treatment of disease.
- Dr. John Snow founded the science of epidemiology – the study of the causes of disease – through his discovery that the cause of a cholera outbreak in London was a polluted public water well. Before John Snow discovered the cause of cholera, it was thought to be an airborne disease. John Snow proved it was linked to one water source (a water pump) and a woman who washed her baby's diapers too close to the water source. The feces in the water source were then linked to cholera
- A couple decades later, another scientist, Louis Pasteur, developed the germ theory of infection, which highlighted the relationship between germs and disease.
- Following Louis Pasteur's germ theory of infection, societies concluded that they could prevent the spread of infectious disease through governmental action. Modern public health regulation was born. This led to many notable public health advances including the building of latrines and sewers, regular garbage collection and development of landfills, the provision of clean water and removal of stagnant water to prevent the breeding of mosquitoes, the use of disinfectants, improved obstetrical care, and use of inoculation.
- The connection between poverty and disease was first acknowledged. Even today, poverty is the single best predictor of poor health.

The 20th Century (1902 – 2000)

- Stark decline in mortality, particularly in children, and a major increase in average life expectancy.
- Marked by major public health achievements, such as vaccination programs and control of many infectious diseases (polio, diphtheria, yellow fever, and smallpox); effective health and safety policies (road traffic safety and occupational safety); improved family planning; tobacco control measures; and programs designed to decrease non-communicable (or non-infectious) diseases by acting on known risk factors such as a person's background, lifestyle, and environment, as well as major sanitary reforms.
- In 1978 the Alma Atta Declaration was adopted during the International Conference on Primary Health Care. The Declaration called for urgent and effective action toward improving the accessibility of primary care to all regardless of economic status, geographical location and within both national and international arenas.
- In 1987 the Bamako Initiative was adopted by African Health Ministries to improve availability of essential drugs and necessary healthcare services throughout Sub-Saharan Africa. The Bamako Initiative is in collaboration with The World Health Organization (WHO) and The United National Children Fund's (UNICEF).

The 21st Century (2001 – Present)

- Marked by a change in the concept and scope of public health.
- A new era in public health called 'Population Health.'
- Includes all the ways that society as a whole, or communities within society, are affected by health issues and how they respond to these issues.
- Because of the nature of issues affecting the 21st century, such as the potential for bioterrorism, the high cost of health care and the control of infectious diseases like HIV/AIDS and pandemic influenza, the need for community-wide or population-wide efforts has become increasingly important.

Current State of Health in Senegal

As Peace Corps Health Volunteers, our projects and priorities align with the current state of health in our host country. It is imperative that Health Extension Volunteers are aware of which diseases are prevalent before installing in their permanent sites.

To begin with, a few crucial demographic statistics:

- The population has grown to over 13 million people.
- There are over 2 million children under the age of five and over half a million pregnant women, making our goal of improving the health of mothers, infants, and children a priority.

A major obstacle to reliable health related statistics and data in the Senegal is the ongoing strike by the health workers union that began in July of 2010. While on strike, all health workers refuse to submit their routine patient data. This creates gaps in statistics for both the Senegalese government and non-governmental organizations working on health research in the country. The following passages include the best available data as of February 2014.

Infrastructure

In terms of structures, the health system relies upon the availability of health care based in health posts, as well as secondary and tertiary care centers at the regional hospital. Senegal currently has 1248 health posts, which has increased from 978 health posts in 1999. There are 88 health centers, which has increased from 65. And there are 34 hospitals, increased from 23. Despite this increase in infrastructure, there are not enough well-equipped centers to accommodate for the current growing population.

2012 Coverage in Senegal:

- 1 health post for every 10,301 inhabitants
- 1 health center for every 146,081 inhabitants
- 1 hospital for every 378,093 inhabitants

WHO Recommendations:

- 1 health post for every 5,000-10,000 inhabitants
- 1 health center for every 150,000 inhabitants
- 1 hospital for every 300,000 inhabitants

Personnel

The distribution of healthcare providers is essential to improving service quality. In response to the gap in demand and supply of trained healthcare providers, the Ministry of Health has developed a national training plan that incorporates the needs of both initial and continuing training. Moreover, despite budgetary constraints, the Ministry of Health has a special quota for

the annual recruitment of various health personnel. However, despite the efforts noted, the situation is far from satisfactory compared to WHO standards.

2012 Healthcare Personnel Distribution in Senegal:

- 1 doctor for every 12,373 inhabitants
- 1 nurse for every 4,320 inhabitants
- 1 midwife for every 2,426 women of reproductive age

WHO Recommendations:

- 1 doctor for every 10,000 inhabitants
- 1 nurse for every 3,000 inhabitants
- 1 midwife for every 300 women of reproductive age

Projected Health Personnel Needed

If Senegal continues its pace and the number of health workers are trained each year, we will continue to have a deficit through 2017 of general health care personnel, specialists, nurses and midwives. Below is a table which depicts the country's deficit of specific health care personnel. The deficit is calculated based upon the above WHO guidelines.

Categories	2013	2014	2015	2016	2017
Specialists	206	88	86	58	57
Generalists	41	37	36	24	23
Nurse	5155	1505	1488	934	916
Midwife	2563	687	682	422	418

Senegal also receives aid in the management of its healthcare system in the form of a consortium of organizations, including World Vision, USAID, Child Fund, the World Health Organization, Helen Keller International, UNICEF, and the United Nations Population Fund (UNFPA). Different organizations may work in your district or region and it is helpful to get to know the goals, objectives, and field work as well as the staff of these organizations, as collaborative projects and activities are possible.

Peace Corps Senegal Project Framework and the Millennium Development Goals

We will focus now on each of our three goals from our project plan and Senegal's progress towards the Millennium Development Goals (MDGs) associated with each area.

Malaria

Our project plan includes the goal that communities will improve their ability to prevent and treat malaria. This corresponds to MDG Goal 6: To Combat HIV/AIDS, Malaria and other Diseases. By 2015, MDG Goal 6 aims to have halted and begun to reverse the incidence of HIV/AIDs and malaria.

Currently more than three out of four households in Senegal (76% compared to 72 % 2010-2011) have at least one net. 73% of households have an ITN (insecticide treated net) and 68 % have a LLIN (long-lasting insecticide-treated net). In 2010-2011, these proportions were 63% and 58%. The proportion of households with at least one mosquito net type ITN is higher in rural areas (89%) than urban areas (56%). The variations across the regions of Senegal are strong, the lowest proportions of households with ITN are found in the West (regions of Dakar and Thies: 50%), followed by the South (Tambacounda, Ziguinchor, Sédhiou, Kolda and Kédougou: 86 %) and Center (Kaolack, Diourbel, Fatick and Kaffrine: 88%). The highest proportion is observed in the North (Matam, Louga and St Louis: 93%). Similar variations were observed for LLINs kind. It

should be noted that the regions of Dakar and Thies had not yet received universal coverage during more than half of the period of collection. Moreover, the regions that have received universal coverage before data collection all have higher rates of LLIN ownership (up to 80%).[1]

The current level of bed net use is 43%. This has increased by 8% from2010-2011. However, this level of use is still relatively low compared to the MDG target for this indicator (80 %). Among households with ITNs 51 % of household members slept under this type of mosquito net the night before. Among household members, children under 5 years and adults aged 50 years or more are the groups which have most often slept under a mosquito net. In addition, female members of the household (43%) and members of households in rural areas (45%) are relatively more likely to have slept under an ITN then male household members (39%) and those living in urban areas (35%). The regional differences are quite significant. The North has a large proportion of the population sleeping under an ITN - 61%. In the other three major regions, use is 48% in the center, 40% in the South and only 24% in the West.

Parasite levels have decreased slightly in children from six months to five years of age, from 2010-2011. This shows that Senegal has reduced the incidence of malaria, at least in children. However, the parasite levels are still quite high in rural areas. The regional differences are very important. In the South (9.3%), there is the highest prevalence, followed distantly by the central region (2.2%). In contrast, the North (0.7%) and West (0.6%) have extremely low prevalence's. According to the collection period of the 2012-2013 from the DHS (Demographic and Health Survey), the variations are also significant (4.5% during the first wave against 1.0% during the second wave), reflecting the seasonality of transmission malaria in children from six months to five years of age.

Maternal and Child Health

Peace Corps Senegal's health project plan goal is for communities to adopt behaviors and practices that contribute to improved maternal, infant and child health; we are thus aligned with the Senegalese Ministry of Health's efforts to meet the MDG Goals 4 and 5: To reduce under-five child mortality (MDG Goal 4) and improve maternal health and reduce the maternal mortality rate (MDG Goal 5). The following topics and interventions are aligned with the MDG goals as well as our own project framework:

Oral Rehydration Salts

To fight against the effects of dehydration, the World Health Organization (WHO) recommends the therapy of oral rehydration (ORT), advising the use of either a prepared oral rehydration solution of (ORS), or *solution rehydration orale (SRO*), or a solution prepared at home with water, sugar and salt. Overall, 22% received an ORT (including solutions made at home). For children aged 12-23 months (20%) and 24-35 months (19%), the use of ORS is more frequent. The gap is largest between children in urban areas (20%) and rural areas (16%). Children in central Senegal (20%) receive ORS more frequently than the rest of the country. When a pre-packaged ORS solution is supplemented with homemade solutions, children 48-59 months (35 %) are more frequently treated than their counterparts. There is also a gender disparity - -girls (23%) more frequently receive an ORT than boys (20%). Children in urban areas (24%) are more fortunate than those in rural areas (20%) with respect to ORT, as well as those of West (25%) and Central (23%) compared to other regions. There is a correlation between the uses of

[1] Agence Nationale de la Statistique et de la Démographie (ANSD) Dakar, Sénégal et MEASURE DHS, ICF International, Calverton, Maryland, USA. "Sénégal Enquête Démographique et de Santé Continue (EDS-Continue) 2012-2013," July 2013. Measure DHS. 26 November 2013. http://www.measuredhs.com/publications/publication-FR288-DHS-Final-Reports.cfm (17 February 2014).

ORT and economic status of households. More economically well-off households use ORTs. Only 39 % of children who had diarrhea in the two weeks preceding the DHS survey had parents or guardians who sought advice or treatment with an institution or a health care provider.

In 2012 the ChildFund consortium-implementing partners instituted a nation wide program that aimed to synergize efforts to combat life-threatening dehydration for children due to diarrheal disease. Trainings or *formations* were held at the health post and district level; Community Health Workers were equipped with the Information, Education and Communication materials as well as the zinc tablets and ORS packets to extend to their communities. These materials are supposed to be used in an advanced strategy,' where by the ASC actively follows up with diarrheal cases and prescribes the ORS and tablets as a packaged treatment.

Acute Respiratory Infections

Acute respiratory infections (ARIs), especially pneumonia, are one of the root causes of child mortality in Senegal. Regional differences are particularly important: the West (74%) has the highest prevalence of treatment-seeking behavior for children with ARI symptoms. The center (44%) and the South (43%) had the lowest treatment-seeking behavior. It was also found that treatment-seeking behavior had a high prevalence among economically well-off families.

Feeding Practices and Nutrition

Feeding practices are the primary factors that determine the nutritional status of children, which in turn affects the morbidity and mortality of these children. At birth all children in Senegal are breastfed and this practice continues long after birth: at 12-15 months, 97% of children are breastfed and 20-23 months, 47% still are. However, while WHO recommends that until the age of six months children are exclusively breastfed, it is found that exclusive breastfeeding is not common practice. At less than two months, only 57% of children receive only breast milk and at 4-5 months, this proportion is only 18%. Overall, the proportion of children aged under six months exclusively breastfeeding was 38%, while 62% of children are receiving other liquids or foods in addition to breast milk, mainly water (46%). Between 6 -9 months, at which all children should already receive complementary foods in addition to breast milk, only two out of three children are fed in this way (65%).. The practice of exclusive breastfeeding has nevertheless improved over time: it was only 5% in 1992, 11% in 1997 34% in 2005 and 39% in 2011. The use of the bottle in children is rare, only 3% for those less than 2 months and 6% of all those under 6 months received something like a bottle over the past 24 hours. However, this level has not changed compared 2010-2011, where the percentage of children under 6 months who took food from a bottle during the past 24 hours was also 6%.

Malnutrition

19% of children in Senegal suffer from stunted growth, a symptom of chronic malnutrition: more than one in twenty (6%) suffer from severe stunting. Overall, the nutritional situation according to height-for- age index can be characterized as acceptable, but this conceals disparities important in terms of socio-demographic variables. First, the proportion of children with stunting is nearly two times higher in rural areas (21%) than in urban areas (13%). There are significant variations in the prevalence of stunting, whether moderate or severe. The proportion of children with stunting increases with age: 7% in infants less than 6 months, increasing to over 25% at 23-35 months before falling to 18% between 48 -59 months. Stunting is slightly more frequent in boys than girls (20% compared to 17%). In regards to the effect of birth interval, 16% of children of first-time mothers have stunting. For mothers of multiple children, the incidence of stunting of children decreases when the amount of time between each birth increases. Stunting is very prevalent when the interval is less than 24 months (29%) and gradually decreases to 16% with more than 48 months between children. The same trend was observed

for the severe growth retardation with a prevalence ranging from 3% to 10 %. When the mother does not live in the household, the data shows no significant difference in prevalence of stunting: 21% against 23% when the mother lives in the household and was not interviewed and 18% when she was present and interviewed. The prevalence of late growth of children has declined steadily from 26% in households in the lowest economic strata to 11 % in households in the highest strata. Children whose mothers have no education (21%) are more affected by stunting than those whose mothers have primary education (15%) and almost two times more affected than those whose mothers have received secondary education or higher (10%). The same trend was observed for severe stunting which is 7% for children whose mother has no education, compared to 4% for children whose mothers have primary education and 2% for children whose mothers have a level of education secondary or higher. Stunting is highest among children 24-35 months, in infants (25%) among those of uneducated mothers (21%), living in rural areas (21%) residing in the households in the lowest economic strata (26%) and in the central regions (30%) and the South (26%).

Wasting reflects acute malnutrition. Overall, the acute malnutrition rate is high, nearly one in ten children (9%) is thin with moderate or severe malnutrition, while 2% are severely emaciated. In terms of age, children under 6-11 months suffer more frequently from wasting (13%). The prevalence of wasting decreases between 12 and 35 months (7%) and increases again for children 36-47 months (9%) and 48 - 59 months (11 %). The prevalence of wasting is higher in rural areas than in urban areas (10% compared to 7%) and varies greatly depending on the region. It is much higher in the North (12%), South (11 %) and central (10 %) regions than in the West (5%). The prevalence of wasting among children is also higher when the mother has no education (10 %) than when she has a primary level of education (8%) or secondary education (6%). Prevalence of wasting is also related to the level of economic well-being of the household: the higher the level of welfare increases, the lower the prevalence of wasting. It is 11 % among children in households of the lowest economic strata against 6% among children in the highest strata.

The low weight-for-age index, or underweight, is the one most often used by healthcare providers to monitor progress growth of children. Low-weight-for-age is a composite indicator that can reflect chronic malnutrition or acute malnutrition. Nearly one in six (16% compared to 18% in 2011) suffer underweight: 3% suffer from being severely underweight (against 5% in 2011). There are disparities in the prevalence of underweight according to demographics: Low-weight-for-age is higher in children over 11 months. This form of malnutrition occurs very early (at least 6 % of infants aged six months or less) and increases rapidly to one in ten children 6-9 months old(11%) and increases again to nearly one in five children 10-11 months old (19 %). Children whose birth interval is less than 24 months apart are more likely than others to have inadequate weight (21% compared to 12% when the interval is greater than 48 months).Low-weight-for-age is higher for children who are very small at birth (24% compared to 13% when the child is average or larger than average at birth). In rural areas, 18% of children are affected by this form of malnutrition compared to 11% in urban areas. The prevalence of low-weight-for-age was higher in the South (21%), North (18%) and central (17%) regions than in the West (11%). As for stunting, the educational level of the mother is one of the most variable discriminants for underweight: 11% of children whose mothers have secondary or higher educations have an underweight against 12% for those whose mothers have a primary education and 18% for those whose mother has no education. The prevalence of low-weight-for-age decreases with the level of welfare of households and in households in the highest quintile, 10% of children are underweight compared to 21% of households in the lowest quintile.

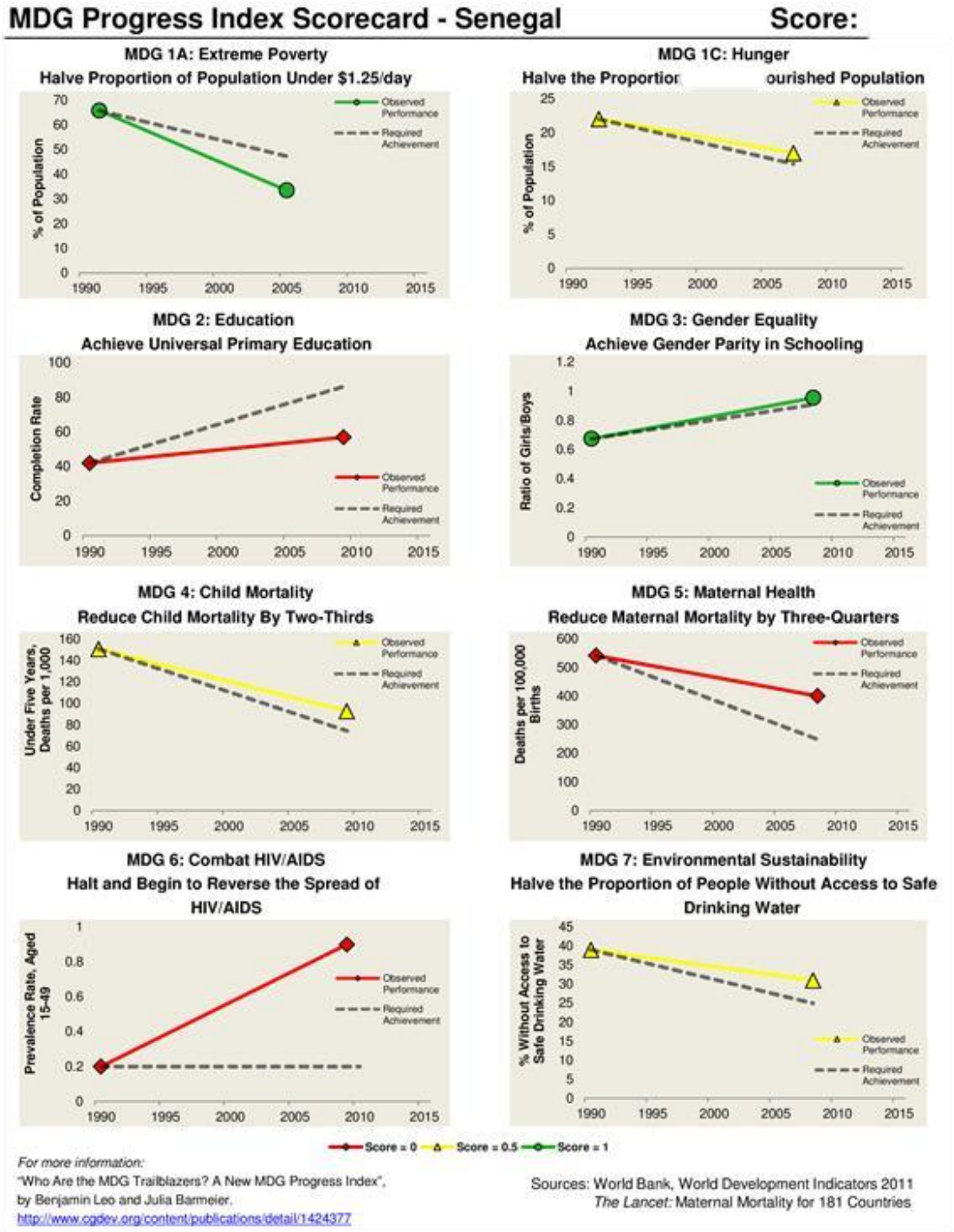
Water, Sanitation and Hygiene

The last objective this section will address is WASH, or Water and Sanitation, Hygiene. The project plan goal is that community members will adopt water and sanitation hygiene practices and behaviors resulting in improved health. This directly aligns with MDG Goal 7: To ensure environmental stability. Specifically, MDG Goal 7 aims to halve, by 2015 the proportion of the population without access to safe drinking water and basic sanitation.

Between 1990 and 2008, 3.4 million people gained access to improved sanitation facilities in Senegal. The number of people using improved drinking water sources increased by 3.8 million. Senegal is NOT on track to reach the MDG target for sanitation. With the current trend, the target will not be achieved before 2033.

The MDG Progress Index Scorecard for Senegal shows information gathered in 2011. Overall you can see that Senegal is doing moderately well. The country is on target for a couple of goals. For several other goals Senegal is just below the target or significantly behind.

A review of the evolution of child mortality over the past 15 years shows that regardless of the type of mortality, the level fell significantly in the past five years. The infant mortality rate decreased to 43% in the past five years, compared to 64% in the 10-14 years prior, an overall decrease of 33%. However, this decline is not uniform throughout the period: it has decreased nearly twice as much between 2008 and 2013 (23%) than between 2004 and 2008 (13%). The decline in child mortality also continues, the rate increased from 62 ‰ to 23 ‰, a drop of 63 %. However, unlike infant mortality, the decline appears to be weaker in the last period than the previous period (23% between 2008 and 2013 compared to 52 % between 2004 and 2008).



The above graphs illustrate the Senegal's current state of progress in regards to each MDG. The color lines—green, yellow, or red—track Senegal's progress from 1990 to current status. The color also reflects whether not Senegal is on track to achieve the MDG: green represents a MDG that is on schedule to be achieved, yellow represents delayed and lagging progress, and red is used for the MDGs that Senegal is not on track to achieve. The dotted lines portray the ideal trajectory of progress toward the required achievement.

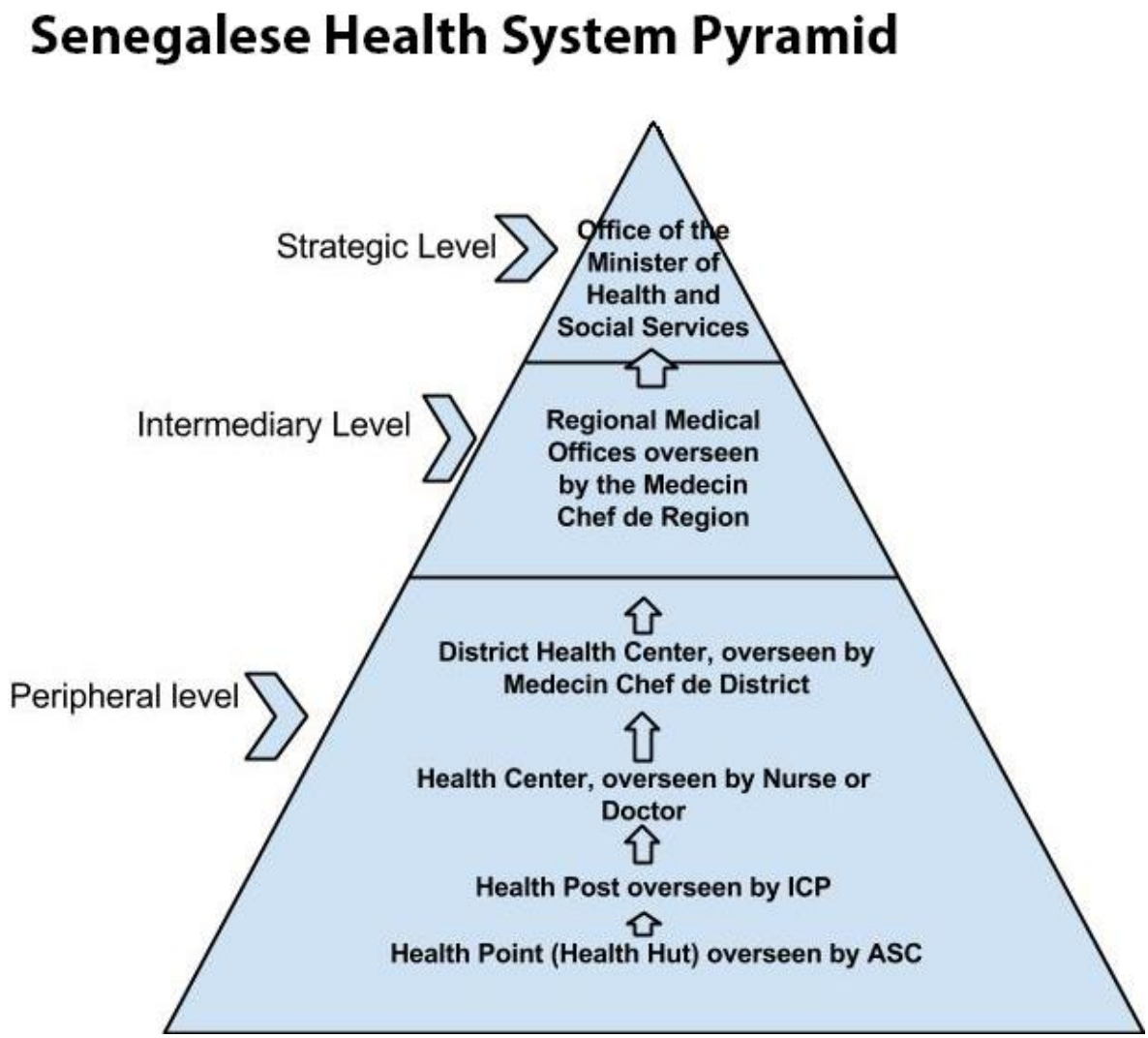
The Senegalese Health System

The health system in Senegal differs distinctly from the health system in the United States. This section will help volunteers understand (a) the basic structure, vocabulary, and professional positions within the Senegalese Health System and (b) how our roles, responsibilities, and partnerships fit into this system.

The Senegalese health system is managed by the Ministry of Health and Medical Prevention and Social Welfare a department in the Senegalese government. The system of personnel corresponds with the distribution and hierarchy of health structures. The health system levels are as follows (from the base of the pyramid and working up.)

The Peripheral *(Niveau Périépherique)*

This level corresponds to the medical district. The medical district is an operational zone comprised of a health center and a network of health posts. It covers a geographic zone that could be a whole department or just a piece of a ***département***.[2]



[2] ***Départements*** are the 45 administrative subdivisions of the 14 regions of Senegal.

Most Health PCVs in Senegal serve at the most basic part of this system in rural areas. The peripheral health care system has three levels of care that report up to the district medical office. Most health volunteers in Senegal are assigned to a rural community with a **health point**, also known as a **health hut**, in French ***case de santé***. The health points are connected to the health system via the health post responsible for their zone. The health points are staffed by volunteer health agents led by an ASC, health points are also staffed by a traditional birth attendant or midwife.

These health huts report up to a managing **Health Posts** or ***Postes de Santé***, which have about 4 or 5 health workers and are managed by an ***Infirmier/ère Chef de Poste*** **(ICP)**. This ICP oversees the health hut operations in its designated zone; it may have several health huts that refer to it. The highest level structure in the peripheral health system is the **Health Center** or ***Centre de Santé*** which is staffed by medical doctors and trained health staff which can include a dentist and midwives. In rural areas, these Health Centers and the Health Posts they oversee are assigned based on the ***communauté rurale.***[3] The number of health posts per health center depends on the size of the district and its population density.

Senegal has 76 health districts with 88 heath centers and 1248 health posts. As shown in the Senegalese Health System Pyramid diagram, the health points report and refer to the health posts, who then report and refer to the health centers, which report and refer to The Regional Medical Office. This chain of communication and command is also the structure of the medical supply system.

It is crucial to understand how the pyramid relates to your specific community and to whom and where health structures in your area report and refer. Often volunteers are asked to attend meetings or trainings at the district level as representatives from their communities. Ask your fellow volunteers and your counterparts to help you understand the hierarchy of health professionals in your area at the strategic level.

Health PCVs in Senegal are not assigned to private health structures, however it is important to note that the private sector plays an important role at the peripheral level of the health care delivery system in Senegal. There are 4 private hospitals in Senegal as well as 24 private clinics, 414 private medical offices and 20 private medical service enterprises, 700 private pharmacies, and about 20 private medical analysis laboratories.

The entire strategic level is overseen by the next tier in the health care pyramid: the intermediary level.

Intermediary Level

This level corresponds to the fourteen medical regions (***Régions médicales)***. This level in the system coordinates the regional medical administration. Each medical region is led by a ***Médecin Chef de Région*** **(MCR)** who has specialized in public health.

Every region has a designated hospital or public health establishment which hosts the regional administrator. The Minister of Health holds these regional administrators responsible via performance contacts which are linked to indicators related to HIV/AIDS, malaria, and tuberculosis.

[3] ***Communautés Rurales*** are the local collectives in Senegal. These collectives are not administrative circumscriptions. They group villages in a close geographic area; the villages hold elections to staff the leadership of the collective.

Strategic Level
This level is comprised of the office of the Minister of Health and Social Action, two directors, and seven national hospitals/public health establishments. The Minister of Health reports directly to the Prime Minister. Branches of related services for health include the health inspection branch (the Ministry of Health and Medical Prevention and Social Welfare), and the Directorate of Studies that is responsible for managing the informational support of the program and medical teaching tools.

Strategic Level Health Policy
Senegal's government enshrined the state's duty to the health of the populous in the original constitution, "The State and public authorities have the social duty to ensure the physical, mental and moral health for each family." The Senegalese State has reaffirmed its commitment to this ethos by signing and ratifying international agreements such as the Universal Declaration of Human Rights, the OAU Charter, and the Convention for the Rights of Children.

New directions in health policy and social support are derived from the Declaration of Health Policy and Social Action in June 1989, based on the program approach outlined in the National Plan for Health Development (NHDP) 1998-2007. It is the culmination of a long process of ideas and events beginning in 1995 between the Ministry of Health and its partners that have brought about a number of new reforms in health policy. Programs at both legislative and institutional levels have been introduced primarily affecting hospitals, doctors, and pharmacies. New initiative in health information systems, the health financing, and the reorganization of the Ministry of Health have, and will, continue to improve.

The Integrated Development Program of Health (PDIS), which covers a period of five years (2009-2014), is the concrete priorities of health defined in the ten year National Health Development Plan (PNDS) drafted in 2009 and valid until 2018. The objectives are:

- Reducing Maternal Mortality
- Reduction of infant and child mortality
- Control of fertility
-

These objectives are being met through the mobilization and streamlining of financial resources to rehabilitate existing health facilities and programs as well as creating new initiatives thereby improving accessibility of health and social services.

The program emphasizes the role of epidemiological surveillance, reproductive health, and the control of endemic diseases (mainly malaria, schistosomiasis, onchocerciasis and tuberculosis). The PDIS is run annually through the operational plans (Ops) produced by workers at all levels in health development. The overall control of PDIS is provided by the Support Unit and Monitoring of the PNDS (CAS/PNDS). Information management is controlled by the Directorate of Studies, Research and Training (DERF) which is responsible for the monitoring and evaluation program at the department.

Health System Staff and the Level of Education Required for Each Position
The need for increased healthcare personnel has been the subject of several studies to maximize the health budget. The distribution of healthcare providers is essential to improving service quality. In response, the Ministry of Health (MOH) has developed a national training plan that incorporates the need of initial and continuing training. Moreover, despite budgetary constraints, the MOH has a specific quota for the annual recruitment of health personnel. However, despite the aforementioned efforts, the situation is far from satisfactory with regards to WHO standards.

Positions at the Hospital, Health Center, and Health Post Level

- ***Médecins, docteurs, officiers médicaux*** **(Doctors) -** In order to become a doctor, students must successfully pass the Scientific **BAC**[4]. After high school they will need to complete at least 8 years of university/medical school and a few years of interning/residency. Specialists must then complete additional training according to their specialty. Doctors, depending on their qualifications, can be assigned to the District or Regional level as *Médecin Chefs.* The responsibilities of a *Médecin Chef* include consultation, administration, and supervision of all health structures and interventions in their geographic area. For any major project it is important for you and your counterparts to inform the *Médeicin Chef de District.*
- ***Infirmiers, professionel infirmiers, personnel infirmier*** **or** ***Infirmiers Diplomés d'État*** **(Nurses) –** Students who want to be State accredited nurses must have attained a BAC. They then proceed to at least three years of specialized school for nurses. After completing their training they are assigned to health centers, hospitals, or health posts. Their responsibilities include administration and supervision of local health workers and medical stocks. They also perform consultations and deliver babies at the health post level.
- ***Assistants Infirmièrs*** **(Assistant Nurses) –** They are also called nurses. Their training lasts about two years after which they receive a diploma accredited by the State of Senegal. In order to do the training they need to have at least attained their BFEM. After completing their two year specialized training, they are able to work in health posts, health centers, and hospitals. Their responsibilities at their assigned health structure include curative and preventive consultations.
- ***Sage-femmes diplômées, sage-femmes d'État*** **(Midwives) –** To become an accredited midwife in Senegal, one must have attained a BAC. Their first year of training is the same as the Nurses. After successfully completing three years they are assigned to health posts, health centers and hospitals. Their responsibilities include consultations, vaccination programs (both at the health post and in the field), pre and post natal consultations, and family planning delivery and supervision.
- ***Pharmacien(ne)*** **(Head of Pharmacy) –** In order to be qualified to run an official public pharmacy, the candidate must have completed six years of specialized training after receiving their scientific BAC, they must continue with six years of specialized training.
- ***Préparateur en pharmacie*** **(Pharmacy Assistants) –** After attaining their BFEM, pharmacy assistants must complete a two year training before being assigned to a pharmacy position. This level of training is only required when seeking employment at a private pharmacy.
- ***Techniciens de Laboratoire*** **(Pharmacy Tecnician) –** *After attaining a BFEM*[5]*,* pharmacy technicians must complete two to three years at a technical school. This level of training is only required when seeking employment at a private pharmacy.

Positions at the Village Level:

- ***Agent de Santé Communautaire (ASC) a.k.a. Prestataire de Santé –*** An ASC is charged with the management of a health point in a village. They should be literate; however some volunteers have reported that their ASC cannot fully read and write. Many ASCs have at least

[4] **'BAC' – The BAC is an abbreviation and colloquial term for the *baccalauréat* degree. It is an academic qualification that is awarded after an exhaustive exam. This allows students in Senegal to obtain a standardized qualification at the end of their high school (*lycée)* studies. There are three different types of general BAC: S – Science, ES – economics and social sciences, and L – literature. The *baccalauréat* system allows students to choose a specialized course of study in *lycée* before sitting for the terminal exam.**

[5] **The BFEM is an exam students are eligible for at the end of collège (middle school). If they successfully pass the exam they are eligible for studies at the high school (lycée) level.**

reached the *collège* level of training. They are technically unpaid volunteers, although they might charge a nominal price for certain services and products that would allow them a small stipend (often referred to in French as a *motivation*). In order to be an official ASC, the community member must have attended an intensive training. These trainings are part of the state system but are often facilitated by an NGO belonging to the USAID community health consortium. The training provides them with basic community health education as well as technical training on reproductive health, the prevention and treatment of common disease, and basic first aid. The ASCs are also trained extensively in how and when to refer a patient to the health post level. This is particularly important because in many communities the ASCs are the first point of contact with the health system for any ailing person; the ASC must therefore be able to indentify danger signs and facilitate a patient referral. The patients in the ASC's community will always be referred to the health post in their zone. If a patient is referred to a health post that is not in charge of their health point's zone, they may be denied or charged for certain products and services that are free to members of communities within the health post's zone. The ASCs are often in charge of the stock of products available at the health point. With the help of a health point committee, the ASCs should be taking stock of products, managing the budget and money earned from product sales, as well as making sure that the necessary products are requested from the appropriate Health Post.

- ***Matrone*** **(Traditional Birth Attendant) –** These women work at the village level and may work within or in conjunction with the health hut if possible. Senegal does not have an official state accredited program for all of the traditional birth attendants; however some NGOs host trainings for village-based birth attendants. In the past Peace Corps volunteers have written grants to fund trainings for *matrones* in their communities. The USAID community health consortium is piloting an education program for illiterate matrons, which uses a series of picture-based manuals for training. For more information contact the consortium representatives assigned to your area. *Matrones* can also be the heads of health points. If this is the case then they may receive the ASC training (which includes reproductive health/basic natal training) along with a more specialized obstetric training. The roles and responsibilities of matrons include baby deliveries, identification of high risk pregnancies, and referral of high risk pregnancies or complications to the health post or hospital, and vaccinations
- ***Relais*** **(Community Health Worker) –** Relais at the village level are health volunteers who aide with health promotion activities, especially Information, Education, and Communication (IEC) projects. Many relais have been included in various NGO trainings on specific subjects such as nutrition. These people can be excellent resources when planning causeries and other health outreach programming.
- ***DSDOM*** **(Disease Specific Trained Communty Health Worker) –** DSDOMs are part of a specific program designed by the National Malaria Program. These health volunteers can simultaneously be ASCs or other health relais from a community. Their responsibilities are specifically centered on malaria prevention, testing and treatment. Their responsibilities and methods have been expanded in the PECADOM-PLUS model. For more information see the Malaria section of the manual.
- ***Marabout*** **(Religious Leader) –** Community members will often refer to religious leaders, such as the village *marabout*, for medical consultation and treatment. Traditional medicine still has a strong presence in the rural and urban areas of Senegal. Many community members will often refer to the traditional healer or religious leader before they consult the health structure. Volunteers and their village counterparts should help encourage community members to seek care at the health structure as soon as possible.

USAID Projet de Santé Communautaire Phase II Consortium

This section will provide you with a brief overview of the USAID PSSC Phase II Consortium. This Consortium is particularly important for Health PCVs in Senegal because the consortium interventions are largely centered on strengthening the health point system. The major implementing partners of this consortium have been assigned to the various regions of Senegal and are in charge of executing the structural and programmatic developments at the health point/village level.

What does this mean for you at site? This means that if you are assigned to a health point, your community will also have a Community Health Agent from the implementing partner in your region that is charged with reaching out to the ASC, matrone and relais in your village. The NGO in charge of coordinating all the implementing partners is ChildFund International. The leadership from ChildFund in Dakar met with the Peace Corps Health Program leadership and USAID in 2013. The leaders from all three of these organizations agreed that there should be a greater effort to work together because all of our indicators, objectives, and goals align in the same geographic areas. In many regions, Health PCVS (and in some cases Ag and CED PCVs) have met with the regional staff of their implementing partner to discuss program frameworks and action plans. The first part of this section will briefly outline the history of the consortium. The second part will describe how this partnership is taking shape in Senegal and how you should expect to contribute to this growing synergy at your permanent site.

History of the USAID PSSC Program

The goal of the Community Health Program (CHP) has been to ensure widespread access to a basic package of primary health care services in rural communities, largely through revitalizing and staffing the existing but greatly underutilized network of health points or health huts. Although lacking its own resources to support these facilities, the Senegalese Ministry of Health considers them the essential base of the country's "health care pyramid". Through strategic aid to this base of the pyramid, this initiative will bring dependable **primary care** closer to rural populations, whose access to such services in government Health Posts and Health Centers has always been limited by distance and cost. This is a large and ambitious program, originally funded at about $13 million, but now, after expansion of its coverage from five to thirteen regions, valued at $26 million, with further expansion to a $40 million program to expand the coverage to a national level over five years.[6]

With the 2011-2016 USAID grant amounts to 40 million dollars. This large grant will allow the consortium partners to establish 2,151 health huts and 1,717 outreach sites nationwide, not only in rural areas but also in underserved urban areas. The project will also add a focus on neglected tropical diseases and education communities about the health dangers inherent in the cultural practice of female genital cutting and expanding interventions concerning family planning. The community-level health huts will continue to be linked to the national health system by way of the health posts district and regional medical teams; consortium partners are trying to strengthen these relationships as ownership and independence of the health huts continues to develop.

During the first five years of the program, consortium members trained volunteer community health workers, traditional birth attendants and outreach workers in basic health care and

[6] ChildFund International site, report from the first phase of the consortium: https://www.google.sn/search?q=map+of+USAID+PSSC+senegal+implementing+partners&rlz=1C1CHRG_enSE464SE464&oq=map+of+USAID+PSSC+senegal+implementing+partners&aqs=chrome..69i57.8356j0j7&sourceid=chrome&espv=210&es_sm=93&ie=UTF-8#q=map+of+USAID+PSSC+senegal+implementing+partners&start=10 (17 February 2014)

healthy practices. They also set up a standardized menu of products and services that a health hut should make available to the community. These menu items include basic services for preventive and curative maternal and neonatal child health, care for diarrhea and respiratory infections, malaria prevention and treatment, HIV/AIDS prevention and more.

The goal is that the communities that host these health points will eventually take full ownership of the structure's management and financing. The goal is that in another five years the Community Health Program will have transferred the facilities to community management. Villagers will pay nominal fees for care, and those fees will be used to keep the health huts running.

Consortium Partners

In addition to ChildFund, the partners in the 2006-2011 projects initially included Africare, Plan International and World Vision, joined in 2008 by Catholic Relief Services and Counterpart International. In the second phase, the consortium partners no longer include Counterpart International but the rest of the NGO partners remain. The second phase of the consortium incorporated NGO Enda Santé as an implementing partner. The consortium also liaises with the United Nations Entity for Gender Equality and the Empowerment of Women (UN Women) in order to broaden and harmonize the distribution of family planning and the training of traditional birth attendants.

Health Point/Health Hut Reinforcement

The first and most important responsibility and preoccupation of the consortium is to help encourage, reinforce, and systematize the services and products available to communities with health huts. Please see Appendix B for the list of services and products that the consortium partners would ideally like to see available at every health hut. This list of product and services can be used by you and your counterpart to self-evaluate the services and products currently available. If you see that your health hut is considerably under stocked or underserviced, reach out to your community health agent for help. Each of the implementing partners assigns an ASC who is charged with overseeing a number of health points in a certain zone and helping them expand and reinforce their services and products available. Consortium partners also frequently host various trainings or meetings related to basic primary care at the community health level. As per the memorandum of understanding between Peace Corps and the Consortium, any and all of these trainings and meetings should be open to any interested volunteers. If you are interested in a closer collaboration with the consortium agents in your area, reference the work zone documents and ask the work zone coordinators for an update on the current status of collaboration between the consortium's implementing partners in your area.

Personnel Reference Chart

French	English	Where	Main Functions	Training/ Education
Médecin-Chef	Head Doctor	National/Regional/Departmental hospitals, clinics, health district	Head doctor, Consultation, administration, supervision, specialization	8 years post lyceé, with medical degree
Sage Femme	Midwife	National/Regional/Departmental hospitals, clinics, district and post levels	Consultations, Vacc. Programs, Pre and Post natal, Family Planning, Delivery Supervision	3 years nursing, 1 year maternal and child health (MCH)
Infirmier Chef de Poste (ICP)	Health post manager or State Nurse	Poste de santé level dispensary, village level	Curative and preventative health, supervision of local health workers and medical stocks	If nurse 3 years, if auxiliary 1 year
Matrone	Traditional Birth Attendant (TBA)	Departmental, village, Post de Santé, Rural maternity(case de santé)	Baby deliveries, IDs high-risk for referral, assists in vaccinations	Non-formal apprenticeship, 3-6 month on the job training
Agent de santé communautaire (ASC)	Community Health agent	Case de santé, Poste de Santé	First aid, health education, malaria programs	3 months at a Poste de Santé
Agent Sanitaire	Auxiliary Health Worker	National/Regional/Department hospitals, villages	Same as Chef de Poste	1 year of Technical Training
Agent d' Hygiene	Military Hygiene worker	National/Regional/Departmental hospitals	Vaccine mobile teams, latrine building, clean-up campaigns	1 to 2 years
Relais	Community health workers	village level	Assist in community sensibilisation and government health initiatives	On the job training-length dependent on tasks

2 Behavior Change Theory

As the processes of biology, psychology, and general science tend to change throughout the years, a single definition of a specific ethological movement in a species may be difficult to classify in a small chapter of a training manual not intended to seek answers rather than demonstrate techniques in the field of development work and research. Though, in the past several years three Biologists at Cornell University, Daniel Levitis, William Lidicker, and Glenn Freund wrote a proficient article in regards to behavior–of course with the lens of biology attached. In the essay "Animal Behaviour" the men suggest that behavior "is the internally coordinated responses (actions or inactions) of whole living organisms (individuals or groups) to internal and/or external stimuli."

What we as Peace Corps Volunteers may ultimately take from this definition is that general responses to specific encounters a human may demonstrate do not necessarily derive from conscious choice and rather somewhere else more ingrained in the complexities of the human nervous system. In layman's terms: we must continue to think of the reasons behind some of the most complex behaviors we may find in the field during our service.

Considering the field that Peace Corps Volunteers work in is deeply respected by the community, criticizing the plausible reasoning of a behavior, or those behaviors that are culturally embedded may be counterproductive to seeking them to change. This could cause offense and limit your ability to work in the community.

When criticizing reasons for perceived negative behavior, one may be fair-minded yet still find fault with feeding a four month old child with a bottle of instant milk rather than mother's breast milk. At the same time, some health related behaviors should be promoted in all Senegalese communities: exclusive breastfeeding, condom use, and ensuring children with malaria symptoms receive accurate diagnosis and, if positive, appropriate treatment with ACTs—the list goes on but the point is that we should make careful decisions, weighing cultural context, when telling others that a local behavior should change.

Behavior change is not a new concept. People have been changing their behavior, successfully and unsuccessfully for thousands of years. It is why we are here today. If people never changed their behavior, nobody would ever have evolved. Years of sociological research has allowed for humans to develop new theories based on behavior change, making change easier and simpler to accomplish if desired. In part, that is what this chapter sets out to accomplish. By incorporating popular basic change theories into the training program, Peace Corps Senegal can trains volunteers how to use specific Behavior Change perspectival tools in their work so as to, improve the lives of their community members as well as their own.

Behavior

In community development terms, behavior is:

- An action
- Observable
- Specific (time, place, quantity, duration, frequency)
- Measurable
- Feasible
- Directly linked to an improved outcome

Change

- In community development terms, change is:
- An action
- An alteration (to what some may classify as routine)
- A measurable difference
- Feasible (with appropriate tools/personnel/etc.)
- A recordable outcome
- Difficult to accomplish

Thinking about Behavior Change in the Field

The Four Decisions

Prior to starting a project, a community development agent must identify and describe the change that he or she hopes to achieve. The agent will do this by focusing on a behavior, a priority group, the determinants and actions.

Behavior — An action that the priority group members carry out to address a problem they face. Often referred to as *practices,* when done enough they become *habits.*

Priority Group — The group among whom you hope to see the behavior change.

Determinants and key factors: Reasons why the priority group may or may not practice a given behavior. Formative research, such as a Doer/Non-doer study or Barrier Analysis, should be conducted among the priority group to find the most influential determinants. These determinants are categorized as follows?

- **Perceived Self-Efficacy/Skills —** An individual's belief that they can do an action given their current knowledge and skills
  - Ex. A woman who may know that everyone needs to drink water to stay alive, even her three month old child.
- **Perceived Social Norms —** The perception that people important to an individual think that s/he should do the behavior
  - Ex. My father doesn't wash his hands with soap, so why should I?
- **Perceived Positive Consequences —** What positive things a person thinks will happen as a result of performing a behavior
  - Ex. If I sleep under an insecticide treated net my little sister won't catch malaria.
- **Perceived Negative Consequences —** The negative things a person think will happen as a result of performing a behavior
  - Ex. If I use an IUD for birth control, my body will become poisoned.
- **Other Less Common Determinants of Behavior —** Access, cues for action, perceived risk, perceived severity, perceived action efficacy, perceived divine will, policy, culture, universal motivators

Activities

Activities are a series of tasks that program implementers plan, organize and conduct with the priority group.

Barrier Analysis

Barrier Analysis is a survey that focuses on identifying the reasons which are preventing the priority group from adopting the behavior, as well as enablers of the behavior. Too often, program planners focus on increasing knowledge about benefits, but lack of knowledge is not

usually the biggest barrier. To identify the key barriers/motivators, the priority group is asked a series of questions to identify up to 12 potential determinants that can block people from taking action. These 12 potential determinants are as follows:

- **Perceived Self-Efficacy/Skills**
  - An individual's belief that he/she can do a particular behavior given his/her current knowledge and skills (e.g. my nervous system is strong, it can fight off the effects of malaria)
  - The set of knowledge, skills, or abilities necessary to perform a particular behavior
- **Perceived Social Norms**
  - The perception that people important to an individual think that he/she should do the behavior (e.g. my mother never reminds me about pre-natal checkups, why should I go?)
  - Norms have two parts: who matters most to the person on a particular issue and what the person perceives those people think he/she should do
- **Perceived Positive Consequences**
  - What positive things a person thinks will happen as a result of performing a behavior
  - Responses to questions related to positive consequences may reveal advantages (benefits) of the behavior, attitudes about the behavior, and perceived positive attributes of the action
- **Perceived Negative Consequences**
  - The negative things a person thinks will happen as a result of performing a behavior
  - Responses to questions related to negative consequences may reveal disadvantages of the behavior, attitudes about the behavior, and perceived negative attributes of the action (e.g. you don't use pit latrines? Who are you?!)
- **Access**
  - Includes the degree of availability (to a particular audience) of the needed products (e.g., fertilizer, soap, condoms) or services (e.g., veterinary services, immunizations) required to adopt a given behavior
  - Includes barriers related to cost, geography, distance, linguistics, cultural issues, and gender
- **Cues for Action/Reminders**
  - The presences of reminders that help a person remember to do a particular behavior.
  - The presence of reminders that help a person remember the steps involved in doing the behavior (such as memory aids)
  - Key powerful events that triggered a behavior change in a person (e.g., "my brother-in-law died of cholera" so I decided to wash my hands regularly)
- **Perceived Susceptibility/Risk**
  - A person's perception of how vulnerable or at risk he/she feels to the problem (e.g., is it possible that his/her crops could have cassava wilt? is it possible for him/her to get HIV?)
- **Perceived Severity**
  - Belief that the problem (which the behavior can prevent) is serious (e.g., a farmer may be more likely to take steps to plant trees if he thinks soil erosion is a serious problem, a mother may be more likely to take her child for immunizations if she believes that measles is a serious disease
- **Perceived Action Efficacy**
  - The belief that by practicing the behavior one will avoid the problem, that the behavior is effective in avoiding the problem (e.g., if I sleep under a mosquito net, I won't get malaria)
  - Sometimes talked about as part of perceived positive consequences

- **Perceived Divine Will**
  - A person's belief that it is God's will (or the gods' wills) for him/her to have the problem and/or to overcome it
  - Includes the priority group's perception of what their religion accepts or rejects and perceptions about the spirit world or magic (e.g., spells, curses)
  - Numerous unpublished Barrier Analysis studies have found this determinant to be important for many behaviors (particularly for health and nutrition behaviors)
- **Culture**
  - The set of perceived social norms including, but not limited to: history, customs, lifestyles, values, and practices within a self-defined group (e.g. early marriage is a cultural practice, not biological)
  - May be associated with ethnicity or lifestyle, such as gay or youth culture

In any case, always start by exploring the 4 most common determinants discussed above.

Doer/Non-Doer Analysis

This survey only studies the four most common determinants of behavior. The results of the questions are compared among groups of people who already have adopted a new behavior, known as "Doers", and people who haven't yet adopted a new behavior, called "Non-Doers". By comparing the percentage of people who responded with one answer with the percentage of people who responded in the same way, we can see which behavioral determinants seem to be the most important. This is called the Doer/Non-Doer methodology.

Psychology of Behavior Change

The book *Changing for Good,* by James Prochaska, John Norcross and Carlo Diclemente, explains the psychology of behavior change. The following description of stages of change is paraphrased from that book. The process includes the following stages:

- **Precontemplation —** Characterized by denial and rationalization. The subject ignores or is not even aware that the issue or their behavior warrants change. In the eyes of the subject, discussion of the problem behavior is seen as nagging.
- **Contemplation —** Obviously follows pre-contemplation, but represents recognition of the change-issue, substituting thinking for action. In this stage, the subject is willing to discuss the problem and will consider ways to change the behavior but feels unable to act. Commitment to enact change is lacking.
- **Preparation —** Subject evaluates the problem while envisioning how life will be different after behavior is changed. They announce intent to change and describe the concrete steps that will is called for. These small, preparatory steps are the edge of action
- **Action —** Behavior and environment are actively modified. This requires the greatest commitment of time and energy. Changes made during Action stage are overt and visible to others. Therefore, supporters may conclude that hoped for change has taken place when in actuality it is only just beginning. Thus, community support for change tends to diminish during stages when subject most need support: Precontemplation, Contemplation, Maintenance and Termination.
- **Maintenance —** Gains made during Action stage are consolidated and become entrenched. This is when subject tries to prevent and/or deal with lapse and relapse to previous behavior. A long, ongoing process that some say is never-ending.
- **Termination:** The ultimate goal, when former problem no longer presents temptation. The achievement of change, with a low likelihood of relapse.

The Switch Framework

The book *Switch,* by Chip and Dan Heath, vividly illustrates the determinants of human behavior using three characters: The Rider, The Elephant and The Path. The Switch framework is paraphrased below:

- **The Rider** is a thinker and a planner and can plot a course for a better future. The Rider's weakness contemplating and directing analysis at problems rather than what may be working and why it's working.
- **The Elephant** reacts to feelings. It is generally reluctant to move due to the uncertainty that change brings. Analytical arguments will not overcome the elephant's reluctance. The sequence of change that motivates the elephant is SEE-FEEL-CHANGE. Therefore a successful effort should present evidence that makes the elephant feel emotion.
- **The Path** is the outside stimuli that compels our choices—everything from income level, friend groups, and upbringing to our town layout, government system and exposure to marketing. Shaping the Path ignores an individual's character and instead focuses only on their environment. One of the subtle ways our environment acts on us is by reinforcing (or deterring) our habits. To change a behavior, you have to change the environment—our habits are stitched into the environment. Therefore, we often attribute people's behavior to "the way they are" rather than to the "situation they are in."

    - **Direct the Rider —** in order to give the Rider proper direction we must take a few actions: Locate the Bright spots, "Script the Critical Moves", and Send a Destination Postcard.
        - **Locate the Bright Spots —** To "Locate Bright Spots" is to ask the question, "What's working, who is doing it and how can we get more of it done?" Too often, the question we actually ask is more problem focused: "What's broken, and how do we fix it?" This is called *archaeological problem solving.* The mindset that is promoted instead is bright-spot evangelizing. That is to say, don't obsess about failures. Instead, investigate and clone successes. Newton's Laws of Motion don't apply to behavior change; a large, weighty problem is rarely solved with a solution of equal or greater size and weight. Instead, they are most often solved by a sequence of small solutions, sometimes over weeks, sometimes over decades. This is where *Doer/Non-Doer Analysis* comes into play.
        - **Script the Critical Moves —** After "Locating the Bright Spots," the next step is to Direct the Rider by Scripting the Critical Moves for change. That is, limit the number of options available to the subject of the change effort. When overwhelmed by options, we find it difficult to make a choice: more options create difficulty in choosing a single one. Limiting these options also helps prevent decision paralysis, deterring people from making progress on their change goal.
        - **Send a Destination Postcard —** Now that a plan is in place with the Critical Moves Scripted, Send a Destination Postcard. A Destination Postcard is the author's lingo for conveying a vivid, compelling description of the near-term future that shows what could be possible in the community or someone's life if the change effort were to succeed. This postcard gives an audience a tangible goal, and answers the questions, "where are we headed with this project? What's the point where we can say we are done and can call this project a success?"

    - **Motivate the Elephant:** with that said, the central challenge of change is keeping the Elephant moving forward. The Elephant requires motivation, and motivation is driven by emotions and confidence—knowledge isn't enough to motivate change. The Elephant has to believe it is capable of conquering the change, and this belief comes from an

Elephant feeling "big" relative to the challenge—thus you can "Shrink the Change" or "Grow Your People."

- **Find the Feeling —** Fueled by emotion, The Elephant has to Find the Feeling before it takes a stand on an issue. Because The Rider, The Elephant and The Path are just figurative language representing your target population, Finding the Feeling is the same as saying, "influence the emotions of community members." There is compelling evidence that change efforts driven by facts and analytical arguments are more likely to fail than efforts which are driven by real stories and situations about characters with which the community can sympathize.
- **Shrink the Change —** The Elephant inside of us is easily demoralized by large change efforts. Engineer small-scale successes early on to reassure the easily demoralized elephant by Shrinking the Change, showing them the tangible progress they have made toward their goal.
- **Grow Your People —**Ask yourself, how can we make the change a matter of identity rather than a matter of knowledge? When we make decisions based on our identities, we exclude any calculation of costs and benefits. Instead, we ask ourselves three questions: *Who am I? What kind of situation is this? What would someone like me do in this situation?* A Democrat or Republican will vote with their party even when their party supports policies that harm their interests. Think of a Democratic Silicon Valley millionaire who votes for a candidate who will raise their taxes. Keep in mind that just as identities are central to the way people make decisions, any change effort that violates someone's identity is likely doomed to failure. Failure is a necessary investment and will go a long way towards changing behavior. Remember that failure is a part of the change process; use it as a motivating factor or growing experience. Real change, the kind that sticks, is often three steps forward and two steps back. All change efforts can look like a failure in the middle. The large design company, *Idea,* trains employees to visualize a project as a line-graph with a peak at the start-of-project point, a mid-project valley, and an end-of-project peak again. They call the valley "insight," it is characterized by hardship, toil, frustration and elements of failure. Recognition of the "valley of insight" is described as an essential buffer against defeatism—knowing that falling down is learning (not failing) builds perseverance in a change effort.

- **The Path**
  - **The Fundamental Attribution Error (FAE) —** This error describes the tendency to chalk up other people's behavior to the "way they are" rather than to the "situation they are in." In others, we tend to attribute negative qualities to a person's character rather than their environment. For example, a person is always a rude driver vs. in a hurry the one time you meet them on the road. This realization is foundational to the Peace Corps approach to development. Actively examining your assumptions about the population to pre-empt the FAE. should be the starting point of any Peace Corps project.
  - **Tweak the Environment —** Remove obstacles to the sought behavior and create obstacles for the unwanted behavior.
  - **Building Habits —** Think of habits as behavioral autopilot—repetition will allow them to become second nature. We can encourage the building of new habits by using Action Triggers which tie a specific action to a specific situation. They are specific enough and visible enough to interrupt a person's normal stream of consciousness. For instance, drop an Aqua Tab into every pot/bucket of water that enters the compound, no matter what the water is for. Action Triggers preclude conscious deliberation. They represent pre-decision, protecting goals from

distraction, bad habits, and competing goals. Checklists are also useful building habits and are insurance against overconfidence. Checklists script the change effort creating concrete steps toward a goal destination. Checklists can even be comprised of images to make them more approachable for some populations. Planning checklists spark new thinking and remind planners about key areas of consideration—avoiding blind spots in a complex environment. And action checklists standardize mission-critical steps in any routine procedure.

Coda—Four Principles of Behavior Change Work

- Action is what counts (not beliefs or knowledge).
- Know exactly who your priority group is, and look at everything from its point of view (People take action when it benefits them; barriers keep people from acting).
- All your activities should maximize the most important benefits and minimize the most significant barriers.
- Base decisions on evidence, don't guess, and keep checking.

The content included in the Behavior Change manual section is meant to encourage conscientious work by Peace Corps volunteers, especially when that work recommends lifestyle changes and therefore implicitly judges existing community lifestyles. If the ideas and tools mentioned in this section interest you, please read further on the topics of development and behavior change. Excellent books on these subjects include *Switch* (Chip and Dan Heath), *The White Man's Burden* (William Easterly), *Thinking Fast and Slow* (Daniel Kahneman), *Poor Economics* (Abhijit Banerjee and Esther Duflo), *The Art of Innovation* (Tom Kelley, brother of IDEO founder), and *Change By Design* (Tim Brown, CEO IDEO). Controlled-studies on aid interventions, behavioral economics, and human-centered design processes have contributed new perspectives to the development field and at their best these perspectives will help development practitioners to focus their locally-specific initiatives on high priority communities while measuring the impact of the work, eliminating ineffective initiatives and facilitating priority groups to identify needed changes and address changes themselves. The ball is in your court. Good luck and have a great Peace Corps service!

3 Malaria

Science of Malaria

Malaria is an infectious disease carried by the Anopheles mosquito and caused by a protozoan parasite of the genus Plasmodium. It is currently transmitted in 108 countries where about 3 million people live, including parts of the Americas, Asia, and Africa. Each year, there are approximately 216 million cases of malaria, killing an estimated 655,000 people, mainly young children in Sub-Saharan Africa, where 90% of cases occur[7]. Malaria is commonly associated with poverty, but is also a cause of poverty and a major hindrance to economic development.

Malaria Lifecycle in The Mosquito

Of the 430 species of Anopheles mosquitoes, five transmit malaria to humans. Anopheles serve as the vector, and humans the host to the plasmodium parasite; both are required for its complete lifecycle. Most cases of malaria are caused by *Plasmodium falciparum*, which is the primary cause of malaria deaths. *Plasmodium vivax* is also common, but infections caused by *P. ovale*, *P. malariae*, or *P. knowlesi* also exist[8]. When the parasite vector, a female Anopheles mosquito bites a person infected with malaria (the primary host), a small amount of blood is taken, which contains malaria parasites. Once ingested, the parasite gametocytes taken up in the blood will further differentiate into male or female **gametes** and then fuse in the mosquito gut via sexual reproduction, which only occurs in the mosquito. This produces an ookinete that penetrates the gut lining and produces an **oocyst** in the gut wall. When the oocyst ruptures, it releases sporozoites that migrate through the mosquito's body to the salivary glands, where they are then ready to infect a new human host.

Only female mosquitoes feed on blood, thus males do not transmit the disease. The females of the anopheles genus of mosquito prefer to feed at night. They usually start searching for a meal at dusk, and will continue throughout the night until they find one. Once they have eaten, they will find a place to rest, digest, and get ready to lay eggs. Malaria parasites can also be transmitted by blood transfusions, although this is rare.

Malaria Life Cycle In The Human

After the mosquito infects a person the sporozoites enter the bloodstream, and migrate to the liver. They infect **hepatocytes**, liver cells, where they multiply into **merozoites**, rupture the liver cells, and escape back into the bloodstream. Then, the merozoites infect red blood cells, where they develop into ring forms, then into **trophozoites** (a feeding stage), then into **schizonts** (a reproductive stage), then back into merozoites. Sexual forms called **gametocytes** are also produced, which, if taken up by a mosquito, will infect the insect and continue the life cycle.

Malaria in humans reproduces asexually via **mitosis** and develops via two phases: an **exoerythrocytic** and an **erythrocytic** phase. The exoerythrocytic phase involves infection of the hepatic system, or liver, whereas the erythrocytic phase involves infection of the erythrocytes, or red blood cells. When an infected mosquito pierces a person's skin to take a blood meal, **sporozoites** in the mosquito's saliva enter the bloodstream and migrate to the liver. Within 30 minutes of being introduced into the human host, the sporozoites infect hepatocytes,

[7] "Factsheet on the World Malaria Report 2013." *WHO*. World Health Organization, Dec. 2013. Web. 5 Jan. 2014.

[8] Kantele, A., and T. S. Jokiranta. "Review of Cases With the Emerging Fifth Human Malaria Parasite, Plasmodium Knowlesi." *Clinical Infectious Diseases* 52.11 (2011): 1356-362. Print.

multiplying asexually for a period of 6-15 days; the patient is asymptomatic during this time. Once in the liver, these organisms differentiate to yield thousands of merozoites (each sporozoite can produce from 10,000 to over 30,000 daughter merozoites[9]), which, following the rupture of their host cells, escape into the blood and infect red blood cells, thus beginning the erythrocytic stage of the life cycle. The parasite is relatively protected from attack by the body's immune system because for most of its human life cycle it resides within the liver and blood cells and is relatively invisible to immune surveillance. It escapes from the liver undetected by wrapping itself in the cell membrane of the infected host liver cell. However, circulating infected blood cells without protective mechanisms are destroyed in the spleen.

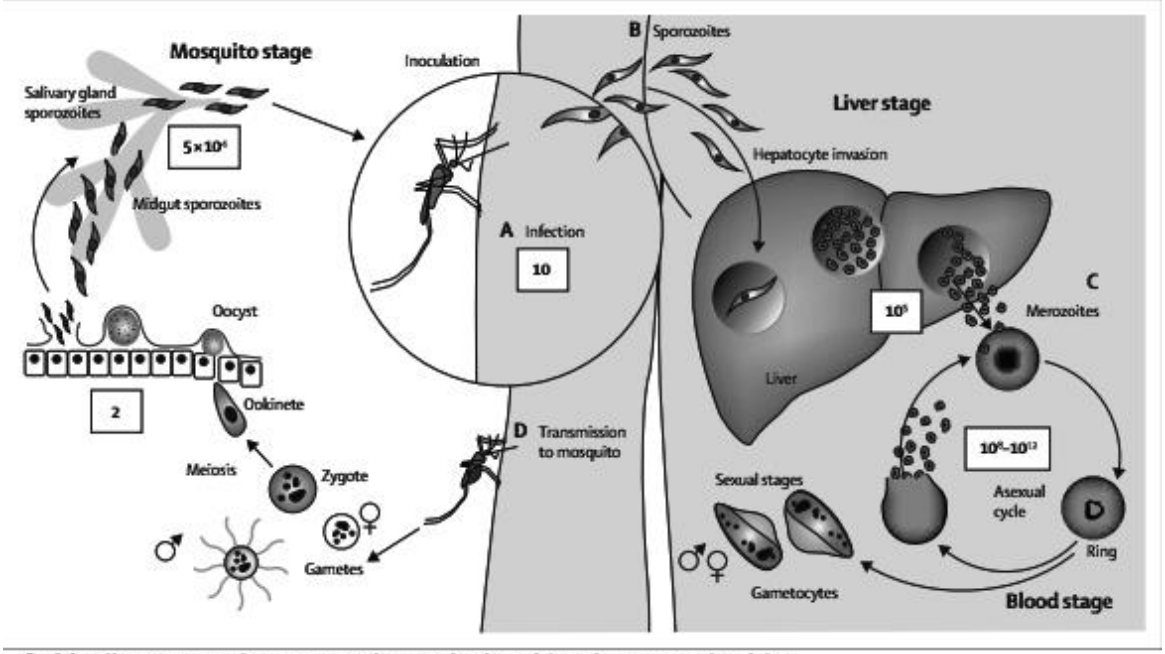
Within the red blood cells, the parasites multiply further, again asexually, periodically breaking out of their hosts to invade fresh red blood cells. Several such amplification cycles occur, and after 6-8 days, and when the parasite density load has reached 50 per microliter of blood (approximately 100 million parasites in an adult human), the symptomatic stage of infection begins. Classical descriptions of waves of fever arise from simultaneous waves of merozoites escaping and infecting red blood cells.

Asexual malaria lifecycles in a human host[3:]

- *P. falciparum*: 36-48 hours
- *P. vivax*, and P. ovale: 48 hours
- *P. malariae*: 72 hours
- *P. knowlesi*: 24 hours

Some *P. vivax* and *P. ovale* sporozoites do not immediately develop into exoerythrocytic-phase merozoites, but instead produce **hypnozoites** that remain dormant for periods ranging from several weeks to as long as three years (8-10 months is typical) before causing a relapse. After a period of dormancy, they reactivate and produce merozoites. Hypnozoites are responsible for long incubation and late relapses in these two species of malaria. *P. malariae* blood infection may persist for decades.

[9] White, Nicholas J., Sasithon Pukrittayakamee, Tran Tinh Hien, M. Abul Faiz, Olugbenga A. Mokuolu, and Arjen M. Dondorp. "Malaria." *The Lancet* (2013): n. pag. 15 Aug. 2013. Web. 5 Jan. 2014.



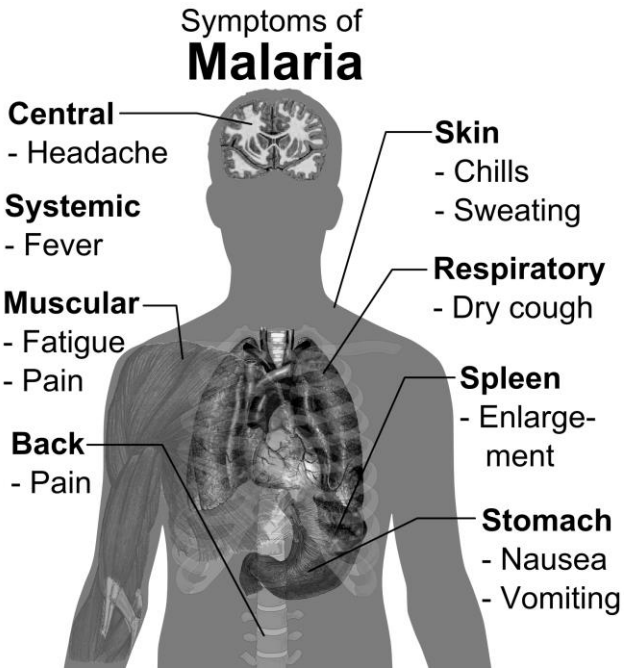
A: Motile sporozoites enter through the skin via mosquito bite
B: Each sporozoite invades a hepatocyte then multiplies over the course of about a week
C: Merozoites are released from hepatocytes into the bloodstream where they invade red blood cells and begin the symptomatic infection.
D: Some parasites develop into gametocytes and are taken up into a mosquito gut where they reproduce sexually. Ookinates then oocysts form and burst, releasing sporozoites into mosquito salivary glands, where they can inoculate another host.

Types of Malaria

Five Species of the plasmodium parasite can infect humans; the most serious forms of the disease are caused by Plasmodium falciparum. Malaria caused by Plasmodium vivax, Plasmodium ovale, and plasmodium malariae causes milder disease in humans that is not generally fatal. A fifth species, Plasmodium knowlesi, is a zoonosis that causes malaria in macaques but can also infect humans.

Signs and Symptoms

Symptoms of malaria include fever, shivering, arthralgia (joint pain), vomiting, anemia (caused by **hemolysis**), **hemoglobinuria**, retinal damage, and convulsions. The classic symptom of malaria is cyclical occurrence of sudden coldness followed by rigor and then fever and sweating lasting four to six hours, occurring every two days in *P. vivax* and *P. ovale* infections, and every three for *P. malariae. P. falciparum* can have recurrent fever every 36-48 hours or a less pronounced and almost continuous fever. For reasons that are poorly understood, but that may be related to high intracranial pressure, children with malaria frequently exhibit abnormal



posturing, a sign indicating severe brain damage. Malaria has been found to cause cognitive impairments, especially in children. It causes widespread anemia during a period of rapid brain development and also direct brain damage. This neurologic damage results from cerebral malaria to which children are more vulnerable. Cerebral malaria is associated with retinal whitening, which may be a useful clinical sign in distinguishing malaria from other causes of fever.

Severe Malaria

Severe malaria is almost exclusively caused by *P. falciparum* infection, and usually arises 6-14 days after infection. *P. falciparum* is the most common cause of infection, and is responsible for about 80% of all malaria cases and about 90% of the deaths from malaria. To avoid being detected by the host immune system, the *P. falciparum* parasite displays adhesive proteins on the surface of the infected blood cells, causing the blood cells to stick to the walls of small blood vessels, thereby sequestering the parasite from passage through the general circulation and the spleen. This "stickiness" is the main factor that can cause hemorrhaging.High endothelial venules (the smallest branches of the circulatory system) can be blocked by the attachment of masses of these infected red blood cells. The blockage of these vessels causes symptoms such as in placental and cerebral malaria. In cerebral malaria the sequestrated red blood cells can breach the blood brain barrier possibly leading to coma and death. Other consequences of severe malaria include **splenomegaly** (enlarged spleen), severe headache, cerebral **ischemia**, **hepatomegaly** (enlarged liver), **hypoglycemia**, and hemoglobinuria with renal failure may occur. Renal failure may cause blackwater fever, where hemoglobin from lysed red blood cells leaks into the urine. Severe malaria can progress extremely rapidly and cause death within hours or days. In the most severe cases of the disease, fatality rates can exceed 20%, even with intensive care and treatment in endemic areas, treatment is often less satisfactory and the overall fatality rate for all cases of malaria can be as high as one in ten. Over the longer term, developmental impairments have been documented in children who have suffered episodes of severe malaria.

Chronic Malaria

Chronic malaria is seen in both *P. vivax* and *P. ovale*, but not in *P. falciparum*. Here, the disease can relapse months or years after exposure, due to the presence of **latent** parasites in the liver. Describing a case of malaria as cured by observing the disappearance of parasites from the bloodstream can, therefore, be deceptive. The longest incubation period reported for *P. vivax* infection is 30 years. Approximately one in five of *P. vivax* malaria cases in temperate areas involve overwintering by hypnozoites (i.e., relapses begin the year after the mosquito bite).

Global Malaria Dynamics

The continued existence of malaria in an area requires a combination of high human population density, high mosquito population density, and high rates of transmission from humans to mosquitoes and mosquitoes to humans. If any of these is lowered sufficiently, the parasite will sooner or later disappear from that area, as happened in North America, Europe, and much of the Middle East. However, unless the parasite is eliminated from the whole world, it could become re-established if conditions revert to a combination that favors the parasite's reproduction. Many countries are seeing an increasing number of imported malaria cases due to extensive travel and migration. Many researchers argue that prevention of malaria may be more cost-effective that treatment of the disease in the long run, but the capital costs required are out of reach of many of the world's poorest people. Economic adviser Jeffrey Sachs estimates that malaria can be controlled for US $3 billion in aid per year.

Malaria Endemic Countries 2013

The following maps illustrate the presence and prevalence of the two most common types of malaria parasite, *Plasmodium falciparum* and *Plasmodium vivax* around the world in 2010[10,11].

In many malaria-endemic countries, malaria transmission does not occur in all parts of the country. Even within tropical and subtropical areas, transmission will not occur:

- At very high altitudes
- During colder seasons in some areas
- In deserts (excluding the oases)
- In some countries where transmission has been interrupted through successful control/elimination programs

Generally, in warmer regions closer to the equator:

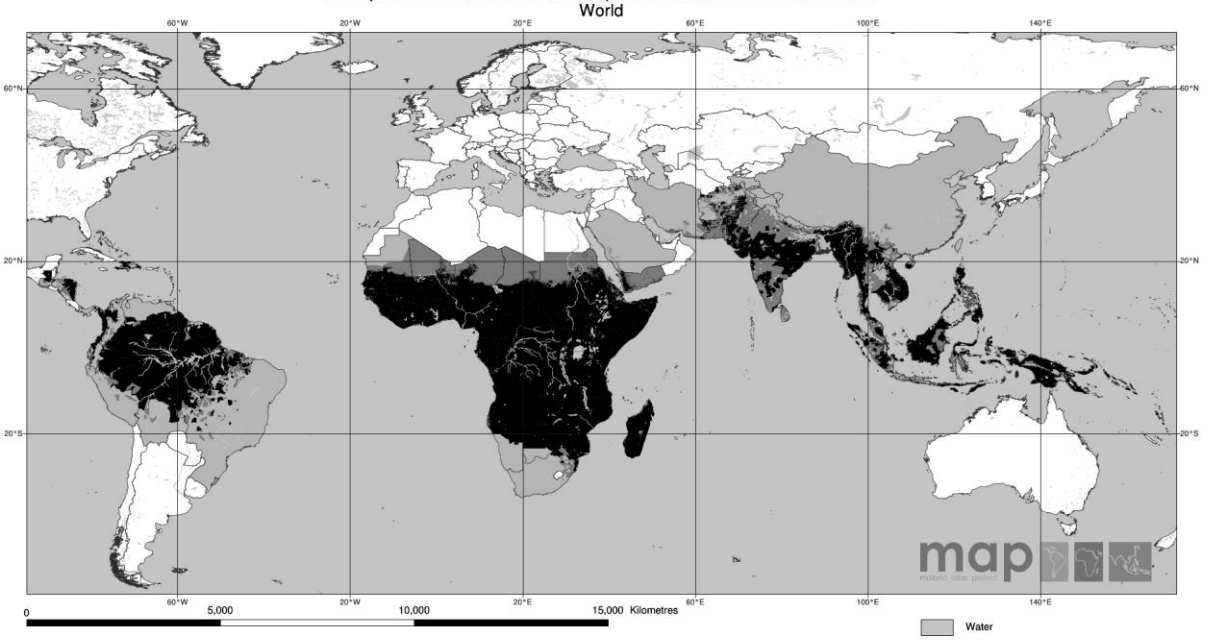
- Transmission increases and susceptibility increases
- Malaria is transmitted year-round

The highest transmission is found in Sub-Saharan Africa and in parts of Oceania such as Papua New Guinea. In cooler regions, transmission will be less intense and more seasonal. There, *P. vivax* might be more prevalent because it is more tolerant of lower ambient temperatures.

[10] "The Spatial Limits of Plasmodium Vivax Malaria Transmission Map in 2010 Globally." *Malaria Atlas Project*. Malaria Atlas Project, n.d. Web. 5 Jan. 2014.

[11] "The Spatial Limits of Plasmodium Falciparium Malaria Transmission Map in 2010 Globally." *Malaria Atlas Project*. Malaria Atlas Project, n.d. Web. 5 Jan. 2014.

The spatial limits of *Plasmodium falciparum* malaria transmission in 2010
World



Water
P. falciparum free
*Pf*API < 0.1‰
*Pf*API ≥ 0.1‰

Transmission was defined as stable (*Pf*API ≥ 0.1 per 1,000 people p.a.), unstable (*Pf*API < 0.1 per 1,000 people p.a.) and no risk using medical intelligence data. The limits were further refined using temperature and aridity data. Data from International travel and health guidelines (ITHG) were used to zero risk defined areas.

Gething, P.W.*, Patil, A.P.*, Smith, D.L.*, Guerra, C.A., Elyazar, I.R.F., Johnston , G.L., Tatem, A.J. and Hay, S.I. (2011). **A new world malaria map: *Plasmodium falciparum* endemicity in 2010.** *Malaria Journal*, **10**: 378.

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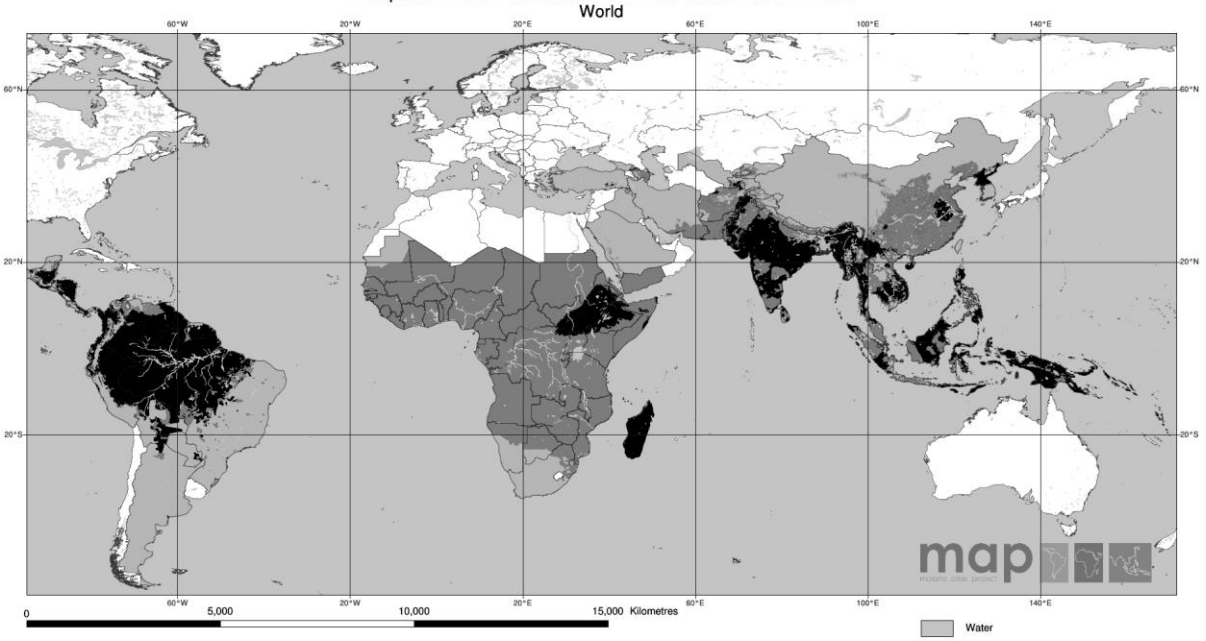
The spatial limits of *Plasmodium vivax* malaria transmission in 2010
World



Water
P. vivax free
*Pv*API < 0.1‰
*Pv*API ≥ 0.1‰

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Gething, P.W., Elyazar, I.R.F., Moyes, C.L., Smith, D.L., Battle, K.E., Guerra, C.A., Patil, A.P., Tatem, A.J., Howes, R.E., Myers, M.F., George, D.B., Horby, P., Wertheim, H.F.L., Price, R.N., Müeller, I., Baird, J.K.A. and Hay, S.I. (2012) **A long neglected world malaria map: *Plasmodium vivax* endemicity in 2010.** *Public Library of Science Neglected Tropical Diseases*, 6(9): e1814.

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These maps illustrate the presence and prevalence of the two most common types of malaria parasite, Plasmodium falciparum and Plasmodium vivax around the world in 2010.

Global History of Malaria

The current malarial life cycle between people and mosquitoes has been around for 500,000 years, with the first account of it in 2700 BC in China, around the time that humans discovered fire[12]. It has also been found in 30 million year-old amber-preserved mosquitoes. 10 percent of the proteins in Plasmodium contain evidence of having performed photosynthesis, so it is thought to have emerged as a plant or plantlike organism[13]. Through genetic changes, adaptation, and random events, Plasmodium joined forces with mosquitoes and humans to become the parasite it is today.

The name of the disease comes from the phrase "mal'aria" meaning "bad air," which corresponded with a theory that it was caused by fumes from swamps. Wormwood (artemisia annua), one of the same treatments we use today, was identified as the cure by 2nd century BC. Around 10,000 years ago, around the time of the start of agriculture, malaria began to have a major impact on human survival. As a result, natural selection against infection, including sickle cell disease, **thalassaemias**, and **glucose-6-phosphase dehydrogenase deficiency** developed.

Communities Fighting Malaria

The death of his 12-year-old daughter Ami from malaria in 1999 was El Hadj Diop's motivation to start a malaria-fighting organization in his community of Thienaba Seck, Senegal. In order to combat malaria, he and his organization:

- Organized a training for community leaders on the basics of malaria, including transmission, prevention, and treatment.
- Facilitated regular village clean-up events to reduce standing water and mosquito habitat.
- Enlisted religious leaders, village chiefs, and community group presidents to relay messages about combatting malaria
- Distributed mosquito nets for every sleeping space.
- Enforced mosquito net use through home visits and fines.
- Started a community fund to supplement the purchase of mosquito nets and malaria treatment for those in need.

Now, in 2014 there are 74 communities participating in El Hadj's malaria-fighting organization, and 40 of them have not registered a single case of malaria since 2009. The economic status of Thienaba Seck has advanced significantly in the last 15 years, and there is a distinct correlation between the reduction of malaria and poverty.

According to El Hadj, malaria causes poverty, and the answer to eliminating malaria is mobilizing every member of the community in the fight. Thienaba Seck has received international attention for its malaria program and continues to make progress every year. Watch a video about it here: http://goo.gl/gNMDk2

In the early 1900's, two Nobel Prizes were awarded to the scientists who discovered that malaria is transmitted by mosquitoes and that multiple forms with varying fever patterns exist. Soon after, the construction of the Panama Canal was seriously affected by malaria, with 21,000 of 26,000 (80.7%) of employees being hospitalized for malaria in 1906. By 1912, hospitalizations due to malaria were down to 5,600 of 50,000 employees, 11.2%. Its construction was made possible by malaria control. The U.S. Congress allocated funds in 1914 to control malaria, where it was endemic in 49 of 50 states. By 1947, it was essentially eliminated and the National Malaria

[12] Shah, Sonia. "Birth of a Killer." *The Fever: How Malaria Has Ruled Humankind for 500,000 Years*. New York: Sarah Crichton /Farrar, Straus, and Giroux, 2010. 12. Print.

[13] "Herbicide Hope for Malaria." *BBC News*. BBC, 31 Jan. 2003. Web. 5 Jan. 2014.

Eradication Program was formed and malaria cases reached zero in 1951. This achievement was a result of insecticide spraying, mosquito breeding ground control, education, and case management.

The Center for Disease Control and Prevention (CDC) was founded in 1947 in order to help fight malaria, and after elimination of the disease from the U.S., their efforts switched to focus on worldwide malaria eradication, which was proposed by the World Health Organization (WHO) in 1955. This program had varying success depending on climates, drug resistance, community participation, and other factors; it was abandoned. Malaria resurged between the 1970s and 1990s in tropical countries due to decreased control efforts and resistance of both mosquitoes to insecticides and malaria to drugs used to treat it. Since then, success in reducing malaria prevalence has been due to distribution of insecticide-treated bed nets, artemisinin combination treatment, chemopreventive strategies, and education efforts. There are, however, still significant challenges in achieving malaria reduction and elimination goals, such as economic downturns, drug and insecticide resistance[1].

STOMP Malaria Initiative

Malaria has always been a part of Peace Corps; the three programmatic areas outlined in 1961 for the first Volunteers to address were education, food security, and malaria.

On May 5th, 2009, President Barack Obama announced the creation of the Global Health Initiative (GHI), an effort to coordinate the activities of all US governmental organizations engaged in health related foreign assistance. Since that time, Peace Corps has been working to deepen its integration with partners at the President's Malaria Initiative (PMI) and its constituent agencies: the National Institutes for Health (NIH), the Centers for Disease Control (CDC), and the United States Agency for International Development (USAID).

On April 25, 2011 Peace Corps launched its Stomping Out Malaria in Africa initiative at a World Malaria Day event at Peace Corps Headquarters in Washington DC. As a part of this initiative, Peace Corps began a training program for highly specialized malaria prevention Volunteers – the Malaria Team – and embed those Volunteers in every malaria-focused organization in Africa with an urgent need for human resources. PMI provides expert trainers, professional and technical mentoring of Malaria Team members and support in liaising with host country institutions and NGOs. Malaria Team Volunteers make the organizations they work in more effective and coordinate between those organizations and the field network of Volunteers in sub-Saharan Africa to bring the full focused effort of the Peace Corps Volunteer network to bear on the issue of malaria prevention.
Embedding Volunteers in partner organizations would create a significant increase in inter-organizational communication bandwidth. This increase in communication would lead to increased synergies among USG agencies and organizations funded by USG funds in line with the vision of the GHI.

Now, more than 3,000 volunteers in 23 programs across Africa have teamed up to collaborate on the Stomping Out Malaria initiative. Training for Malaria Team members occurs at recurring "boot camps," held at the Peace Corps training facility in Thies, Senegal and bring current volunteers, staff members, new Peace Corps Response recruits and Peace Corps Volunteer Leaders from these programs together to learn. Leading experts in malariology share their knowledge while volunteers and staff members share their countries' best practices. At the end of each boot camp, these volunteers and staff members return to their posts to become resources for other volunteers in their countries.

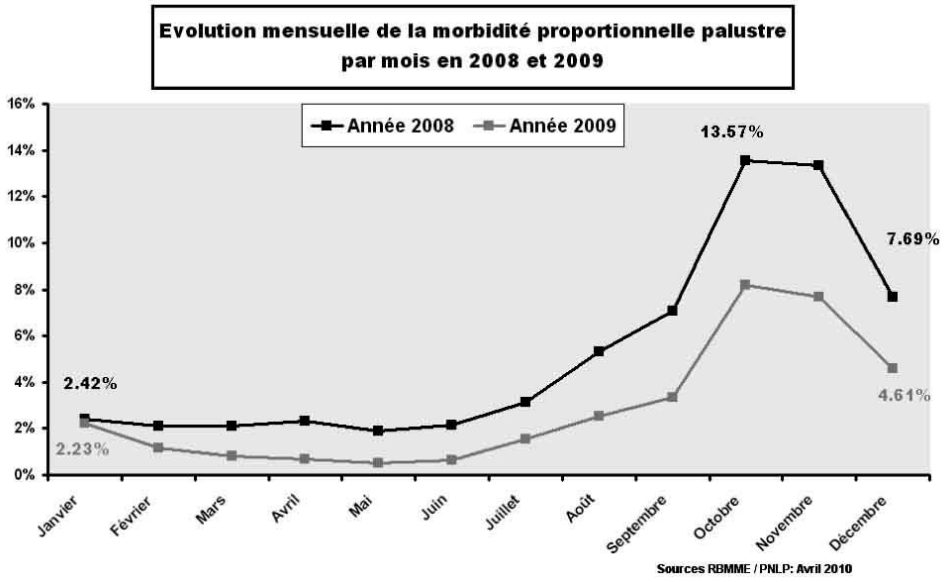
The initiative's goals include increasing the number of communities and Volunteers engaged in malaria prevention activities, as well as the number of people reached with resulting interventions. Helping to achieve the Millennium Development Goal to "Halt and begin to reverse, by 2015, the incidence of malaria…"[14].

Malaria in Senegal

All of Senegal is at risk of malaria transmission throughout the year, although certain regions have much higher malaria prevalence than others. In 2009, the last time that national data was collected, 3% of all patients that visited a health structure were diagnosed with malaria and 4% of all deaths were caused by malaria. In some areas, the incidence rate is far higher. For example, in Kedougou in the same year, 18% of health structure visits and 23% of deaths were due to malaria according to records from health structures. The majority of reported cases have been confirmed by rapid diagnostic tests, but a small percentage is based on less accurate diagnostic methods and may have been over reported. 90% of malaria infections in Senegal are caused by the plasmodium falciparum parasite.

Pregnant women and children under 5 are the most at risk groups for malaria. The incidence of malaria among pregnant women is highest in Dakar and Tambacounda. In 2009, in Dakar alone, nearly 1,800 pregnant women had malaria.

Each time the Demographic and Health Survey (DHS) is conducted, the CDC tests the blood of children under 5 in each regions of Senegal. During the last survey in 2010-2011, nearly 4% of a sample of 3,700 children were found to have parasites in their blood. Kedougou, Kolda and Tambacounda had the highest prevalence rates for this age group. The percentage of boys and girls who tested positive was about equal. However, children of mothers who had not gone to school were three times more likely to test positive for malaria than children of mothers who had gone to secondary school or higher.
On average, the percent of malaria cases steadily increases from July to October, peaks in November and goes back down from December to June. The rise coincides with rainy season and the peak is just after the rains end—a time when people tend to believe it is safe to stop sleeping under nets, but malaria carrying mosquitoes are still present.

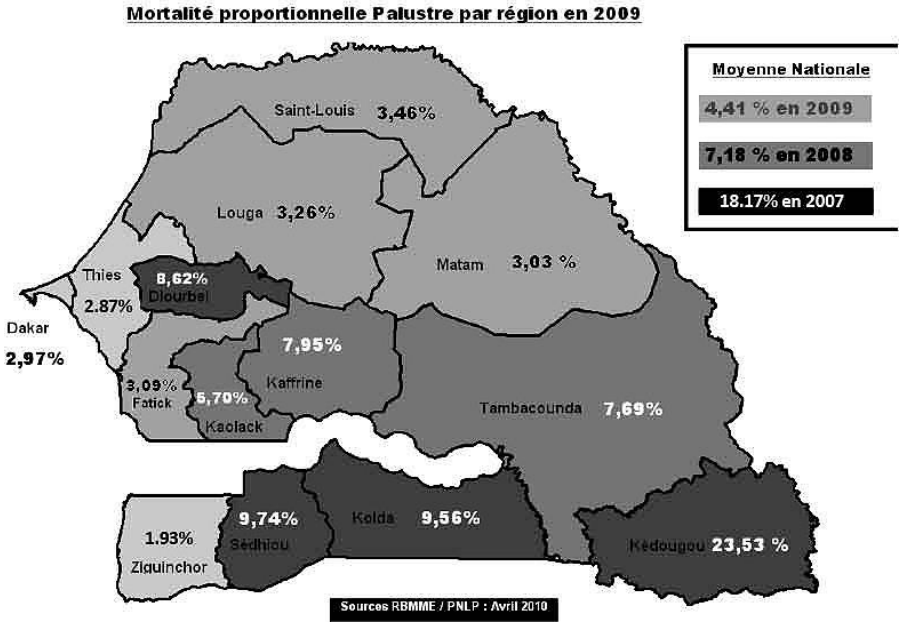


[14] "United Nations Millennium Development Goals." *UN News Center*. UN, 2013. Web. 5 Jan. 2014.

Senegal's Current Status

Currently, most regions of Senegal are working on malaria control strategies. The goal of these strategies is to save as many lives as possible through treating illness and preventing its spread, with interventions such as LLINs and indoor residual spraying. The target population is people that are more at risk, mainly children under five and pregnant women. Interventions may benefit others, but they are designed to mainly help people from those demographic groups.

Since these control strategies have been successful in some areas, those regions are moving away from control strategies and focusing on pre-elimination. Pre-elimination means that the number of malaria cases is close to zero and therefore prevention strategies need to be changed. These strategies involve finding everyone who is infected, even if they are not showing symptoms and treating them. The main strategies include thorough diagnostic testing and treating each positive case with an effective anti-malarial drug. These interventions are targeted towards all members of the population, regardless of their demographic group. According to the National Malaria Control Program's National Strategic Plan, some parts of Senegal, mainly in the North, including Richard-Toll, Podor, Matam, Louga, and Saint-Louis, are ready to move to a pre-elimination strategy.



One of the millennium development goals is to stop the incidence of malaria by 2015 and begin getting the number of cases of down. The areas that are ready to work on pre-elimination are close to achieving this goal, but other areas have only a short time to catch up. The ultimate goal of pre-elimination is to get the number of infections by malaria parasites down to zero in a given area and eventually reach total elimination. The World Health Organization can declare malaria has been eliminated in a country if there has been no local transmission for 3 consecutive years.

Partners

Peace Corps Senegal has many local partners in our fight against malaria that conduct a wide range of prevention and treatment activities.

National Malaria Control Program

In French, it is the Programme National de Lutte contre le Paludisme (PNLP). Their mission is to implement policies that fight against malaria in Senegal so malaria will no longer be a burden or stall socio-economic development. Their goals are to reach pre-elimination in Senegal by 2015 by continuing to use proven interventions to fight malaria, as well as piloting new interventions and adopting successful ones. The PNLP highly subsidizes nets through the support of the Global Fund and other donors, preventative medicines for pregnant women and children, and ACTs—

the medicine that is used to treat simple malaria. They also work on community based communication programs, implement monitoring and evaluation, improve supply chain issues, and control epidemics.

President's Malaria Initiative (PMI)
PMI is a U.S. government program that was launched in 2005 to reduce the burden of malaria and relieve poverty throughout Africa. They started by working in 15 African countries and are now up to 19, including Senegal. The President's Malaria Initiative's goal is to reduce malaria-related deaths by 70% by 2015. They aim to achieve this goal by getting 85% coverage of the most vulnerable groups—children under five and pregnant women—with proven interventions, including ACTs, insecticide treated nets, preventative medicine for pregnant women and children, and indoor residual insecticide spraying. They support all the major malaria prevention programs in Senegal, including:

- Providing **long-lasting insecticide treated nets (LLINs)** and funding for universal LLIN distributions and working with the government to come up with distribution strategies
- Supporting Indoor Residual Spraying (IRS) operations and resistance monitoring
- Training IRS technicians
- Training health workers in effective case management and IPTp
- Procuring malaria medicines and tests for the health system.
- Training lab technicians on microscopy
- Helping the PNLP with M&E
- Supporting behavior change communication programs

PMI is led by USAID and the CDC is a major implementing partner. PMI has two staff members in each contry where they work, called resident advisors—one representing the CDC and one USAID.

PATH (Program for Appropriate Technology in Health)
PATH is an international nonprofit that uses entrepreneurship and scientific innovation to transform global health. One of their projects—MACEPA (Malaria Control and Evaluation Partnership in Africa)—is playing a crucial role in the fight against malaria in Senegal. MACEPA's goal is to completely eliminate malaria. They partner with governments and ministries of health in sub-Saharan Africa to control malaria by supporting national programs, such as LLIN distributions, IRS, and pre-elimination programming. They also have a malaria vaccine development initiative.

ADEMAS (l'Agence pour le Développement du Marketing Social)
ADEMAS is a Senegalese organization that is supported by USAID. ADEMAS develops social marketing programs, like those used by the private sector, to influence people to adopt behaviors that are good for them—such as family planning or treating water. They also work to improve the accessibility of health products and services. For malaria prevention, they are currently working on a social marketing campaign to bring LLINs back to the private sector. They are highly subsidizing insecticide treated nets and getting vendors to sell them in the market for less than untreated nets. The project is also accompanied by mass communication advertisements for the insecticide treated nets. In addition, ADEMAS is working on behavior change programs and studies surrounding LLIN use.

Speak Up Africa
Speak Up Africa's goal is to reduce child mortality, fight preventable diseases and implement global development partnerships. They also encourage governments to go through with their public health commitments. Speak Up Africa works by leveraging the influence of celebrities in high profile, mass media-campaigns. Their Malaria No More initiative in particular is dedicated

to ending malaria deaths. They engage leaders and the public and get life-saving tools and education to families throughout Africa. In 2009, Speak Up Africa launched a huge communications campaign in Senegal, called NightWatch, that used nightly reminders by big celebrities through radio, TV and text to sleep under one's net. They also created an educational curriculum with the same name that many PCVs have conducted in schools.

IntraHealth
IntraHealth is an international organization that works in over 90 countries. Their mission is to empower health workers to better serve needy communities across the world. They aim to bring about local solutions to health care challenges by strengthening health systems, improving health worker performance and fostering partnerships. IntraHealth is the organization that is currently in charge of net distributions in Senegal. They also manage PMI's IRS, clinical, communication and drug management programs.

University Cheikh Anta Diop (UCAD)
UCAD is a large public University in Dakar. It is partnered with a number of research and academic institutions around the world and helps research epidemiology, parasitology and entomology. They have done entomologic monitoring to test for resistance in villages in all districts that have received IRS.

SLAP (Service Lutte Anti-Parasite)
A Thies based parasite laboratory, SLAP, helps with entomological monitoring to make sure IRS is effective and to test for insecticide resistance in mosquito populations.

Malaria Prevention

A number of malaria prevention techniques are available within Senegal including mosquito nets, indoor residual spraying, effective case management and preventative treatment for pregnant women and children (See Malaria Treatment for information on case management and see Malaria in Pregnancy for information on preventative treatment for pregnant women.). In addition, many supporting interventions take place including behavior change communication and research.

Long Lasting Insecticide Treated Nets (LLINs)
In our toolkit of malaria prevention techniques, **long lasting insecticide treated nets** (LLINs) are the most effective intervention. The specific type of mosquito that causes malaria—anopheles—is most active from sunset to sunrise. Therefore, mosquito nets provide protection from anopheles mosquito bites when they are most likely to bite people and cause infections.
Insecticide treated nets (ITNs) also contain a chemical that kills mosquitoes on contact thereby directly disrupting the transmission vector. LLINs are factory impregnated with insecticides that last up to 20 washes. Many older mosquito nets are also impregnated but not with long lasting insecticide. They need to be periodically re-treated. Such mosquito nets are less effective than LLINs, but better than mosquito nets with no insecticide.

To considerably reduce the amount of malaria in a community, it is essential to have **Universal Coverage** of mosquito nets. A village is defined as having Universal Coverage if 80% or more of the population is sleeping under LLINs. In communities where fewer than 80% of people sleep under nets, mosquitoes are deflected from LLIN users to other members of the community. In this case, LLIN users have a lower risk of contracting malaria, but the malaria burden in the community is only slightly lower and mostly shifts to people who are not sleeping under mosquito nets. However, when a village has Universal Coverage, the vector population in a community decreases. As a result, disease burden decreases and can be seen in reduced child mortality, scholastic absenteeism and health structure visits.

Culture of Net Use Study

A study by Networks found that 72.5% of nets covering a sleeping space that was used by at least one person the night before were actually used that night. Common reasons for not having a net hung at all included:

- Taken down during the day
- Net is cumbersome
- Shape isn't good/doesn't fit room well
- Needs to be washed
- No mosquitoes
- Proprietor traveled
- Décor of bedroom

However, one of the most important barriers concerned the insecticide—in terms of fear of the insecticide and side effects when exposed to the insecticide. Respondents claimed that they had experienced rashes, itching and felt as they were suffocating when they slept under treated nets. This may have resulted from not leaving their net out in the sun for 24 hours before first use. Many respondents said they preferred net purchased from the pharmacy over those distributed for free because they were perceived to have better doses of insecticide and to be more durable.

Others said that they only used their nets seasonally due to weather concerns or because they think there are no mosquitoes at certain times. Some mentioned heat as a barrier to net use.

Senegal has been actively working toward achieving universal coverage since 2010. PCVs have and continue to play a crucial role in universal coverage campaigns. As a proxy, universal coverage used to be measured by whether a household had one mosquito net for every two people. However, in 2009, volunteers in Kedougou suggested measuring sleeping spaces instead. This includes any area where people sleep within a household: mattresses, floor mats, etc. Because of the PCVs' proposal, Universal Coverage mosquito net distributions provide one mosquito net for every regular sleeping space. Past mosquito net distributions had only targeted pregnant women and children under 5. Pregnant women and children under 5 are the most vulnerable populations, but this strategy had not significantly reduced the disease burden. PCVs believed that universal coverage was possible and first tested it with a pilot phase in the districts of Velingara and Saraya. The pilot phase was successful and therefore scaled up by the Ministry of Health and National Malaria Control Program in partnership with the President's Malaria Initiative and NetWorks, a USAID-funded NGO run by Johns Hopkins University. Universal Coverage campaigns are conducted in phases by region. All regions in Senegal have participated in at least one phase of Universal Coverage distribution and are scheduled to participate in a second by the end of 2015.

Between 2010 and 2012, 4 million LLINs were distributed in 12 regions. In addition to handing out LLINs, the distribution process also includes mass communication campaigns to encourage nightly use and proper care procedures. After each distribution, community health workers visit each household to ensure LLINs are being properly used, washed and cared for. Demonstrations, health talks, radio programs and social mobilizations are also conducted to reinforce these messages.

Since each region of Senegal has participated in the Universal Distribution, **routine distribution** programs are taking place throughout the country to fill gaps in coverage. Routine distribution happens through four channels: health structures, community-based organizations, businesses and schools. In health structures, women who attend at least one pre-natal visit receive a pink coupon, which can be redeemed for a free LLIN at the structure's pharmacy. Individuals who attend any type of consultation or preventive activity such as vaccinations or family planning are also eligible to purchase a LLIN at a subsidized price of 500 FCFA (about $1USD). During the consultation the individual must request a coupon for a LLIN from the health worker. The blue coupon is redeemable at the structure's pharmacy.

Routine distributions are being expanded to include community organizations and businesses, such as Total Gas Stations. Local administrators select interested organizations and businesses to sell LLINs at a subsidized price of 500 FCFA available to all individuals.

Steps in a Universal Coverage Campaign

1. **Planning meetings and trainings —** Meetings take place at each level of the health system. In some regions, PCVs have been able to attend these planning sessions and add the perspective of someone living in a village.
2. **Household Census —** Community Health Workers conduct a door to door census to calculate household size and the number of LLINs needed. Each family is given a coupon for the number of nets they will receive at the distribution. A validation committee reviews the census data to ensure each family has been allotted the correct number of mosquito nets. As volunteers know the local language and community members, PCVs can be extremely helpful at this stage of the process if they accompany Community Health Workers in conducting the census.
3. **Distribution —** First the LLINs are sent to the regional hospital who then allocates the correct number to the correct health structures under their purview. Next, health workers and community members sort and label the LLINs by village, neighborhood and household. On the day of the distribution, health workers hand out the LLINs to people with coupons and relay messages of net use and care. In the past PCVs have submitted SPA grants to help with this process, for example covering transportation costs. PCVs have also helped figure out logistics and participated in the actual distribution.
4. **Mass Communication Campaigns —** These campaigns reinforce the messages given during the distribution of net repair, care and proper use. They use a variety of different channels including radio programming, community mobilizations and theater presentations. Some PCVs have helped by creating and performing their own radio spots in local language or participating in these events.
5. **Follow Up and Evaluation —** Community Health Workers conduct home visits to make sure people are using their LLINs and taking care of them properly. Volunteers can be helpful by accompanying health workers on these visits and ensuring accurate data collection.. This step also includes fixing any mistakes that were made then having a final wrap-up meeting to discuss what went well and what could go better.

This channel was first piloted in Louga and Ziguinchor in 2013.

Another more recent channel for LLIN distribution is schools. LLINs are given for free to children in select classes at elementary schools. The frequency of distribution is calculated based upon the longevity of LLINs. The program was also piloted in the Louga and Ziguinchor regions in 2013 where students in two grade levels received LLINs Distributions through this channel are also used as opportunities to educate students about malaria prevention.

Mosquito nets are also available for purchase in the private sector. Insecticide treated nets can be purchased at many private pharmacies. However, they are not subsidized and therefore much more expensive—about 4,000 FCFA—than LLINs available through routine distribution channels. Mosquito nets are also available in local markets in different styles (including pop up, with doors and circular). However, many of these mosquito nets are not insecticide treated and therefore not as effective as an LLIN. ADEMAS is currently in the planning phase of creating a campaign to make subsidized LLINs widely available in the private sector for 1000CFA.

According to the 2010-2011 DHS in Senegal, over 7 in 10 households (72%) had at least one mosquito net. Yet, not all of these households had insecticide treated nets. 63% of households had at least one insecticide treated net—either a factory impregnated one with long lasting insecticide or one with non-long last insecticide that needs to be treated manually. Only 58% of households possessed one or more LLIN. This study was conducted before most regions of Senegal received LLINs through the Universal Coverage Distributions. The percentage of households that have mosquito nets, particularly the percentage with LLINs, is projected to be higher in the upcoming survey. (Only mosquito nets with long-lasting insecticide are given out during distributions.)

Currently in some regions, nearly all households have at least one mosquito net. For example, the 2010-11 DHS reported that over 90% of households in Kedougou, Kolda and Sedhiou met this standard. On the other hand, in some regions, particularly ones that had not conducted distributions yet, coverage was much lower. In Louga, only 50.5% of households had at least one mosquito net. Yet, in all regions that had already had distributions, 68% or more of households had at least one mosquito net.

However, the percent of people whose household has a mosquito net that slept under a mosquito net the night before is drastically lower. In Kolda, where coverage seemed very high, only 59% of individuals with access to mosquito nets had slept under them the night before. In Fatick, where 72% of households had at least one mosquito net, merely 32% of individuals had slept under a mosquito net the night before. This gap may be caused partly by the fact that a household in Senegal includes 10 people on average, and therefore one mosquito net per household is not an accurate measure of Universal Coverage. However, it could also be caused by people that have nets not using them all the time.

Indoor Residual Spraying (IRS)

Indoor Residual Spraying is another major malaria prevention technique that involves spraying the inside walls of homes with insecticide. It works by killing mosquitoes and deterring them from entering rooms in the first place. IRS intervenes with the malaria transmission vector; after an anopheles mosquito has bitten an individual and is digesting its blood meal, it seeks a vertical position to rest and digest. Female anopheles mosquitoes prefer to feed at night and to feed on humans and walls are the perfect place for them to rest. IRS is not intended to disrupt the transmission cycle before the mosquito bites a human, but rather it kills mosquitoes before they can transmit malaria parasites to another person.

IRS is a very expensive intervention and is not as well supported by donors as other prevention techniques. As a result, it is only taking place in a select few districts in Senegal where it is believed to have the highest impact, including Guinguineo, Koumpentoum, Malem Hoddar, Nioro and Velingara. Spraying normally begins in June in all of the targeted districts. In 2012, over 300,000 structures were sprayed, protecting over 1 million people. 98% of households visited that were eligible for spraying agreed to have their house sprayed.

All insecticides are carefully monitored for safety and efficacy. Entomologists from the UCAD, SLAP, the Ministry of Health and more conduct entomological monitoring in villages where IRS has taken place. They perform **cone bioassays** on walls to make sure the insecticide is working and conduct **knock-down spray catches**, also known as **pyrethrum spray catches (PSC)** and human landing catches to see how many mosquitoes are still present and biting people. When they find that insecticide resistance is taking place and mosquitoes are becoming less susceptible to the current pesticide, another insecticide is chosen for spraying.

All of the insecticides currently in use have good safety profiles and degrade rapidly in the body and environment. Sprayers are well trained in how to safely and precisely apply the insecticide and are supervised. In order to protect themselves, community members must remove all items from the room being sprayed, especially food and cooking items. They should also stay out of the room during the spraying and for 2-4 hours afterward.

Bright Spot: PECADOM Plus

A home-based care model called PECADOM was implemented by the Ministry of Health in Senegal starting in 2008 to address many of the barriers to care and care seeking, particularly geographic and financial ones. Under the normal PECADOM program, volunteer community-based care providers (DSDOMs) are trained to perform rapid diagnostic test and administer treatment for cases of uncomplicated malaria, referring all negative and severe cases. After observing shortcomings in the program, RPCV Ian Hennessee's counterpart came up with the idea for the PECADOM Plus program, a new model where DSDOMs are trained to switch their mentality from passive to active. Instead of waiting for a patient to come to them for testing and treatment, they are paid a small per diem to conduct a sweep of their village once a week to actively seek out suspected cases of malaria, perform a rapid diagnostic test on anyone with symptoms and treat any confirmed cases of simple malaria on the spot. All pregnant women, children under 2, negative TDRs, or cases of malaria with danger signs are referred to the formal health structure. In addition, one woman from each compound in the target villages are trained to recognize symptoms of malaria and make sure all ill family members are tested during the sweeps. The objectives of this active model are to reduce incidence of both simple and complicated malaria through early detection and treatment. In 2012, the PECADOM Plus model was piloted by a PCV in one village in Kedougou with impressive results. The project was then scaled up to 15 villages in the Saraya Health District (with 15 additional comparison villages with the original passive model) in an operational research study to rigorously measure the difference between the two models. At the time of writing this report, the preliminary results are quite promising, and we look forward to another PCV-initiated intervention to be conducted on a large scale in Senegal.

Seasonal Malaria Chemoprevention (SMC)

Seasonal Malaria Chemoprevention involves giving anti-malarial drugs to children in order to clear existing infections and prevent new infections from occurring. It uses the same scientific basis as IPTp for pregnant women **(See Malaria in Pregnancy).** When a person takes the

medicine, it flushes the body of any living parasites. This kills the parasites before they can cause illness and before they can be transmitted to another person.

SMC is given to children from three months to 10 years of age in mass distributions during peak malaria times—during and after rainy season—without testing them for malaria. This group was chosen because children under 5 are considered a vulnerable population for malaria infection. Community health workers travel door to door once a month throughout the rainy season and distribute a combination of sulfadoxine pyramethamine and amodiaquine to every child under 10 years.

In July and August of 2013, SMC began in Kedougou and one district in Tambacounda. An accompanying study is being conducted in the Saraya health district of Kedougou to track parasite load over the first four years of the program, measure biomarkers of resistance as well as to track and monitor older children who will age out of the program. In the future, SMC is planned for a larger area in Senegal.

Home Visits

Conducting home visits is an effective way of providing behavior change messaging about malaria treatment and adherence. PCVs often visit households if they hear of an individual having malaria. One possible activity is to work alongside a health worker to create a quick two minute "elevator speech" about treatment protocol. Then, visit households and deliver the speech to sell the idea to household members. Incorporate the use of visual aids such as an ACT packet, describe the regimen, and use creative analogies to better relay the information. An example of a great analogy is to describe the malaria parasites as 3 different people: a child, a healthy adult and famous Senegalese wrestler Balla Gaye. These three people portray different strength levels of malaria parasites. The first day treatment of ACT clears out the parasites that have the strength of a child. After taking the first day's medication, an individual begins to feel a little better, about 30%. The second day's treatment wipes out the healthy adult, or normal strength parasites in the individual. The third day, the ACT has left to clear the Balla Gaye of the malaria parasites, the strongest. If an individual does not take her third dose of ACT the Balla Gaye parasites, who are already the strongest of the malaria parasites, grow stronger and more opportunities arise for resistance to ACT. After the second day's treatment the individual may feel much better and at about 80% of their normal strength. However, the third dose is crucial to rid their body of all the infection, especially the strongest of the parasites.

Supporting Interventions

Many other activities that contribute to malaria prevention also take place throughout Senegal. One type is **behavior change communications** (BCC). Through radio programs, causeries, home visits, theatre sketches and more, health workers, NGOs and PCVs support the messages of other malaria prevention techniques. Many communication activities surrounding LLIN promotion center around the "trois toutes" slogan (tout la famille, toutes les nuit, tout l'année)—encouraging all members of family to sleep under LLINs every night, all year long. BCC activities for IRS can include what to expect, why it is good for one's family and what precautions to take. BCC can also be used to encourage people to seek prompt treatment for fever, finish their malaria treatment, go to pre-natal visits and facilitate the uptake of SMC by children.

Another supporting intervention is research, including entomological monitoring. Research is also conducted on antimalarial drugs to make sure they are effective and kept in good condition. Others, particularly PMI, conduct research on the manner in which pre-natal and general consultations occur in order to better understand how national protocols are executed at the

community level. In addition, some organizations conduct research on why people behave the way they do. ADEMAS has taken over NetWorks' Culture of Net Use Study and is doing ongoing research on the context of LLIN use, with the end goal of improving BCC activities. PCVs have also been involved in operational research to determine the effectiveness of additional interventions, particularly regarding a health systems strengthening intervention called PECADOM Plus.

Malaria Diagnosis and Treatment

Senegal maintains internationally accepted and supported standards of care in the diagnosis and treatment of malaria infections through the Ministry of Health and the Country's National Malaria Control Plan. These standards of care vary between simple and severe malaria and also within the health structure levels. These are based upon the three delays individuals experience in their route to receive health care: delay in the decision to seek care, delay in reaching care, and delay in receiving adequate available health care and a correct diagnosis.

Malaria infection and transmission can be greatly mitigated and stopped if an infected individual receives treatment within 24 hours of first showing symptoms of malaria. The **malaria early treatment theory** first proves that seeking treatment within 24 hours greatly expedites an individual's recovery and alleviates her burden of disease. In addition, the theory states that early treatment has a community effect as the transmission vector is compromised; the infected individual is no longer actively contributing malaria parasites to the transmission vector and therefore alleviates the burden of malaria infection for her whole community. Therefore, infected individuals are encouraged and taught to seek treatment within 24 hours of showing signs of malaria infection. This directly combats the first delay; delay in the decision to seek care.

Each level of the Senegalese Government Health Structure has a capacity to detect, diagnose and treat malaria infections. The ways in which trained health workers diagnose malaria differs between structures. The three available diagnostic techniques are clinical diagnosis, rapid diagnostic tests and microscopy. In Senegal, the most accurate and reliable method for definitive diagnosis of malaria is still creating a blood smear to have a microscopic examination of the blood. Each of the four major parasite species has distinguishing characteristics, which can be identified by a technician. The parasite load in the blood can also be determined this way.

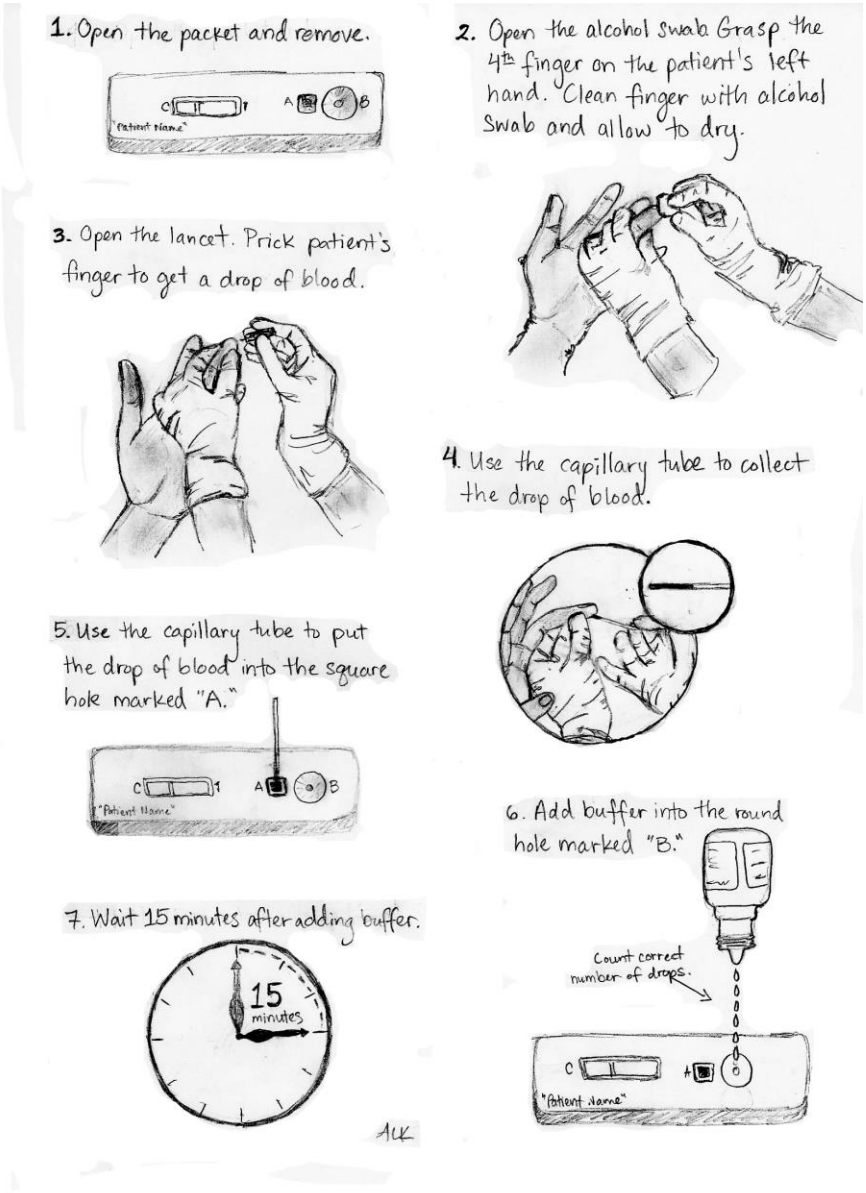
Microscopy

In Senegal, the most accurate and reliable method for definitive diagnosis of malaria is still creating a blood smear to have a microscopic examination of the blood. Microscopy is utilized at District and Regional Hospitals throughout the country. Microscopy can quantitatively measure the parasite within a patient's body. In addition, the blood films, or slides, are able to show precise parasite (*P. falciparum* or *P. vivax)* as each has distinguishable features. Blood films can also detect parasite load at extremely low levels. In the case of an individual who does have malaria, microscopy also has the capacity to provide a correct diagnosis for another illness; it gives answers and allows for the patient to receive the correct prescription and treatment. Unfortunately, microscopy requires specialized training for health workers and technicians, expensive equipment, and drawing blood intravenously from each patient. For these reasons, rapid diagnostic tests (RDTs, or test diagnostic rapide, TDR in French) have become by far the most commonly used malaria diagnostic method.

Rapid Diagnostic Test

In recent years, a new diagnostic tool became available to malaria endemic countries; the rapid diagnostic test. A RDT is used to verify a clinical diagnosis of malaria that includes the signal

symptoms of fever, vomiting, and malaise. RDTs are used at all levels of government health structures: health points, health posts, district and regional hospitals.

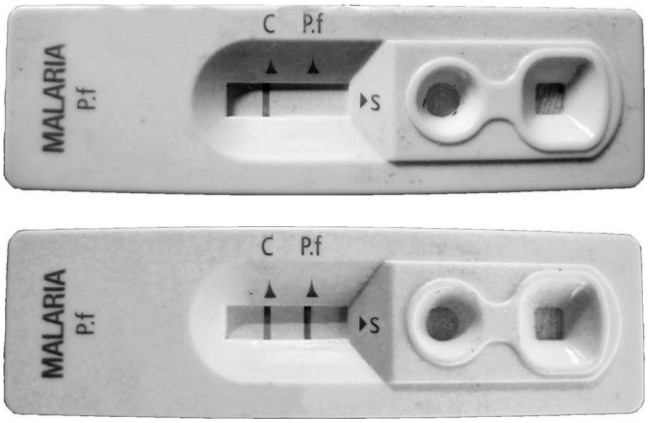


RDTs are available to test for multiple species of malaria, but those most commonly used in the field test for only *P. falciparum* as it's the most common strain of malaria present in Senegal. Using RDTs requires only a few drops of blood, which can be collected with a finger prick. The test takes a total of 15-20 minutes, and a laboratory is not needed. The threshold of detection by these rapid diagnostic tests is in the range of 50 parasites per microliter of blood, compared to 5 by microscopy. It takes a few cycles of blood stage replication to produce a level of **parasitemia** that can be detected by blood spear analysis. Therefore, sensitivity of a RDT is moderate as it takes a larger parasite load present to express a positive result. The first rapid diagnostic tests used *P. falciparum* glutamate dehydrogenase (PGluDH) as an **antigen**. PGluDH was soon replaced by *P. falciparum* lactate dehydrogenase, a 33kDa oxidoreductase. It is the last

enzyme of the glycolytic pathway, essential for ATP generation and one of the most abundant enzymes expressed by P. falciparum[15].

After blood is obtained by finger prick and collected with a capillary tube, it is placed into a cell on the RDT. A buffer solution is added to the blood with the use of a dropper. At this point, the health worker and patient wait fifteen minutes to conduct the blood smear and allow for the detection of pLDH in the individual's blood.

Three results are possible from a RDT: positive, negative and invalid. To decipher the results, a health worker determines the number of lines present once the blood smear has run its course. Two possible lines are available: control and variable. The control line must be present in order to assure that the RDT result is valid. A result of two lines present signifies a positive result; there is malaria parasites present within the individual. If there is one line at the control marker, the result is negative; the individual is not infected with malaria. One line present at the variable marker but absent at the control marker signifies an invalid test. If an invalid result occurs, another RDT must be conducted to receive a diagnosis.



Above depicts the two types of valid RDT results. The top is negative for malaria as there is only 1 line present at the control. The bottom is a positive result with two lines; one at the control and another to validate the presence of malaria parasites in the patient's blood.

All cases of rapid testing levels of **parasitemia** are not necessarily correlative with the progression of disease, particularly when the parasite is able to adhere to blood vessel walls. Once a person has recovered from a case of malaria, an RDT may be positive for several more weeks. Therefore more sensitive diagnosis tools need to be developed in order to detect low levels of parasitemia and differentiate active from previous cases in the field.

Clinical Diagnosis

Clinical diagnosis is the detection of infection through a physical exam and the measuring of vital signs. This is the least accurate of the three diagnostic techniques. It includes taking a patient's vital signs and examining parts of the body that signal malaria infection specifically; health workers are verifying the presence or absence of specific symptoms and signs of illness. This includes: headache, fever, vomiting, chills, nausea, diarrhea, dyspnea, cough, **splenomegaly**, **jaundice**, **pallor** and **hepatomegaly**[16]**.** In malaria endemic areas including Senegal, clinical diagnosis should be based upon the presence of a fever within the last 24 hours and presence of anemia detected by examining the palm of an individual's hand. Within Senegal specifically, a clinical diagnosis of malaria is not given if an individual is also presenting symptoms of upper respiratory infections such as bronchitis and pneumonia.

This technique is used if and only if both microscopy and RDT are unavailable. As the signs and symptoms of malaria are nonspecific, it is very difficult to assume a correct diagnosis based upon

[15] "Malaria rapid diagnostic test performance. Results of WHO product testing of malaria RDTs: Round 3 (2010-2011)." WHO. World Health Organization. Web. 15 Dec 2013.
[16] Manual de Procedures Administratives et Techniques a l'Intention des Reseaux d'Appui Communautaires de Lutte Contre le Paludisme. Senegal Ministry of Health National Malaria Control Plan. Web. 2 Feb 2014.

current symptoms alone. This results in the overtreatment of malaria and under treatment of other grave illnesses. It is necessary that a health worker closely considers any other possible causes of fever and other symptoms.

Diagnostic Tool	Advantages	Disadvantages	Availability
MIcroscopy	• High specificity and sensitivity • Able to provide an alternative diagnosis if an individual presents negative for malaria	• Requires skilled technicians and expensive laboratory equipment • Time consuming	• Regional and District Government Hospitals
Rapid Diagnostic Test (RDT)	• Moderately sensitive • Provides results within 15 minutes • Easy to administer and requires very little technical training and equipment	• If the result is negative, it is usually definitive; microscopy is the only option for an alternative diagnosis • Cannot determine the stage of infection and therefore may miss early infections and present as a false positive up to two weeks after infection has cleared	• All Government Health Structures from Health Points to Regional Hospitals administer RDTs as the primary tool to diagnose malaria.
Clinical Diagnosis	• Requires little equipment	• Low sensitivity and specificity, which may result in the overtreatment of malaria and under treatment of other diseases	• All Government Health Structures from Health Points to Regional Hospitals execute this technique if and only if RDTs and microscopy are not available.

Treatment

Once there is a diagnosis—based upon a physical exam, rapid diagnostic test, or microscopy—the patient is given medication and a treatment regimen based upon the specific malaria diagnosis of simple or severe malaria[17].

Simple Malaria

Treatment for simple malaria utilizes combination drug therapy technology. Historically, some strains of malaria parasites have successfully developed resistance to malaria treatments such as quinine and chloroquine. In recent years, the standard of care transitioned to the use of **artemisinin combination therapy (ACT)** oral drugs, which delay and discourage the appearance of resistant malaria parasite strains. ACT is a combination of two medications, not one specific drug. The base drug artemisinin is paired with a companion drug from another class. Effective

[17] "Guidelines for the treatment of malaria." Second Edition March 2010. WHO World Health Organization. Web. 15 Dec 2013.

companion drugs include but are not limited to lumefantrine, mefloquine, amodiaquine, sulfadoxine/pyrimethamine, piperaquine and chlorproguanil/dapsone. The specific type of ACT available varies between pharmaceutical production companies and location. Within Senegal the three most common types of ACT found government health structures are Coarsucam, Coartem and Duo-Cotexcin. At Government Health Structures, ACT is individually prepackaged with easy to follow instructions included. For successful clearance of malaria parasites in cases of simple malaria, ACT must be given for at least three days.

As implicated by the WHO guidelines, the standard of care in Senegal is three day treatment of ACT. The dosage level is calculated by weight and divided into four encompassing age groups: infant, child, adolescent and adult.

Infant: 2-11 months, one capsule taken two times a day (6 capsules total)
Child: 1-5 years, two capsules taken two times a day (12 capsules total)
Adolescent: 6-13 years, three capsules taken two times a day (18 capsules total)
Adult: >13 years, four capsules taken two times a day (24 capsules total)

In addition to ACT, the individual is most often prescribed a fever reducer, Paracetamol, and an antiemetic or anti-nausea medication to alleviate symptoms and improve recovery rate. They however are not required to treat the malaria infection. It is crucial that all doses of ACT are taken on schedule as failure to do so will have direct effects on the individual; malaria parasite remains active in the body, simple malaria turns into severe, and parasites build resistance to current effective ACT medications. ACT is available at all government health structures, including health points, and private pharmacies. ACT is free of charge if acquired at a government health structure and ranges from 4,000 to 6,000 FCFA at private pharmacies; depending on the pharmaceutical brand and availability. In cases of simple malaria, the individual is not required to rest at the health center and may return to their home to rest and recover on their own. The diagnosing health worker may ask the individual to return for a follow-up visit the next week.

Severe Malaria

In the case of severe malaria infection, ACT is insufficient to clear the infection. Severe malaria is always a medical emergency and treatment should begin immediately. Severe malaria treatment requires the use of intravenous (IV) or intramuscular (IM) medications. Current WHO standard of care guidelines recommends the use of one of the following for the treatment of severe malaria: IV artesunate, IV quinine, or IM artemether. This is a more recent change in protocol as previous recommendations favored the use of intravenous quinine. In clinical trials and comparison between artesunate and quinine, artesunate was proven more effective in reducing the risk of death from severe malaria. In addition, the administration of artesunate is easier to facilitate by health workers throughout

Portraying the Economic Burden

Consider finding a creative way to portray the economic burden of treatment on a community. RPCV Ben Gascoigne, Kedougou 2011-2012 calculated the total amount of money his community spent on malaria treatment for one full year. He converted the amount into the purchasing power; how many 50kg bags of rice could his village have purchased with that money? This was a more relevant statistic for his community to understand and to relate to directly. Afterward, he illustrated the statistic by placing that number of rice sacks stuffed with grass along the road throughout his community. Within one year, one village spent 3 million FCFA on malaria treatment. This is equivalent to 196 50kg bags of rice!

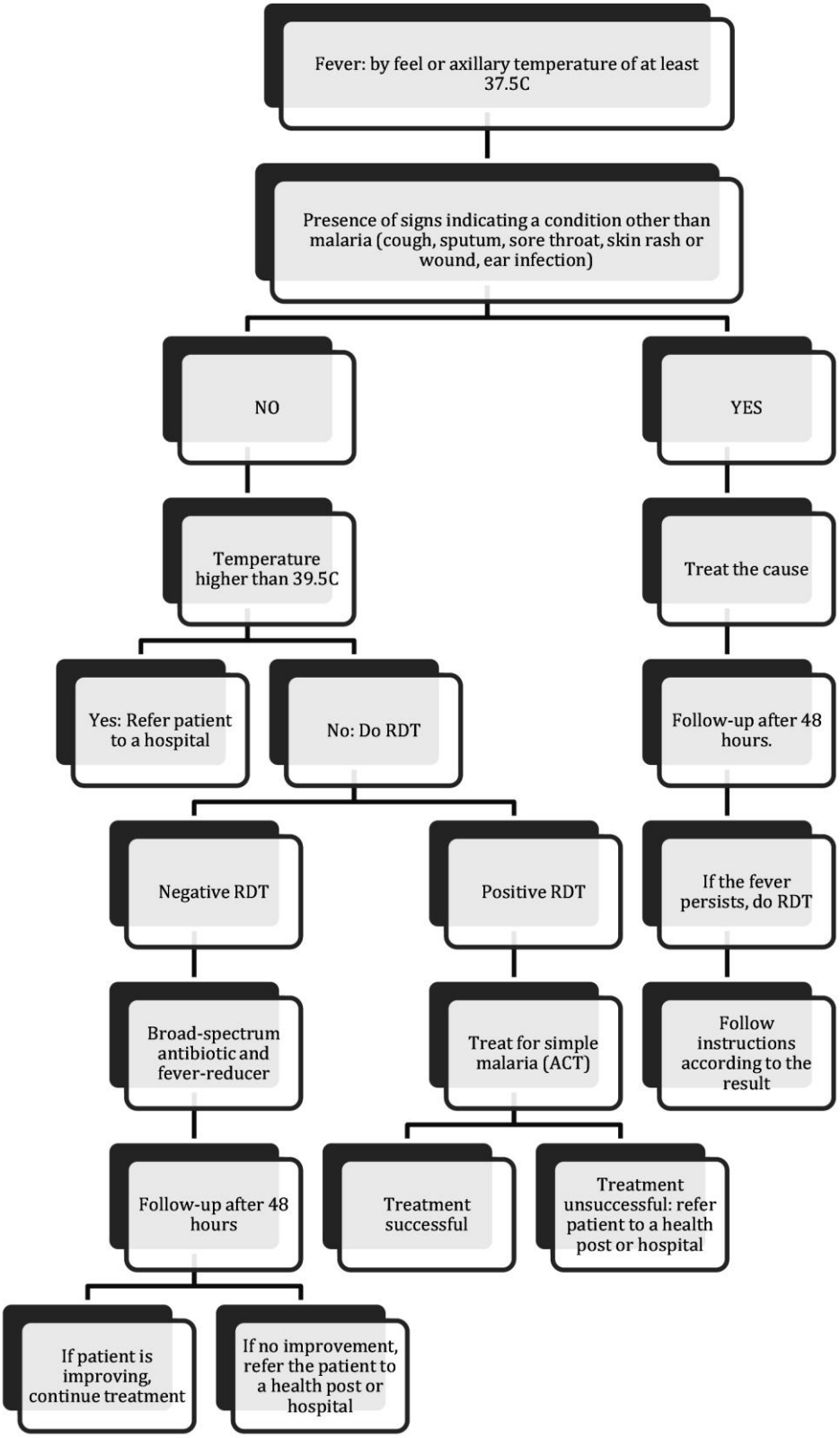
the world and differing health structure capacities as it does not require rate-controlled infusions or active cardiac monitoring. Within Senegal, the choice of treatment is at the discretion of the treating health worker, availability of medications and the administering health structure.

Individuals receiving treatment for severe malaria require intensive monitoring, nursing care and constant monitoring of vital signs. Therefore, individuals must stay at the health center until the full treatment regimen is complete. The dosage and recovery time for severe malaria vary on a case by case basis. When presenting with severe malaria, the individual is required to receive treatment for at least 24 hours. Most cases of severe malaria require at least a two to three day stay at the health structure. Following the administration of IV or IM medications, upon discharge the individual is also prescribed a three day regimen of oral ACT in the same doses as prescribed for simple malaria. According to protocol, severe malaria treatment is only available at Regional Hospitals and District Hospitals. However, in practice, it may also be available at Health Posts throughout the country.

Health Points cannot treat severe malaria. Rather, Health Points have the capacity to provide pre-referral treatment for severe malaria. This is to alleviate the signs and symptoms of severe malaria until the individual can travel to a nearby Health Post or Hospital to receive treatment. Rectal artesunate suppositories are available at Health Points and Health Posts around the country. This is not a substitution for IV artesunate, IV quinine or IM artemether. As described by the Malaria Early Treatment Theory and recent clinical trials, the use of rectal artesunate has proven effective in significantly reducing an individual's chance of death and disability due to severe malaria.

In both instances of infection—simple and severe malaria—it is crucial for the individuals to strictly follow the treatment regimen. In addition to a failure to clear the parasite from the individual, one skipped dose provides the malaria parasites the opportunity to learn the medication, adapt their structure and resist the medication during future rounds of treatment. This has very grave implications for local communities, countries and the world as drug resistance continues to arrive faster than new effective treatment options are available.

The ability to diagnose and treat malaria infections is reliant upon the availability of supplies and medications. Stock outs and the mismanagement of supplies are present at all levels of the government health system. Stock outs of malaria diagnostic tools and medications most often occur when in highest demand and during the months of peak malaria infection rates. Insufficient availability of supplies is related to the overall structure of the government health system and the Ministry of Health's coordination with partners such as USAID. In 2012 and 2013, stock outs of ACT occurred throughout most of the country due to a lack of communication between health care providers and suppliers within all levels of the health care system. Stock outs are not always due to a physical lack of supplies within the country but more often due to the location of supplies and miscommunication between the levels of the health structure.



Above is the ordinogramme used by Health Workers throughout Senegal. The ordinogramme depicts the standard of care in diagnosing and treating malaria infections.

Malaria in Pregnancy

All demographic groups in Senegal are susceptible to malaria, but pregnant women are especially at risk of contracting it and having severe effects from it. Pregnant women are particularly susceptible to malaria because pregnancy causes minor immunosuppression; therefore pregnant women are less able to fight off all diseases including malaria. Adults who have been repeatedly infected with malaria throughout their lives may become partially immune to severe malaria, but the changes in a woman's immune system during pregnancy take some of that immunity away. In addition, as the placenta grows inside of a pregnant woman, malaria parasites have more places to bind. Because of these factors, pregnant women are two to three times more likely to contract severe malaria. Malaria can cause maternal deaths directly through severe malaria or indirectly through severe anemia resulting from too many red blood cells being ruptured by parasites.

Barriers to Change

- Traditionally, talking about a pregnancy is taboo because of beliefs that it admitting one is pregnant could cause problems with the pregnancy, including miscarriage. As a result, many women wait to go to pre-natal visits or do not want to go at all.
- Health workers tend not to explain what SP is, why it's important and how often it needs to be taken. Not knowing this information may prevent women from getting enough doses of IPTp.
- Some health workers say they cannot administer IPTp because their health structure does not have the necessary materials, including clean water and cups.

Malaria can also be extremely dangerous to the fetus. In many cases of malaria, the malaria parasite enters the person's red blood cells and as it matures, changes the cells' surface properties so they become sticky, and causes them to clump together and stick to blood vessels, much like a blood clot. If the infected person is pregnant, the cluster of altered red blood cells can build up inside the placenta, causing placental malaria. This type of malaria is especially dangerous because the essential flow of nutrients and oxygen from the mother to fetus is blocked and the fetus cannot develop properly. Placental malaria can cause miscarriages, premature delivery and growth retardation. It is also associated with delivery of low birth-weight infants, which is a risk factor for infant death.

In addition, unlike in cases of malaria in a non-pregnant person, placental malaria causes the parasite filled blood cells to stay inside the placenta and not circulate through the mother's bloodstream. Since the parasites essentially hide in the placenta, a mother may have no symptoms and a rapid diagnostic test may be negative. Meanwhile, damage to the fetus occurs undetected. Women are at the highest risk of getting placental malaria during their first or second pregnancies.

In order to reduce the risks posed by malaria in pregnancy, the CDC recommends that pregnant women sleep under insecticide-treated bed nets, get diagnosed and treated with appropriate medicines if they do contract malaria, and take preventative medicine—IPTp.

Treatment

The protocol for treating malaria during pregnancy is different than the normal malaria treatment protocol. If a pregnant women contracts malaria it is automatically considered severe. It is recommended that she be treated with quinine and then take ACTs for three days when the symptoms lessen. Severe malaria should only be treated at the district level or higher, but in practice is often treated at the health post level. If a pregnant woman is first diagnosed at a health hut or health post, she should immediately be referred to a higher health structure.

Intermittent Preventative Treatment for Pregnancy (IPTp)

IPTp entails administration of medicine that prevents and treats malaria in pregnant women. It has been proven to reduce maternal anemia, placental malaria, low birth weight infants and infant mortality. If a woman is already infected with malaria, the treatment kills the existing parasites. It also prevents new infections from developing. IPTp is especially important during a woman's first and second pregnancies, for young women, and those who are HIV positive.

In Senegal, IPTp consists of 3 pills of sulfadoxine-pyrimethamine (SP), also known by the brand name, Fansidar. SP is an anti-malarial medicine that used to be commonly used to treat malaria. It is no longer used to treat the general population because resistance started developing in some places; however, it has been proven effective for IPTp even in areas where it is generally not effective for treating active cases. Three pills are considered a curative dose.

As of November 2013, the CDC recommends that pregnant women take at least two doses of SP with at least one month in between each dose. The first dose can be given after 16 weeks or perception of fetal movements. The second dose should be at least one month after that, but can be given up until the end of pregnancy. Extra doses can be given at any other visits as long as they are a month apart. If IPTp is given according to this protocol, it can prevent malaria throughout the pregnancy. IPTp is administered during pre-natal visits, with a health worker watching.

At pre-natal visits, women are also supposed to be given pills with iron and folic acid to take at home. Folic acid is important because it prevents neural tube defects. However, because folic acid and SP are both sulpha-based, high doses of folic acid can interfere with SP. Women that take SP should only take less than 0.5mg of folic acid. In Senegal, the folic acid women are provided conforms to this recommendation. In places where 0.5mg of folic acid is given out, women must wait two weeks after taking IPTp before they take the folic acid pills. Pharmacists are generally aware of these concerns. SP is normally very well tolerated by most people and does not commonly cause severe side effects. Some women have reported mild side effects including nausea, vomiting, weakness and dizziness. These side effects are more common with the first dose, and tend to decrease after subsequent doses.

According to the 2010-2011 Senegal Demographic and Health Survey 68.25% of women who had been pregnant in the last 2 years said they took SP/Fansidar during their last pregnancy. Just 40.1% took 2 or more doses. Only women who had a live birth in the last 2 years were asked this question, therefore is does not include women that may have had a miscarriage as a result of malaria. About 10% fewer women took SP/Fansidar in 2010-2011 than in 2008-2009. This is likely because there were major supply chain issues and many health structures faced stock-outs of SP.

Some regions have a higher coverage rate than others; in Thies, about 70% of pregnant women took two or more doses of SP during their last pregnancy. Yet many other regions had less than the 40% average. In Matam, the region with the lowest percentage, only 26% of pregnant women took or more doses of SP. Many factors lead to these discrepancies including the average income of families in the area and cultural norms surrounding discussing pregnancy.

4 Nutrition

Basic Nutrition

This section explains basic nutritional needs of families and potential nutrition actions for improving nutritional status of individuals and communities.

Basic Nutritional Needs of Children and Adults

The Go, Grow, Glow Model (Source: Where There Is No Doctor) [18]

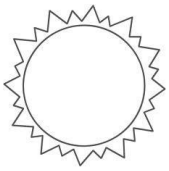
What is the connection between healthy foods and what they do for the body? This model is simple and easy to share with others when describing nutritional needs of children and adults.

Main and Go foods are those foods that contain carbohydrates, which your body breaks down to make energy. Grains and fats are included in the Main and Go food groups. Grow foods are those foods that help you grow big and strong, these are foods that contain protein including milk, eggs, meat and beans. Most importantly, foods in the Glow group help to protect your body, encourage development and boost your immune system. This group includes fruits and vegetables and all are good sources of vitamins and minerals.

- **Main foods:** Sources of energy that meet most of the body's needs
  - Cereals and grains, starchy vegetables, starchy fruit
- **Go Foods:** Energy → Carbohydrates and Fats

  - Pure fats (oil, butter, lard)
  - Fat-rich foods (nuts, oil seeds, fatty animal products, coconut)
  - Sugar, honey
- **Grow Foods:** Body Builders → Proteins

  - Legumes: beans, peas, groundnuts, soybeans
  - Nuts, oil seeds
  - Animal products
- **Glow Foods:** Protective helpers → Vitamins and Minerals



  - Vegetables
  - Fruits
  - Animal products (milk, meat, eggs, etc)

[18] *Where There Is No Doctor*, www.arvindguptatoys.com/arvindgupta/hesperian-no-doctor.pdf, 17 February 2014.

1000 Day Window of Opportunity

The Peace Corps' nutrition strategy is aligned with evidence-based best practices and is designed to combine volunteer community-level activities with the international community to eradicate hunger and malnutrition. To reach that goal, Peace Corps supports the SUN (Scaling Up Nutrition) Movement and its 1000 Days partnership, which are both engaged in maximizing the impact of nutrition work and initiating activities that are proven to be effective.

The **1000 Days Mission** is "to promote targeted action and investment to improve nutrition for mothers and young children during the critical 1,000 days from pregnancy to age 2, when better nutrition can have a lifelong impact on a child's future and help break the cycle of poverty."[2]

The impact of malnutrition during the critical 1,000 days between a woman's pregnancy and a child's 2nd birthday can last a lifetime. Malnutrition early in life can cause irreversible damage to a child's brain development, immune system and physical growth. This results in a diminished capacity to learn, poorer performance in school, greater susceptibility to infection and disease, and a lifetime of lost earning potential. The damage caused by malnutrition translates into a huge economic burden for countries, costing billions of dollars in lost productivity and avoidable health care costs. It starts with the health of the mother.

How do we do this? Through actions targeted to improve nutrition during the first 1000 days, so a child can reach his or her full potential in life. Not just any actions, tested and proven effective actions. This is where the Essential Nutrition Actions come into play.

Essential Nutrition Actions
The Peace Corps is aligned with the global body of work that continues to inform best practices and highlight high-impact activities to improve nutrition outcomes.

In the world of undernutrition, this has led to the promotion of the **Essential Nutrition Actions (ENA)**, an approach to programming that utilizes a platform of seven direct actions, and does so through multiple entry points that are directly related to the 1000 Day Window of opportunity. These seven actions are as follows:

- Exclusive breastfeeding for children through their first 6 months
- Appropriate complementary feeding practices during the weaning period of 6 to 24 months
- Appropriate feeding practices for children during bouts of illness
- Appropriate maternal nutrition
- Control of vitamin A deficiency through supplementation and food-based approaches
- Control of iron deficiency through iron supplementation and de-worming
- Control of iodine deficiency through iodization of salt and food-based approaches

Education that focuses on improving nutrition is a very important and cost-effective way to improve the health of communities around the world. If a child or adult is properly nourished, many life threatening and debilitating diseases can be prevented or diminished in intensity.

Locally Available Nutritious Foods
Using local foods to prevent and treat malnutrition is easy, cheap, and available. What are some local foods that could be a part of a good diet? Plants? Porridges? Meals?

- **Vegetables -** beets, cabbage, carrot, cassava (root), chinese turnip, cucumber, eggplant, jaxatu (bitter tomato), lettuce, okra, onion, hot pepper, green pepper, potato, squash, sweet potato (root), tomato
- **Fruit -** avocado, banana, baobab, guava, jujube (ziziphus), lemon, lime, madd, melon, orange, papaya, passionfruit, pomegranate, sapote, soursop, sweetsop, tamarind, watermelon
- **Nuts –** cashew, peanuts
- **Field Crops -** corn, cowpeas, millet, peanuts, rice, sorghum
- **Herbs and Leaves -** amaranth, basil, cassava leaves, garlic, hibiscus flowers (bissap), hibiscus leaves (bissap), lemongrass, mint, purslane, sweet potato leaves
- **Trees -** Moringa, pigeon pea
- **Animal Products-** eggs, meat, milk

In particular, cassava leaves, hibiscus, okra, squash, sweet potato leaves, and watermelon are very easy to grow and widely available.

Vitamin and Mineral Supplements
Many vitamin supplements for both children and adults are available in Senegal from health posts. Refer to the sections on Maternal Health and Childhood Vaccinations for an in-depth explanation of zinc for respiratory illnesses and diarrhea; vitamin E for children; iron, folic acid, and calcium for pregnant and menstruating women, and vitamin A and vitamin D distribution.
In addition to vitamin supplements, de-worming prevents worms from absorbing vital nutrients that should be utilized by the child.

Obstacles to Proper Nutrition
Resource Obstacles to Child Nutrition:

- Food quantity
- Food quality
- Money

- KNOWLEDGE. People want to be healthy and have healthy children! Sometimes knowledge is the biggest barrier.

Cultural Obstacles to Child Nutrition:
- Recipes often lack nutrients
- Rice is easier to cook than other base starches (like corn, millet) that provide more nutrients
- Healthier foods often considered 'village' food, not for the city slickers or patron type
- Consumption of sugar and oil in large quantities
- White bread, rice, other highly processed grains and foods digest the same way as sugar

Promoting Healthy Childhood and Family Diets
Promoting healthy childhood diets varies depending on the community, but can be very fun. Here are some general ideas to keep in mind when promoting healthy diets:
- **Educate -** Share information. This is our most important role as health volunteers. In Senegalese culture, what makes you fat is what is good for you. This is not true. Rice and oil are essential parts of the diet, but if they're the only part, or even the majority, then children and adults are at risk for malnutrition. Use your knowledge, language, and cultural sensitivity to negotiate nutritional behavior change. "This is what you are doing. Here is the information for healthier eating habits. Can we meet in the middle?" Take small steps, work with children, youth groups, and women.
- **Observe -** Look at what people are already doing well, and enhance it.
- **Lead by example -** Bring vegetables as gifts to your family. Cook foods that are healthy and share them. Have a personal garden.
- **Work with the health system -** Get involved to help address immediate concerns – screen for malnutrition, refer people to health facilities, and act as a bridge between the community and the health facility.
- **Get dirty in agriculture work -** Work with agriculture volunteers and community farmers on personal, family, and community gardens. Do moringa extension. Work with Master Farmers and their communities in your area.

Most importantly, USE THE RESOURCES AVAILABLE IN YOUR COMMUNITY. Whether that's a motivated mother, a health post, a beautiful vegetable garden, or an awesome weekly market, take advantage of what's already there, don't dwell on what's lacking or what should be introduced.

We tend to see culture as the barrier to change. Let's start looking at culture as the key to change, the strength. This is an advantage that we have as Peace Corps Volunteers in Senegal – we learn the language, the culture, and even though it is difficult and sometimes confusing, live and work in the communities. We can use and develop this skill, and combine it with our knowledge of nutrition, to successfully act and improve nutrition.

Here are some specific examples of current projects done by PCVs in Senegal that may work for your community:
- Talk to women in their own homes about what they cook and why. Start the conversation.
- Work with or help start gardens in your community or household, extend improved agriculture techniques/knowledge to increase yields and quality of existing crops
- Cook porridges with your community to address malnutrition and/or to sell
- Hold informational causeries at the local health facility, or even better, in the fields and Master Farms in your community
- Teach nutrition classes and have fun activities at the local school. Work with school gardens.

- Have a nutrition booth at your local weekly market. Make it relevant to your area and the seasons (e.g. cashew apple season, mango season, grain harvest, vegetable growing season; make the information relevant to what is available)
- Host an 'Iron Chef' Nutrition Cooking competition
- Work with hospital gardens – have a voucher system for malnourished patients

Moringa

The *Moringa oleifera* tree is a fast growing, highly nutritious tree grown for the leaves and as live fencing. It can grow in almost any soil type under many conditions and can be grown from both seed and cuttings. Moringa is nitrogen-fixing and has a deep taproot so it does not compete with other plants, making it an ideal tree for fields and gardens. Moringa only requires watering for the first three months of life and can be planted any time of year.

Gram for gram, moringa leaves contain:
- 7 times the vitamin C in oranges
- 4 times the calcium in milk
- 4 times the vitamin A in carrots
- 2 times the protein in milk
- 3 times the potassium in bananas

For a child aged 1 to 3 years, a 100-gram serving of fresh moringa leaves provides:
- ALL their daily requirements of vitamin A, vitamin C, and calcium
- 75% of their daily iron requirement
- 50% of their daily protein requirement

25 grams of dried leaf powder (approx. 3 spoonfuls) will provide and infant with following recommended daily allowance:		50 grams of dried leaf powder (approx. 6 spoonfuls) will provide a pregnant or breast-feeding mother with the following recommended daily allowance:	
Protein	42%	Protein	21%
Calcium	125%	Calcium	84%
Magnesium	61%	Magnesium	54%
Potassium	41%	Potassium	22%
Iron	71%	Iron	94%
Vitamin A	272%	Vitamin A	143%
Vitamin C	22%	Vitamin C	9%

Important Conversions to Consider:
- 1 liter of fresh leaves = 155 grams; 2 liters of fresh leaves = 400 grams
- 1 liter of fresh leaves = 155 grams fresh leaves = 40 grams dry powder = 5 spoonfuls dried powder

If you are looking to improve the food security of your community in the quickest, most cost effective way, moringa propagation is an ideal project. It's easy, cheap, and has many proven benefits for our bodies and fields. Intensive moringa beds, live fences, and home tree plantings can be replicated on a small- or large-scale in a short amount of time.

Moringa is promoted by all sectors in PC Senegal. The Preventative Health sector promotes moringa for its nutritional benefits, the Agriculture sectors promote it as a fast-growing and

multi-use live fence and alley cropping species, and the Community Economic Development sector promotes it as a means to generate income. Moringa connects all the Peace Corps Senegal sectors into the food security mission, and if we work together, we can help support all pillars of Food Security in our communities: Availability, Accessibility, Utilization, and Stability.

For those who know the tree, moringa is highly valued for leaf sauces in Senegal. People like the taste and it's very easy to grow. You can promote moringa by first increasing availability of knowledge and resources to begin moringa production. You can create intensive moringa beds in homes or community gardens, plant moringa as a live fence or alley crop, encourage its use as the leaf sauce for the evening couscous bowl, and demonstrate how to dry the leaves for later use or sale.

Especially in areas where fruits and vegetables are scarce, moringa can be promoted as a way to prevent and help treat malnutrition. Moringa leaves, bark, roots, flowers and pods also have many medicinal benefits. For more extensive information on moringa history, uses, recipes, and propagation, see "Moringa Manual for Peace Corps Volunteers and others, 2004 edition" provided on the PC Senegal Drive.

Maternal Health and Nutrition

Pre-Natal Visits
Women should visit their local health post three times (during the 1st, 3rd and 6th month of pregnancy) before the birth of their baby to monitor their progress in pregnancy and receive important supplements and preventative care. These visits are not expensive; all the supplements not marked as free usually amount to less than 1000 CFA per visit. Pregnant women are also eligible for a free mosquito net and should request one at their first visit.

- **1st month -** Women should receive iron and folic acid supplements, Vitamin C supplements, and a tetanus shot (free)
- **3rd month -** Women should receive the same things as in the 1st month visit, and additionally SP Fansidar malaria prophylaxis (free)
- **6th month -** Women should receive iron and folic acid supplements, Vitamin C supplements, and SP Fansidar malaria prophylaxis (free)
- **9th month (birth) -** Women should receive iron and folic acid supplements, Vitamin C supplements, and Vitamin A supplements (free)

Ante-Natal Visits
Women should visit the health post three times after giving birth to monitor the health of the new baby as well as the mother. These should occur at 1 week after the birth (women should receive Vitamin A supplements at this time), 2 weeks after the birth, and 7 weeks after the birth.

Essential Nutrition Actions (ENAs) Relating to Maternal Nutrition:
Pregnant women should eat **one additional meal per day** as part of a balanced, varied diet which includes:

- **Iron** *(fer)* - To help prevent premature delivery and anemia for the mother. Found in beans, beef, eggs, hibiscus leaves, onions, tomatoes
- **Vitamin D and Calcium -** To help with the baby's bone development. Found in dairy products, eggs, fish, moringa leaves
- **Folic Acid/Folate** *(acide folique)* - Helps prevent early miscarriage and premature delivery. Found in avocadoes, beans, hibiscus leaves, lentils, okra, oranges, papayas, and peanuts
- **Choline -** Helps with the baby's neural and brain development. Found in beef, eggs, and fish.

Foods that contain 2 or more of the above vitamins and minerals (good to recommend to pregnant women): beans, beef, eggs, fish, and hibiscus leaves.

Breastfeeding women should eat **two additional meals per day** (to replace the 500 calories a day lost in breastfeeding) as part of a balanced and varied diet which includes the same recommended vitamins and minerals for pregnant women and additionally:

- **Vitamin A** - To help protect from infection. Found in hot peppers, carrots, baobob leaves, moringa leaves, mangoes, papaya, and palm oil.
- **Protein** - To help build protein in breast milk. Found in meat, beans, moringa leaves, eggs, and fish.

Breastfeeding women also require more **water** than average and should drink water every time they breastfeed to replenish fluids.

Iodine is also important for pregnant and breastfeeding women, to help with the baby's brain development, and to prevent goiters. Iodine deficiency is the leading cause of mental retardation. Iodized salt (*sel iode*) is widely available, and new Maggi® cubes also contain iodized salt.

Caffeine (ie. attaya, coffee) should be avoided or consumption should be minimized as it disturbs the baby. The WHO recommends a maximum of 2-3 cups of caffeinated drinks a day.

Activities to be avoided during pregnancy:

- heavy lifting
- pounding
- squatting/deep lunges
- activity during extreme heat

Women work very hard here in Senegal and unfortunately that means that pregnant women are often expected to perform heavy domestic work. These activities are to be avoided to ensure the proper development of the baby.

Possible unhealthy behaviours or misconceptions to look out for in Senegal:

- Pregnant women eating less at the end of pregnancy 'to make the baby smaller'
- Protein-rich food causes the baby to be bigger and therefore harder to get out
- Pregnant and nursing women fasting during Ramadan
- Pregnant and nursing women being discouraged from eating more than usual or more than other women

Intervention Techniques:

- Women's groups and CARE groups
- One-on-one conversations during baby growth monitorings, pre-natal visits and home visits
- Relais and matrone trainings
- Visual aids such as murals and flip charts
- Men as partners– Think of creative ways you can include the men in your community in this important conversation on maternal nutrition, they are frequently responsible for budgeting for foods eaten in the household

Infant Feeding

Infant feeding refers to the crucial nutritional intake of infants. The most important time period for infants to receive proper nutrition is during the window from birth to six months of age.

During this time, infants should feed exclusively on their mother's breast milk. Early and **exclusive breastfeeding** is the single most critical element to ensuring a child's survival, growth and development. Immediate and exclusive breastfeeding helps encourage sensory and cognitive development and protects the baby against infectious and chronic diseases. Exclusive breastfeeding diminishes infant mortality due to diarrhea, pneumonia, and other common childhood illnesses, as well as helps accelerate recuperation in the case of illness.

Breast milk provides an infant under 6 months of age with all the energy and nutrients that (s)he needs. Immediate and exclusive breastfeeding also benefits the mother in the following ways:

- Helps stop post-partum hemorrhage
- Reduces maternal risk of acquiring type-2 diabetes, uterine cancer, and ovarian cancer
- May reduce vulnerability of mothers to post-partum depression
- If done properly, the mother's body will refrain from ovulating, a natural form of birth control (see lactational amenorrhea below)

Important Terms in Infant Feeding:

- **Immediate and Exclusive Breast Feeding –** A newborn should be immediately breastfed after birth. As mentioned above, this breastfeeding should be exclusive for the first six months of life. Exposure to foods and liquids other than breast milk can put a baby at extreme risk.
- **Colostrum –** This is a thick yellow/orange liquid that is the first secretion from the mammary glands starting during pregnancy until after giving birth. This liquid is essential to the newborn's nutrition as it is responsible for providing a large dose of antibodies to the baby (the baby's first vaccination) and primes the baby's sensitive stomach to begin consuming breast milk.
- **Latching –** When the baby's mouth assumes the correct position around the nipple such that it can feed easily and readily. In order to latch properly the baby needs to be properly aligned with his/her mother's breast body. Sub-optimal latching is a major problem for an infant's nutrition. Improper latching/breastfeeding position can also cause acute pain for the mother.
- **Skin-to-Skin Contact -** This concept is essential during the newborn's first few hours. The baby should be put in immediate and direct contact with his/her mother's body. This skin-to-skin contact helps the baby's skin populate with good bacteria. It also helps regulate the baby's body during its most vulnerable hours of life.
- **Lactational Amenorrhea -** If a mother is exclusively breastfeeding and the baby is feeding at least 10 times per day, the mother's body will normally refrain from ovulating, and she will not have her normal menses during this time.

Cradle Hold

CRADLE HOLD CROSS CRADLE HOLD TWIN CRADLE HOLD TWIN CROSS CRADLE HOLD

The cradle hold is similar to the cross-cradle hold, but you support the baby with your arm on the same side as the nursing breast. As with the cross-cradle hold the mother should sit up straight. The baby's head should rest comfortably in the crook of the mother's arm as he or she faces the breast.

The cross-cradle hold is ideal for early breast-feeding. The mother should sit up straight and support her arm. The baby is brought across the front of the body, the mother and baby's stomach should touch. The back of the baby's head should be supported. The baby's mouth should be guided towards the breast. The mother should not bend over or lean forward.

Football Hold (most comfortable for women who have had a C-section)

FOOTBALL HOLD TWIN FOOTBALL HOLD

Another option is the 'football hold.' This position might be good choice if the mother is recovering from a C-section or if the mother has very large breasts. The mother should hold the baby at her side with her elbow bent. With her open hand she should support the baby's head and face him or her toward her breast. The baby's back should rest on her forearm.

The football hold can also work for twins. This allows a woman with twins to breast feed twins. It is essential that both twins are able to attain an optimal feeding alignment. They can also be fed one by one, alternating breasts.

Lying Down (most comfortable for women who have had a difficult delivery or for night feeds)

SIDE LYING POSITION

A lying position is also conducive to good breastfeeding alignment. Lie The mother should lie on her side and face the baby toward her breast, supporting him or her with one hand. With the other hand the mother should touch her nipple to the baby's lips. Once her baby latches on, she should use one arm to support her own head or help support the baby.

Behavior Change and Infant Feeding

- **Barrier Analysis** – A good activity to do before you write a grant or start a major project to address infant nutrition is a thorough barrier analysis. See the PACA handbook for more information.
- **Addressing Barriers -** An effective way to address barriers to behavior change in infant and child nutrition is to look for "bright spots" or "positive deviants." These can be mothers who have successfully exclusively breastfed their children, or birth attendants who make sure that mother and baby have direct contact after birth. Work with these people to bring the message to your community; using a good example and scaling up on good behaviors can be more effective than simply campaigning against bad behaviors.

How can you address proper infant feeding at site?

First and foremost, you should make sure you can talk about this in your local language. If you are having trouble, use the French vocabulary list below and ask your local ICP or midwife (*sage femme)* for assistance in translating these key terms. Be sure to ask how your health post/health point has addressed these topics in trainings for health relais and in causeries or home visits in your community.

- *Allaitaint* – (adj.) – breast-feeding
- *Allaitement – (n)* - breastfeeding; lactation
- *Allaitement au sein exclusif – (n)* –exclusive breastfeeding
- *Aménorrhée (n)* - the absence of menses after giving birth (lactational amenorrhea – if the mother is exclusively breastfeeding her body will not ovulate and thus she will not have menses during this time)
- *Anticorps* – Antibodies (provided by mother's milk and skin-to-skin contact)

Other ideas for activities at site that can address infant feeding:

- A causerie for pregnant women in your community on post-partum nutrition for mother and baby
- A visual aid and causerie in a location where you know your target audience (lactating mothers/pregnant mothers) will be, i.e. a market, a baby growth monitoring, a baptism/naming ceremony, a women's group meeting

- A public and very visible mural
- Home visits. These visits are crucial for good one-on-one counseling with lactating or pregnant mothers. Make sure your community counterpart (relais, ASC, etc.) is with you
- If a woman is having acute pain while breastfeeding, ask your ASC or local midwife to help you discuss proper breastfeeding positioning with her
- No water for babies campaign – During hot season, women will often give their infants water, saying that they are 'thirsty.' Before hot season comes, talk to your ASC about formal and informal ways to campaign against water for infants under 6 months
- Men as Partners – Think of creative ways you can include the men in your community in this important conversation on infant feeding via causeries or informal conversations

Statistics relevant to Infant feeding in Senegal[19]

- In Senegal, only one third of newborns are exclusively breastfed for the first 6 months of life
- Less than 1 in 4 newborns receive breast milk within the first hour of life
- If all newborns in Senegal were exclusively breastfed until the age of 6 months, under-five child deaths rates would decrease by 30%
- At age 2, 51% of children are still breastfeeding

Child Weaning and Complementary Feeding

The window of a child's lifetime between birth and two years of age is widely recognized as crucial to his/her nutritional, behavioral, and cognitive development. Optimal feeding is crucial to this development.

Breast feeding should continue for the first two years of a child's life, but starting at 6 months of age, children must be provided with adequate, safe, age-appropriate food. At 6 months, a child's nutrition requires the introduction of micronutrients from nutrient-dense, quality foods in sufficient quantities, paired with breastfeeding. The extra food is meant to complement breast milk and is called **complementary feeding**, and the gradual transfer from breastfeeding to solid foods is referred to as **weaning.**

Complementary Feeding Basics

Even with optimal breastfeeding, children will become stunted (low height for age), if they are not fed adequate complementary foods at the appropriate time. Since the mother's breast milk cannot provide all the micronutrients necessary for optimal growth past 6 months of age, complementary feeding at 6 months is strongly encouraged to fill an energy and micronutrient gap. As a child gets older, the number of times that the child is fed in addition to breast milk must be increased. This complementary feeding practice continues until at least age two, at which point the child can be fully weaned off breast milk.

What is this energy and micronutrient gap? Once the child reaches 6 months of age, the calories and nutrients available for a child through breast milk are no longer sufficient as the child's overall energy requirements increase. This leads to an energy gap that continues to widen from 6 months through 2 years of age. This gap must be filled by appropriate complementary feeding, so the child can receive sufficient calories and micronutrients, including vitamin A and iron. If energy density or quantity of food per meal is low, or the child is no longer breastfed, more frequent meals or snacks may be required. These are generally convenient and easy to prepare and can often consist of meal leftovers.

[19] Photo Essay Supporting Breastfeeding in Senegal, http://www.unicef.org/wcaro/english/5233.html, UNICEF 19 February 2014.

Providing nutrient-dense complementary foods, nutrient-fortified foods, and vitamin-mineral supplements for children is important, especially when children are not receiving adequate amounts of "glow" foods. A plant-based diet may not fill all of a growing child's needs, especially in terms of protein, iron, zinc and calcium, in which case fortified foods or more nutrient-dense complementary foods should be included in the diet. Vitamin A-rich fruits and vegetables should be eaten daily. Fats are essential to growth and nutrient absorption, especially of vitamin A. The child must intake a significant amount of fat in his/ diet through animal products, nuts and seeds, or oil.

Food Consistency in Complementary Feeding

Simple mashed-up foods such as sweet potatoes, squash, and other vegetables and fruits are great complementary foods. Weaning porridges, such as *ceramine*, can also be important additions to a complementary feeding program. By 12 months, infants can usually eat the same types of foods consumed by the rest of the family, in addition to breast milk. Refer to the "Go-Grow-Glow" model for more ideas of appropriate complementary food ingredients. The child must eat a variety of foods to ensure that nutrient needs are met. Meat, poultry, fish or eggs should be eaten daily, or as often as possible. Usually vegetarian diets cannot meet nutrient needs at this age unless nutrient supplements or fortified products are used. Children should avoid drinks with low nutrient value, such as tea, coffee and sugary drinks, as they merely displace more nutrient-rich foods without adding nutritional value.

Feeding Behavior in Complementary Feeding

- Feed infants directly by hand. Do not allow them to feed themselves exclusively. Assist older children when they feed themselves as well
- Be sensitive to their hunger and satiety cues
- Feed slowly and patiently. Encourage children to eat, but do not force them
- If children refuse many foods, experiment with different food combinations, tastes, textures and methods of encouragement
- Minimize distractions during meals

Feeding Frequency in Complementary Feeding

At 6 months of age, babies need just 200 calories; at 9-11 months, between 300-400 calories; and after a year, at least 550 calories. In general, for children and adults, 45-65% of calories should come from carbohydrates, 20% of calories from protein, and 15-35% of calories from fat. The appropriate number of feedings depends on the energy density of the local foods and the usual amounts consumed at each feeding. For the average healthy breastfed infant, meals of complementary foods should be provided 3-4 times per day at 12-24 months of age, with additional nutritious snacks (such as a piece of fruit or bread) offered 1-2 times per day.

Behavior Change

A Barrier Analysis can be especially helpful to analyze why proper complementary feeding isn't occurring. Another useful PACA tool for determining the appropriate behavior change intervention is the seasonal calendar. This method allows for an understanding of the complementary food ingredients available at different times in the year (see PACA handbook).

How Can You Address Child Weaning and Complementary Feeding at Site?

Remember, you are not in it alone. Engage your work partners – many ASCs have been trained on this information already and those who have not been trained are generally eager to pursue projects in this important area. Also, there are many NGOs that are currently engaged in nutrition-related projects at Peace Corps sites. Ask your counterparts and fellow volunteers if NGOs like Counterpart International, ChildFund, USAID Yajeende, and Helen Keller International

are active in your area or if they have conducted any recent trainings (*formations*). If they have, learn their target populations *(populations ciblées*) for their projects. Some organizations have introduced pre-packaged complementary or therapeutic feeding products in certain communities – ask your ASC or ICP if they have access to pre-packaged foods often made for supplementing complimentary feeding or the rehabilitation of moderate/severe acute malnourished children (these might include Nutributter®, Plumpy'Sup® or Plumpy'Nut®). When considering these options, please be sure and research the specific product and its intended purpose before making any recommendations.

Volunteers have successfully addressed complementary feeding through causeries, cooking demonstrations, home visits, care groups, tourneys and murals. For complementary feeding recipes, see the appendices.

Malnutrition

This section will address how malnutrition impacts health, the causes of different types of malnutrition—stunting, wasting (marasmus and kwashiorkor)—and how to recognize the signs and symptoms of malnutrition in children.

Malnutrition occurs when a person's diet is lacking in calories, essential nutrients, vitamins, and/or minerals. While malnutrition is usually associated with a lack of calories, it is possible to consume enough calories and still be malnourished.

According to the World Health Organization, malnutrition is the single greatest threat to the world's public health, in both developed and developing countries.

Malnutrition Statistics

- The United Nations Food and Agriculture Organization (UNFAO) estimates that nearly 870 million people, or one in eight people in the world, were suffering from chronic undernourishment in 2010-2012[20]
- In 2010-2011, approximately 10% of children under 5 in Senegal were malnourished. That number ranged from 6% in Dakar to 21% in Kaffrine (DHS 2012-2013).

What about global trends in malnutrition? Is it getting better or worse?

- In the last 10 years the number of undernourished people decreased nearly 30 percent in Asia and the Pacific, largely due to socio-economic progress in many countries in the region. Latin America and the Caribbean also made progress in decreasing the number of undernourished people during the same time period.[1]
- The number of undernourished grew in Africa over the same period, with nearly 20 million added in the last few years. Specifically, in sub-Saharan Africa, the progress achieved up to 2007 was reversed, with hunger rising annually by 2 percent. As of 2012, an estimated one in four were hungry.[1]

Poor nutrition is considered the single largest threat to global public health. It plays a role in over five million child deaths per year, more than half of the total number of child deaths. By compromising the immune system, malnutrition magnifies the effect of every disease, including measles, pneumonia, diarrhea, and malaria. The estimated proportions of deaths in which malnutrition is an underlying cause are roughly similar for diarrhea (61%), malaria (57%), pneumonia (52%), and measles (45%) (Black 2003, Bryce 2005).

[20] World Hunger Facts, http://www.worldhunger.org/articles/Learn/world%20hunger%20facts%202002.html, 18 February 2014.

Causes of Malnutrition

One of the major causes of malnutrition is the lack of **Food Security**, a combination of social, cultural, political, economic, physical and ecological factors that can affect an individual or a community's consumption of food. Cost of food, availability of food, and seasonality can all be factors in food insecurity.

Food insecurity not only causes malnutrition but can also impact the following:

- Human capital: the ability to continue with education or maintain good health
- Financial capital: household finances etc.
- Physical capital: assets
- Natural capital: the ability to protect the use of natural resources, including trees for firewood and soil nutrient
- Social capital: family, friends and business relationships

These deficiencies caused by food insecurity often lay the foundation for both the indirect and direct causes of child malnutrition at the household level.

Indirect causes of malnutrition:

- **Inadequate care practices -** Individual behaviors in the household can impact the nutritional status of a child. Examples of these include inadequate breastfeeding, irregular bathing and washing, and sub-optimal feeding practices (such as too little food, a diet of low nutritional quality, or cultural beliefs that contradict nutritional science).
- **Unhealthful environment and lack of services -** These include water and sanitation issues, such as the practice of open defecation or collecting water from a contaminated water source. They also include access to health services linked to public health, including lack of child immunizations (often due to inaccessibility of immunizations caused by distance to a clinic or stock-outs).

Direct or Immediate causes of malnutrition:

- **Inadequate Diet -** This is the simplest cause of malnutrition. It occurs when the child is not consuming enough food, is consuming the wrong kind of food, or does not have enough nutritional variety of food.
- **Illness/Disease** - The body's ability to utilize nutrients in food is compromised during sickness, while the nutritional needs of the body increase.

Types of Malnutrition

Overnutrition

Overconsumption of foods that are energy-dense but nutrient-poor can result in overweight or obese individuals and is referred to as **overnutrition**. It can be caused both by eating the wrong types of foods and by eating too much food. Examples of some energy-dense but nutrient-poor foods are oil, rice, white bread, white flour products, and sugar. Even in cases of calorie abundance, deficiencies of certain micronutrients can be common. Additionally, the abundance of calories and weight gain are both risk factors for a number of chronic diseases, including diabetes, hypertension, heart disease, and stroke, all diseases suffered by people in Senegal as a result of overeating certain foods. Within one family, it is possible for some individuals to be suffering from overnutrition and others from undernutrition.

Undernutrition

Stunting, one form of undernutrition, is a reduced growth rate in human development represented in the low height of a child. It is associated with chronic malnutrition, which occurs over a long period of time. Chronic malnutrition can even begin when a child is a fetus. While stunting is only visible in the height of a child, chronic malnutrition also leads to slow and

improper development of the brain and other organs. Stunting/chronic malnutrition can often be difficult to detect.

Wasting, another form of undernutrition, is the loss of muscle and fat tissue due to disease. It is associated with acute malnutrition, which occurs rapidly and often is the result of severe protein deficiency. There are two types of acute malnutrition: Moderate Acute Malnutrition and Severe Acute Malnutrition.

Moderate acute malnutrition (MAM) is defined as a weight-for-height index between -3 and -2 z-scores (standard deviations) of the international standard or by a mid-upper arm circumference (MUAC) between 11 cm and 12.5 cm ("in the Yellow"). It is often not obvious without weighing the child or measuring the MUAC. More information is available in the Growth Monitoring section.

It is important to identify malnutrition as early as possible in this 'moderate' stage, which is possible at a community level by members of that community. The earlier malnutrition is recognized, the more effective interventions will be.

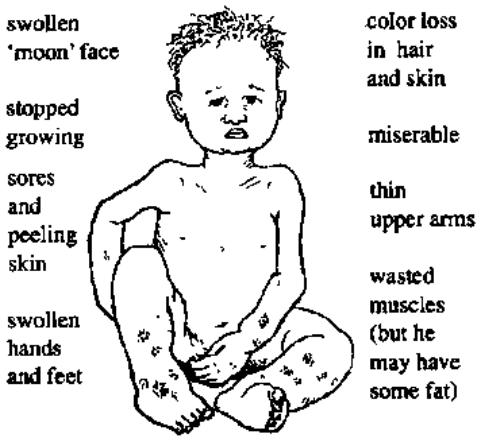
Severe acute malnutrition (SAM) needs IMMEDIATE and intense intervention because if it is not treated it can result in death. The first and most obvious symptom of SAM is severe wasting. There are two types of severe acute malnutrition: marasmaus and kwashiorkor.

1. Marasmus is caused by severe deficiency in proteins and carbohydrates (lack of "Go" and "Grow" foods). It is the result of starvation and is represented by severe wasting.
Signs and symptoms:

- Extreme growth failure: body weight very low, thin muscles and thin fat
- Children are irritable and eat a lot when presented with food (no anorexia)
- Hair is normal and there is no edema (swelling of the body)
- Seen more often in children under 1 year of age

2. Kwashiorkor is caused by a diet deficient in proteins (lack of "Grow" foods) but contains calories from carbohydrates.

- Edema present: a distended belly and swollen face, feet, and legs
- Thin muscles but fat is present
- If the swollen legs have open sores, the kwashiorkor is in a very late and severe stage
- Skin changes in pigment or peeling, as well as changes in hair
- Irritability and poor appetite are common
- It is more common in children over 18 months of age.



In your community, you are more likely to see less severe symptoms of malnutrition in children, such as low weight and stunting

Micronutrient Deficiencies

Hidden hunger, another name for micronutrient deficiencies, occurs when an individual does not get an adequate amount of micronutrients—vitamins and minerals found in the diet and needed by the body in small yet essential amounts. Micronutrients include dietary vitamins and minerals such as zinc, iodine and vitamin A, and they are necessary for the healthy functioning of all of the body's systems, from bone growth to brain function. Deficiency in micronutrients can occur due to a lack of intake, absorption, or utilization. Not having enough of a micronutrient in the diet is just half of the problem: the individual may not absorb the micronutrient because of chronic or acute diarrhea.

According to the World Health Organization, 1 out of 3 people living in developing countries face vitamin and mineral deficiencies.

Examples of essential micronutrients and the associated deficiency diseases:

- **Vitamin A -** Vitamin A deficiency can cause night blindness and reduces the body's resistance to disease. In children, vitamin A deficiency can also cause growth retardation.[21]
- **Iron -** Iron deficiency is a principal cause of anemia. Two billion people— over 30 percent of the world's population— are anemic, mainly due to iron deficiency, and, in developing countries, frequently exacerbated by malaria and worm infections. For children, health consequences include premature birth, low birth weight, infections, and elevated risk of death. Later, physical and cognitive development can be impaired, resulting in lowered school performance. For pregnant women, anemia contributes to 20 percent of all maternal deaths (World Health Organization).
- **Iodine -** Iodine deficiency disorders (IDD) jeopardize children´s mental health and often their very lives. Serious iodine deficiency during pregnancy may result in stillbirths, abortions, and congenital abnormalities such as cretinism (a grave, irreversible form of mental retardation that affects people living in iodine-deficient areas of Africa and Asia). IDD also causes mental impairment that lowers intellectual abilities at home, at school, and at work. [2]

It should be noted that the types of malnutrition mentioned above are not mutually exclusive. For example, a severely stunted child is likely to have deficiencies in one or more micronutrients or individuals can experience symptoms from marasmus and kwashiorkor at the same time.

For a comprehensive list of deficiency diseases, symptoms, and foods with high levels of specific micronutrients reference "From the Ground Up: A Nutritional Guide to the Fields of Senegal" in the PC Senegal Drive.

Malnutrition Treatment

This section explains what to do if you come across moderate or severe acute malnutrition. Depending on the severity of acute malnutrition, different approaches are taken to manage the malnutrition. This is known as the Integrated Management of Acute Malnutrition.

Treatment of MAM (Moderate Acute Malnutrition)

Early treatment is extremely important to prevent MAM from becoming Severe Acute Malnutrition. According to the World Health Organization:

[21] World Hunger Facts, http://www.worldhunger.org/articles/Learn/world%20hunger%20facts%202002.html, 18 February 2014.

The dietary management of children with moderate acute malnutrition is based on the optimal use of locally available foods to improve nutritional status and prevent severe acute malnutrition. In situations of food shortage, or where some nutrients are not sufficiently available through local foods, supplementary foods have been used to treat children with moderate acute malnutrition.

In addition to encouraging the caretaker to take the child to the clinic, Volunteers and work partners can develop activities that seek to improve the types of complementary foods consumed through activities such as causeries, porridge classes, and community/homestead gardens.

In some regions, programs exist to provide food supplements to families with moderately acute malnourished children, for example two week long supplemental feeding programs at the health clinic. It is important that families are encouraged to participate in these programs; the additional calories they provide can be essential to improve the nutritional status of these children and prevent MAM from developing into SAM.

Treatment of SAM (Severe Acute Malnutrition)
Marasmus and kwashiorkor are both manifestations of severe acute malnutrition and can be present with or without complications

Without Complications
If a child has severe acute malnutrition without complications, meaning the child:

- Has an appetite
- Is free of infection
- Is alert and responsive

This child must be referred to a clinic/health facility to participate in a therapeutic feeding program, either in the clinic or as an outpatient. This could involve feeding the child Plumpy'Nut® or a local porridge for two weeks. There may be government or NGO funded programs available, it depends on your location and the resources available to your health facility.

With Complications
If any of the following signs are observed, indicating SAM with complications:

- Severe edema (distended belly and swollen face, feet, and legs)
- High fever
- Dehydration
- Listlessness
- Lack of appetite
- Infection or other major health problem

This child must be IMMEDIATELY referred to a health clinic or hospital. Their condition is beyond our ability as Volunteers to address.

Micronutrient Deficiency Treatment
Recognizing specific micronutrient deficiencies can be challenging. However, by incorporating micronutrient-dense foods into a child's diet, many micronutrient deficiencies can be prevented or treated. For example:

- **Vitamin A –** carrots, papaya, sweet potato, fortified oil, vitamin A supplementation
- **Iron–**red meat, beans, leafy greens (sweet potato leaves, bissap), iron pills for women (not

for children, can be poisonous)
- **Iodine—**fish, yogurt, milk, eggs, iodized salt

Evidence-Based Nutrition Interventions and Volunteer Initiatives

Essential Nutrition Actions are evidence-based, proven-effective nutrition actions to prevent MAM and SAM from manifesting. See the section on Basic Nutrition for the list of Essential Nutrition Actions. In addition, household food security can be improved through:

- Increasing food production (gardens, improved agricultural techniques)
- Reducing agricultural losses (improved agricultural techniques and storage)
- Generating income and increasing purchasing power
- Other actions that increase the access to or availability of food items generally

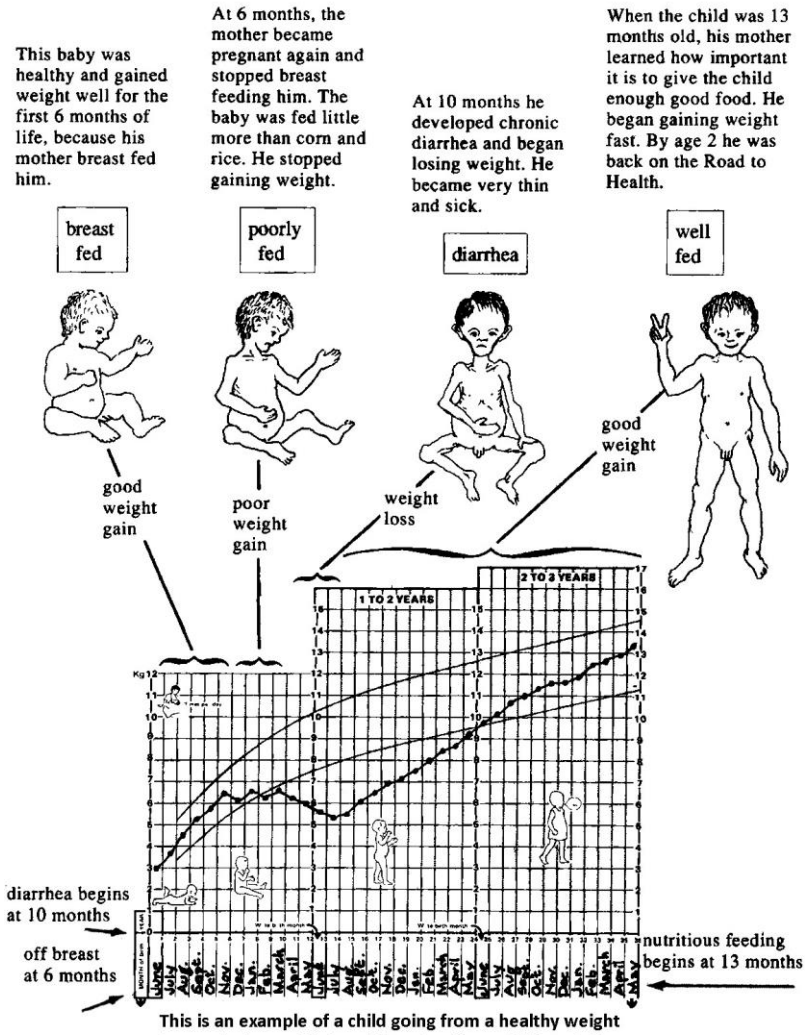
Care practices include:

- Breastfeeding
- Participation in immunization and Vitamin A supplementation programs
- Complementary feeding
- Proper hygiene maintenance

Optimizing these behaviors can improve dietary quality and quantity while minimizing the risk of disease.

Additionally, practicing responsive feeding and creating positive feeding experiences can improve the adequacy of dietary intake for children and their cognitive development. Responsive feeding refers to approaching child feeding with an interactive and supportive tone rather than a negative one. This is especially important for children going through a feeding program to treat malnutrition. Volunteers can include this concept into their activities and discourage caretakers from "forcing" food items and choices upon children or creating a negative feeding experience. Eating should be a positive experience, a special treat for the child.

Volunteers can also work with communities to address aspects of community and household sanitation. Proper disposal of trash, elimination of breeding sites for vectors (rats, mosquitoes, flies, etc.), and promotion of the use of latrines or otherwise improved methods for human waste disposal are all possible areas through which volunteers can work toward the reduction of malnutrition.



This is an example of a child going from a healthy weight for age to low weight, and then healthy weight again between birth and two years of age.

Growth Monitoring: A child who grows well is healthy

We are guilty of many errors and many faults, but our worst crime is abandoning the children, neglecting the foundation of life. Many of the things we need can wait. The child cannot. Right now is the time his bones are being formed, his blood is being made and his senses are being developed. To him we cannot answer "Tomorrow." His name is "Today." Gabriela Mistral, 1948

Why have growth monitoring programs?

- Growth monitoring allows early detection of children with growth retardation, malnutrition (or at risk of malnutrition) all of which are frequently associated with other illnesses and even mortality
- Growth monitoring can greatly strengthen preventative health problems
- Growth is the best general index of the health of an individual child
- Birth weight is of particular significance in determining the nutritional status of a community; low birth weight is a good indicator of subsequent illness and death in children
- Programs provide a forum to teach mothers about child health and nutrition
- Programs encourage self-reliance and responsibility of mothers and other members of the community

- Programs bring mothers together to discuss common problems, explore their causes, and work together towards change
- Programs allow for Information or data collection to determine nutritional needs in the community and to evaluate progress

Monitoring the growth of a child requires measurements at regular intervals to determine change. A single measurement only indicates the child's size at that moment; it does not give any information about whether a child's size or weight is increasing, remaining the same, or declining.

An important difference in nutrition and growth monitoring exists between infants and children. Infants are defined as having 0-2 years of age, children as 2-5 years of age. It is easier to reverse malnutrition in infants because it can be identified earlier and thus treated earlier. Additionally, since infants are still developing and growing rapidly, early identification and treatment of malnutrition allows for both improving the child's health and for teaching the family about proper nutrition for the child as he/she continues to grow and develop.

Anthropometry is the science that defines physical measurements of a person's size, form, and functional capacities. Anthropometry is used to screen for malnutrition. There are different indicators used in screening: age, sex, length (for infants), and weight. Each one individually is important but when used together they can provide important information about a person's nutritional status.

Growth monitoring is extremely vital to early detection and treatment of malnutrition. Mothers should be explained the importance of these events and encouraged to attend. After the child is weighed, it is important to advise the mother of the baby's status and relevant advice to prevent malnutrition; simply weighing the baby is not enough. Baby growth monitoring can also serve as a forum to teach mothers about other healthy nutritional practices, for example one might host cooking demonstrations and other related causeries.

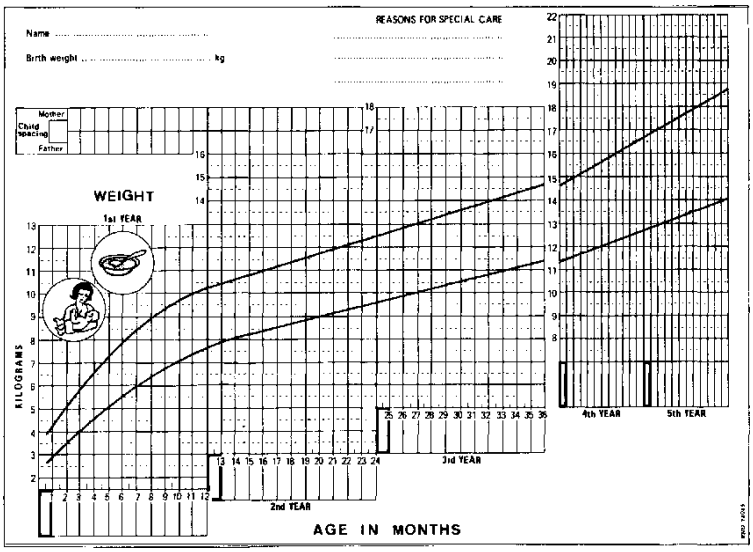
There are three main types of malnutrition of concern in Senegal: underweight, stunting and wasting. These are detected by the following growth monitoring techniques:

Weight-for-Age (underweight/overweight)

The weight-for-age index is used to detect if a child is underweight or overweight. If underweight, this represents a composite measure of wasting (acute malnutrition) and stunting (chronic malnutrition), though the measurement cannot differentiate between the two. The child's weight is generally measured using a hanging scale and then plotted at intervals (ideally monthly) from birth to 5 years of age. The weight of the child (in kilograms) is compared with that of a typically healthy child of the same age (sex-specific). A child weighing less than 60% of the reference weight-for-age is considered severely malnourished.

An example of a growth chart is seen below. Every *carte de santé* (health card) for children contains this chart. It charts the weight for age of a child: the y-axis plots weight in kilograms, and the x-axis plots age in months. Every month, when the child is weighed, a dot is placed on the line corresponding with the month and the weight. This chart also has pictures to remind the mother when to exclusively breastfeed and when to start complimentary feeding. At the top, there is a section entitled, "Reasons for Special Care," which addresses the relationship between malnutrition and illness; malnutrition can cause or be caused by illness, so it is important to note when a child is sick and what caused the sickness. You can also note on this

card when the baby was fully weaned off breastfeeding. The *carte de santé* should be given to the mother for free at her first pre-natal visit. However, if it is lost, a 500 CFA fee is charged to replace it. Growth chart use varies greatly among health facilities. This is something you are encouraged to promote more.



There are multiple ways to monitor malnutrition on a growth chart. They are as follows:

- To identify increasing weight as the child ages
- To ensure the dots are in between the printed solid lines that indicate proper nourishment
- Most importantly, to examine the trend of the line. The direction, or slope, of this growth curve on the chart is the most crucial element. Even if the child's weight to age is consistently between the lines, if the slope of the child's line declines for several months, it is early evidence of malnourishment, and the child needs immediate help. A child whose growth curve shows a levelling off or flattening is also in need of help, though it is not as severe as a falling weight curve.

To measure a baby's weight, a hanging scale is generally used. These are portable and thus often employed by health relais. Before weighing the baby, it is important to remove any heavy clothing and to always remove shoes. If possible, all clothing should be removed. For the hanging scale, the child is paced in the sling, and then the sling containing the child is hung from the hook. The child must initially be supported by someone's hand; otherwise, he/she may fall out of the sling. If this begins to happen, move the child's arms so that they are located behind the straps (as in the image below). Then ensure that the child is still, so the needle is not bouncing around. Sometimes this can be difficult because many kids are terrified of the situation; having the mother close can put the child at ease, but she should not touch or hold her child, since this would affect the measured weight. Finally, read the scale to the closest tenth of a kilogram. The weight of the child should then be recorded on their *carte* as the exact number, plotted on the chart, and written in the *relais'* book.

Some health professionals such *sage femmes* utilize the infant scale on which the baby lies down, and the weight is noted. If neither is available, a step scale can be substituted; the difference in weight between the mother and child together and the mother alone is indicative of the weight of the baby alone. However, the step scale method is not commonly used since it is less accurate.

Advantages of the weight-for-age index:

- Sensitive to small changes in the child's nutritional status
- Good indicator for detecting growth faltering
- The only tools needed are weighing scales and charts, both generally easy to transport and inexpensive

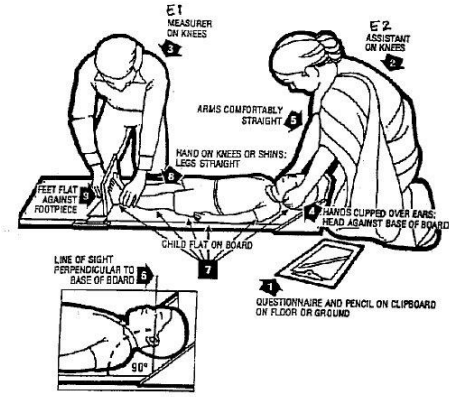
Disadvantages of the weight-for-age index:

- Weighing must be done regularly, which is not always possible
- Necessary to know a child's age to the nearest month
- The child may be frightened in a suspended scale, causing inaccurate measurements
- Certain types of malnourished children may not be classed as such (stunted children cannot be identified)

Height-for-Age (stunting)

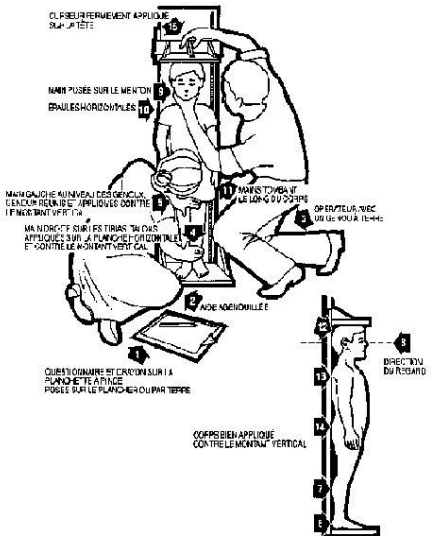
Height-for-age (or length-for-age as it is referred to with infants under the age of two) compares a child's height with the expected height of a healthy reference child of the same age (sex-specific). A child who measures 85% or less of the standard reference height/length-for-age is considered severely stunted. A measuring board is the most accurate tool used for this index.

In the case of infants (under the age of two) the board is laid flat on the ground. For children (ages 2-5 years), their height is measured upright. When measuring an infant, the infant lies with his/her head near the non-moving end and feet near the moving end. With children, 2-5 years, the board is upright, and the child is standing straight, with knees locked. Two people are always needed to measure, regardless of whether the child is standing or lying down. One measurer kneels at the head, holding the child's head with both hands so it remains against the board. The other person kneels at the feet, pulls the legs straight, and then slides the piece to the bottom of the feet. The measurement is taken to the nearest tenth of a centimeter.



Advantages of the height-for-age index:

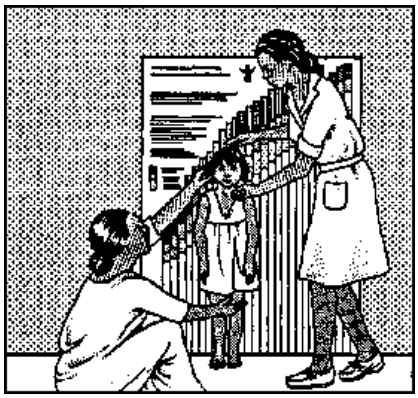
- It can indicate past nutritional problems and illnesses
- A board for measuring length and height can be made locally at low cost and easily transported
- Measuring a child's height is relatively hassle free



Disadvantages of the height-for-age index:

- Changes in height occur relatively slowly in response to nutritional problems
- It cannot serve as an independent monitoring measure
- It is more difficult to get accurate height measurements than weight measurements.
- The child's age must be known

Weight-for-Height (wasting)



The weight-for height measurement is an indicator of wasting. Wasting represents current or acute malnutrition resulting from failure to gain weight or actual weight loss. In this indicator, the weight of the child is divided by the weight of a reference child of the same height to obtain a percentage. Those children who fall below 2 standard deviations of the weight-for-height norm are considered to be wasted. Children below 2 SD are moderately malnourished, while children below 3 SD are severely malnourished. A child who is less than 70% of the expected weight-for-height is classed as severely wasted.

Advantages of the weight-for-height index:

- It identifies very thin or wasted children with definite malnutrition who require immediate attention
- It serves as a good indicator to distinguish children who are well proportioned from those who are thin for their height
- It does not require age

Disadvantages of weight-for-height:

- Stunted children are often misclassified
- Two pieces of equipment (scale and measuring board) are required, which adds to expense and transportation problems
- Measurements take longer
- It is more difficult for unskilled workers to learn to take accurate measurements.

Edema

Edema is another factor used to determine malnutrition. Edema is the observable swelling from fluid accumulation in body tissues. Edema most commonly occurs in the feet and legs, where it is referred to as peripheral edema. The swelling is the result of the accumulation of excess fluid under the skin in the spaces within the tissues. Edema can be demonstrated by applying pressure to the swollen area by depressing the skin with a finger; this is similar to pressing into a ripe mango. If the pressing causes an indentation that persists for some time after the release of the pressure, it is indicative of pitting edema. Any form of pressure, such as from the elastic in socks, can induce pitting with this type of edema. Edema is a sign of severe malnutrition and any child with edema should be referred to the health post as soon as possible.

Mid-Upper Arm Circumference (wasting)

Mid-upper arm circumference (MUAC) is a useful indicator of severe current malnutrition, whether or not stunting is present. It is quick and can be carried out by non-literate health workers. It does not require age. It is inexpensive and easily portable. However, it is not a sensitive early predictor of malnutrition; it only identifies children that are currently malnourished. The MUAC strip can be utilized at a variety of times. Some villages use it every month to accompany baby growth monitoring, while some NGOs use it to monitor children at the beginning, middle, and end of their projects. For color-coded strips, green indicates good nutrition, yellow, moderate malnourishment, and red, severe malnourishment. If a child is in the red (MUAC<115mm), he/she should be immediately referred to the health post, where the ICP then provides treatment. When a child is in the yellow (MUAC 115-125mm), he/she should

be provided with a nutritional porridge or supplemental food and information should be given to the mother about good nutrition.

MUAC is measured on the upper left arm while the arm is hanging down and relaxed. The strip is placed at the midpoint of the upper arm. This can be found by placing the window of the strip over the top of the shoulder bone, folding the strip in half, and marking the bottom of the strip to demarcate the midpoint. Then slide the end through the window and take the measurement without putting too much pressure on the arm. If the skin starts to indent, too much pressure is being applied and the band should be loosened.
Advantages of the MUAC Index:

- It is a useful indicator of severe current malnutrition, whether or not stunting is present
- It is quick to use and can be carried out by non-literate health workers
- Age does not need to be known
- It can be useful in indicating changes in nutritional status (though not as rapidly as monitoring weight)
- The MUAC strip is inexpensive, easily portable and easily made

Disadvantages of the MUAC Index:

- Only identifies children with moderate and severe malnutrition and therefore is not a sensitive early indicator
- There can be great variability in measurements (finding mid-point and tape tightness)

For all these indices, it is very important to explain everything to the mother. Measurements can be scary for the child; if the mother doesn't know what is occurring, she may be hesitant to allow a foreigner to handle her child. Gaining permission from the mother is also crucial to maintain credibility; the mother will not want information recorded about her child or if she does not know what is being written or why.

When carrying out growth monitoring, it is very useful to have mothers help as much as possible, have a Senegalese counterpart working with you, and speak nicely to the kids. If children kick and scream while being weighed, try to calm the child down or have the mother calm him/her down. If this is ineffective, have a less afraid child go first to show the other child that it is ok. If the child does not calm down, it is alright to continue measuring while they scream; it does not take long, the child will not be hurt, and the mother will help manipulate the child.

Logistics of a growth monitoring session
As a Volunteer, NEVER DO GROWTH MONITORING BY YOURSELF!!! This is not a self-led project. Always use counterparts. To initiate growth monitoring, talk to your ICP/ASC about the idea. If they are supportive, either they or you can talk to whoever would be helping you with it, whether it be a *sage femme*, the *ICP*, or *relais*. The *relais* can then inform your target audience.

Growth monitoring can be set up at the beginning and end of nutrition projects. They can also occur as monthly events in a village. This then requires either you or your *ICP* to train *relais* on using the scale, board and/or armband. The *relais* then find a time that is convenient for you and the women they are working with each month to weigh babies. It would also be helpful to record the weights each month.

Problems associated with growth monitoring programs that volunteers should consider include:

- Lack of understanding on the part of the health workers
- Lack of involvement of mothers in monitoring of growth and development

- Lack of commitment of health post personnel to growth monitoring
- Lack of planning and facilities when children with growth faltering are detected
- Lack of knowledge of mothers on the status of their children
- Lack of behavior change based on status of the child

At worst, a baby growth monitoring program can be a meaningless and humiliating experience for mothers. At best, it can help bring people, especially mothers, together to better understand and solve their common child rearing problems. It can help strengthen their capacity for working together toward change.

5 Common Childhood Illnesses

As you walk around your site, you will notice many signs and symptoms of illness in children. Many parents will ask you to identify the illness and to suggest treatment. As a Peace Corps Volunteer you are not certified to administer medications; however, it is helpful to know what health issues children at your site are facing as well as what actions can be done at the community level to prevent further cases of the illness.

A childhood illness refers to illnesses facing children under 5, the age group most vulnerable to illnesses and deaths resulting from these illnesses. According to Dr. Leon Eisenberg, a leading child psychiatrist, in "Disease and Illness Distinctions between Professional and Popular Ideas of Sickness:"

> *Patients suffer "illnesses"; doctors diagnose and treat "diseases". Illnesses are experiences of discontinuities in states of being and perceived role performances. Diseases, in the scientific paradigm of modern medicine, are abnormalities in the function and/or structure of body organs and systems. Traditional healers also redefine illness as disease: because they share symbols and metaphors consonant with lay beliefs, their healing rituals are more responsive to the psychosocial context of illness.*

For purposes of this manual, the term "illness" and "disease" will be used interchangeably.

In Senegal, malaria, **diarrheal disease**, and pneumonia are the three most common childhood illnesses. Malaria accounts for 19% of deaths in children under 5 (compared to the average of 8% for developing countries), diarrhea accounts for 14% of deaths in children under 5 (compared to the average of 15% for developing countries), and pneumonia accounts for 13% of deaths in children under 5 (compared to the average of 18% for developing countries). Though the under-5 mortality rate, predominantly arising from these three illnesses, has declined in the past few years from 121/1,000 live births in 2005 to 72/1,000 in 2011, there is still much that can be done. These illnesses are all easily preventable and treatable. This is where you, as a Peace Corps Volunteer, can be most effective tin urging preventative action.

Senegal addresses common childhood illnesses through a program entitled **Integrated Community Case Management of Childhood Illnesses** (iCCM). The goal of the program is to provide the delivery of high-quality services to populations in remote locations through the use of community health workers. It seeks to address illnesses at the levels of both prevention and treatment. Its success in Senegal has allowed it to serve as a model for many other countries in Africa.

Diarrheal Diseases

Diarrheal diseases are dangerous diseases which make a person pass frequent watery stool. For an adult, they are defined as the passage of four or more loose or liquid stools per day for an adult. For children under 5, diarrhea is defined as the passage of more than two loose or liquid stools in one day or the passage of loose or liquid stools for more than one day. It is important to note that frequent passing of formed stools is not diarrhea, nor is the passing of loose, "pasty" stools by breastfed babies. Diarrhea is usually a symptom of an infection in the intestinal tract, which can be caused by a variety of bacterial, viral and parasitic organisms. They make the body lose water fast and may lead to death if not treated. They are most common among children under the age of five. Common diarrheal diseases include dysentery and cholera,

though there are many others. In addition to making a person pass frequent watery stools, different diarrheal diseases have different characteristics:

- Acute diarrhea – watery stools are sudden and continue for several days
- Persistent diarrhea – watery stools last for more than 2 weeks
- Dysentery – diarrhea with blood in the stool
- Cholera – diarrhea is sudden, serious, and accompanied by vomiting

A major cause of diarrheal diseases is lack of proper sanitation related to dirty living conditions and personal hygiene, which allows dangerous germs to enter a person's stomach or intestine. Diarrhea is generally a symptom of infection caused by bacterial, viral, and parasitic organisms. These disease-causing organisms can enter a person through:

- Contact with stool or vomit
- Lack of handwashing
- Food that is spoiled
- Food that is not well-cooked
- Food or water that is served or kept in dirty pots, buckets, bottles, plates, bowls, pans, cups, or other dirty containers
- Improper storage of food or water
- Water contaminated with human feces (resulting from improperly dug latrines, latrines located too close to a water source or the water table, and open defecation) or animal feces

Diarrhea kills over 1.5 million children globally every year, with the majority of cases occurring in children under two years of age. Since diarrhea can last several days and leaves the body without water and salts, it can lead to severe **dehydration**; it is the resulting dehydration and malnutrition that are responsible for the majority of deaths.

- **Malnutrition -** Children who die from diarrhea often suffer from underlying malnutrition, which makes them more vulnerable to diarrhea. Each diarrheal episode, in turn, makes their malnutrition even worse. In developing countries, children under three years old experience on average three episodes of diarrhea every year. Each episode deprives the child of the nutrition necessary for growth. As a result, diarrhea is a major cause of malnutrition, and malnourished children are more likely to fall ill from diarrhea.
- **Dehydration -** The most severe threat posed by diarrhea is dehydration. During a diarrheal episode, water and electrolytes (sodium, chloride, potassium, and bicarbonate) are lost through liquid stools, vomit, sweat, urine, and breathing. Dehydration occurs when these losses are not replaced. Death can follow severe dehydration if body fluids and electrolytes are not replenished, either through the use of oral rehydration salts (ORS) solution, or through an intravenous drip. The degree of dehydration is rated on a scale of three:
  - Early dehydration – no signs or symptoms
  - Moderate dehydration – thirst, restless or irritable behavior, decreased skin elasticity, sunken eyes
  - Severe dehydration – symptoms become more severe, shock, diminished consciousness, lack of urine output, cool, moist extremities, a rapid and feeble pulse, low or undetectable blood pressure, and pale skin

Diarrheal diseases can be prevented by practicing proper hygiene:

- Hand wash at the critical times using soap, or wood ash if soap is unavailable
- Wash uncooked food, such as fruits and vegetables in clean water with bleach
- Access to safe drinking water
- Improve sanitation including the proper use of latrine
- Prepare food in a clean place, using clean pots and utensils
- Eat or serve food while it is hot, re-heat food if it is cold

- Exclusively breastfeed for the first six months

The first step of treatment can be provided with home remedies:
- Exclusive breastfeeding for children under six months
- Nutrient-rich foods
- Consume baobab, bananas, cassava, and potatoes
- Avoid foods that contribute to loose stools, such as bissap, mangos, and oily rice
- Drink rice water
- Eat porridges

Additionally, Zinc supplements are available at most health facilities, including health huts. These reduce the duration of a diarrhea episode by 25% and are associated with a 30% reduction in stool volume. Health facilities also have pre-packaged ORS mixtures. If systems persist or worsen or if there is severe diarrhea, it is important to seek medical attention.

Pneumonia

Pneumonia is a form of acute respiratory infection that affects the lungs. The lungs are made up of small sacs called alveoli, which fill with air when a healthy person breathes. When an individual has pneumonia, the alveoli are filled with pus and fluid, which makes breathing painful and limits oxygen intake. Children can be protected from pneumonia; it can be prevented with simple interventions, and treated with low-cost, low-tech medication and care. While most healthy children can fight the infection with their natural defenses, children whose immune systems are compromised are at higher risk of developing pneumonia. A child's immune system may be weakened by malnutrition or undernourishment, especially in infants who are not exclusively breastfed.

Pneumonia is caused by a number of infectious agents, including viruses, bacteria, and fungi. Pneumonia is extremely contagious and can be transmitted from person-to-person via coughing, sneezing, blood (especially during and directly after birth), and even from exhalation.

The symptoms of viral and bacterial pneumonia are similar. However, the symptoms of viral pneumonia may be more numerous than the symptoms of bacterial pneumonia. They include:
- Rapid or difficult breathing
- Cough
- Fever
- Chills
- Loss of appetite
- Wheezing (more common in viral infections)
- Lower chest wall indrawing, where the chest moves in or retracts during inhalation (in a healthy person, the chest expands during inhalation), is possible in severe cases
- Unconsciousness
- Hypothermia
- Convulsions

How can pneumonia be prevented?
- As part of the vaccination campaign in Senegal, all children receive the DCT-1. This is the most effective way to prevent pneumonia.
- Adequate nutrition is key to improving children's natural defenses, starting with exclusive breastfeeding for the first six months of life. In addition to being effective in preventing pneumonia, it also helps to reduce the length of the illness if a child does become ill.

- Addressing environmental factors such as indoor air pollution, second-hand smoke, and encouraging good hygiene in crowded homes also reduces the number of children who fall ill with pneumonia.

Pneumonia must be treated at a health facility with antibiotics. In 2009, WHO and UNICEF launched the Global Action Plan for the Prevention and Control of Pneumonia (GAPP). The aim is to accelerate pneumonia control with a combination of interventions to protect, prevent, and treat pneumonia in children with actions to:

- Protect children from pneumonia include promoting exclusive breastfeeding and hand washing, as well as reducing indoor air pollution
- Prevent pneumonia with vaccinations
- Treat pneumonia to ensure every sick child has access to health facilities and/or health workers and access to antibiotics

Other Common Childhood Illnesses

The following chart contains the signs/symptoms, prevention, and home treatments for some of the more common illnesses in Senegal. It is important to note that if symptoms for any of these illnesses do not improve or worsen when utilizing home treatments, the patient must receive medical treatment at a health facility. Additionally, if the illness is severe, the patient should be urged to seek immediate medical treatment at a health facility rather than attempting a home treatment. For a more complete listing of illnesses, consult *Where There is No Doctor*.

Illness	**Signs/Symptoms**	**Prevention**	**Home Treatments**
Worms/intestinal parasites	Discomfort, indigestion, pale, weakness, swollen belly, diarrhea, anemia, stomach ache, desire to eat dirt	Sanitation, use latrines, wear shoes, only consume unspoiled cooked fish, clean water, keep food free of flies	Moringa (see medicinal and preparation info in the Moringa Manual on Google Drive), medication, papaya
Skin infection/cyst	Pimples, itching, rash	Wash regularly with soap, wear clean clothes	Wash with soap often, wear clean clothes, stay dry, use moringa on wound
Wound infection	Redness, swollen, hot, painful, puss, smelly, fever	Clean wound, cover with clean cloth, remove dirt, wash with soap	Clean wound, cover, hot compress 4 times a day
Burn	Black skin, boils, charred flesh	Be careful around fires	Cold water immediately, wash, put vaseline on burnt skin, cover with clean cloth
Conjunctivitis (pink eye)	Redness, pus, itchy, lids stick together	Sanitation, wash hands well, use latrines	Rinse eye with clean water, sanitation
Runny nose/cold	Runny nose, headache	Sanitation, sleep well, consume a diet rich in vitamin C, keep dry in rainy season	Drink water, rest, eat fruits, moringa, inhale hot water vapor

Lice	Itchy scalp, lice visible	Wash hair often, wash clothes often, wash bedding often	Wash hair often, home-made anti-lice shampoos
Toothache	Pain, swollen mouth, red gum, black holes in teeth	Saltwater rinse after consuming sugar and every night, brush teeth (baking soda or wood ash toothpaste), tooth stick, floss (can use thread)	Saltwater rinse, chew alfafa
Fever	Hot, sweaty	Sanitation, sleep well, drink water, avoid the sun, consume a nutritious diet	Drink water, sleep, bathe, get fresh air, remove clothes, moringa
Ringworm	Rings on head, round patches with scales, hair loss	Sanitation	Sanitation, keep dry, wash with soap
Fish poisoning ("Borom bopp")	Swollen "chipmunk" cheeks	Consume only unspoiled well-cooked fish	Saltwater rinse, moringa

The following chart contains signs/symptoms of illnesses included in the vaccination program. If a child shows any of these signs/symptoms, he/she should go immediately to the nearest health facility; home remedies are not effective for these illnesses. Prevention measures are not provided since all children in Senegal should be receiving vaccinations to prevent these illnesses.

Illness	**Signs/symptoms**	**Vaccine Information**	**Side effects**
Measles	Fever, runny nose, red and watery eyes, dry cough, diarrhea, tiny white spots in the mouth, rash that begins on the face	1 dose after the age of 9 months	Fever 6-12 days after the vaccination
Tuberculosis	Chronic cough for more than 15 days, chest and back pain, chronic weight loss, afternoon fevers, pale waxy skin, bloody phlegm	1 dose for children less than 1 year, 1 dose for children more than 1 year	A small boil will form after 2-4 weeks at the injection site and will leave a scar
Diphtheria	Fever, sore throat, cough, yellow-gray coating or membrane on the back of the throat, swollen neck, bad breath, hoarse voice, difficulty breathing	3 doses for children less than 1 year	Fever, pain and swelling at injection site
Tetanus (Children and Adults)	Fever infected wound, stiff neck, locked jaw, contraction of the entire body, convulsions, difficulty breathing and swallowing	3 doses with a minimum of 4 weeks between doses	Fever, pain and swelling at injection site
Tetanus (Infants)	Begins 5-8 after birth, continuous crying, inability to suck, infection of the umbilical cord, fever	3 doses with a minimum of 4 weeks between doses	Fever, pain and swelling at injection site

Whooping Cough	Fever, runny nose, cough, after 2 weeks will cough up a plug of sticky mucus, vomiting	3 doses at birth, 3 doses with a minimum of 4 weeks between doses	Fever
Polio	Fever, vomiting, diarrhea, sore muscles, paralysis of limbs	1 dose at birth, 3 doses with a minimum of 4 weeks between doses	None
Yellow Fever	Fever, body aches, bloody vomiting, jaundice, renal failure, hemorrhaging	1 dose after 6 months of age	None
Meningitis	Rigidity of the neck, back is too stiff to put head between the knees, projectile vomiting, headache, fever, convulsions	1 dose after the age of 2	None

Oral Rehydration Salt (ORS) Solution

ORS provides an easy, cheap means for replacing water and electrolyte loss due to diarrhea and vomiting. When a child has a diarrhea and/or vomiting, it is vital that the water and food loss be replaced. The child should continue to eat and drink, and ORS helps to replace the salts and sugars lost in an easily digestible form. Currently, only 43% of children with diarrhea use ORS. Pre-packaged ORS solutions are available at all levels of the health system including health points and posts. If the person is vomiting, he/she should continue to drink the ORS; the body will retain some of the fluids and salts he/she need. Also, it is important to remind people that drinking water, ORS, and breast-feeding do not increase diarrhea.

It should be noted that ORS does not treat the illness; it only prevents dehydration resulting from diarrhea and/or vomiting. The child should be encouraged to visit a health facility to receive treatment for the illness itself. It should also be noted that ORS is intended for children over 6 months of age; if under 6 months, the child should continue to exclusively breast-feed and should not consume any food or water.

Diarrhea Models: The Gourd Baby

A good teaching tool for showing the effects of diarrhea on the body is the **gourd baby**. With the baby, you can visually demonstrate the importance of Oral Rehydration Salts and the effects of dehydration on the body. However, as you know, getting a gourd in Senegal is difficult when they are not in season. Instead, you can use a plastic bottle, which is equally effective.

Materials:

- Plastic bottle
- Markers
- Nail or thumb tack
- Water
- Juice mix (optional)

Preparation:

- Remove all stickers and labels from the plastic bottle
- Cut off the top of the bottle
- On one side, draw the front of a baby (head, torso, arms, and legs)
- On the backside, draw the back of a baby
- Poke a nail or thumbtack through the baby's anus

Instructions:

- Fill the bottle with water. Explain how a healthy baby contains lots of water in the body. If you want, put juice mix in the water to show how a healthy baby also contains salts and sugars (as represented by the color).
- Pull out the nail or thumbtack. Water will flow from the baby's butt, illustrating diarrhea. The level of water in the baby decreases, leading to dehydration. Discuss the signs of dehydration and why these are dangerous. You can show these signs based upon the level of the water and which body parts would be affected (sunken fontanel, absence of tears, reduction to absence of urine, absence of sweat, etc.).
- Add water to the baby. Show that by continually adding water, the original level of water can be maintained. It is important to continually replace these fluids. If you are using juice mix, discuss how the color is less vivid as the solution becomes more dilute. It is important to also add more juice mix to sustain the original color of the water. For the same reason, it is important to continually replace salts and sugars in the body.
- Poke a nail or thumbtack through the mouth to represent vomiting. Explain how dehydration can occur much more rapidly with simultaneous diarrhea and vomiting.
- Finally, explain how ORS is important, but it only treats the symptoms. You've prevented dehydration, but the baby still has diarrhea (and is now vomiting). It is important that medical attention be sought to treat the actual problem. At this point, you can replace the nail in the anus (and one in the mouth) to stop the water from flowing. Only through addressing the disease-causing agent itself is the baby healthy.

Infant Vaccinations

Vaccines are a crucial component of basic preventive health. In all of our communities here in Senegal women should be able to have their newborns and children vaccinated free of charge (upon payment of the consultation fee). There are myriad obstacles to 100% vaccine coverage in Senegal including geography, illiteracy, misunderstandings and superstitions about vaccines, and supply chain management.

There are two approaches to vaccine coverage.

The first is the **routine in-patient vaccination strategy** that takes place at a health post or at the village level (administered by a member of the health post staff). These vaccinations include the basic postnatal package including tetanus, BCG, Penta, Yellow Fever and Measles. Since 2001 the Expanded Program for Immunization (EPI) in Senegal has been a dynamic and effective program tackling 9 diseases. In 2004, Senegal introduced the Hepatitis B vaccine into the routine EPI coverage. In 2012 the EPI introduced the pneumococcus vaccine, and in 2013 they

AGE	VACCINE
Birth	BCG, VPO 0
6 weeks	Pentavalent1, VPO1
10 weeks	Pentavalent 2, VPO2
14 weeks	Pentavalent 3, VPO3
9-11 months	Measles, yellow fever

added the rotavirus vaccine. These routine vaccinations are delivered in three different ways: fixed (at a health post), advanced (at a central place in a village by a health post staff member), and mobile (at the household level).

The second approach is a **'campaign' format**, where local community health workers are trained at the health post level to deliver vaccines to every child under a certain age. The campaign approach has been used in the last two years to deliver vaccines against polio, meningitis vaccine, yellow fever, and measles.

Supply Chain Management

The way the supply chain works at each level is as follows:

- The central level is supplied every 6 months
- The regional level is supplied every 6 months
- The district level (hospitals, depots) are supplied every 2 months
- The health stations (health posts) are supplied every month –
- NB: due to weak storage capacity certain regions and districts may increase their supply frequency. Many of these vaccines require a cold-chain – meaning that they need to be kept below a certain temperature; this can be a major obstacle to vaccine conservation during campaigns at the village level.

How can you address infant vaccinations at your site?

Under NO circumstances should you, as a volunteer, be administering vaccinations to children in your community. Your role is to reinforce the message in your community that vaccinations are essential to preventive health. During polio campaigns if you feel comfortable administering the drops and you attend the health worker training beforehand you are welcome to participate in the campaign in that way. Make sure to talk about vaccinations with your ASC and ICP, ask about barriers they have encountered to vaccines in your community.

The maternal illiteracy problem can be a big obstacle. The ICP will write a date on the vaccination card that the mother needs to return and she won't be able to read it. She also can't read the vaccinations that her child has received. This can get very difficult. Vaccination cards often get destroyed or damaged and you can't tell what is written on them. There is an opportunity here to try some innovative project ideas – what kind of programs/materials could you use to help mothers better protect and care for these cards that they receive at their first prenatal visit. A full vaccination schedule has several steps to it. The other two big obstacles (illiteracy and vaccination cards) often prevent the mother from adhering to the full vaccination schedule. This should be part of your behavior-change analysis. There are many activities including home visits, causeries, and murals that you can conduct in order to help your community reach a higher percentage of infant vaccination coverage.

Relevant statistics for vaccinations in Senegal

- Vaccination coverage against the main childhood diseases remains insufficient: Only 42% of all children between 12 and 23 months in Senegal received all necessary vaccinations. [22]

[22] Institute for Transportation and Development Policy, Report on current situation in the health sector of Senegal and possible roles for non-motorised transport interventions, http://siteresources.worldbank.org/INTTSR/Resources/ITDP_20Transport_20and_20Health_20Care_20-_20Senegal.pdf (accessed 17 February 2014).

Vaccination Terminology
English

- **0 – 1 Month:**
  - BCG: Tuberculosis
  - GENEVAC B: Hepatitis B
- **2-4 Months:**
  - PENTAVALON (PENTA) a.k.a. TETRACOQ: Diphtheria, Tetanus, Whooping Cough, Polio [first dose]
  - ACT HIB: Influenza Vaccine type B [1 dose per month]
  - GENEVAC B: Hepatitis B [2nd dose during the 2nd or 3rd month]
  - PENTAVALON (PENTA)
- **9 months:**
  - PENTAVALON (PENTA) a.k.a. TETRACOQ: Diphtheria, Tetanus, Whooping Cough, Polio [first dose]
  - ROUVAX: measles
  - Yellow fever vaccine
- **12 – 18 Months:**
  - TETRACOQ: [first booster]
  - ACT HIB: [booster]
  - ROR: known as MMR in the states – Measles/Mumps/Rubella
- **5-6 Years:**
  - D.T. Polio: Diphtheria, Tetanus, Polio, and a freeze-dried TB vaccine that should be administered if the child did not receive the BCG at birth

French

- **0– 1 Mois :**
  - BCG : Tuberculose
  - GENEVAC B : Hépatite B [première dose]
- **2– 4 Mois :**
  - PENTAVALON (PENTA) ou TETRACOQ : Diphtérie, Tétanos, Coqueluche, Poliomyélite
  - ACT HIB : Haemophilus Influenzae type B [1 dose par mois]
  - GENEVAC B : Hépatite B [2ème dose au 2ème ou 3ème mois]
- **9 Mois :**
  - PENTAVALON (PENTA) ou TETRACOQ : Diphtérie, Tétanos, Coqueluche, Poliomyélite
  - ROUVAX : Rougeole
  - Vaccin anti Amarile : Fièvre jaune
  - GENEVAC B : Hépatite B [3ème dose]
- **12 – 18 Mois :**
  - PENTAVALON (PENTA) ou TETRACOQ : [1er Rappel]
  - ACT HIB : [Rappel]
  - ROR : Rougeole/Oreillons/Rubéole
- **5 – 6 Ans :**
  - D.T. Polio : Diphtérie, Tétanos, Poliomyélite Vaccins lyophilisé antituberculeux [si pas fait à 0-1 mois]

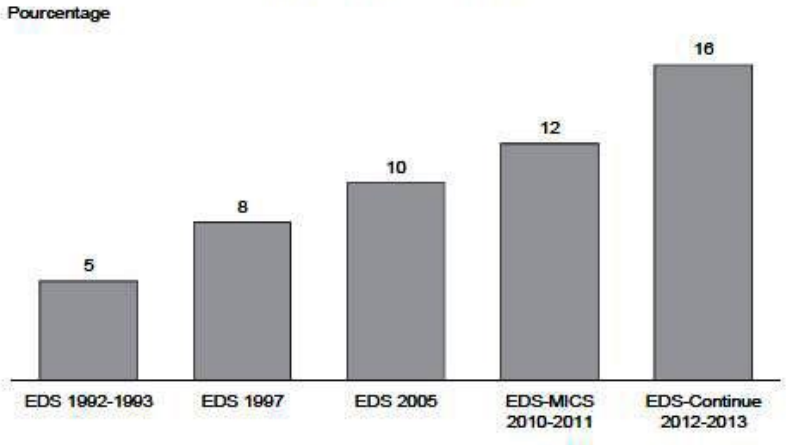
6 Family Planning

In many African countries, the high rate of population growth is a constraint to major development efforts. The persistent imbalance between the high increase in population and insufficient economic growth contributes to the deterioration of living conditions in both rural and urban settings. Recognizing this conflict, the 2011 International Family Planning Conference was hosted in Senegal and, in 2012, the UK Government, the Bill & Gates Foundation, and the United Nations Population Fund (UNFPA) convened the London Summit on Family Planning. At this Summit, donor agencies, donor governments, and aid-recipient governments pledged $2.6 billion and made various political commitments to family planning as part of an effort for 120 million additional women and girls to have access to contraceptives by 2020. That same year, the Government of Senegal was among the few aid-recipient governments to serve on the first Reference Group driving the initiative established at the London Summit forward. The Government committed itself to making family planning a national top priority, doubling the overall budget for the management of the family planning program.

> ***Senegal's vision is for women to have equal access to high quality and affordable newborn and child health services, including family planning.***
> – Minister of Health Awa Marie Coll-Seck, London Summit on Family Planning, 2012.

Also in 2012, the Senegalese government created the National Action Plan for Family Planning for 2012-2015, with the goal of increasing the country's contraception prevalence rate from 12% to 27%—an increase of 15%, representing 350,000 additional married women using contraception. Between 2012 and 2013, the country realized an increase of 4%—bringing the prevalence rate to 16% with injectables (6%), the pill (5%), and implants (3%) being the most popular. A large motivation for this campaign was to achieve Millennium Development Goals 4 and 5 of reducing child mortality by two-thirds and mother mortality by three-quarters by 2015. Senegal also aspires to reduce the **unmet need for family planning**[23] to 15% by 2015 (from the current rate of 30%) and to ensure women have equal access to high quality and affordable maternal, newborn, and child health services, including family planning.

Graphique 5.2 **Tendance de l'utilisation de la contraception moderne par les femmes en union**



[23] The "unmet need for family planning" is the proportion of women of reproductive age who do not want to become pregnant for the next two years or do not wish to have any more children, but are not currently using a contraceptive method.

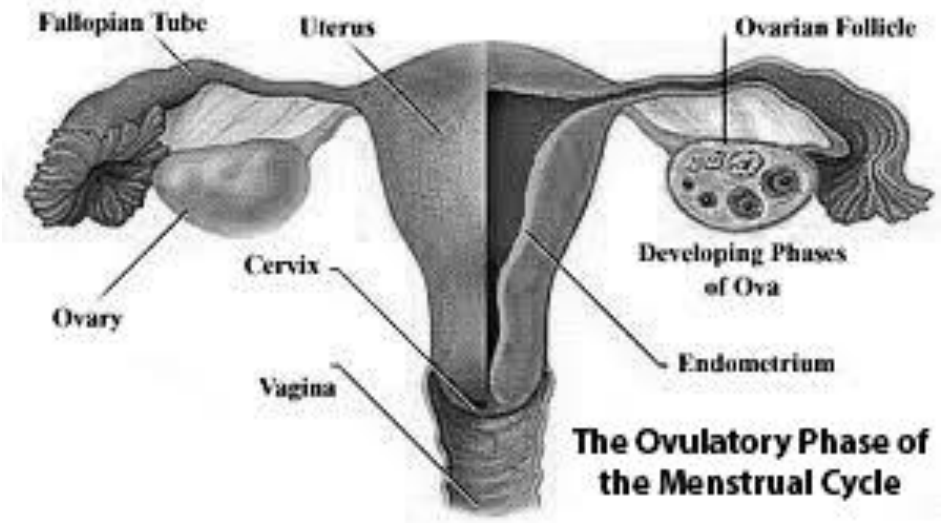
Senegal's action plan builds on six fundamental pillars:

- Generate demand through mass media communication and community mobilization with targeted messages for women and to increase involvement of men and young people.
- Leverage networks of religious leaders, as well as national and local champions to advocate for family planning.
- Improve the supply chain and reduce stock outs to zero.
- Improve the quality of care and services.
- Expand mobile outreach, social marketing and franchising to ensure access in peri-urban and rural areas.
- Generalize community-based distribution to bring family planning to the most vulnerable and remote areas.

These policy changes in Senegal provide opportunities for Peace Corps Volunteers to become involved in efforts to promote family planning in their communities. This chapter is intended to explain what family planning methods are available in Senegal, how they work, and various obstacles and opportunities for family planning activities in Senegal.

The Menstrual Cycle and Family Planning

Menstruation is the monthly flow of bodily fluid from the uterus through the vagina. It takes place between **menarche** and **menopause**. Menarche is the beginning of **menstrual cycles** starting in puberty, when the female body begins to produce more **estrogen** and **progesterone** hormones. Menopause occurs when a woman's ovaries stop producing eggs and, as a result, her menstrual cycle stops completely. The menstrual cycle is a repeating series of changes in the ovaries and **endometrium**, or the thickened lining of the uterus, that includes **ovulation** and monthly bleeding. The monthly cycle is different for each woman, but most women have cycles that last between 24 and 35 days.



The menstrual cycle begins with the first day of bleeding and has four stages:

Menstrual Phase: Day 1 – 5

- If there is no pregnancy, estrogen causes the endometrium to break down and the unfertilized egg is shed with this as menstrual blood. Commonly known as "the period," this phase can last anywhere from one to seven days.
- Contractions of the uterus at this time cause menstrual cramps.

Follicular Phase: Day 1-13

- The pituitary gland in the brain increases the creation of **follicle-stimulating hormone (FSH)**, causing both ovaries to produce more follicles, each with an egg; only one follicle will reach maturity in this menstrual cycle and release an egg.
- Towards the end of the phase, the ovaries increase estrogen secretion, causing the uterine lining to thicken.

Ovulatory Phase: Day 10-18

- The pituitary gland and hypothalamus release a surge of **luteinizing hormone** (LH) midway through the cycle, causing the mature follicle in the ovary to bulge from the ovary surface and burst, releasing an egg. This often occurs around day 14, but can occur anytime between days 7 and 21. This lack of uncertainty around the exact day of ovulation is one of the disadvantages of using **fertility awareness methods** as a form of contraception.
- Ovulation occurs and the egg travels down the fallopian tube, at which point the woman is fertile. Many hormonal family planning methods contain estrogen, **progestin** (a synthetic version of progesterone), or both hormones, which prevent the release of LH and FSH and, thus prevent ovulation.

Luteal Phase: Day 15-28

- The ruptured follicle in the ovary turns into **corpus leuteum** (CL) and increases progesterone secretion, causing the endometrium to thicken even more, preparing for a potentially fertilized egg. The increased production of progesterone also causes cervical mucus to thicken, blocking sperm from entering the uterus.
- If the egg is not fertilized, the CL disintegrates after around 14 days and progesterone and estrogen levels drop, causing the endometrium to break down and shed as menstrual blood.
- If the egg is fertilized, the CL produces human chorionic gonadotropin (HCG)—the hormone that pregnancy tests detect–which allows for the continued increase in progesterone secretion. The egg then moves to the uterus and implants approximately 6-7 days after ovulation.

Introduction to Family Planning

The following family planning methods are organized by prevalence in Senegal. This is not an exhaustive list of family planning methods, but rather a list of what is commonly available at most health posts in Senegal. Prices vary greatly between posts and should be researched on a case by case basis. Availability also varies greatly between posts, and stock-outs often occur.

Depo Provera

Depo Provera is an injection of progestin into the muscle of the upper arm, hip, or buttocks once every three months. The private nature of Depo use—no one except for the woman and her provider can tell she is using the method—and the fact that it only has to be given once every three months—accommodating for women who are short on time or far from a health structure—makes this a popular method in the developing world, including Senegal.

While currently, the availability of Depo injections is limited to health posts as the lowest level, the World Health Organization has concluded that community-based provision of Depo by appropriately trained community health workers is safe, effective, and acceptable.[24] To this end, a new delivery method of Depo, called the "**Sayana Press**," (formally known as Depo SubQ) has

[24] WHO 2009 Technical Consultation - Community-Based Health Workers Can Safely Administer Injectable Contraceptives.

been developed. Like the intramuscular Depo injection, it is a three-month, progestin-only injectable contraception, but it is delivered under the skin, rather than under the muscle, by an injection system with a small, prefilled, one-use device.[25] Therefore, it has the potential to improve contraceptive access by increasing the ease, safety, and reach of non-clinic delivery, and possibly even self-injection. As of 2013, the Sayana Press is currently being piloted by the nongovernmental organization PATH in a number of countries, including Senegal.

- Consistent and correct use: 99.7%[26]
- Typical use: 97%
- Duration: 3 months
- Mechanism of action: Prevents ovulation and thins endometrium
- Availability: Regional hospitals, district health centers, health posts
- French Names: *Le Depo Provera*, *la piqûre*

Advantages	Disadvantages
• Only needs to be administered once every three months, and the injection can be given as much as 3 weeks late. • Does not interfere with sex. • Women often report that their appointments are easy to remember and easy to keep private. • Since this method does not contain estrogen, it by breastfeeding mothers as soon as six weeks after birth and by women who cannot use methods with estrogen.	• Changes in bleeding patterns include an irregular, often heavy cycle during the first 3 months of use, and infrequent, irregular, or no monthly bleeding after a year of use. • Potential side effects include: gradual weight gain, headaches, dizziness, and possible loss of bone density. • Not immediately reversible, with fertility typically returning within four months after discontinuation, although 10 months is not uncommon. • No protection against STIs.

Combined Oral Contraceptives

"The pill" contains low doses of progestin and estrogen and is used on a daily basis.

- Consistent and correct use: 99.7%
- Typical use: 92%
- Duration: Taken daily
- Mechanism of action: Prevents ovulation
- Availability: Regional hospitals, district health centers, health posts
- French Names: *La pilule*, *les contraceptifs oraux combinés*

Advantages	Disadvantages
• Inexpensive. • Provides women with monthly bleeding, and women can control their monthly bleeding by skipping non-hormonal pills. • Immediately reversible, and can be stopped at any time without a	• Must be taken daily, often resulting in improper use. • In the first few months of use, irregular bleeding may occur, then lighter, shorter, and more regular monthly bleeding. • Side effects include headaches, breast tenderness, and weight gain. • No protection against STIs.

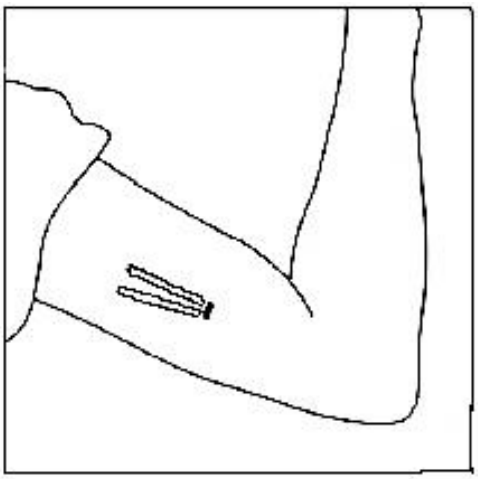
[25] This Uniject technology is also being used to deliver oxytocin, an important maternal health drug that prevents life-threatening bleeding during delivery, antibiotics, and vaccines against tetanus and hepatitis B.

[26] All figures on effectiveness (for correct and consistent use and typical use) are taken from WHO's *The Family Planning Handbook*. Correct and consistent use is defined as the perfect use of a method, whereas figures for typical use take into account method failure and user error.

provider's help. • If non-hormonal pills are iron supplements, may help to prevent anemia. • Does not interfere with sex. • Protects against ovarian and endometrial cancers.	• Can be used by breastfeeding mothers only after exclusive breastfeeding has concluded (at 6 months), or at 6 weeks after birth if the mother is partially breastfeeding. • Should not be used by women who smoke or women over 35. • There is a slight increased risk of breast cancer among women who have used the pill within the past 10 years.

Jadelle Implants

Two matchstick-sized, flexible, plastic rods that are inserted into the upper arms and emit a small, continuous amount of progestin.



- Consistent and correct use: 99.5%
- Typical use: 99.5%
- Duration: 5 Years (depending on the woman's weight)
- Mechanism of action: Thickens cervical mucus (thus blocking the sperm from meeting an egg) and disrupts the menstrual cycle, including preventing the release of eggs from the ovaries (ovulation)
- Availability: Regional hospitals, district health centers, most health posts
- French Names: *Les implants*, *la Jadelle*

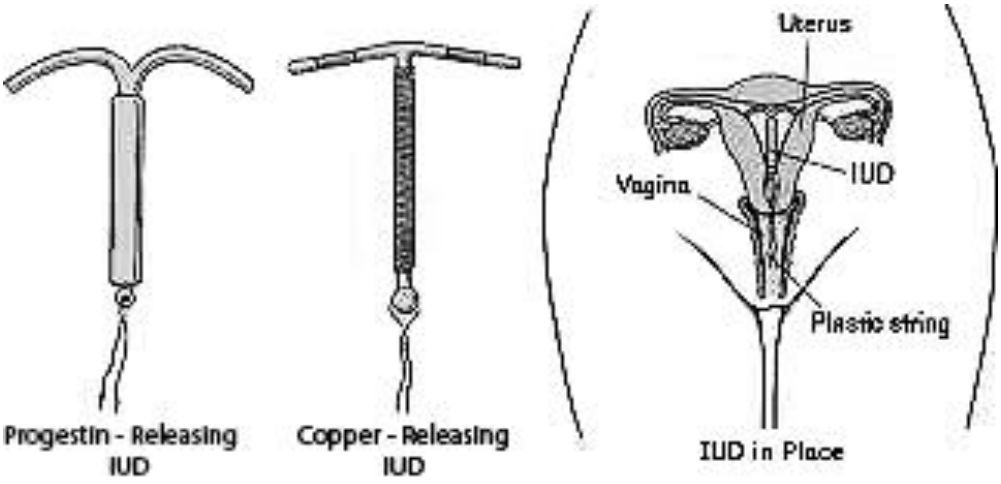
Advantages	**Disadvantages**
• Prevents pregnancy very effectively. • Provides long term pregnancy protection. • Upon removal, immediately reversible. • Little required of the client once implants are in place, resulting in little to no user error. • Does not contain estrogen, and so can be used throughout breastfeeding and by women who cannot use methods with estrogen. • Breastfeeding mothers can start using implants as soon as six weeks after childbirth. • Does not interfere with sex.	• Higher upfront cost, but cheaper over a longer period than short term methods, such as combined oral contraceptives. • Requires specifically trained provider to insert and remove. • Insertion requires a minor surgical procedure. • Bleeding changes, such as prolonged bleeding, heavy bleeding, or no bleeding are common, especially in the first year. In following years, bleeding becomes more regular or infrequent. • Other side effects can include headaches, abdominal pain, and breast tenderness. • No protection against STIs. • After the insertion procedure, women are not supposed to do heavy work (e.g., collecting fire wood, pounding anything, washing clothes, etc.) for at least 3 days and have to wear a bandage that can be visible depending on their clothing. • May be less effective in obese women.

Hormonal IUD

The progestin **intrauterine device** (IUD), known in the United States as the Mirena, is a T-shaped plastic device that steadily releases small amounts of levonorgestrel, the same type of progestin widely used in implants and oral contraceptive pills.

- Consistent and correct use: 99.8%
- Typical use: 99.8%
- Duration: 5 years
- Mechanism of action: Suppresses the growth of the endometrium, disrupts ovulation, and causes an immune reaction towards sperm and eggs
- Availability: Regional hospitals, district health centers, health posts
- French Names: *Le dispositif intra-utérin (DIU) au lévonorgestrel*, *le DIU hormonal*, *le Mirena*

Advantages	Disadvantages
• Long-term pregnancy protection. • Immediately reversible. • Little required of the client once implants are in place, resulting in little to no user error. • Private—often not even partners can detect its presence. • Reduces menstrual cramps and symptoms of endometriosis. • In breastfeeding women, can be inserted as soon as four weeks after childbirth. • If a woman is not breastfeeding, can be provided within 48 hours after giving birth (which requires a provider with specific training in postpartum insertion).	• Must be inserted into the uterus by a specifically trained provider. • Typically results in lighter and fewer days of bleeding, infrequent or irregular bleeding, no monthly bleeding, or prolonged bleeding. • Side effects can include acne, headaches, breast tenderness, and abdominal pain. • No protection against STIs.



Copper-Bearing IUD

The copper-bearing IUD is a non-hormonal, small, flexible plastic frame with copper sleeves or wire around it inserted into a woman's uterus.

- Consistent and correct use: 99.4%
- Typical use: 99.2%
- Duration: 12 years
- Mechanism of action: Acts as a spermicide; the copper inhibits sperm motility so they cannot reach the fallopian tubes and fertilize the ovum

- Availability: Regional hospitals, district health centers, most health posts
- French Names: *Le dispositif intra-utérin (DIU)*, *le DIU au cuivre*

Advantages	Disadvantages
• Long-term pregnancy protection. • Immediately reversible. • Little required of the client once implants are in place, resulting in little to no user error. • Private—often not even partners can detect its presence. • No further costs after the IUD is inserted. • Can be inserted anytime 4 weeks after birth, or within 48 hours after giving birth if the provider has been trained in postpartum insertion.	• Must be inserted and removed by a specifically trained provider. • Typically longer and heavier bleeding and more cramps or pain during monthly bleeding, especially in first 3 to 6 months. • Should not be inserted in women with untreated gonorrhea or chlamydia or at high risk for contracting gonorrhea or chlamydia.

Male Condoms

- Consistent and correct use: 98%
- Typical use: 85%
- Duration: One sexual act (a new condom must be used for each successive sexual act)
- Mechanism of action: Forming a barrier, thereby preventing sperm from entering the vagina
- Availability: Regional hospitals, district health centers, health posts, boutiques, pharmacies
- French Name: *Les préservatifs masculins*, *les capotes*

Advantages	Disadvantages
• Condoms are the only contraceptive method that can protect against both pregnancy and STIs, including HIV. • Has no hormonal side effects. • Can be used as a temporary or backup method. • Can be used without seeing a health care provider. • Free at many health facilities.	• Requires correct use with every act of sex for greatest effectiveness. • Requires both partners' cooperation. • Interrupts sex. • Is thought to decrease pleasure in men

Female Condoms

- Consistent and correct use: 95%
- Typical use: 79%
- Duration: One sexual act
- Mechanism of action: Forms a barrier, thereby preventing sperm from entering the vagina
- Availability: Regional hospitals, district health centers, health posts, some pharmacies
- French Name: *Les préservatifs féminins*

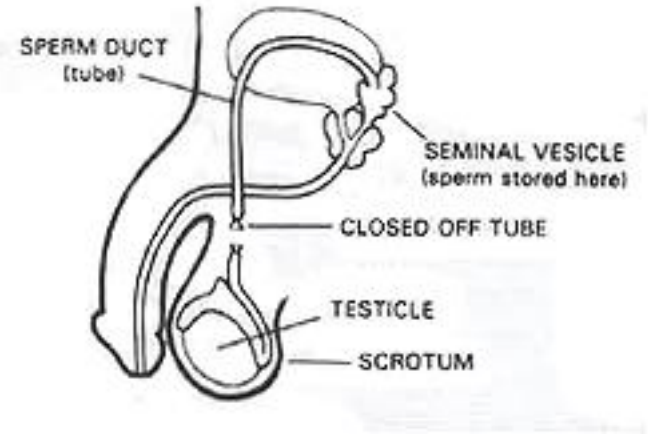
Advantages	Disadvantages
• Condoms are the only contraceptive method that can protect against both pregnancy and STIs, including HIV. • Women can initiate their use. • Has a texture said to feel more natural than male	• Requires correct use with every act of sex for greatest effectiveness. • Requires both partners' cooperation.

condoms, is less restrictive, and outer ring can provide additional stimulation. • Can be used without seeing a health care provider. • Can be inserted ahead of time so as to not interrupt sex. • Does not have to be removed immediately after ejaculation.	• Insertion and removal may require some practice. • Can cause a quiet yet undesirable noise during intercourse.

Vasectomy

The primary form of male **sterilization**, were the vas deferens are cut or blocked, thus preventing sperm cells from entering semen.

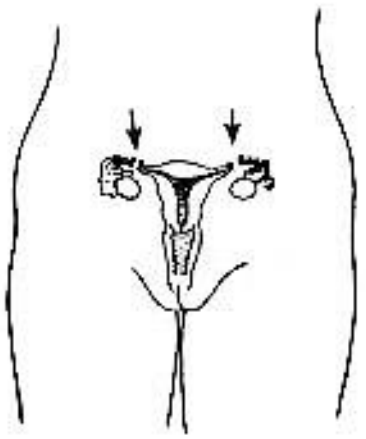
- Consistent and correct use: 99.9%
- Typical use: 99.85%
- Duration: Lifetime
- Availability: Some regional hospitals and some district health centers, but many health workers won't discuss this option
- French Names: *La vasectomie*, *la stérilisation masculine*



Advantages	Disadvantages
• Intended to provide lifelong, permanent, and very effective protection against pregnancy.[27] • Involves a safe, simple surgical procedure. • Has fewer side effects and complications than many methods for women. • The man takes responsibility for contraception, taking the burden off of the woman.	• Reversal is usually not possible. • Three month delay in taking effect, where a man or couple must use condoms or another contraceptive method for three months after the vasectomy. • No protection against STIs.

Female Sterilization

Minilaparotomy, one of the more common forms of **tubal ligation**, involves making a small incision in the abdomen. The fallopian tubes are brought to the incision to be cut or blocked. Eggs released from the ovaries cannot move down the tubes, and so they do not meet sperm. Most women, at least in rural areas, do not seek out this procedure. The majority of women in developing countries who have this done are encouraged to do so by a doctor after a difficult childbirth when they believe having another child will most likely kill the mother.



- Consistent and correct use: 99.5%
- Typical use: 99.5%
- Duration: Permanent
- Availability: Regional hospitals.
- French Name: *La stérilisation féminine*, *la stérilisation tubaire*, *la ligature des trompes*, *la tubectomie*, *nouer les trompes*, *la minilaparotomie*.

[27] Due to its irreversible nature, getting *informed consent* for sterilization procedures is duly important.

Advantages	Disadvantages
• Intended to provide lifelong, permanent, and very effective protection against pregnancy. • Easy to use, as there is nothing to do or remember.	• Expensive. • Some women find the surgical procedure to be scary. • Irreversible. • After the procedure, women should rest for two days and avoid vigorous work and heavy lifting for a week. • Side effects can include more cramps and pain during monthly bleeding. • No protection against STIs.

Lactational Amenorrhea Method

Lactational Amenorrhea Method (LAM) is a temporary family planning method based on the natural effect of breastfeeding on fertility that provides contraception for the mother and best feeding for the baby. The LAM requires that the mother's monthly bleeding has not returned (**amenorrhea**) and that the baby (6 months old or younger) is exclusively breastfeed often and consistently every time the baby is hungry, day and night.

- Consistent and correct use: 99.1%
- Typical use: 98%
- Duration: 6 months
- Mechanism of action: Prevents ovulation
- French Name: *La méthode de l'allaitement maternel et de l'aménorrhée (MAMA)*

Advantages	Disadvantages
• Effective for as long as monthly bleeding has not returned and the woman is exclusively breastfeeding. • Can be used in conjunction with a non-estrogen based family planning method. • Has no direct cost for family planning or for feeding the baby. • Can be used by women with normal nutrition.	• Requires breastfeeding day and night, whenever the baby wants to be fed, at least 10 to 12 times a day in the first few weeks after childbirth and thereafter 8 to 10 times a day, including at least once at night in the first months. Daytime feedings should be no more than 4 hours apart, and nighttime feedings no more than 6. • Some babies may not want to breastfeed 8 to 10 times a day and may want to sleep through the night. • Incorrect use may result in less than optimal protection from pregnancy. • No protection against STIs.

Fertility Awareness Methods

Fertility Awareness Methods (FAM), also called periodic abstinence or natural family planning, are behavior-based family planning methods that require a woman to know when the fertile time of her menstrual cycle starts and ends. There are several ways to find these dates that can be used exclusively or in combination with each other. **CycleBeads** are a popular calendar-based method that involves keeping track of days of the menstrual cycle in order to identify the start and end of the fertile time. This method is socially acceptable in Senegal since these beads are somewhat similar to "bin-bins" that women

typically wear. Other symptom-based methods include the monitoring of cervical secretions or resting body temperature.

- Consistent and correct use: 91-99%
- Typical use: 75%
- Availability: Regional hospitals, district health centers, health posts
- French Name: *Les méthodes basées sur la connaissance de la fécondité*, *le Collier du Cycle (CycleBeads)*

Advantages	Disadvantages
• Requires both partners' cooperation. The couple must be committed to abstain or use another method on fertile days. • No side effects or health risks. • Does not require procedures and may not require supplies. • Helps women learn about their bodies and fertility. • Allows some couples to adhere to their religious or cultural norms about contraception. • Can be used to identify fertile days by both women who want to become pregnant and women who want to avoid pregnancy. • Does not require literacy or advanced education.	• Women must stay aware of body changes or keep track of days, according to rules of the specific method. • Ovulation usually occurs on day 14 of the menstrual cycle, but can occur anytime between days 7 and 21. This lack of uncertainty around when exactly ovulation takes place sometimes results in the failure of this method. • No protection against STIs.

Progestin-Only Pills

Also known as mini-pills, **progestin-only pills** are often given to breastfeeding mothers to add to the contraceptive effect of exclusive breastfeeding and women who cannot take estrogen-based methods.

- Consistent and correct use: 99.7%
- Typical use: 92%
- Duration: Taken daily
- Mechanism of action: Thickens cervical mucus (blocks sperm from meeting an egg) and disrupts the menstrual cycle, including preventing ovulation
- Availability: Should be available at most health posts
- French Name: *Les pilules progestatives*, *la mini-pilule*

Advantages	Disadvantages
• Safe for breastfeeding women and their babies, as well as women who can't use estrogen-based methods. • Can be started less than 6 weeks after childbirth, and can be given to mothers of children less than 6 weeks old to be started at a later time. • Can be stopped at any time without a provider's help. • Does not interfere with sex.	• Taken daily and must be taken at the same time every day. • Breastfeeding women normally do not have monthly bleeding for several months after giving birth; mini-pills lengthen this period of time. For women having monthly bleeding, frequent or irregular bleeding is common. • Potential side effects include headaches, dizziness, and breast tenderness. • No protection against STIs.

Withdrawal

- Consistent and correct use: 96% effective
- Typical use: 73% effective
- French Name: *Le coït interrompu*, *le retrait*.

Advantages	Disadvantages
• Always available in every situation. Can be used as a primary method or as a backup method. • Requires no supplies and no clinic or pharmacy visit. • Correct use promotes male involvement and couple communication.	• One of the least effective contraceptive methods. • No protection against STIs.

Emergency Contraception Pills

Emergency contraception pills (ECPs), also known as "Plan B" in America and *la pilule de lendemain* or *la contraception d'urgence* in Senegal, are a form of post-coital contraception containing a high dose of progestin, the same hormone found in oral contraceptives and the hormonal IUD, to prevent or delay ovulation. It is most efficacious when taken within the first 72 hours after intercourse. When treated within 24 hours, ECPs have a failure rate of 0.4%, and 2.7% between 48 and 72 hours. This leaves a narrow period in which a woman can access ECPs before its effectiveness declines. The typical one pill dose at the pharmacy costs between 2500-3700 CFA and varies widely at health facilities. Combined oral contraceptives can also serve as ECPs and are a much cheaper option.[28]

ECPs are considered very safe; the duration of use is short, and they are composed of the same hormones that are approved for use in other contraceptives. In fact, women who are unable to use other hormonal contraceptive methods can use it. Even if a fertilized egg has implanted in the wall of the woman's uterus by the time she takes the pills, it will not harm the embryo. Side effects can include slight irregular bleeding for 1 to 2 days after taking emergency contraception pills and monthly bleeding that starts earlier or later than expected. In the week after use, there may be nausea, abdominal pain, fatigue, headaches, breast tenderness, dizziness, and vomiting.

When starting to discuss the topic of family planning with your health care counterpart, slowly get a feel for their attitude about emergency contraception. In most areas, it is accepted and encouraged, but there are still some areas where it is not accepted, and you do not want to ruin a professional relationship because you assumed your counterpart supported the use of this drug.

It is important to remember that emergency contraceptives are not a method of habitual family planning and should not be used as such. It should be used in cases of rape, broken or misused condoms, and other singular cases. This is not due to safety reasons but rather because other forms of hormonal contraception are more reliable for regular use.

Common Barriers

Religion

As is the case with most religious texts, the Koran has many different translations. As a result, some Senegalese believe that God does not approve of family planning. However, there are Senegalese religious leaders who believe the Koran is in favor of family planning if it is done to

[28] For dosing information on using combined oral contraceptives as emergency contraception, based on the brand of COC, see page 55 of the WHO manual *Family Planning: A Global Handbook for Providers*.

safeguard the health of the mother and child. Seek out religious leaders and teachers to both develop and disseminate messages that are based on passages from the Koran. For example, in 2008, USAID provided Imams with interpretations of the verses pertaining to and in favor of family planning. These provided the religious leaders with an alternative perspective, understanding, and evidence from the Koran. Having religious leader support is very important because they can then spread this information to other Imams and the general population.

Men

According to the 2010-2011 Demographic and Health Survey (DHS), Senegalese men desire larger families than Senegalese women (7.3 and 5.2 children, respectively). The male head of the household is usually the one who controls the family's finances and, as such, dictates how the money is spent. If he disapproves of family planning, his wife will be denied access. Often, men know that having many children can be dangerous for both the mother and child and that it is an economically poor choice, but having many children is a cultural norm and seen as a status symbol; many men want more children to increase their status, have assistance cultivating farmland, have children to care for them in the future, etc.

Targeting men for interventions, especially if you are a male Volunteer, can have a large impact. Men are very conscience of their social status and if they see other men, especially their friends, supporting family planning, they will be more likely to do the same. If you are a female PCV, you should try to find a male counterpart that is credible, motivated, and supportive of family planning.

Side Effects

Contraceptive side effects and misconceptions of them are a large obstacle for women. This is especially true when the menstrual cycle is affected. In Senegalese culture, an abnormal period or not having a period (a side effect called amenorrhea) is often seen as a sign that something is wrong. With many long-term, hormonal methods, women experience little or no monthly bleeding or have irregular, unpredictable, or prolonged bleeding. While these bleeding changes are not harmful, they can create fear among the women using them, especially if such side effects have not been clearly explained to them by their health care provider. Amenorrhea—a potential side effect for the Jadelle implant, the hormonal IUD, and the Depo-Provera shot—can be very scary for Senegalese women and can lead to fears and rumors of infertility. Increased monthly bleeding—a common side effect for the Jadelle implant, the hormonal IUD, the copper-bearing IUD, and the Depo Provera shot—can create cultural problems among Senegalese women. Muslim women are considered "unclean" during their monthly bleeding and are not allowed to pray during that time. Moreover, prolonged bleeding may increase the likelihood that a woman with low iron levels will become anemic, or exacerbate the condition if a woman already has it.

If a Woman Misses Oral Contraceptive Pills. . .

- She should take the pill as soon as she remembers, and continue to take one pill each day.
- If she misses pills 3 days or more in a row, or if she starts a pack 3 days or more late, she should use condoms or avoid sex for the next 7 days.
- If she misses those three or more pills in a row in the third week of her monthly pack, she should use condoms or avoid sex for the next seven days, *and* skip the non-hormonal pills for week four, and start taking pills at one from the next pack.

Delayed onset of fertility after discontinuation of some methods, such as Depo Provera, can also lead to fears and rumors of infertility. Depo is not an immediately reversible family planning

method, with fertility typically returning between 4 and 10 months after discontinuation. Women are often not told about this potential side effect before using the method, and many quit after the first three to six months because of misunderstandings regarding other side effects (such as changes in bleeding patterns). After that, due to the delayed return of fertility linked to Depo, these uninformed women may be unable to become pregnant immediately. When women experience such side effects, they may confide in their friends, which leads to misunderstanding, not only about Depo, but also about family planning in general, and can make other women reluctant to practice it.

The barrier of misunderstanding around side effects can easily be circumvented if doctor-patient communication is clear from the start. Studies have shown that high-quality counselling regarding side effects, especially if those side effects include disruption to bleeding patterns, can result in continued and correct use of family planning methods. According to U.S. law (the Tiahrt Amendment), bodies receiving U.S. government funding for family planning (e.g., USAID SPA grants) are required to describe the potential side effects for the method a woman is choosing. It is important to ensure that this is occurring and to encourage health workers to also inform women about other available methods of family planning, their benefits, and possible side effects. It should also be stressed that women should work with their doctor to find the method that is best for them, and to explain the normalcy of switching methods at least once before settling on the method that's best for their body.

Extended hormonal contraception delays menstruation; continuous use eliminates menstruation. When combined oral contraceptive (COCs) were first introduced in the 1960s, social, cultural, and religious pressures favored associating pills with a "natural" cycle whereby hormone withdrawal for 7 days was followed by bleeding "withdrawal bleeding" (i.e., not actual menstruation). The standard COC regimen of 21 hormonal pills and 7 non-hormonal pills continues to be prescribed, although there is no known medical benefit to routine monthly bleeding. However, many times, the 7 non-hormonal pills contain iron which is a welcome addition, especially in Senegal where anemia is a large problem.

What You Can Do to Increase Knowledge

- Start an education campaign using a variety of outlets, such as advertising, causeries, radio shows, and poster campaigns. Images can be used instead of words.
- Find the people in your community currently using family planning and have them to conduct a question-and-answer session at a women's group meeting.
- Work with your local health care worker to perform structured counseling and create a script for them to use during prenatal visits encouraging postpartum family planning.
- Be very open with women. Provide them with as much information as possible so that they can make educated decisions.
- Don't forget that your messages, especially if this is a new topic for people, need to be coming from a local individual that people find reliable and trustworthy.

Opportunities

Birth Spacing

In Muslim societies such as Senegal, limiting the number of children a couple has can often be seen as contrary to Islam's teachings. However, some individuals view efforts to space birth, for the sake of the health of mothers and their babies, as acceptable, and some interpretations of the Koran, as aforementioned, support family planning use.

Many studies have shown that adverse maternal, fetal, and newborn outcomes are related to closely spaced pregnancies. Close pregnancies can contribute to anemia, which increases the woman's risk for postpartum hemorrhage (the leading cause of maternal mortality in Senegal and worldwide). Close pregnancies can also lead to miscarriage, stillbirth, low birth weight, and preterm delivery, and are associated with higher mortality in infancy and childhood. USAID and the World Health Organization have recommended that women wait until at least 24 months and no more than 5 years after their last birth before attempting their next pregnancy, in order to reduce the risk of adverse outcomes among women, newborns, and infants. The babies of women outside of these age ranges are more likely to have a low birth weight, which puts them at greater risk for illness and mortality in infancy and childhood. Moreover, women with short intervals between birth are at increased risk for premature delivery, anemia (which puts women at risk for post-partum hemorrhage) and pre-eclampsia (pregnancy-induced hypertension), and women with long intervals between births are at greater risk for pre-eclampsia. Post-partum hemorrhage and pre-eclampsia are both dangerous maternal health complications, and are discussed in further detail in the Reproductive Health Chapter of the Health Manual.

Common Bleeding Changes Side-Effects

- Jadelle Implant: Bleeding changes, such as prolonged bleeding, heavy bleeding, or no bleeding are common, especially in the first year. In following years, bleeding becomes more regular or infrequent.
- Hormonal IUD: Typically results in lighter and fewer days of bleeding, infrequent, or irregular bleeding, no monthly bleeding, or prolonged bleeding.
- Copper-bearing IUD: Typically longer and heavier bleeding and more cramps or pain during monthly bleeding, especially in first three to six months.
- Depo Provera: Changes in bleeding patterns include an irregular, often heavy cycle during the first three months of use, and infrequent, irregular, or no monthly bleeding after a year of use.

Young People

As a consequence of socio-cultural and religious norms, access to quality health information and services for Senegalese adolescents has been hindered in the past. There is little to no communication to young people from their elders regarding sexual or reproductive health. Many females never know about the menstrual cycle until they are surprised by their own. This breakdown in communication is illustrated by the fact that adolescents aged 15-19 account for 9% of the total fertility with disparities among rural (10%) and urban (7%) settings, due to factors related to schooling, early marriage, and poverty. According to the DHS, 19% of those aged 15-19 years have already become sexually active with 17.1% of females in the same age range already having a child. The rate of contraceptive use for this age group is low, at just 5.8%.

In 2014, the Government of Senegalese released its National Action Plan for Reproductive Health for Adolescents and Youth for 2014-2018. Led by the Division de la Santé de la Reproduction des Adolescents et des Jeunes, the National Action Plan aims to organize, monitor, and evaluate preventive, curative, and promotion activities for the health and well-being of young people. Its goal is for all adolescents, regardless of sexual orientation, to have access to information and advice regarding health, services adapted to their needs, and for providers and outreach workers (including Badiene u Gox) to be trained to have the knowledge, skills, and positive attitudes to offer services tailored to young people's needs.

Young people are a target population with which you can make a great impact. They are often the most eager to learn, are open-minded, and enjoy helping with Volunteer projects. Family planning can and should be taught as an addendum to life skills activities. There are already some structures in place for adolescents. Middle school science classes (SVT) have reproductive health in their curriculum, but teachers often do not teach the information due to embarrassment or fear of backlash from the community. Also, Club EVF (Education à la Vie Familiale) programs were created to teach youth about the risks of unprotected sex, negotiating skills, decision making, early pregnancy and its consequences, as well as the modes of transmission and prevention of HIV and other STIs. Since adolescents receive their information from a variety of sources that may not always be the most reliable, training peer educators can have a great impact on the quality of information being passed around and encourages youth to seek more information. You can also make family planning and life skills the school year's theme for your English club, theater group, or radio club.

By increasing the Senegalese contraceptive rate to 60% by 2032, Senegal would need 1 million fewer jobs, and 25,000 maternal and 1.2 million children's lives would be saved.
– IntraHealth International

As a reminder: while in American culture, being open about reproductive and sexual health in an educational setting is not taboo, it still is in many places in Senegal. Be cautious as you approach the subject, or you may face community backlash. Discuss the topic with multiple community members before beginning any projects, receive the approvals from the appropriate people, and have a respected community member working with you closely.

Encouraging Family Planning in Your Community

In order to broach the topic of family planning, you must be trusted by your community. Once you establish that trust and begin having personal conversations with those interested, try to determine the barriers to family planning. Also, terminology is vital to success. For example, the term "birth spacing" is much more acceptable than "birth control." Teaching families to space births and stressing the benefits on the health of the mother and child will make for a more successful campaign than asking people to "limit births."

Your campaign should combine different interventions, such as, radio, causeries, theater, and poster ads. Don't just use one type of intervention and, to add credibility, make sure the message isn't coming from you. Collaborate with local respected leaders, religious leaders, and people currently practicing family planning to create and disseminate messages. Put yourself out there and host events large and small at the places people are *already* gathering—markets, boutiques before lunch time, garages, wells, etc.

"I'D LIKE AN OLDER BROTHER, PLEASE."

An important but currently overlooked part of the issue is the lack of doctor-patient communication. Women are often scared or embarrassed to ask doctors, seen as superior, about side effects they are having or even questions they may have before treatment begins. Working with health care professionals on structured counseling is a great way to improve communication and reduce misconceptions about side effects. As with most projects in the Peace Corps, having strong, respected counterparts is key to affecting behavior change in your community.

7 Secondary Project Areas

HIV/AIDS Prevention

Non-Project Plan Disclaimer - Although HIV prevention is not a part of the Peace Corps Senegal project framework, it is still a serious public health issue that can be addressed by Peace Corps Volunteers.

Global History

It is widely accepted by researchers that HIV is closely related to the Simian Immunodeficiency Virus (SIV), a virus that can affect non-human primates. Research shows that in the early 20th century SIV jumped from primates to humans and mutated into Human Immunodeficiency Virus (HIV). One of the most simple and likely explanations for the cross-species jump is that a hunter or handler of bush meat was exposed to the blood of an infected primate via a cut or bite. This species to species jump and mutation has occurred multiple times over the course of human history and many theories blame development – the creation of cities and improved travel routes leading to more frequent and prolonged interactions between communities – for providing the means for the virus to spread without dying off. The original virus is thought to have been brought by a man who traveled to the Democratic Republic of Congo (DRC) from Cameroon on the Congo River. Once the virus reached an urban center, infection rates escalated. Cases are thought to have existed as early as the 1920's but the first substantiated human case was found in blood samples from a malaria project done in 1959 in the DRC. During the 1960's a different strain of HIV, HIV-2 was found in West Africa, possibly having originated from a separate SIV to HIV jump in Guinea-Bissau. While HIV-1 is believed to have originated with SIV from chimpanzees HIV-2 is believed to have originated from a different primate, the sooty mangabey.

In 1966, an unknown infected individual who worked in the DRC carried HIV-1 to Haiti, thus spreading the virus to the western hemisphere. Subsequently, another unknown individual then carried the virus from Haiti to the United States. Around the same time, the DRC experienced what was later realized to be one of the first AIDS epidemics.

In 1980, the epidemic in the United States began within the male homosexual population. The Center of Disease Control and Prevention (CDC) reported groups of otherwise healthy men being afflicted with a number of opportunistic diseases common to immune-suppressed patients. Around the same time 85% of sex workers in Nairobi were afflicted with what was known as "slimming disease" or simply "slim". It was later determined that this disease was actually HIV/AIDS. At the time, doctors made no connections between "slim" in Eastern Africa with opportunistic infections and the deadly epidemic effecting white homosexual men in San Francisco and New York. HIV in Africa spread through Central and West Africa but not as rapidly due to lack of infrastructure and fewer urban centers. Currently most cases in Senegal and West Africa in general are HIV-2 which has less of a viral load than HIV-1 and is thus less contagious. It has also been shown that those with HIV-

HIV vs. AIDS

When talking about HIV/AIDS it is important to note the difference between the two. HIV is the actual virus that infects T-cells while AIDS is a set of symptoms and infections resulting from the damage to the human immune system caused by HIV. This condition progressively reduces the effectiveness of the immune system and leaves individuals susceptible to opportunistic infections and tumors. HIV exists in blood, semen, vaginal fluid, breast milk, and in very, very small quantities, saliva.

2 are semi-immune (70%) to HIV-1.

History in Senegal

In 1986, the first AIDS case was documented in Senegal. At the same time the Senegalese government established the National Program for the Fight against AIDS (Programme National de Lutte contre le SIDA) later renamed the National Council for the Fight against AIDS (Conseil National de Lutte contre le SIDA or CNLS) in 2002. In 1998, Senegal was the first sub-Saharan country to have a policy to provide free antiretroviral drugs (ARVs). UNAIDS and Global Fund have stated that Senegal is a model country in the fights against AIDS because of the transparency, mobilized in-country partners, and vibrant civil society along with having good oversight and good results. Currently the general population's prevalence rate of HIV stands at a steady 0.7%. (Compare that to the United States prevalence rate of 0.6%)

HIV/AIDS Status in Senegal

According to the 2010-2011 Demographic Health Survey (DHS)-while nearly all Senegalese women (95%) and men (97%) have heard of AIDS, knowledge of HIV prevention is lower; just 67% of women and 76% of men know that using condoms and limiting sex to one uninfected partner can reduce the risk of contracting HIV. Women living in the Matam Region (40%) and men living in the Saint-Louis Region (51%) are least likely to know these two main HIV prevention methods. 37% of women and 28% of men know that HIV can be transmitted by breastfeeding and that the risk of mother-to-child transmission can be decreased by the mother taking special drugs during pregnancy.

During the 2010-11 DHS-Multiple Indicator Cluster Survey (MICS), more than 12,000 women and men were eligible for HIV-1 and HIV-2 testing and among them, 84% of women age 15-49 and 76% of men age 15-49 were tested. In Senegal, the prevalence of HIV-1 and HIV-2 in the adult population age 15-49 is 0.7%. HIV prevalence is slightly higher among women (0.8%) than among men (0.5%). HIV prevalence has not changed since the 2005 DHS. HIV prevalence varies by marital status; 4.6% of divorced or separated women are HIV-positive, compared to 0.8% of married women. Unmarried women are least likely to be infected (0.4%).

At-Risk Groups

In Senegal, prostitution is legal. Registered sex workers get free treatment and testing for STIs and HIV/AIDS. However, there are still a large number of sex workers that are not registered. Of those registered, 18.5% in 2011 were positive, down from 19.8% in 2006. As a point of reference, in the Health District of Saraya, in the region of Kedougou, there were 230 registered sex workers in May 2013. Many regions have an HIV specialist that would have statistics on the number of sex workers in the region and other relevant statistics to HIV transmission.

At Risk Groups

Other groups that are at higher risk than the general population are: intravenous drug users (IDU) (9.4%), drivers (as high as 1.9%), prison inmates (as high as 4.5%), fishermen (as high as 1.5%) and miners (as high as 3.4%). These rates increase with age, alcohol use, polygamy, and lack of education.

Another at-risk group is men who have sex with men (MSM). Statistics show that rates of HIV infections of MSM in Senegal have reached 21.8% and are even higher for those over 25 years of age. Although homosexuality is illegal in Senegal, most regions have groups organized for homosexuals supported by a health structure that often have free testing days. Government organizations and health structures are seeking new methods to access a larger portion of the MSM population.

Regional Hotspots
According to the 2010-2011 DHS, HIV prevalence among women is highest among those living in the Kédougou (2.5%) and Kolda (2.4%) regions. Among men, HIV prevalence is highest in the Kolda Region (2.4%) and, to a lesser extent, in the Tambacounda (1.2%) and Ziguinchor (0.9%) regions. This is attributed to many things including but not limited to:
internal migration for socio-economic activities, external migration with neighboring countries for travel and trade (HIV prevalence rates - Gambia 1.5%, Guinea-Bissau 2.5%, Guinea 1.4%), early youth sexuality (women in these regions have more children and start childbearing earlier than other regions of Senegal), higher rates of illiteracy, poverty, lack of ease of access due to insecurity/poor infrastructure creating a lack of HIV interventions, medicines, and testing materials, and seasonal mobility for work. Other areas that encourage risky behavior and promiscuity are: tourist areas, travel hubs, and major religious events.

National Strategic Plan
In 2011, Senegal revealed its 2011-2015 Strategic Plan for HIV/AIDS: "Zero new infections, zero AIDS-related deaths, zero discrimination by 2015". By 2015, the government aims to eliminate all mother-to-child transmission, increase access to testing and treatment to 80%, and maintain less than 1% HIV prevalence in the population. Their method of reaching these goals will focus on overcoming the barriers to receiving testing and treatment. To eliminate all mother-to-child transmission the government and health structures will enforce routine HIV testing during antenatal care and supply ARVs when necessary. They aim to strengthen their existing programs in health facilities with the goal of eliminating stock-outs of tests and of ARVs, track cases from diagnosis through to the completion of first ARVs cycle, and increasing access to testing and treatment in high-risk groups.

Cultural Checks and Balances
Senegal has relatively low rate of HIV infection due to several factors such as the conservative religious culture in Senegal, the common practice of circumcising men, and relatively high levels of HIV awareness.

The practice of male circumcision has been shown to reduce the risk of heterosexually acquired HIV in males by approximately 60%. (WHO) The foreskin has less keratinization and is more susceptible to small epithelial tears during intercourse which provides a portal of entry for pathogens, including HIV. The presences of other sexually transmitted infections, which independently may be more common in uncircumcised men, increase the risk for HIV acquisition.

According to the Joint United Nations Programme on HIV/AIDS, Senegal's success at maintaining a low prevalence among the general population can be attributed to the country's rapid and consistent implementation of several measures such as: reinforcement of the national blood supply (which had been systematically tested for syphilis and hepatitis since the 1970's in order to prevent HIV transmission through blood transfusions); the provision of appropriate equipment and personnel trained in HIV testing to regional and national blood banks; HIV education programs; registration and regular medical checkups for commercial sex workers (harm reduction measures which allow access to condoms and health services in this high risk population); and promotion of condom use in the general population (dissemination of millions of condoms through social marketing programs to the general population and distribution to high-risk populations).

Senegal's policies are considered to be successful in the control of the spread of HIV. Challenges to continued success include population movement across borders, high HIV prevalence among commercial sex workers, and the need to reach young people approaching sexual debut.

Another reasons prevalence rate is low in Senegal because a number of religious leaders were involved in the campaigns; it was developed into what is call the faith-based approach to HIV prevention.

Barriers to Prevention

While there is currently at least one anonymous testing center in every district and both tests and ARVs are free, ARVs are only available from the district level and above. This creates a discrepancy between those who can and cannot access the medication. Those far from the district health center may have issues paying for transportation or may just be embarrassed to go for fear of their community finding out they are infected. In addition, the existing supply chain is weak and lack of medicines – which is especially dangerous for time sensitive ARV therapy - and improper storage are problems that need improved.

According to policy, all pregnant women coming to the center for antenatal consultations are to be asked if they are willing to be tested for HIV. While many women agree, there are problems with the system: of the women that agree, most are ushered out of the consultation room before the test results are ready, many women decline because of fear or lack of knowledge of mother-to-child transmission, and sometimes the health worker does not do it.

There is an apparent stigma and discrimination against those that are HIV+ and it is especially harsh towards sex workers and men who have sex with men - another major barrier to receiving care. In 2008, 9 HIV prevention workers were imprisoned for “acts against nature” which caused intervention programs to be suspended and those that remained open had fewer participants out of fear.

Encourage Work in Non-Hotspot Areas

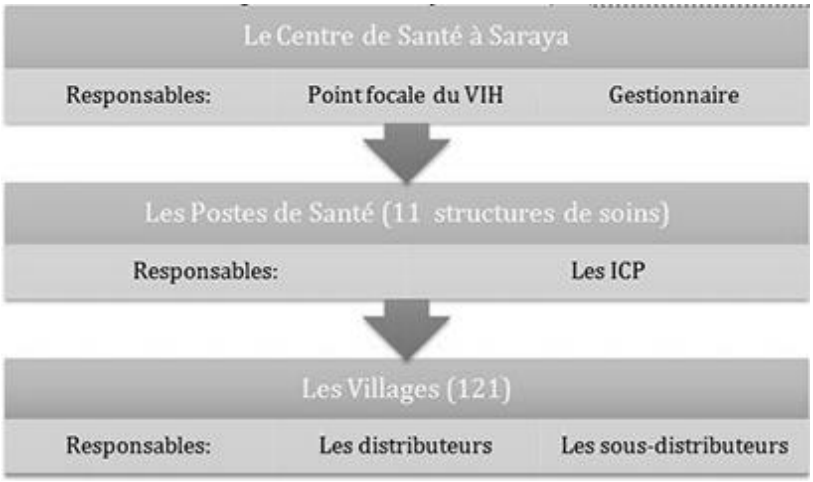
Although HIV prevention is not a part of the Peace Corps Senegal project framework, PCVs can still be involved in this major global health problem and have a significant impact. It is important to research your local situation before committing to any projects for a better understanding of which areas or populations would benefit most. Some things to consider for your area are: HIV prevalence, prevalence of pregnant females being tested during prenatal visits, local condom availability (at dispensaries or in boutiques) or lack thereof, and local attitudes, beliefs, and misconceptions about HIV/AIDS.

Peace Corps Volunteers have orchestrated a number of projects and supported existing programs throughout Senegal. More recent projects include:

Community-Based Condom Distribution Network

Starting in 2009, PCVs in the Saraya district of Kedougou have worked with the health district to create a department-wide condom distribution network. The following description was taken from the COS report from RPCV Chris Brown who started the project.

“The community-based condom distribution network was established to create a constant supply of condoms, available to all at any moment, in any village. Due to the geographically dispersed villages, access to care and methods of prevention, specifically condoms, are often difficult to access. The constant and consistent availability of condoms is essential to reducing the risk of transmission of HIV and other STIs.



The condom distribution network utilizes the structure of the local health post, the mobility of the head nurse, and the existing community health workers (CHWs) and community volunteers who all serve as distributors. A large supply of condoms is kept at seven health posts spread out over the health district, and a central supply is stored at the district hospital. The stock of condoms at the health post level is maintained by communication between head nurses and the district coordinator of HIV related activities for the health district. The head nurses, in turn, act as intermediaries between local distributors in each village and the health post, ensuring that a stock of condoms is maintained in each village. The number of villages assigned to each distributor was based upon population and distance; often, larger villages had multiple distributors.

The distributors were responsible for filling out and maintaining a supply sheet and distribution sheets, which recorded the age, sex, number of condoms distributed, and the village of origin for each person who received condoms. The sheets of distribution were then brought to the health post, as well as any orders for more condoms. Condoms were then given either directly to the distributor/supervisor or brought to the village by the ICP during the monthly vaccination visit. Distributors were taught to complete orders at the moment when they had a one-month supply left. This threshold was established over the first few months after the implementation of the distribution network.

As of June 2012, over 200,000 condoms had been distributed through the network. In 2014, the network will be expanded to better target sex workers in gold mining areas by training distributors in bars and sex worker lodgings at the biggest mining sites."

World AIDS Day

For World AIDS Day—December 1 every year—PCV Courtney Pedersen collaborated with a Kaolack radio station and the largest high school in Kaolack to create a rap contest for World AIDS Day. She worked with president of the student body to create the rules and inform the student body of the contest through fliers and word of mouth. Once she had applicants, she arranged a short training for them that covered HIV transmission and prevention, Senegal's HIV status, and the information that testing and ARVs are free in Senegal. This information had to be included in the rap but otherwise, students were given creative freedom. Courtney recorded all of their raps in the studio and edited/produced their songs. The finished tracks were then given to the radio station which ranked them and created a World AIDS Day-themed rap contest countdown show that also included interviews from local health workers and discussions based on the theme. The winner won a free session at a professional recording studio where he got to work with a producer to create an original song and beat.

Increasing Accessibility to Condoms

In 2013, RPCV Julia Bowers worked with a male counterpart to get all 3 boutiques (male-owned) in her village of 900 to sell condoms. She chose this approach instead of working with supply chain management in the hospitals, as they did in Saraya, because the supply chain to Kolda was already plagued with problems and she was reluctant to rely on condom shipments from partner organizations in Dakar. With her approach, boutique owners fill their supply at the weekly market they usually attend, where condoms are available for wholesale. It also provides the boutique owners in her village the chance to increase their profits. She has found that the 3 boutiques cumulatively sell an average of 150 condoms per week. In conjunction with this, she and her counterpart perform monthly causeries with the male population in her village and surrounding villages about condom use and monogamy.

Garage Causeries - In 2011, as a result of the increasing prevalence of STIs in the Kaolack region, the Coutal health post made an effort to promote condom use and monogamy or limiting partners to the young men that work in transport hubs. With the help of a small flip chart that pictorially demonstrated men visiting prostitutes, condom use, STIs, AIDS, etc., a gregarious female ICP was able to discuss condom use, behavior patterns and choices, dispel common misconceptions, provide information, and create trusting relationships with motorcycle and taxi drivers. As a result, the health post experienced a sustained increase in condom requests from young males.

How to Use a Condom

After abstinence, consistent and correct use of latex condoms is the most effective method to prevent the sexual transmission of HIV.

- Use a new condom for every act of vaginal, anal and oral sex throughout the *entire* sex act (from start to finish). Before any genital contact, put the condom on the tip of the erect penis with the rolled side out.
- If the condom does not have a reservoir tip, pinch the tip enough to leave a half-inch space for semen to collect. Holding the tip, unroll the condom all the way to the base of the erect penis.
- After ejaculation and before the penis gets soft, grip the rim of the condom and carefully withdraw. Then gently pull the condom off the penis, making sure that semen doesn't spill out.
- Wrap the condom in a tissue and throw it in the trash where others won't handle it.
- If you feel the condom break at any point during sexual activity, stop immediately, withdraw, remove the broken condom, and put on a new condom.
- Ensure that adequate lubrication is used during vaginal and anal sex, which might require water-based lubricants. Oil-based lubricants (e.g., petroleum jelly, shortening, mineral oil, massage oils, body lotions, and cooking oil) should not be used because they can weaken latex, causing breakage.

Reproductive Health

According to the WHO, reproductive health is the ability to have a responsible, satisfying and safe sex life and the capability to reproduce and the freedom to decide if, when, and how often to do so. Implicit in this are the right of men and women to be informed of and to have access to safe, effective, affordable and acceptable methods of fertility regulation of their choice, and the right of access to appropriate health care services that will enable women to go safely through pregnancy and childbirth and provide couples with the best chance of having a healthy infant.

Focus areas within reproductive health are generally accepted to include: maternal and newborn health, family planning, reproductive cancers, HIV and AIDS, sexual health, gender-based

violence, abortion and post-abortion care, infertility, and young people's sexual and reproductive health. As family planning and HIV and AIDS have been covered in other sections in this manual, we will focus here on young people's sexual and reproductive health, maternal and newborn health, and reproductive cancers.

Total Fertility Rate is the average number of children that would be born to a woman over her lifetime if she were to experience the exact current age-specific fertility rates through her lifetime, and she were to survive from birth through the end of her reproductive life.
Senegal Total Fertility Rate: **5**

Determinants of Fertility

Demographers typically focus on four areas when discussing the drivers of fertility in a given population:

- Age of marriage.
- The level of contraceptive use.
- Miscarriage and abortion rates.
- **Postpartum** practices, such as exclusive breastfeeding or traditional practices where partners live separately for the first months of the new baby's life.

Young People's Sexual and Reproductive Health

Resources on the sexual and reproductive health of "young people" are often devoted to the following subgroups, based on biological and cognitive subgroups:

- 10-14 years old: Very Young Adolescents
- 10-19 years old: Adolescents
- 15-24 years old: Youth
- 10-24 years old: Young People

Contraceptive Prevalence Rate among married women in Senegal, modern methods: **12%**

Targeting the under-25 age group with behavior change interventions is not only important for ensuring the health of young people in their own right, but it is also important strategically—including as part of life skills activities (as covered elsewhere in the Health Manual). Cognitive development is not fully complete until about age 25, especially with regards to decision making and risk taking. Moreover, habits that are adopted before age 25 are more likely to be continued later in life.

In Senegal, important determinants of young people's sexual and reproductive health include: educational level, cognitive development, gender relations, and early marriage. While primary school enrollment in Senegal is high, the completion rate is lacking in some parts of the country.

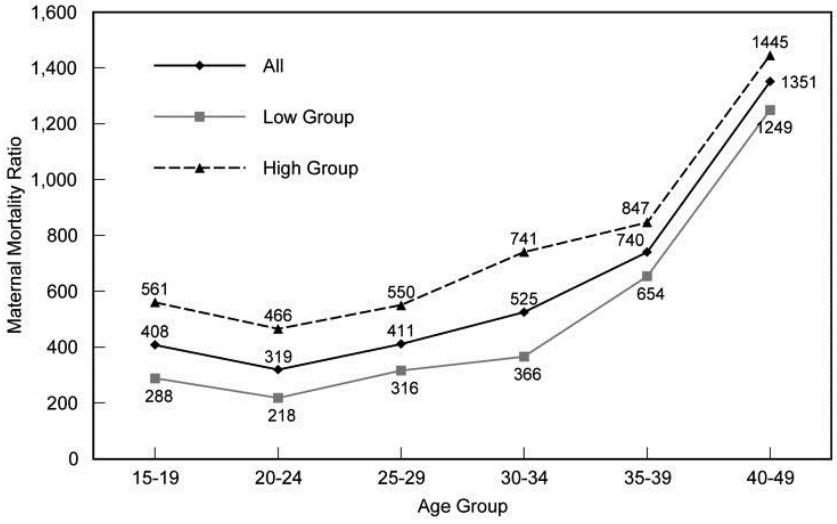
Basic sexuality education is typically part of the middle school curriculum, but many children do not reach this level. This may result in a poor understanding of one's anatomy, a lack of awareness of STIs, and how and when a woman can become pregnant. This—paired with the incomplete cognitive development that is tied to increased risk-taking and poor decision-making—can lead to STIs and unintended pregnancy during youth and in adult life. Moreover, the higher the level of education a girl has attained, the more likely she is to delay marriage and motherhood.

- Senegal Population under 18 years: **6.4 million**
- **25%** of women are married by ages 15-19
- **16%** of 15-19 year olds have had a child
- **63%** of the Senegalese population is under the age of 25

Gender and social expectations shape how adolescents think about themselves and others, and how they relate to members of the same and opposite sex. Deeply ingrained gender roles and unequal power relationships hinder the ability of girls and young women to refuse unwanted sex, negotiate condom use, make contraceptive choices, and

discuss family planning and child spacing with their partners. These power dynamics are highlighted in the context of intergenerational relationships, common in Senegal, where women can be significantly younger than their husbands.

According to the 2010-2011 Demographic and Health Survey, a quarter of the women in Senegal married between the age of 15 and 19. Early age of marriage often leads to a woman beginning to have children at an earlier age. Teenage mothers—still undergoing puberty—are at heightened risk of a number of pregnancy and childbirth related complications, such as obstetric **fistula**, **premature delivery**, and **eclampsia** (seizures and coma brought on by pregnancy-induced hypertension), among others.



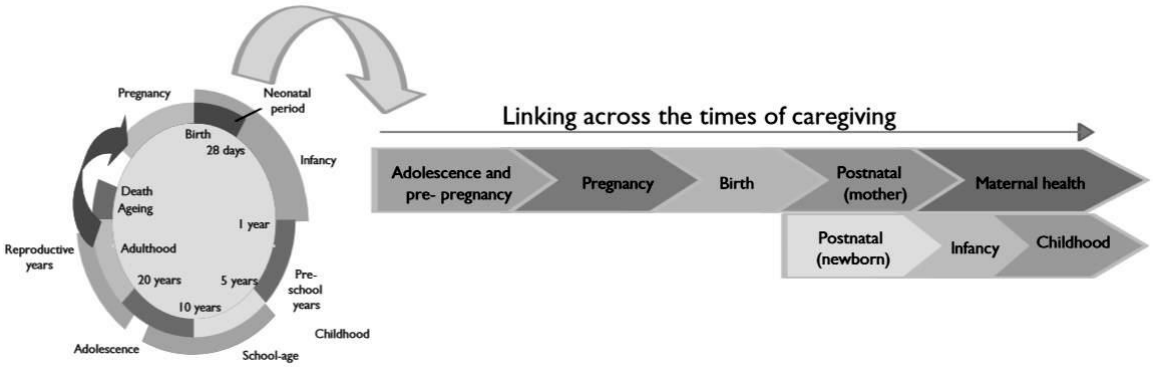
When looking at maternal mortality rates, compared with maternal age, one sees a general "J-curve." As in the graph above, rates are elevated among the 15-19 age group, are lowest among the 20-24 age group, increase slightly for 25-29, and continue increasing among the 30-34, 35-39, and 40-49 age groups. A "J-curve" is also seen when comparing maternal age and perinatal mortality (namely miscarriage and stillbirth). This elevated risk among teenagers and at first birth explains in part why teen pregnancy in the developing world can be risky for girls' health.

Maternal Health

Mothers, newborns, and children are inseparably linked in life and in health care needs. In Africa, most maternal and newborn deaths occur during childbirth and in the first few days of life, and many of these deaths happen in the home. The WHO and other groups encourage the use of a "continuum of care model"—displayed next—that connects essential adolescent, maternal, newborn, and child health packages throughout pre-pregnancy, pregnancy, childbirth, postnatal, and newborn periods, and into childhood.

Unmet Need for Family Planning: is the proportion of women of reproductive age who do not want to become pregnant for the next two years or do not wish to have any more children, but are not currently using a contraceptive method. Senegal's Unmet Need for Family Planning: **29%**

Connecting care throughout the crucial time periods in the lifecycle



As such, this section will cover a spectrum of maternal health aspects relevant to PCVs' work: **antenatal care**, birth planning, safe delivery, delivery complications, **postnatal care**, and traditional cultural practices.

Antenatal Care

The WHO and the Government of Senegal recommend that healthy women without risk factors[29] attend at least four antenatal care (ANC) visits: one as soon as she thinks she is pregnant, preferably within the first trimester (the first three months of pregnancy); a second at about six months (at the end of the second trimester); a third at eight months; and a fourth right before she is due. A full-term pregnancy is 40 weeks long. A trained birth attendant should do the following at a prenatal visit:

- Examine the mother to make sure she is healthy and the baby is growing well.
- Listen for the baby's heartbeat. In rural settings, this is usually done with a fetoscope, a small piece of wood shaped like a trumpet.
- Check the baby's position.
- Discuss maternal nutrition with the expectant mother, including a diet rich in iron in order to prevent **anemia**. Give iron and deworming tablets to prevent anemia at all four ANC visits. Also give vitamin C tablets, which help with iron absorption. Also check the eyelids and finger nails for signs of anemia. Many ANC activities focus on preventing and treating anemia, since the condition can lead to **postpartum hemorrhage**—the largest contributor to maternal mortality worldwide.
- Give folic acid tablets to prevent neural tube defects in the fetus at all four ANC visits.
- Check the hands and face for swelling, a sign of pregnancy-induced hypertension, which can lead to eclampsia. Eclampsia is a condition associated with seizures and coma at delivery and can result in death. The woman's blood pressure may also be taken to check for pregnancy-induced hypertension.
- Give vaccinations to prevent **tetanus**, a disease that

Why do women die during pregnancy and childbirth?

- Limited and poor access to reproductive health services, particularly in rural areas.
- Widespread misconceptions about women's health and causes of disease.
- A low contraceptive prevalence rate.
- Almost half of all births take place at home without qualified help.

[29] Risk groups include women: with anemia, with diabetes, with high blood pressure, who are 35 or older, who have had five or more children, who are under age 17, who are carrying twins, who are carrying breach babies, who have undergone the infibulation form of female circumcision, and who have had problems with past pregnancies (e.g., seizures, caesarian sections, heavy bleeding, premature or low birth weight babies, or stillbirths).

can kill both mothers and babies. These vaccinations are free, and can be given at the first or second ANC visits (in the first and second trimesters).

- Beginning in the second trimester, give medicine as part of **intermittent preventive treatment of malaria during pregnancy** (IPTp). Malaria in pregnancy can result in anemia in the mother and a baby with a low birth weight. Babies with a low birth weight are at much higher risk for death and illness in infancy. See the Malaria in Pregnancy section in the Malaria chapter of the Health Manual for more information.
- In Senegal, a long-lasting insecticide-treated bednet should be given to any pregnant women coming in for a prenatal consultation, also to prevent malaria in pregnancy.
- Give tests for HIV and syphilis, which can be passed to the fetus.
- Discuss birth planning with the mother.
- Discuss birth spacing and postpartum family planning with the mother.

Mothers Seeking Formal Care
Percentage of women receiving prenatal care by a trained provider: **93.3%**

Birth Planning

Potentially life-threatening complications develop in about 15% of pregnancies, and all women in such situations need immediate care. Most complications cannot be predicted, but health workers and PCVs can help women and their families be prepared for them. PCVs can help improve maternal health in their communities by being familiar with danger signs during pregnancy childbirth, and among newborns, and by:

- Helping women arrange for a skilled attendant (doctor, nurse, or midwife) to be present at birth, and ensuring that they know how to contact the **skilled birth attendant** at the first signs of labor.
- Explaining danger signs during pregnancy and childbirth to women and their families.
- Helping women and their families plan how she will reach emergency care if complications arise: Where will she go? Who will take her there? What transport will they use? How will she pay for medical assistance?

Danger Signs during Pregnancy and Childbirth

If any of these signs appears, the family should follow their emergency plan and get the woman to emergency care immediately:

- High fever, foul-smelling discharge from the vagina, or green or brown fluid leaking from the vagina—all of which may be signs of **sepsis** (severe infection).
- High blood pressure, severe headache, or blurred vision, which are all signs of pre-eclampsia (pregnancy-induced hypertension). Convulsions and fainting are also danger signs for pre-eclampsia. If left untreated and the baby is not immediately delivered, the woman may develop eclampsia.
- Heavy, prolonged, or painful vaginal bleeding. During the first three months, this may be a sign of an **ectopic pregnancy** (when an egg implants and fetus develops in the fallopian tube). Bleeding in the last three months of pregnancy can mean there is something wrong with the **placenta**. After birth, it can mean the woman is experiencing postpartum hemorrhage.
- Severe abdominal pain during the first three months of pregnancy—a sign of an ectopic pregnancy.
- Difficulty breathing, which may be a sign of heart problems.
- Decreased or no fetal movements. This may mean the baby is in trouble and at risk of becoming a stillbirth.

Maternal Mortality Rates

- **Maternal mortality** is defined as any death that occurs during pregnancy, delivery, and the 42 days after delivery.
- Maternal mortality rate: **392 deaths per 100,000 births**
- Lifetime risk of maternal mortality: **1 in 43**

Danger Signs for a Newborn

- Irregular breathing (too fast, too slow, labored, or grunting), a sign of **birth asphyxia**.
- Convulsions, or a floppy or stiff body. Convulsions are troublesome in their own right, but these may also be signs of tetanus.
- Fever, a sign of sepsis (severe infection). Sepsis can be caused by improper umbilical cord cutting and other unhygienic delivery practices.
- Body temperature is too low or not rising, which is a sign of pneumonia. This is exacerbated by the traditional practice—even in health facilities—of washing the baby immediately after birth, bringing the newborn's temperature down.
- Umbilical cord stump is bleeding or draining pus, or umbilical redness and swelling extending to the skin. This may mean the cord stump has become infected.
- Feeding problems (i.e., the baby is having difficulty breastfeeding).

Safe Delivery

The vast majority (80%) of all maternal deaths are avoidable. When women are provided with better care to manage their pregnancies and have their deliveries are assisted, the result is better postpartum outcomes. 40% of maternal deaths occur at the community level—in home deliveries, often where a skilled birth attendant is not present. However, in Senegal there are only 69 health facilities able to provide the basic emergency obstetric and newborn package of care, and 38 facilities are able to perform caesarian-sections and transfuse blood—meaning that the health system is not fully equipped to provide all expectant mothers with adequate care.

Safe Delivery

- Percentage of women giving birth in a health structure: **72.8%**
- Percentage of women giving birth attended by a trained provider (doctor, nurse, or midwife): **65.1%**

Every birth has three parts: stage one is when contractions open the **cervix**, stage two includes the delivery of the baby, and stage three includes the delivery of the placenta. The primary tasks of the birth attendant during delivery are to prevent and treat complications that arise at these various stages, and refer the woman to a higher level of care, if needed.

The essential newborn and obstetric package of care is evidence-based care that the public health community recommends for all women to receive in order to maintain normal labor and birth and to prevent complications, such as: maternal sepsis (severe infection), obstructed or prolonged labor, postpartum hemorrhage, birth asphyxia, hypothermia, and sepsis. It includes the following components:

- Respectful care for women and their families.
- Infection prevention practices.
- Use of a **partograph**—a graphical record of key data during labor, such as cervical dilation, fetal heart rate, duration of labor, and vital signs—for clinical decision making.
- Periods of walking during the first stage of labor, with food and fluid intake as desired by the mother.
- Presence of a companion during labor and birth.
- Position of the mother's choice for labor and birth.

Five "Cleans" to Prevent Infection:

- Clean place of birth (i.e., at a health facility).
- Clean hands (of the birth attendant).
- Clean clothes (of the birth attendant).
- Clean tools.
- Clean cord (i.e., the use of a clean tool to cut the umbilical cord).

- Restricted use of **episiotomy** (a surgical incision made below the vaginal opening during the second stage of delivery).
- Active management of the third stage of labor, when the placenta is delivered.
- Immediate newborn care includes: delayed umbilical cord clamping and cutting, clean cord care, drying and warming the baby to prevent pneumonia, and immediate and exclusive breastfeeding within the first hour.

At delivery, the Government of Senegal recommends the active management of the third stage of labor, and the essential care of newborns. Although great progress has been made to address neonatal mortality, 52% of child deaths worldwide still occur within the first 28 days of life, in large part due to a lack of structured prevention and management programs for newborn care.

Direct causes of maternal mortality are related to the "four delays" in:

- Recognizing danger signs.
- Deciding to seek care.
- Accessing services.
- Providing quality service.

They are also related to the "four too's":

- Too many children (five or more).
- Too close (less than 33 months apart).
- Too young (under age 18).
- Too old (over age 34).

Obstetric Fistula

Obstetric fistula occurs when a hole develops in the skin between the vagina and the urethra or bladder (vesico-vaginal fistula), or between the vagina and the rectum (recto-vaginal fistula), causing urine or stool to leak from the vagina. This serious problem happens as a result of prolonged, obstructed labor. It is most common to occur during delivery among girls still undergoing puberty, before their bones (including the pelvis) are fully grown. Fistulae can also occur among older women who have had five or more deliveries, because their muscles may be weakened, and among girls who have undergone **female circumcision**, since their vaginal opening may be smaller as a result of the procedure. In all of these cases, it is difficult for the baby to get out, and as a result the baby's head presses against the skin between the bladder and the vagina. This damages the skin and causes an opening (fistula) to form between the bladder and vagina.

Sadly, the prolonged labor that causes fistulae results in a stillbirth and serious problems for the mother. After the delivery, the fistula does not heal, and urine leaks from the bladder or feces leak from the rectum and out through the vagina; a process that the woman cannot control. The woman's husband, family, and community may avoid or even shun her due to her condition. Women who are suspected of having a fistula should go to the nearest health facility right away, so they can be referred to facilities that can treat and, when necessary, perform an operation to repair a fistula. Sadly, few women

Top Direct Causes of Maternal Death in Senegal:

- Postpartum hemorrhage: 34%
- Eclampsia: 19%
- Indirect causes (malaria, anemia, HIV and AIDS) :16%
- Sepsis (severe infection): 9%
- Unsafe abortion: 11%
- Obstructed labor: 4%
- Embolism: 1%

Top Direct Causes of Newborn Death in Senegal:

- Preterm birth: 13%
- Asphyxia (due to prolonged or obstructed labor): 11%
- Sepsis, meningitis, and tetanus: 5%.
- Pneumonia: 4%
- Birth defects: 3%

undergo this procedure, mainly because such services are not widely available and the surgery (which can cost about $400) is too expensive.
Prevention of fistulae include: preventing marriage and pregnancy among girls until they have completed puberty; spacing births, ideally by waiting until at least 2 years after delivery before trying to get pregnant again; and, if a girl under age 17 is pregnant, she should try to deliver with a skilled birth attendant.

Newborn Care

- Percentage of newborns receiving postnatal care within the first two days of birth: **41.2%**
- **Neonatal mortality**: Death within the first 28 days of life.
- Neonatal mortality rate: **26 deaths per 1000 live births**
- **Infant mortality:** Death within the first year of life.
- Infant mortality rate: **47 deaths per 1000 live births**

Postnatal Care

Within the first hour after birth, the mother should be encouraged to breastfeed. Immediate breastfeeding greatly benefits both the mother and the baby. For the baby, the first breastmilk that the mother produces (the colostrum) is nutrient-rich and helps prevent disease. For the mother, immediate breastfeeding increases the production of oxytocin in the woman's body, which can help prevent postpartum hemorrhage.

The WHO suggests that women should stay under observation by a skilled birth attendant for 24 to 48 hours. Upon discharge, women should be advised on care for the newborn, hygiene and nutrition; on birth spacing and family planning, including the lactational amenorrhea method; and on when to return for postnatal care, including routine visits, follow-up visits for problems, and danger signs for the new mother and her baby. Neonatal mortality is highest in the first 24 hours and week after birth. The greatest period of risk of postnatal complications for the mother is during the first six weeks after birth, before the **uterus** has returned to its normal size.

The Government of Senegal recommends postnatal consultations take place three, nine, and 42 days after delivery by qualified health care providers to ensure that both mothers and their newborns are healthy.

Percentage of women receiving postnatal care in the two days following birth: **68%**

Traditional Cultural Practices

Female Circumcision

As female circumcision is discussed in other parts of the Health Manual, the health impacts of the practice, especially those resulting in delivery complications, are covered here.

The following problems may happen right away (within the first week), and are extremely dangerous:

- Heavy bleeding and shock. Warning signs of shock include: severe thirst; pale, cold, and damp skin; weak and fast pulse; and fast breathing; confusion; or fainting.
- Infection, caused by the use of a cutting tool not cleaned properly. Signs of wound infection include: fever, swelling in the affected area, pus, or a bad smell from the wound, or pain that gets worse. Signs of severe infection (sepsis) include: fever and other signs of infection, confusion, and shock. Unhygienic cutting tools can also spread tetanus.
- Problems with passing urine, which can lead to kidney stones.

Other problems may happen later, and can last for many years:

- Problems with monthly bleeding. If the vaginal hole after circumcision is too small or is blocked by scarring inside the body, menstrual flow can be blocked. This can cause: very

painful monthly bleeding; long monthly bleeding, lasting 10-15 days; no monthly bleeding due to blockage; and trapped blood, which can lead to serious pelvic inflammatory disease and scarring in the uterus and fallopian tubes, which can in turn cause infertility.

- Problems with sex. In Senegal, girls are circumcised at a young age and have their vaginal opening made larger just before first sex in marriage. If she is expected to have sex before the wound has healed, sex will be very painful and dangerous, and the wound may take longer to heal. Open wounds also increase her risk of contracting HIV and other STIs. If an unsterile tool is used to open the vagina, it may also lead to wound infection. During sex, a woman may find it difficult to become aroused, since the external part of the clitoris has been cut off.
- Lasting pain.
- Mental health problems.

Female circumcision may also lead to complications during and after delivery. With some types of circumcision, there is a greater risk that the baby will have difficulty getting out of the vagina, resulting in prolonged, obstructed labor. If the hole left after circumcision is very small, it must be opened so that the baby's head can pass through. If the person who does the opening is not a skilled birth attendant, it may lead to infection. Scarring from circumcision can also cause the genitals to tear more during childbirth, since scarred skin does not stretch easily, and postpartum hemorrhage may result. As discussed above, women who have been circumcised are also at greater risk for fistula, a result of obstructed or prolonged labor.

Lastly, if a circumcised woman's vaginal opening is not large enough, she cannot get a pelvic exam or be screened for **cervical cancer**. This means she has fewer choices for protecting herself against pregnancy, cancer, and STIs.

Child Marriage

The term **child marriage** is used to describe a union between two people, of whom one or both spouses is under 18. In Senegal, the age of consent for marriage is 16 years for girls and 18 for boys. Child marriage is also often referred to as "early" or "forced" marriage, since children—given their age—are not able to give informed consent to their marriage partners or to the timing of their marriage. Poverty often underlies child marriage. Some parents genuinely believe that marriage will secure their daughters' future, while others see their daughters as a burden or even a commodity. However, child marriage often stands in the way of ensuring that girls have healthy and productive lives.

Senegal is among the 25 countries with the highest rates of child marriage—33% of women 20-24 years old were married by age 18. In rural areas, 49% of girls in this age group were married before age 18. The youngest median age of marriage in Senegal (at about age 16) is found in the regions of Kédougou, Kolda, and Matam.

International conventions declare that child marriage is a violation of human rights because it denies girls the right to decide when and with whom to marry. Married girls are also often under pressure to become pregnant immediately or soon after marriage. As discussed in earlier parts of the chapter, a pregnancy during puberty—before a girl's body is fully mature—is a major risk to both mother and baby. Complications of pregnancy and childbirth together are the main cause of death among adolescent girls aged 15-19 in developing countries. Most of the world's births to adolescents (95%) occur in the developing world, and nine in 10 of these births occur within marriage or a union. West and Central Africa has the highest percentage of adolescent girls in marriages worldwide, with a regional average of 28% of women ages 20-24 having married between the ages of 15 and 19.

Preventing child marriage would reduce early pregnancy and associated maternal death and disability (such as obstetric fistula). Stillbirths and newborn deaths are 50% higher among babies born to adolescent mothers than among babies born to mothers in their twenties, and teenage mothers are also more to likely to deliver babies who are premature or have a low birth weight. Early childbearing is associated with more pregnancies at shorter intervals during a mother's lifetime. These factors—a young age, multiple children, and a short interval between births—are all linked to a higher risk of death and disability related to pregnancy or childbirth.

However, girls who remain in school longer are less likely to become pregnant. Education reduces the likelihood of child marriage and delays childbearing, leading eventually to healthier birth outcomes. In Senegal, girls with only a primary education are more than four times more likely to marry before 18 as those with a secondary education or higher; girls with no education are almost eight times more likely to marry before 18 than those with a secondary education or higher. Leaving school—because of pregnancy or any other reason—can jeopardize a girl's future economic prospects and exclude her from other opportunities in life. This is one reason why PCV efforts to curtail child marriage—a culturally engrained practice here in Senegal—often focus on promoting girls' education.

Cultural Practices in Pregnancy

In Senegal, there are cultural practices and misconceptions around maternal nutrition and activity that are harmful to both the health of the mother and her baby. Some believe that, the harder a woman works, the smaller her baby will be and the easier the delivery will be. In actuality, heavy physical activity in the third trimester can lead to placenta abruption—when the placenta unexpectedly separates from the uterine wall during pregnancy—and uterine rupture. Both of these conditions put a woman at risk for hemorrhage, a dangerous complication. Activities women should avoid later in pregnancy include: heavy lifting, pounding found, squatting and lunging (e.g., during farming), and physical labor during extreme heat.

Similarly, some women may start eating less food—including less protein—at the end of the pregnancy, as part of an effort to make their baby smaller. In fact, this puts women at risk for developing anemia, which in turn can lead to postpartum hemorrhage and a dangerous delivery.

Many women in Senegal see it as taboo to discuss a pregnancy, especially in the first trimester. However, this is an important time for the woman to go to her first prenatal visit, and delaying the start of prenatal care typically means a woman will have less than the four recommended prenatal visits during her pregnancy. PCVs often straddle the line as both integrated members of their community and members of another culture—they can use this role to their advantage by discussing potentially taboo topics. PCVs should talk to women about their pregnancies, especially in a joking, roundabout way, as is often indicative of this culture.

Reproductive Cancers

Cancer results from the uncontrolled growth of abnormal cells. Below, various cancers of women's reproductive organs of women are highlighted.

Cervical Cancer

The **human papillomavirus (HPV)** is a STI that causes abnormal cells to develop and grow in the cervix, and sometimes leads to **cervical cancer**. HPV is primarily transmitted through skin-to-skin contact and is found on skin in the genital area, in semen, and in the tissues of the vagina, cervix, and mouth. HPV can be spread even with correct and consistent condom use. Over 50 types of

HPV can infect the cervix; six of them account for nearly all cervical cancers (other types of HPV can cause genital warts).

Some factors make women more likely to be infected with HPV, including:

- Sexual debut before the age of 18.
- Having had many sexual partners currently or over the years.
- Having a sexual partner who has or has had many other sexual partners.
- Having had many births.

Other factors make the HPV infection spread more quickly:

- Having a weak immune system (especially HIV).
- Smoking cigarettes.
- Burning wood indoors (for cooking) regularly.
- Having had other STIs.
- Having used combined oral contraceptives for more than five years.

An estimated 50-80% of sexually active women are infected with HPV at least once in their lives. In most cases, the HPV infection clears on its own. However, in some women HPV persists and causes precancerous growths, which can develop into cancer. The WHO estimates that over one million women worldwide currently have cervical cancer, with most cases being undiagnosed and among women with no access to treatment. In 2005, 95% of women that died of cervical cancer lived in developing countries. In fact, cervical cancer is the leading cause of mortality from cancer among women between the ages of 40 and 70 in developing countries, and is estimated to be the most common type of cancer and cause of death from cancer in Senegal.

Since cancer of the cervix usually takes 10 to 20 years to develop, there is a long period of opportunity to detect and treat changes and precancerous growths before they become cancer. This is why one of the primary efforts of cervical cancer control is routine screenings. To find cancer of the cervix early enough to treat it simply and successfully, women should be tested at least every three years. In places where this is not possible, women should try to get tested every five years, especially women aged 30-50. Women should be tested more often, if possible, when: they are more at risk for developing cervical cancer; and/or when they have a screening that shows some slightly abnormal cells (these cells usually return to normal in two to three years, but should be checked in one to two years to see if they are becoming precancerous). Before precancers become cancer, they can be frozen away with a probe filled with dry ice (**cryotherapy**). This is a relatively low-tech treatment that some providers in Senegal have been trained to perform, and no hospital stay is needed.

In low-resource settings such as Senegal, where health facilities may not have the lab equipment necessary to analyze tissue samples from Papanicolaou (Pap) smears, health providers can be trained to use the visual inspection with acetic acid method to screen for cervical cancer. With this method, a vinegar solution is dabbed on the cervix using tools typically found at the health post level (cotton, a pair of forceps, and a speculum). The solution turns the cervix white, making it easier to spot precancerous growths on the cervix. Several midwives and some ICPs in the Kédougou Region have been trained by the U.S.-based NGO PeaceCare to perform such screenings, and some health care providers in the region have been trained to perform cryotherapy.

Breast Cancer

Breast cancer is the most common cancer in women both in the developed and developing world, and is the most common cause of cancer-related death in women worldwide. Almost 50% of breast cancer cases and 58% of deaths occur in less developed countries. It is estimated to be the second most common type of cancer and cause of death from cancer in Senegal.

Cancer of the breast usually grows slowly. If it is found early, it can sometimes be cured. However, it is hard to tell who will get breast cancer. Breast cancer is more common in women over 50. The risk is greater for a woman whose mother or sisters have had breast cancer, or for a woman who has had **endometrial cancer**. Use of combined oral contraception ("the pill") can also sometimes increase one's risk of breast cancer, although this risk typically disappears after use of the pill has been discontinued for 10 years.

There are no public health methods available yet to prevent breast cancer. Rather, efforts typically focus on screening and early treatment. Women are encouraged to examine their breast regularly so that they notice if there are any changes or if a new lump develops. A special X-ray called a mammogram can find a breast lump when it is relatively small and less dangerous. However, mammograms are very expensive and not available in most places in Senegal. Rather, they are performed in private clinics and some large hospitals, such as the health center focusing on cancer prevention and treatment that the Government of Senegal has opened in Tambacounda. Therefore, it is important focus on training women to perform self-exams and where to go if they suspect anything more serious.

The only way to know for sure that a woman has breast cancer is with a biopsy. For this, a surgeon must remove all or part of the lump with a needle of knife and test it for cancer in a laboratory. Treatment depends on how advanced the cancer is and what is available. If the lump is small and found early, just removing it may be effective. Other times, mastectomy (the removal of one or most breasts), medicines, and/or radiation therapy (chemotherapy) may be needed. However, chemotherapy is not affordable to most Senegalese women and mastectomy is reserved for extreme cases, as the removal of breasts is highly stigmatized.

Endometrial Cancer

Cancer of the lining of uterus (the endometrium) is cancer that, if left untreated, can spread to the rest of the uterus and to other parts of the body. This cancer is most common among women who: are over age 40, especially if they have gone through menopause; are overweight; have diabetes; and have taken the hormone estrogen without also taking progesterone. Signs of endometrial cancer include: heavy monthly bleeding; irregular monthly bleeding, or bleeding at unusual times of the month; and bleeding after menopause.

To screen a woman for endometrial cancer, a trained health worker must scrape out the inside of the womb with a dilation and curettage tool or do a biopsy, and send the tissue to a laboratory to be checked for cancer. If cancer is found, it must be treated as soon as possible with a hysterectomy (where the womb is removed) or a total hysterectomy (where the uterus, fallopian tubes, and ovaries are removed). Radiation therapy may also be used. However, few health facilities are able to perform hysterectomies, and chemotherapy is very expensive for most Senegalese.

8 Opportunities for Collaboration

Peace Corps Cross Sector Collaboration

Cross-sector collaboration offers many benefits. Partnering with or bringing in a volunteer from another sector allows for division of labor and responsibilities. Collaboration can expand the reach of your project: a team of volunteers speaking multiple local languages allows you to work with many more people and communities Collaboration with volunteers who are at different points in their service can add to institutional memory and improve chances for your project to continue beyond the years of your service. And "bringing in an expert" from another sector can add legitimacy in the eyes of your community.

Agriculture and Health volunteers frequently work together to develop community gardens, to hold trainings on nutrition and diet, and to sensitize farmers to the dangers of pesticides and other chemicals. CED and Health volunteers work together on projects involving waste management, agribusiness and ecotourism. Below are a few examples of previous effective collaborations but is not exhaustive of all possibilities.

Health Social Marketing

Social marketing applies successful techniques used by commercial marketers to change the behaviors of target audiences to encourage healthy behaviors and promote healthy products. Just as a company like Coca-Cola would, public health organizations do formative research on their target audience's beliefs, attitudes, and desires and create a tailored "marketing mix" that is comprise of the four Ps:

- **Products** can be anything from the tangible (condoms) to the intangible (exclusive breastfeeding, prenatal visits). In order to have a viable product, people must first perceive that they have a genuine problem, and that the product offered is a good solution for that problem. The role of research here is to discover the consumers' perceptions of the problem and the product and to determine how important they feel it is to take action against the problem.
- **Price** is the perceived cost of the product. It includes the monetary cost as well as the time and effort it takes to get that product, as well as risk of embarrassment and disapproval. The perceived benefits must outweigh the costs.
- **Place** describes where the target audience will perform the desired behavior or where the product or service is made available. By determining the activities and habits of the target audience, as well as their experience and satisfaction with the existing delivery system, one can pinpoint the most ideal means of distribution for the offering.
- **Promotion** consists of the integrated use of advertising, promotions, media advocacy, personal selling to make the product know to the target audience. The focus is on creating and sustaining demand for the product. Agence Pour le Développement Marketing Social (ADEMAS) is the organization responsible for most social marketing in Senegal. They have a partnership with Population Services International (PSI). These agencies' social marketing campaigns include branding and promoting the use of condoms, AquaTabs, family planning, and mosquito nets. As an example, instead of marketing mosquito nets as a way to prevent malaria, they market them as a way to prevent mosquitoes from keeping you from a good night's sleep. The Fagaru condom brand, marketed by graffiti artists in a 2013 campaign is pushed to a younger target audience as being the cool condom that you can impress your partner with. Its design is much more vibrant than the Protec brand condom which is the same condom but in a different package that is marketed to married couples and professionals as the way to keep your extramarital lovers secret and keep your freedom. As

an example of a non-branded campaign, ADEMAS launched their campaign encouraging family planning in 2013 under the guise of “Moytou Nef” – encouraging people to be cautious of too closely spaced births. With this campaign they are trying to integrate men into the conversation and slowly change the social norm.

Waste Management
Health volunteers hold meetings and trainings to sensitize people to the dangers of burning trash and the health and hygiene benefits of starting or supporting trash collection in their villages. CED volunteers assist local entrepreneurs in developing and managing trash collection businesses, with recordkeeping, and with local and national governmental regulations.

Agribusiness
CED volunteers often work with women's groups and GIEs to help them produce and market a variety of products made through food transformation and other methods of manufacturing. Health volunteers can help these groups market their products and increase sales and profit potential by offering training in nutrition and health. For example, a women's group that makes ceramine can learn about the nutritional benefits of their product and use that information to better market and promote their product.

Ecotourism
CED volunteers work with business owners and communities to harness the economic benefits of tourism while preserving local cultures and the environment. One way to do that is through the establishment of meal programs that foster cultural exchange: tourists meet and eat lunch with local families in their homes. Health volunteers hold trainings for the participating families about proper sanitization and food is through the establishment of meal programs that foster cultural exchange: tourists meet and eat lunch with local families in their homes. Health volunteers hold trainings for the participating families about proper sanitization and food preparation.

Nutrition
In the past, the Peace Corps Senegal Health Sector has focused on finding existing malnourished children through weightings and arm band measurements, and treating those that are malnourished through supplemental feeding programs, porridge making, and education, as well as addressing malnourishment with gardening activities.

Now and in the future, Peace Corps Senegal is adapting a more holistic, multi-sectoral approach to addressing malnourishment through education and action to prevent and treat malnourishment. What is our role when it comes to health and food security?
The Agriculture sectors can address AVAILABILITY: Is the food and knowledge to grow the food there?

The Economic Development sector can address STABILITY and ACCESSIBILITY: Do people have the purchasing power to secure nutritional health through purchase of food or agriculture related investments?

The Preventive Health sector can address UTILIZATION: Do people have the knowledge to change their eating behaviors to a more nutritious end? Information is the first step to changing behavior.

Peace Corps Senegal has developed a Nutrition Training that invites volunteers and their health and agriculture counterparts to learn about nutrition and potential actions. So far, this training

has resulted in community-specific plans for agriculture and health professionals, along with their volunteers, to implement together. They utilize each contributor's strengths creating a holistic approach to food security in their communities. Examples included working with Master Farmers on gardening demonstrations highlighting nutritious crops and trees, cooking classes to teach proper complimentary meals, and a week long after school program focusing on the main food groups.

Peace Corps Senegal has also created a Nutrition folder on the PC Senegal Drive, incorporating educational materials, visual aids, project ideas, case studies, and other resources for all volunteers or communities interested in nutrition interventions.

Projects involving all three sectors—CED and Ag and Health—are the triple-plays of cross-sector collaboration. A couple of examples are moringa tourneys and community food banks. Like all cross-sector collaborations, these projects allow each volunteer to focus on his or her sector's specific strengths. They are larger and lengthier projects than some of the examples above, and are maybe best organized at the work-zone level, so if you're interested, talk up the idea among the other volunteers in your region. You and your potential collaborators are best able to envision what your specific roles would be (division of labor and responsibilities), the scope your project can encompass (at the work-zone or regional level, serving one community or more, in one language or several), and how to plan for its implementation and continuation.

The Senegalese Education System

As a Health Volunteer, you may want to work with the local schools to promote integrated lesson plans in health awareness and preventative care. The school system is a great place to become involved because the students are ready to learn and are accustomed to the setting. Children are fun to teach, they're cute, and they're eager to please you by retaining the information. By teaching children, you're ingraining health messages in the population at a young age; they'll remember these lessons as they grow up and have children of their own. Additionally, it's important to target a variety of populations in your village; by teaching women, men, and children, you're repeating your message and reinforcing the ideas at many angles.

As you make an effort to relate to the students and teachers in your local school and to work together and accomplish your objectives, you will realize just how much an American education has formed your thoughts and opinions. In Senegal, you will deal with issues such as overcrowded classrooms, dilapidated facilities, overloaded curriculum, more traditional teaching methods and few materials. These will be just a few of the challenges awaiting you. The teachers at your school may not be comfortable with the way you would like them to format their lesson plans, the students might seem uncontrollable while everyone else seems to handle the rough bunch of fifty kids with ease. Sometimes it's a matter of changing your own cultural values to understand a different method, and other times it's working together to create a better system.

History

Like most francophone countries, the Senegalese school system is closely linked to the French system. During the first twenty years of Senegal's independence, President Leopold Senghor held onto the importance of maintaining the French educational model as a means of relating to outside cultures and developing the country. While some continue to fight for an African-specific curriculum, the language of instruction remains predominately French. In many schools, the teachers do not even speak the same local language as the students, since teachers are assigned the location of their post, without taking into account the local language or preferences of the teacher. Thus, though some teachers, particularly at the primary level, do use local

languages to clarify material, most do not as a result of inability to speak the local language or discouragement from school administration. Yet, in the fight to maintain culture, local language school books and French texts pertaining specifically to Senegalese culture have been championed, and the Ministry of Education, as well as printing presses, have moved away from the use of many French system texts toward Senegalese authors and contributors.

Another important aspect of education relates to the importance of Islam in Senegal. Before the establishment of the French system in Senegal, Koranic schools (*daaras*) were the only type of education in existence. These schools taught young males the teachings of Islam as well as reading and writing in Arabic, led by a *marabout*. These schools are still a respected part of the Senegalese educational system, sometimes causing difficulty for parents to decide which institution their children should attend. However, there has been a recent effort to integrate the two schools and teach Arabic at the local French schools. Also, parallel educational programs are now offered in some conservative Koranic schools, partnering with the Federation of Muslim Cultural Associations in Senegal. These schools provide an Arabic education, which permits entry into higher secondary schooling in the Arab world. Another new development is the *daara moderne*, a Koranic school that teaches the Senegalese public school curriculum in addition to religious education, and falls under the management of the Ministry of Education. As of 2013, there was just one *daara moderne* located in Saint Louis, but there is currently a movement to convert more traditional *daaras* into *daaras modernes*.

There are many ways in which PCVs can work with *daaras* including starting gardens or tree nurseries, health-topic causeries, encouraging local health post staff to visit (ie. for vaccinations), latrine projects or hand-washing stations, or literacy/numeracy classes.

Government Structure

In Senegal, the Constitution guarantees the access to education for all children, and the education system is widely nationalized. All educational programs in Senegal are regulated by the Ministry of Education. The head of all school systems is the Minister of Education, one of the highest-ranking officials in the government Cabinet. The Ministry of Education is in charge of paying salaries, providing equipment for the schools, recruiting teachers and staff, building school facilities, regulating enrollment, organizing exams, delivering degrees, training teachers and staff, controlling the quality of education, assessing performance, recruiting other cabinet members and inspectors, and defining the curriculum.

At the primary and secondary levels, the curriculum is the same for all Senegalese students in any given grade; this includes public, semi-public, and subsidized institutions. This curriculum is decided upon by the Minister of Education.

There are three heads of education: the Minister of Preschool, Elementary, Middle-Secondary Education and Literacy (MPEMSEL); Minister of Technical Education and Vocational Training; and Minister of Superior Education for university education. Under their jurisdiction are 24 Cabinet members, in addition to 43 Departmental Inspectors and Academy Inspectors.

Departmental Education Inspectors are headed by a Chief Inspector who is generally the highest person in authority you would contact for questions and advice regarding your work at the schools. He will have at least two other inspectors who will assist him to administer schools, supervise school directors and teachers, and provide on-going training to teachers. At the rural level, School Directors and teachers are appointed by the Chief Inspectors. School Directors are the heads of primary and middle schools. They mediate between the departmental inspection office and school teachers, as well as develop project initiatives to better their schools. They are

assisted by head teachers (*Adjoint-direct*). At the high school level, schools are headed by a Headmaster (*Proviseur*) who is assisted by the *Censeur* (who manages curriculum, timetable, and directly interacts with the teachers), Intendant (who handles inscription and purchasing) and the Surveillant (an administrative manager).

Another important group at each school is the Parent Association, or *Bureau de Parents d'Eleves.* The Parent Association is often heavily involved with development projects at the school, such as new constructions, as well as management of monies including inscription fees. The President of this group can be a good ally to involve in school-based projects.

The Inspection Academy is responsible for all levels of pre-university public and private schooling at the regional level. It must produce an annual report evaluating the educational system in its region. It exercises its authority over all institutions of education within its region.

School Structure

The Senegalese school system has six basic levels: Preschool/Kindergarden (*Case de Touts Petits/Maternelle/Jardin d'Enfants*), Primary School (*Ecole Primaire*), Middle School (*Collège*), High School (*Lycée*), and University (*Université*). Below is a chart detailing the approximate age ranges of students; however, many students do not have birth certificates or purchase false birth certificates to further repeat a grade. Actual ages of the students in each class are typically very wide. The ages given are the recommended ages for entry into a class. However, students who do not have a passing grade (average, or *moyenne*) must repeat the grade. In general, they can repeat a grade up to three times in one school, and then they are required to transfer schools to repeat it once more, unless they have surpassed the maximum age for a given grade.

In general, preschools are only found in towns and cities. Most village children do not begin formal education until age seven at the CI level. Primary education begins when children are six years of age. At these basic levels, students learn competencies in numeracy, fluency in French, the basic elements of science, history, geography, hygiene, and social and civic education (*Vivre Ensemble* and *Vivre dans son Milieu*) . Primary school is divided into pairs of levels. CI is seen as an introduction to concepts that are reaffirmed in CP, CE1 is an introduction to what is reaffirmed in CE2, and CM1 is an introduction to what is reaffirmed in CM2. In general, students have the same teacher for those two years. The final level of primary school is CM2. This is the terminal class in which students prepare to take the CFEE (*Certificat de Fin d'Etudes Elémentaire*) to gain a certificate of completion of elementary school. They must pass this test to move onto the secondary level.

During *collège*, students are taught to develop abstract thinking and skills in the basic subjects of French writing and comprehension, math, history, geography, science, English, Arabic, and physical education. There are also optional subjects for the students to choose in physical science technology or study of a third language (usually Spanish, Portuguese, or German). During the 4e year, students can choose to begin the *Science-Physique* track, taking additional science courses, which is seen as more academically challenging path. Students in the 3e level of collège also prepare to take the *Brevet* exam, which will provide them with their BFEM (*Brevet de Fin d'Etudes Moyennes*) degree and allow them to pass to lycée.

Lycée courses are specifically designed to prepare a student for the *Baccalauréat* exam. While basic courses, such as French, math, geography, history, science, and English are still required, many more options are open to the students in language, math, science, and philosophy to focus their talents and time on the type of career path they will eventually choose. Students must choose between the L (*littéraire*) path and S (*scientifique*) path for the focus of their curriculum

(*matière dominant*). The science path is seen as more challenging, while the L path includes the study of additional languages and is popular with students who wish to become teachers (non-science) in the future. . Each path is divided into two further focuses: L1 focuses on French and philosophy and L2 focuses on English and history/geography; S1 focuses on math, physics, and chemistry, and S2 focuses on life and earth science, physics and chemistry. An alternative path is available through *Lycées Techniques*, offering technical training in subjects such as welding, carpentry, and sewing. *Lycées Techniques* are found in most regional capitals of Senegal.

Primary Education		
Maternelle (Pres-School and Kindergarten)		
Age	*Grade*	*Abbreviation*
3-4	*Petite Section*	PS
4-5	*Moyenne Section*	MS
5-6	*Grande Section*	GS
Ecole Elémentaire (Primary School)		
Age	*Grade*	*Abbreviation*
6-7	*Cours Initiale*	CI
7-8	*Cours Préparatoire*	CP
8-9	*Cours Elémentaire Premiere Année*	CE1
9-10	*Cours Elémentaire Deuxieme Année*	CE2
10-11	*Cours Moyen Premiere Année*	CM1
11-12	*Cours Moyen Deuxieme Année*	CM2

Secondary Education		
Collège (Middle School)		
Age	*Grade*	*Abbreviation*
11-12	*Sixième*	6°
12-13	*Cinquième*	5°
13-14	*Quatrième*	4°
14-15	*Troisième*	3°
Lycée (High School)		
Age	*Grade*	*Abbreviation*
15-16	*Seconde*	2°
16-17	*Première*	°1
17-18	*Terminale*	T

University Education

Most students attend university at the Université Cheikh Anta Diop in Dakar. This university, founded in 1957, has an enrollment of over 60,000 students (as of 2011). It is extremely overcrowded; some classes have thousands of enrolled students, and students must arrive very early to find a seat. Available dormitory housing is also very minimal and often overcrowded. Additional regional universities have been established in Ziguinchor, Thies, Bambey, St. Louis (Université Gaston Berger), and Sine-Saloum (created in 2013); there are plans to establish additional ones in all regional capitals. There is also an Arabic university in Dakar.

Students entering university must choose their career path before they begin. This is generally based upon their scores on their previous entrance exams, which determine their aptitude for various branches of study. For example, those that score higher in math and science will most likely become doctors or engineers, while those scoring high in composition or language will most likely become teachers. Each class is structured around training a student to learn exactly what they will need to work in the specific vocation. The degrees offered at universities are

License (typically three years of study), *Maitrise 1* (four years), *Maitrise 2* (five years), and *Doctorat* (six to eight years).

Tuition Costs

A luxury in the French education system is that if students are able to achieve each examination level, all levels of public education are free. Yet in a country such as Senegal, with a smaller budget for education, problems arise when the government is unable to fulfill their duty in accommodating for their students' education. University students frequently go on strikes, hold marches, and sometimes even riot due to problems with overcrowded living quarters, classrooms, and lack of stipend or materials. As the country tries to stretch the educational budget to provide for its students, teachers also go unpaid and without necessary teaching materials. The problem becomes cyclical, as the unpaid teachers at all levels of education go on strike, leaving their students to suffer the consequences.

Generally, primary schools are free, while *collèges* and *lycées* charge between 3,000 and 8,000 FCFA per year. There is currently a cap on inscription fees imposed by the Ministry of Education of 10,000 FCFA per year. This inscription fee must be paid should be paid before the student begins studying, but is often not paid until a few months after school begins. The fee must be paid for the student to be officially enrolled in the school. In addition to inscription fees, students must also buy notebooks, pens, other school supplies, and sometimes a school uniform and/or physical education uniform. Additionally, in primary schools, students are sometimes asked to contribute (*cotiser)* a small amount for classroom materials such as chalk or buckets, if these items are not financed by the local government entity.

Testing and Examinations

In Senegal, most classes are primarily concerned with test preparation. Each grade level must pass a final exam to achieve the next level and to move from primary school to secondary school, *collège* to *lycée*, and *lycée* to university. Statistically, few rural children pass these exams and even fewer females. If the student is beyond the age requirement to take the test and his/her parents cannot afford private schooling or bribery, the child's education is at an end.

The first of the major exams that Senegalese for students occurs at the end of CM2 and provides students with the *Certificat de Fin d'Etudes Elémentaire* (CFEE). This is not an official diploma, but it is necessary for the student to enter *collège*. The CFEE tests the student's skills in basic math, science, history, geography, and French fluency.

The second major exam is the *Brevet de Fin d'Etudes Moyens* (BFEM) taken at the end of 3e. This is the first official diploma a student can receive and is required for entry into *lycée*. It focuses on French diction and grammar, comprehension, essay writing, math, history, and geography.

The final exam is the *Baccalauréat* (BAC) and occurs after *Terminale*. This exam is the end-of-*lycée* diploma students receive to enter university or a professional career. It is comparable to American SATs and ACTs.

Private Schools

To ensure their children receive a more secure education, some well-off Senegalese families have turned to private institutions. Some of these schools have a religious affiliation, though an increasing number are being established without any affiliation. They are required to follow the government-approved curriculum, use government-recommended textbooks, and employ licensed teachers. They often have high inscription fees/tuitions, but some do not have

requirements for passing the *concours* or *BFEM* tests for entry, thereby providing students who failed the tests an additional opportunity to continue their studies. Some receive government subsidies to meet operating expenses. Students from private schools are admitted to state exams and are eligible to receive state diplomas. Special education for students with disabilities does exist in some locations. As funding increases, it is expected that schooling for the disabled and mentally handicapped will also increase in both private and public sectors.

History of Teacher Training

Until 1995, Senegalese primary schools consisted solely of highly qualified and relatively well-paid certified teachers, called *Instituteurs*. They were required to undergo a rigorous three-year training from one of the different Teacher's Schools, called *Ecole Normale Superieur*. Under the pressure of the World Bank, in order to boost the enrollment rate, the Senegalese government decided to use Senegalese Volunteers to teach in primary schools. This was a result of financial constraints; by utilizing volunteers, the government could increase the number of teachers without increasing its budget. These volunteer teachers were trained for one month and received a small monthly living allowance. Though it allowed for an influx in the number of primary school teachers in Senegal, and thus in the number of schools, these teachers were often unqualified and lacked the necessary skills to teach. The majority of current teachers began as volunteers. Through strong unions, volunteers pressured the government to given them the possibility to move through the ladder and become *instituteurs*. Now, after four years of service, a volunteer can become a contracted teacher (MC – *Maitre Contractuel*) who can take the professional exam (CAP) to become an *instituteur*. Currently, new primary school teachers are required to have passed the *Baccalauréat*, middle school teachers to have a *license* degree from university, and high school teachers to have a *maitrise* degree. Additionally, they must attend teacher training schools (usually found in regional capitals) with curriculum that includes in-classroom assistantships.

Schedule

Schools generally open officially October 1st; in reality, classes do not begin until after Tabaski, or in rural areas, until planting is completed. Even then, some courses may not begin until December, when all the teachers have returned from break or additional teachers assigned to the school. Students have vacation from school during the Christmas/New Year's and Spring Break/Easter. School officially closes July 31st, though may continue on if a lot of class time was missed due to strikes or other reasons. Primary schools and some colleges and lycees often close when the rainy season begins, so that children can work in the fields; this often occurs before the official closing date.

Classroom Condition

Although many efforts have been made during the past fifteen years, Senegal is still facing a deficit of classrooms throughout the country. In most areas, classrooms are overcrowded, with over 50 students in one classroom. To avoid having classrooms with more than 100 students and classrooms with less than 20 students, the Minister of Education has implemented double flux classes (one teacher and two cohorts alternating morning and afternoon in the same classroom) and multigrade classes (one teacher teaching two or more different classes in the same classroom). Since school enrollment has increased over the past years with the creation of many new primary schools, the government is now scaling-up the number of middle and high schools to accommodate this increased number of students.

Teaching Methods

Most of the schools in Senegal have very few materials available to make education interactive and fun. There is a heavy emphasis on rote memorization as the main form of learning. As one

lycée student said, "As a science major, I can tell you that litmus paper will turn red when touching something acidic, but I have never seen litmus paper." Most schools also do not have enough textbooks. Students thus copy all information into their notebooks, which a teacher has copied from the textbook onto the blackboard, without any supplemental facts, diagrams, explanations, or exercises.

Not only are schools lacking in material, but teacher methods are very specific. Teachers are trained to write exact lessons on note cards, called *fiches*, and each subject taught must follow a specific format. This format will contain a lesson objective (usually with a sentence beginning with "By the end of the lecture, students will be able to"), the lesson structure, and how the objective will be tested. Each fiche is then turned in to the school director for approval. Pre-planning, group thinking, and following the same format are valued in this educational system. Teachers copy onto the board what they've written on their *fiches*; students, in turn, copy this information into their notebooks and learn it through rote memorization and repetition. Even during art and theater classes there is a right and wrong criteria to grade how straight a line is when drawing a flag or how closely you followed a pre-written scenario in acting class. In other classes, students who cross-out mistakes are seen as either sloppy or cheaters. They strive for perfection in handwriting and appearance, rather than a comprehension of the material.
Though there are arts built into the curriculum, teachers at higher grade levels tend to stray away from creative ideas to focus on test preparation. This involves problem sets in the classroom, and hours of cramming by students while class is out of session using the same exercises completed in class. Therefore, the focus for most teachers is not on training the students to understand a topic but rather to regurgitate the right information on a test word-for-word.

When a teacher asks a question, all students raise their hands and shout to be called on, even if they do not know the answer. This is their form of student participation, and students are reprimanded for not raising their hands. It is also very rare for a student to ask questions of the teacher. If he/she doesn't understand the material, it is preferable to continue with the same failed method over and over again rather than be singled out.

At night, when students leave their classes to cram in their day's lessons, they spend hours reading their notes and repeating to themselves over and over again the facts that were written on the board. This has become so ingrained that some students will actually memorize whole French passages, phrases, terminology, and grammar without a true understanding of the material.
These are important points to remember when you are developing lesson plans with teachers in the school, and why it may be difficult, at first, to push both students and teachers to think outside the box and to show not tell.

School Lunch Program
Many elementary schools have a school lunch program (*cantine scolaire*) funded by the departmental government, intended for students who travel long distances to attend school every day. Often, the government provides enough food to cook lunch twice a week. Local NGOs sometimes provide additional funding to provide lunches on the remaining days. The school lunch program sends grains and other dry goods periodically to each school, but the lunch is usually very basic, often with little to no protein content or vegetables. Additionally, some directors sell large quantities of this food, rather than providing it to the students. Schools participating in this program could often benefit from a school garden project to provide fresh vegetables to use in the lunches and excess vegetables can be sold in the market to purchase

fish. The people hired (usually local women) to cook the lunches might also benefit from training in nutrition.

Becoming Involved

As a Peace Corps Volunteer, there are many ways to become involved in the education system. Teachers are generally very welcoming of your participation and are ready to hand their classes over to you; it is important to stress that your role as a PCV is to work with them on lesson plans, rather than to become the teacher yourself. You can teach in local languages or French. Generally, primary schools will be open to your coming regularly (ie: once a week) during class time. *Collèges* and *lycées* will generally request you come after school hours or on weekends since their curriculums are so tight.

When planning lessons, it is important to make them fun, interactive, and creative. The students will automatically be interested because you're a celebrity guest speaker, but be sure to make the content memorable as well. Have visuals, play games, sing songs, engage in theater, conduct experiments, ask questions, paint murals, etc. And remember, repetition of information is very important within the session and between sessions. Make sure to choose your audience carefully, plan well, be energetic, make your lesson fun, and ask the students questions about the lesson in the future to reinforce their learning when you see them at your site.

There are many topics you can teach in the schools. Within the health sector, you can teach:

- Hand washing
- Hygiene/sanitation
- Malaria (Nightwatch curriculum)
- Diarrhea
- Common illnesses and home treatments
- Moringa
- Importance of vitamins
- Dental hygiene
- Vegetable of the week
- Life skills
- Reproductive health
- Environmental health
- Any other health issue you can think of

There are also secondary education projects you can become involved in, such as:

- Michele Sylvester Scholarship (MSS)
- World Map Project
- Girls' clubs
- Establish a school garden
- English clubs/camps
- Girls' camps
- Educational murals

Glossary

Acquired Immunodeficiency Syndrome (AIDS) – A disease in which there is a severe loss of the body's cellular immunity, greatly lowering the resistance to infection and malignancy.

Agent Santé Communautaire (ASC) – Community Health Worker who has been trained in basic administration, management, and duties of a functioning health point.

Amenorrhea – No menstruation or other vaginal bleeding at expected times.

Anemia – A condition in which the body lacks adequate hemoglobin, commonly due to iron deficiency or excessive blood loss. As a result, tissues do not receive adequate oxygen.

Antenatal Care – Also known as prenatal care, the regular medical and nursing care recommended for women during pregnancy.

Anthropometry – The scientific study of the measurements and proportions of the human body.

Antigen – A substance that when introduced to the human body stimulates an immune response and the production of antibodies.

Antiretrovirals (ARV) – Antiretroviral drugs inhibit the reproduction of retroviruses—viruses composed of RNA rather than DNA. The best known of this group is HIV, human immunodeficiency virus, the causative agent of AIDS.

Artemisin Combination Therapy (ACT) – ACT is the current WHO recommended treatment for simple malaria. ACT is a family of medications that combines a companion drug with the base drug of artemisin. Effective companion drugs include but are not limited to: lumefantrine, mefloquine, amodiaquine, sulfadoxine/pyrimethamine, piperaquine and chlorproguanil/dapsone.

Antenatal Consultations – Medical evaluations or operations during or related to pregnancy.

Assistants Infirmières – Assistant nurses at health posts, heath centers or hospital staff who has successfully completed a basic nursing training but do not have the same degree of qualifications as a full Nurse (Infirmiere).

Behavior Change Communications (BCC) – Communication activities that provide supporting health messages. BCC activites include causeries, home visits, theatre presentations, etc.

Biostatistics – The application of statistical analysis of biological events to assess disease presence, cause and effect.

Birth Asphyxia – The medical condition resulting from deprivation of oxygen to a newborn infant that lasts long enough during the birth process to cause physical harm, usually to the brain.

Breast Cancer – Malignant (cancerous) growth that develops in breast tissue.

Cabinet Médicaux – A medical office, a place where basic consultations can be given by a doctor or nurse.

Case de Santé – Health Point or Health Hut

Cervical Cancer – Malignant (cancerous) growth that occurs in the cervix, usually due to persistent infection with certain types of human papillomavirus.

Cervix – The lower portion of the uterus extending into the upper vagina.

Child Marriage – A union between two people, of whom one or both spouses is under 18.

Colostrum – This is a thick yellow/orange liquid that is the first secretion from the mammary glands after giving birth. This liquid is essential to the newborn's nutrition.

Complementary Foods – nutrient rich, quality foods that are introduced at 6 months of age to a child when his/her nutritional needs cannot be meant by breast milk alone.

Cone Bioassays – A test of insecticide efficacy that involves placing lab-raised mosquitoes in cones of specific dimensions and exposing them to sprayed walls; measures the quality and duration of spraying.

Contraceptive Prevalence Rate – The percentage of all women of reproductive age (i.e., aged 15-49) or married women of reproductive age who are using contraception.

Corpus Leuteum (CL) – The progesterone-secreting mass of cells that forms from an ovarian follicle after the release of a mature egg.

Cryotherapy – Treatment for precancerous lesions on the cervix, where precancer is frozen away with a probe filled with dry ice.

Dehydration - The loss and inadequate replacement of water and electrolytes (sodium, chloride, potassium, and bicarbonate) through liquid stools, vomit, sweat, urine, and breathing. Death can follow severe dehydration if body fluids and electrolytes are not replenished, either through the use of oral rehydration salts (ORS) solution, or through an intravenous drip. The degree of dehydration is rated on a scale of three.

Demographic and Health Survey (DHS) – Household surveys funded by USAID and conducted in countries around the world to monitor impact evaluation indicators for population, health, and nutrition.

Diarrheal Disease - For an adult, they are defined as the passage of four or more loose or liquid stools per day for an adult. For children under 5, diarrhea is defined as the passage of more than two loose or liquid stools in one day or the passage of loose or liquid stools for more than one day.

Dyspnea – Shortness of breath.

Eclampsia – A condition of late pregnancy, labor, and the period immediately after delivery characterized by convulsions. In serious cases, sometimes followed by coma and death.

Ectopic Pregnancy – Pregnancy in which the fertilized egg implants in tissue outside the uterus, most commonly in a fallopian tube but sometimes in the cervix or abdominal cavity.

Edema – A condition characterized by an excess of watery fluid collecting in the cavities or tissues of the body.

Elimination – Usually used when describing a geographical region where there has been no local transmission of malaria for three consecutive years.

Endometrial Cancer – Malignant (cancerous) growth in the lining of the uterus.

Endometrium – The membrane that lines the inner surface of the uterus. It thickens and is then shed once a month, causing menstruation. During pregnancy, this lining is not shed but instead changes and produces hormones, helping to support the pregnancy.

Environmental Health Sciences – The study of biological, chemical and physical factors and their effects on the health status of populations.

Enzyme – A substance produced by the human body which stimulates and acts as a catalyst for biochemical reaction to occur.

Epidemic – A widespread occurrence of an infectious disease in a community at a particular time.

Epidemiology – The study of the distribution and determinants of diseases and health-related behaviors.

Episiotomy – A surgical incision made below the vaginal opening during the second stage of delivery.

Epithelial – Pertaining to or involving the outer layer of the skin.

Erythrocytic – Taking place inside red blood cells (erythrocytes).

Essential Nutrition Actions – An evidence-based approach to nutrition programs that

utilizes a platform of seven direct actions to alleviate malnutrition.

Estrogen – Hormone responsible for female sexual development. Natural estrogens are secreted by a mature ovarian follicle, which surrounds the egg (ovum). Also, a group of synthetic drugs that have effects similar to those of natural estrogen, some of which are used in some hormonal contraceptives.

Exoerythrocytic – Taking place outside of red blood cells.

Female Circumcision – A procedure to alter the female genital organs for non-medical reasons.

Fistula – A hole that develops between two organs. After obstructed or prolonged labor, an obstetric fistulae can form in the skin between the vagina and the urethra or bladder (vesico-vaginal fistula), or between the vagina and the rectum (recto-vaginal fistula), causing urine or stool to leak from the vagina.

Follicle-Stimulating Hormone (FSH) – Hormone stimulating growth of the ovarian follicle and the production of eggs.

Food Security – A combination of social, cultural, political, economic, physical and ecological factors can affect an individual's and a community's access, availability, and utilization of food. Cost of food, availability of food, and seasonality can all be factors in food insecurity.

Gamete – A reproductive cell that fuses with another of the opposite sex during sexual reproduction.

Gametocyte – Precursor cells to male and female gametes; formed in the human host during the lifecycle of the malaria parasite plasmodium.

Gardasil – The first vaccine against cervical cancer, precancer, and genital warts.

Glucose-6-Phosphate Dehydrogenase Deficiency – A hereditary disease that alters red blood cell metabolism and reduces the ability of the malaria parasite to invade affected cells.

Growth Monitoring – The regular measurement of a child's size in order to document growth and monitor development.

Gourd Baby - A good teaching tool for showing the effects of diarrhea on the body. It consists of a baby drawn on an empty water bottle with a nail inserted in the anus to demonstrate the importance of replacing fluids and using ORS.

Health Care Management and Policy – The inquiry and improvement of the delivery, quality and cost of health care for individuals and communities.

Health Promotion – Addresses the social, cultural and behavioral factors as they relate to the presence of disease and uptake of health behaviors of individuals and whole populations throughout entire life spans.

Height-for-Age – The age that corresponds to a child's height when plotted on a growth chart. This ratio is used to measure stunting.

Hemoglobinuria – An effect of severe malaria causing the oxygen-transporting hemoglobin protein to be excreted in the urine.

Hemolysis – Rupture of red blood cells.

Hepatocyte – A cell of the main type of tissue found in the liver.

Hepatomegaly – The abnormal enlargement of the liver which occurs during malaria infections.

High-Risk Groups – A group in the community with an elevated risk of disease.

Human Immunodeficiency Virus (HIV) – Is a lentivirus (slowly replicating retrovirus) that causes the acquired immunodeficiency syndrome (AIDS). AIDS is a condition in humans in which progressive failure of the immune system allows life-threatening opportunistic infections and cancers thrive. Infection with HIV occurs by the transfer of blood, semen, vaginal fluid, pre-ejaculate or breast milk.

Human Papillomavirus (HPV) – A common, highly contagious virus spread by sexual activity and skin-to-skin contact in the

genital area. Certain subtypes of HPV are responsible for most cases of cervical cancer, others cause genital warts.

Hypnozoite – A plasmodium sporozoite cell that is dormant in the host's liver, which may cause latency and relapse of malaria infections.

Hypoglycemia – A condition involving abnormally low glucose in the blood.

Immediate and Exclusive Breast Feeding – A newborn should be immediately breastfed after birth. As mentioned above, this breastfeeding should be exclusive for the first six months of life. Exposure to foods and liquids other than breast milk can put a baby at extreme risk.

Indoor Residual Spraying – Insecticide spraying on the inside walls of homes to kill mosquitoes and deter them from entering.

Infant Mortality Rate – Number of deaths within the first year of life per 1,000 live births.

Infections Respiratory Aigues (IRA) – Acute respiratory infection

Infirmière Chef de Post (ICP) – Chief Nurse at the Health Post Structure

Information, Education, Communication (IEC) – Refers to causerie or other programming that does not offer curative care but rather shares basic preventive health information that helps community members take ownership and agency in their own health care.

Insecticide-treated nets (ITNs) – A mosquito net that has been impregnated with insecticide, but it may be an insecticide that lasts less than 20 washes and needs to be periodically reapplied manually.

Integrated Community Case Management of Childhood Illnesses (iCCM) - The goal of the program is to provide the delivery of high-quality services to populations in remote locations through the use of community health workers.

Intermittent Preventative Treatment (IPTp) – Anti-malarial medicine that is given to pregnant women at pre-natal visits in order to prevent and treat malaria.

Intravenous – A route to give medication which introduces medications directly into the bloodstream through the veins. Treatment for severe malaria may be administered intravenously.

Intramuscular – A route to give medication which introduces medications directly into the muscle. Treatment for severe malaria may be administered intramuscularly.

Ischemia – Insufficient blood supply to body tissues.

Jaundice – A medical condition with yellowing of the skin or whites of the eyes, arising from excess of the pigment bilirubin and typically caused by obstruction of the bile duct, by liver disease, malaria infection or by excessive breakdown of red blood cells.

Keratinization – A process by which epithelial cells lose their moisture and are replaced by horny tissue.

Knock-Down Spray Catches – A technique for determining mosquito population density that involves spreading a sheet over the surface of a room, spraying insecticide, catching the mosquitoes on the sheet and identifying the type of mosquitoes collected.

Kwashiorkor – A type of severe acute malnutrition caused by a diet deficient in proteins but contains calories from carbohydrates.

Lactational Amenorrhea – If a mother is exclusively breastfeeding and the baby is feeding at least 10 times per day, the mother's body will normally refrain from ovulating and she will not have her normal menses during this time. Weaning - To accustom an infant to food other than his/her mother's milk.

Latching – When the baby's mouth assumes the correct position around the nipple such that it can feed easily and readily. In order to latch properly the baby needs to be

properly aligned with his/her mother's breast body. Sub-optimal latching is a major problem for an infant's nutrition. Improper latching/breastfeeding position can also cause acutely pain for the mother.

Latent – An inactive or undetectable disease or disease phase.

Long-lasting insecticide treated nets (LLIN) – A mosquito net that has been impregnated with an insecticide that lasts for 20 or more washes in laboratory testing.

Luteinizing Hormone (LH) – The primary function of this hormone is to cause ovulation. It also helps to increase the amount of estrogen produced by the follicle cells.

Malaria Early Treatment Theory – The theory that if an individual receives treatment for malaria within 24 hours of the appearance of symptoms, recovery is greatly expedited and burden of disease alleviated. Seeking early treatment for malaria infections provides a community effect as the transmission vector is compromised; the infected individual is no longer actively contributing malaria parasites to the transmission vector.

Malnutrition – Occurs when a person's diet is lacking in calories, essential nutrients, vitamins and/or minerals. While malnutrition is usually associated with lack of calories, you can be getting enough calories and still be malnourished.

Marasmus – A type of severe acute malnutrition caused by severe deficiency in proteins and carbohydrates. It is the result of starvation and is represented by severe wasting.

Maternal Mortality Rate – Number of deaths that occurs during pregnancy, delivery, and the 42 days after delivery per 100,000 live births.

Matron – Trained birth attendant

Médecin Chef du District (MCD) – Chief District Medical Officer is the chief medical administrator of the district. The MCD reports to the intermediary level with all outcomes from the medical district level.

Médecin Chef de Region (MCR) – Chief medical administrator for the region.

Men who have sex with men – Males who engage in sexual activity with other males, regardless of how they identify themselves. The term was created in the 1990s by epidemiologists as a surveillance tool to better identify the route of HIV transmission and spread of the disease through male-male sexual activity.

Menarche – The beginning of menstrual cycles starting in puberty, when the female body starts to produce more hormones called estrogen and progesterone.

Menopause – Occurs when a woman's ovaries stop producing eggs and, as a result, her menstrual cycle stops completely.

Menstrual Cycle – A repeating series of changes in the ovaries and endometrium, or the thickened lining of the uterus, that includes ovulation and monthly bleeding.

Merozoite – A lifecycle stage of the malarial plasmodium parasite, which are formed in the liver and released into the bloodstream of the host.

Mid-Upper Arm Circumference (MUAC) – The circumference of the left upper arm, measured at the mid-point between the tip of the shoulder and the tip of the elbow. The circumference is used to measure starvation.

Millennium Development Goals – The world's time-bound and quantified targets for addressing extreme poverty in its many dimensions-income poverty, hunger, disease, lack of adequate shelter, and exclusion-while promoting gender equality, education, and environmental sustainability.

Ministère de Santé Publique et Action Sociale (MSP) – Minister of Health and Social Action

Mitosis – The process of cell duplication to form two genetically identical daughter cells.

Moderate Acute Malnutrition (MAM) – is defined by a weight for height indicator between -3 and -2 z-scores (standard deviations) of the international standard or by a mid-upper arm circumference (MUAC) between 11 cm and 12.5 cm ("in the Yellow"). It is less obvious without weighing the child or measuring the MUAC.

Mother-to-child transmission of HIV – Also called perinatal or vertical transmission, occurs when HIV is spread from an HIV+ woman to her baby during pregnancy, labor and delivery or breastfeeding.

Neonatal Mortality Rate – Number of deaths within the first 28 days of life per 1,000 live births.

Oocyst – A lifecycle stage of the malaria parasite within the mosquito, produced when male and female gametes fuse.

Ookinete – An active lifecycle stage of the malaria parasite that penetrates the mosquito stomach wall to form an oocyst.

Oral Rehydration Salts (ORS) - ORS provides an easy, cheap means for replacing water and electrolyte loss due to diarrhea and vomiting. It is a mixture of salt, sugar, and water.

Organisation non-gouvernementale (ONG) – Non Governmental Organization

Overnutrition – Overconsumption of foods that are "energy dense" but "nutrient poor" that result in overweight or obese nutritional statuses. This leads to higher incidence of diseases like diabetes and heart disease.

Ovulation – The release of an ovum from an ovary.

Pallor – Pale skin color caused by illness

Parasitemia – the demonstrable presence of parasites in the blood.

Partograph – A graphical record of key data during labor, such as cervical dilation, fetal heart rate, duration of labor, and vital signs.

Placenta – The organ that nourishes a growing fetus. The placenta (also known as the "afterbirth") is formed during pregnancy and comes out of the uterus within a few minutes after the birth of the baby (during the third stage of labor).

Pneumonia - It a form of acute respiratory infection that affects the lungs. The lungs are made up of small sacs called alveoli, which fill with air when a healthy person breathes. When an individual has pneumonia, the alveoli are filled with pus and fluid, which makes breathing painful and limits oxygen intake.

Postnatal Care – Medical and nursing care recommended for women during the six weeks after delivery.

Postpartum – After childbirth; the first six weeks after childbirth.

Postpartum Hemorrhage – Heavy bleeding after delivery resulting in shock.

Pre-eclampsia – Hypertension with either excess protein in the urine, or local (face, hands, and/or feet) or generalized swelling, or both (but without convulsions) after 20 weeks of pregnancy. May progress into eclampsia.

Pre-Elimination: When the number of malaria cases in an area is nearly zero and prevention strategies are changed to target all demographic groups.

Premature Delivery – A birth that occurs before 37 weeks of pregnancy.

Prevalence – The degree to which something is prevalent; *especially* **:** the percentage of a population that is affected with a particular disease at a given time.

Primary Health Care – The essential health care based on practical, scientifically sound and socially acceptable methods and tehchnology, made universally accessible to individuals and families in the community. It is through their full participation and at a cost that the community and the country can afford to maintain at every stage of their development in the spirit of self-reliance and self-determination.

Progesterone – A steroid hormone that is produced by the ovary after ovulation. Prepares the endometrium for implantation of a fertilized egg (ovum), protects the embryo, enhances development of the placenta, and helps prepare the breasts for breastfeeding.

Progestin – Any of a large group of synthetic drugs that have effects similar to progesterone. Used in many forms of contraception, either by itself or in combination with estrogen.

Programme Santé Communautaire (PSC) – ChildFund-led USAID funded Community Health Program

Programme National de Lutte contre le Paludisme (PNLP) – National Malaria Control Program

Programme National de Lutte contre le Tuberculose (PNT) – National Program for Tuberculoses

Programme Santé Communautaire – Community Health Program, comprises all the basic preventive and curative health interventions active at the community level.

Pyrethrum spray catches (PSC) – Another term for knock-down spray catches.

Rapid Diagnostic Test (RDT) – A malaria diagnostic tool available which using a small amount of blood acquired through a finger prick to detect the presence of specific antigens in an individual's blood.

Registered Sex Worker – Is registered with the district health department, which requires regular screening for sexually transmitted infections (STIs) and human immunodeficiency virus (HIV).

Relais – A health volunteer.

Routine Distribution – A program to fill in gaps from universal coverage campaigns by selling or giving away LLINs in health structures, schools and community based organizations and businesses.

Sage Femme – Midwife

Seasonal Malaria Chemoprevention (SMC) – Malaria prevention technique that involves giving anti-malarial drugs to children under 10 throughout the rainy season to clear existing infections and prevent new ones from occurring.

Sepsis – The presence of various pus-forming and disease causing organisms, or poisonous substances that they produce, in the blood or body tissues.

Sexually Transmitted Infection (STI) – An infection that can be transferred from one person to another through sexual contact.

Severe Acute Malnutrition (SAM) – Needs immediate and intense intervention, because if it is not treated it can result in death. The first and most obvious symptom of Severe Acute Malnutrition is severe wasting. There are two types of severe acute malnutrition, marasmus and kwashiorkor.

Schizont – A lifecycle stage of the malaria parasite where cells divide several times to produce new merozoites.

Simian Immunodeficiency Viruses (SIVs) – Are retroviruses able to infect at least 45 species of African non-human primates. Virus strains from two of these primate species are believed to have crossed the species barrier into humans, resulting in HIV-2 and HIV-1.

Skilled Birth Attendant – A midwife, doctor, or nurse who provides basic and emergency health care services to women and their newborns during pregnancy, childbirth, and the postpartum period.

Skin-to-Skin Contact – This concept is essential during the newborns first few hours. The baby should be put in immediate and direct contact with his/her mother's body. This skin-to-skin contact helps the baby's skin populate with good bacteria, it also helps regulate the baby's body during its most vulnerable hours of life.

Splenomegaly – The abnormal enlargement of the spleen which occurs during malaria infections.

Sporozoite – A lifecycle stage of the malaria parasite, which a mosquito injects into the host's bloodstream

Stunting – A reduced growth rate in human development, represented in the low height of a child. It is associated with chronic malnutrition, which occurs over a long period of time.

Sulfadoxine-Pyrimethamine (SP) – Anti-malarial medicine commonly used for IPTp.

Tetanus – A vaccine-preventable medical condition characterized by a prolonged contraction of skeletal muscle fibers.

Thalassaemia – An inherited blood disorder affecting the production of hemoglobin, which provides some protection against malarial infection.

Total Fertility Rate – The average number of children that would be born to a woman over her lifetime if she were to experience the exact current age-specific fertility rates through her lifetime, and she were to survive from birth through the end of her reproductive life.

Transmission – The act or process by which something is spread or passed from one person or thing to another.

Trophozoite – A resting lifecycle stage of the malaria parasite.

Universal Coverage – When 80% or more of a community sleep under LLINs.

Unmet Need for Family Planning – The proportion of women of reproductive age who do not want to become pregnant for the next two years or do not wish to have any more children, but are not currently using a contraceptive method.

Uterus – The hollow, muscular organ that carries the fetus during pregnancy. Also known as the womb.

Wasting – The loss of muscle and fat tissue due to disease. It is associated with acute malnutrition, which occurs rapidly and is associated with severe protein deficiency.

Weight-for-Age – A ratio used to measure overweight and underweight status of children and adults.

Weight-for-Height – The ratio of weight to height. This is the preferred measurement of nutritional status of children under five and is used to measure wasting.

1000 Days Mission – To promote targeted action and investment to improve nutrition for mothers and young children during the critical 1,000 days from pregnancy to age 2, when better nutrition can have a lifelong impact on a child's future and help break the cycle of poverty.

Print References/Suggested Readings

Health Activities for Primary School Students: consists of sections targeting dental health, hygiene, general health, first aid, self-empowerment, nutrition, and drugs, alcohol, smoking and fitness. It also contains a limited number of environmental activities. Each section outlines basic technical information about the topic, contains several detailed lesson plans, and lists quick activities which can be carried out at the schools. Songs and recipes relevant to each section are also included. Through this, PCVs can encourage students to make healthy decisions and to be responsible for the health of their communities. Adapt the activities and lessons as you see fit. It is available by request from your APCD, PTA and also accessible on the Peace Corps Senegal Google Drive.

Health Kit: The purpose of the Health Kit is to have a concise, practical resource that all Health PCVs can have at their disposal upon completion of PST. It covers the top 10 illnesses/health issues affecting Senegal today,namely Malaria,Nutrition ,GI Problems (Diarrhea/Dysentery, Hygiene, Cholera),Vaccinations, First Aid, Maternal Health, HIV/AIDS, Diabetes, Sanitation, Schistosomiasis. The kit will include basic informational lesson plans for each of the above health issues. When possible, lesson plans will be supported with the most current statistics available (world, Africa, Senegal, regional), basic laminated visual aids, skits, radio programs, games and props. Also, lesson plans will include translations in French, as well as each of the major local languages. The Health Kit will effectively aid Health PCVs in their work immediately after PST. Health PCVs will be able to teach health classes in French at local schools, hold causeries with village groups or at health facilities utilizing local languages, and quickly get 'on air' with regional radio programs. Also, this kit can be used to benefit local health workers and teachers who are interested in improving their ability to effectively teach health lessons. Please talk to your APCD/PTA if you want a copy.

Peace Corps Senegal Community Sanitation Project Guide 2014 By PCVs Courtney Pederson and Andre Oberstadt: This project guide is to aide PCVs in the training of community health workers of WASH concepts. It is to be used in conjunction with Latrine Construction Projects as the behavior change and education component. It includes a project timeline and training resources such as visual aids and pre/post-tests.

Teach English Prevent HIV: A Teacher's Manual [ICE No. M0090]: This teaching manual was produced under contract through the Office of AIDS Relief and the Office of Overseas Programming and Training Support in Peace Corps/Washington in 2011. It consists of 14 individual lesson presents that are often reinforced in subsequent lessons. This manual is designed for school-based programs targeting students ages 13-16 with an intermediate level of English language proficiency. Instructors are Peace Corps Volunteers interested in teaching English, while delivering safety messages and key vocabulary words related to HIV Prevention. Detailed instructional tips and techniques are available on the HE section of the Google drive.

Where There is No Dentist by Murray Dickson (The Hesperian Foundation): This extends the information in *Where There is No Doctor* with a focus on dental issues. In the same format as the other book, it explains preventative care of the mouth and how to treat common dental problems. It can be downloaded in pdf format from the Hesperian Foundation:
http://hesperian.org/books-and-resources/

Where There is No Doctor by David Werner (The Hesperian Foundation): This is a must-have for any Peace Corps Health Volunteer. It explains many diseases and health issues you are likely to see in villages, including

symptoms, home remedies, and when a health professional is needed. It also shows what you can do at your site to teach prevention and give practical advice. It identifies obstacles to good health and offers ideas about how to overcome them. The book also contains simple illustrations to portray the various illnesses. http://hesperian.org/books-and-resources/

Where Women Have No Doctor by August Burns (The Hesperian Foundation): This extends the information in *Where There is No Doctor* with a focus on problems that affect only women or that affect women differently from men. In the same format as the other book, it explains the health issues, offers home remedies, and suggests practical ways to teach the information to communities. Peace Corps has a few copies available, or it can be downloaded in pdf format from the Hesperian Foundation: http://hesperian.org/books-and-resources/

Online Resources

*In addition to the specific resource described below, the Peace Corps Senegal Google Drive contains a wide variety of resources for Volunteers including sector specific information and cross-sector resources.
https://drive.google.com/#folders/0B0qhpwYr4rm0LV9VdklIQUhkcnc

The Bajenu Gox Progam Guide de Formation : The Bajenu gox program is a government program started in 2010. It was initially developed to help reach MDG goals 4 and 5. In Senegal, traditionally and still today, the bajen is the sister of the head of the family. She occupies a strategic position within the family. This position results in a supportive relationship. The Bajenu gox program is rooted in this role and sponsorship. This is the training guide, written in French, that the government uses to train new Bajens.
http://www.dsr.sn/documents/Guide_De_Formation.pdf

The Care Group Guide: The Care Group approach - This guide was developed as a training resource and toolkit to aid in the design, training, implementation, and monitoring of Care group programs. It includes lesson plans for one-week training courses designed to train headquarters and field management on how to set up Care Groups and implementation. The first two links are from the Core group and the last link is from PC Benin.
http://www.coregroup.org/storage/documents/Diffusion_of_Innovation/Care_Manual.pdf

http://www.caregroupinfo.org/blog/narrated-presentations-on-care-groups-and-care-group-tools/planning-m-e-tools
http://www.k4health.org/toolkits/pc-bcc/peace-corps-manual-care-group-approach-health-promotion-and-behavior-change-through-

Centers for Disease Control and Prevention (CDC)*:* The CDC website has great information on the history and basics of malaria. http://www.cdc.gov/MALARIA/

Click Info Ado. "Apprende à Vivre Sénégal: Click Info Ado provides lessons and tools for planning and developing culturally-appropriate family planning activities targeted toward youth. www.clickinfoado.sn

Coursera: massively open online courses (MOOCs): Free online courses on a wide range of topics, these are some related to public health:

1) **Dan Ariely**: A Beginner's Guide to Irrational Behavior – https://www.coursera.org/course/behavioralecon
2) **Bill Breiger**: Community change in Public Health - https://www.coursera.org/course/communitychange
3) **Brian Caffo**: Mathematical Biostatistics Bootcamp – https://www.coursera.org/course/biostats

Demographic and Health Survey (DHS) and Malaria Indicator Survey: Data from surveys funded by USAID measuring the current state of health in Senegal. It includes indicators within each goal of the Peace Corps Community Health Project Framework including maternal and infant nutrition, malaria prevalence, basic sanitation and the overall impact of intervention measures. This survey is the standard measure of progress for many development and health-related topics and is used widely by Government and NGOs. http://www.measuredhs.com/What-We-Do/Survey-Types/MIS.cfm

DSDOM Manual: This is the resource provided to health workers who are trained as home-based care providers for malaria as a part of Senegal's home-based malaria control program called PECADOM (prise en charge a domicile). https://www.google.com/search?q=DSDOM+Manual+Senegal&oq=DSDOM+Manual+Senegal&aqs=chrome..69i57.4198j0j4&sourceid=chrome&espv=210&es_sm=122&ie=UTF-8

Feed the Hungry Barrier Analysis: A guide for conducting a barrier analysis for health behaviors, developed by Family Health International (FHI). http://barrieranalysis.fhi.net/annex/Barrier_Analysis_Facilitator_Guide.pdf

From the Ground Up: A Nutritional Guide to the Fields of Senegal: Written and compiled by Senegal PCVs, this nutritional guide provides cross-cultural information regarding gardening, food security and nutrition information such as micronutrient content of Senegalese foods. https://docs.google.com/file/d/0B1Ul8uGhDQxDYy1sSkxXaUFZX2s/edit?usp=drive_web

Guide du Formateur (Relais, ASC, Matrone): This French and Wolof manual is provided to all relais, ASC, and matrones to provide them with essential health information during their training. It is a valuable resource to volunteers to provide information regarding common health issues in Senegas, as well as to learn the health information provided to local health workers. Each section contains an explanation of the health issue, as well as simple drawings to illustrate the concepts. It can be downloaded in pdf format from: http://www.ccmcentral.com/files/contents/CHW%20Package%20-%20Senegal.pdf

Impact Malaria: An e-learning course about malaria and a series of videos on the lifecycle of malaria. http://www.impact-malaria.com/web/on-line_training

John Snow Inc (JSI) E-learning Courses in Logistics Management for Health Commodities: An online course in managing the logistics of health products. http://www.jsi.com/JSIInternet/Resources/elearning.cfm

Knowledge for Health (K4Health, funded by USAID and run by Johns Hopkins University): Resources for advancing health in development, including a Peace Corps-specific toolkit for Volunteers working within community health. http://www.k4health.org/

Malaria Atlas Project*:* The best malaria mapping tool out there! It lets you see the distribution of mosquitoes and malaria in each region of Senegal as well as other countries where malaria is present. http://www.map.ox.ac.uk/

Management Science for Health (MSH) Supply Chain Management Training Materials*:* Resources such as trainer and participant guides to be used for training health workers on supply chain management. http://www.msh.org/resources?keywords=&system%5B%5D=87

Mapbox*:* Create a custom map based on Open Street Maps. https://www.mapbox.com/

Open Street Map*:* Similar to Google Maps, it lets you map your region or community and can be a very useful tool. http://www.openstreetmap.org/#map=5/51.500/-0.100

Plan Nationale de Developpement Sanitaire: This French document explains the current health strategic plan for Senegal. It provides background information regarding the health structure and programs currently in Senegal and outlines its strategies for the period of 2009-2018. It explains preventative care programs and health facility services that the Senegalese government plans to implement on a national level. It can be downloaded in pdf format from: http://www.unfpa.org/sowmy/resources/docs/library/R242_MOH_SENEGAL_2009_NatlHealthPlan_09_18.pdf

PMI Malaria Operational Plan (MOP): The annual strategic plan of the President's Malaria Initiative (PMI) in Senegal, sponsored by USAID and a major partner in Senegal's fight against malaria. This report outlines the interventions that PMI plans to take in the coming year.
http://www.pmi.gov/countries/profiles/senegal.html

PNLP Plan Strategique National 2011-2015: The strategic plan set by Senegal's National Malaria Control Program (NMCP or PNLP: Programme National de Lutte contre le Paludisme) every 5 years.
http://www.pnlp.sn/

USAID Global Health E-learning: Learning resources for health workers on various topics, including malaria. http://www.globalhealthlearning.org/

Ushahidi*:* A crowd-mapping tool used for purposes such as disaster relief and malaria rapid response. http://ushahidi.com/

Senegal Global Health Initiative Strategy: This document begins by explaining the current health issues in Senegal and Senegal's strategies to address these issues as described in its Plan Nationale de Developpment Sanitaire. It then focuses on US government programs in Senegal and how they are working to address these health issues. It can be downloaded in pdf format.
http://www.ghi.gov/whereWeWork/docs/SenegalStrategy.pdf

Stomp Out Malaria Website: Stomp Out Malaria is Peace Corps' International malaria initiative, founded in April of 2011. Information about the initiative, participating countries and their activities (including Senegal!), malaria trainings, and other resources are available on the website. Stomp Out Malaria also publishes an annual report and maintains a Facebook page.
https://www.facebook.com/StompOutMalaria

Technology, Entertainment and Design (TED): Fascinating video lectures of 20 minutes or less on a variety of topics from the world's leading experts. These are a few favorites:

1) **Nikolas Christakis** "The Hidden Influence of Social Networks" http://www.ted.com/talks/nicholas_christakis_the_hidden_influence_of_social_networks.html
2) **Esther Duflo** "Social Experiments to Fight Poverty" http://www.ted.com/talks/esther_duflo_social_experiments_to_fight_poverty.html
3) **Bill Gates** "Mosquitoes, Malaria, and Education" http://www.ted.com/talks/bill_gates_unplugged.html
4) **Hans Rosling** "On the Beauty of Data and New Ways to Think About Trends in Development" http://www.ted.com/talks/hans_rosling_shows_the_best_stats_you_ve_ever_seen.html
5) **Sonia Shah** "Three Reasons Why We Still Haven't Gotten Rid of Malaria"

http://www.ted.com/talks/sonia_shah_3_reasons_we_still_haven_t_gotten_rid_of_malaria.html

World Health Organization Pesticide Evaluation Scheme (WHOPES): This website outlines the procedure and guidelines for insecticides used in mosquito nets and indoor spraying for malaria. http://www.who.int/whopes/en/

World Health Organization Senegal Malaria Profile*:* A quick view of the malaria situation in Senegal, updated annually. http://www.who.int/malaria/publications/country-profiles/profile_sen_en.pdf

World Health Organization World Malaria Report: A summary of information from malaria-endemic countries around the world including statistics, goals, and progress compiled by the World Health Organization. http://www.who.int/malaria/publications/world_malaria_report_2013/en/

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Appendix A: Peace Corps Senegal Community Health Project Framework

Purpose: Senegalese communities will improve their health status

Goal 1: Communities will improve their ability to prevent and treat malaria

Objective 1.1 By the end of 2018, 880 service providers will increase their capacity to implement malaria prevention and treatment activities

Activities: Each year **80** Volunteers and their partners will increase the capacity of **176** services providers to implement malaria prevention and treatment activities through:

- trainings,
- workshops,
- one-on-one mentoring

SI/PDI	Targets	Output Indicator
SI	**260**	**HE 130 – Community Mobilizers trained in Malaria Behavior Change communication** – Number of Individuals (Community educators/Mobilizers) trained to promote malaria prevention and care seeking.
SI	**48**	**HE-129 - Medical Professionals Trained in Malaria Prevention -** Number of people (medical personnel, health workers, community workers, etc.) trained in malaria treatment or prevention.
SI	**576**	**HE-133 - Teachers trained in malaria prevention**- Number of teachers or other formal educators trained to incorporate malaria prevention themes into their lesson planning.

Objective 1.2 By the end of 2018, 97,840 community members will increase their access to malaria prevention goods and services and will adopt appropriate malaria prevention and treatment seeking behaviors.

Activities: Each year 80 Volunteers and their partners will support 19598 community members to increase their access to ITNs, RDTs and ACTS; and to adopt malaria prevention and treatment seeking behaviors trough:

- mobilizing community members,
- trainings,
- workshops,
- one-on-one mentoring, and
- health promotion activities
- distribution of insecticide-treated bed nets,
- case management,
- supply chain management,
- BCC/IEC outreach,
- PECADOM Plus program
- and other capacity building activities related to malaria prevention and treatment

SI/PDI	Targets	Output Indicator
SI	**14400**	**HE-128 - Nets Purchased or Delivered -** Number of Long Lasting Insecticide-treated Nets (LLINs) purchased or delivered.
SI	**8640**	**HE 131 – Community members attending Malaria Behavior Change communication –** Number of individuals receiving BCC/IEC outreach promoting malaria prevention and care seeking.
SI/PDI	**Targets**	**Outcome Indicator**
SI	**600**	**HE-138 Individuals with Fever Who Received Antimalarial Treatment According to National Policy -** Number of individuals (children, pregnant mothers and the general population) with fever in the last two weeks who received anti-malarial treatment in accordance with the national policy AND

Appendix A: Peace Corps Senegal Community Health Project Framework

		within one day of the onset of fever.
SI	**74200**	**HE 135: Individuals who slept under an insecticide-treated bed net-** Number of individuals who slept under an ITN the previous night **Outcome** (Volunteers will report on this indicator for the age ranges specified below) 0-5 years, 6-14 years, 15-17 years, 18+

Goal 2: Communities will adopt behaviors and practices that contribute to improved maternal, infant and child health.		
Objective 2.1: By the end of 2018, 432 households will have improved access to and consumption of diverse and quality foods.		
Activities: Each year 30 Volunteers and their partners will support 240 household members to increase access to and consumption of diverse and quality foods through: • trainings on nutritional needs, • garden establishment • Moringa propagation and Moringa leaves processing. • Master farms' nutrition activities • preparation of hygienic nutritious foods, • workshops, • one-on-one mentoring, • management of care groups, • health promotion, • mobilizing communities and • other capacity-building activities related to family nutrition		
SI/PDI	**Targets**	**Output Indicator**
FTF	4320	**AG-047: Nutrition Education:** Number of people trained in child health and nutrition through USG-supported health area programs. Feed the Future Code:
PDI	864	**Household/community garden.** Number of individuals who participated in at least one household/community garden training session
SI/PDI	**Targets**	**Outcome indicator**
SI	432	**AG-20: Household Increased Access to Fresh Food:** Number of households, out of total number of households the Volunteer/partner worked with, who reported increased access to fresh foods at six months after establishing a garden.
Objective 2.2 By the end of 2018, 1440women will adopt at least one infant and young child feeding practices resulting in improved nutritional status.		
Activities: Each year, 40 volunteers and their community counterparts will work with 960 mothers on improving infant and young child nutrition through • trainings on nutritional needs, • exclusive breastfeeding and complimentary feeding, • preparation of hygienic nutritious foods, • workshops, • one-on-one mentoring, • management of care groups, management of hearths • health promotion,		

Appendix A: Peace Corps Senegal Community Health Project Framework

• mobilizing communities and • other capacity-building activities related infant and young child nutrition.		
SI/PDI	**Targets**	**Output Indicator**
SI	**4320**	**HE-092: Educated on Exclusive Breastfeeding** - Number of pregnant women trained on the benefits of exclusive breastfeeding
PDI	**4320**	**Maternal nutrition –** Number of individuals attending behavior change communication on the importance of maternal nutrition during pregnancy and post pregnancy
SI	**7200**	**U5s in Nutrition Programs:** Number of children under 5 reached by USG supported nutrition programs. Feed the Future Code: **(AG-046 FTF)**
SI/PDI	**Targets**	**Outcome Indicator**
SI	**1200**	**HE –095 Infant was Exclusively Breastfed for the First Six Months:** Number of infants to 12 months of age with a mother reporting that their child was exclusively breastfed for the first six months
SI	**2160**	**HE-102 Demonstrated How to Make a Nutritious Meal for Children Under-5:** # of women who demonstrate how to make a nutritious meal from locally available foodstuffs
SI	**1440**	**HE-103 Adopted a New Behavior to Reduce the Risk of Malnutrition in Children Under-5:** # of mothers adopting one or more new behavior(s) to reduce the risk of malnutrition in children under 5 years of age
Objective 2.3: By 2018, 480 women will safeguard the health of their children through prevention and proactive treatment of common childhood illnesses.		
Activities: Each year, **40** volunteers and their community counterparts will work with **2784** of individuals to prevent common childhood illnesses including diarrhea, pneumonia, malaria, vaccine preventable diseases through: • trainings, • workshops, • one-on-one mentoring, • Health talks • management of care groups, • health promotion, • mobilizing communities and • other capacity-building activities related to maternal, infant, and young child health		
SI/PDI	**Targets**	**Output Indicator**
SI	**4320**	**HE-114* Educated on Prevention of Common Childhood Illnesses:** Number of individuals reached with individual or small group education on prevention of common childhood illnesses
SI/PDI	**Targets**	**Outcome Indicator**
SI	**4320**	**HE-115*Able to Identify Symptoms Indicative of the need to Seek Care for Diarrhea:** # of individuals able to identify at least 3 symptoms indicative of the need to seek immediate care for diarrhea
SI	**4320**	**HE-116*Able to Identify Symptoms Indicative of the need to Seek Care for Pneumonia:** # of individuals able to identify at least 2 symptoms indicative of the need to seek immediate care for pneumonia
SI	**14400**	**HE-117* Demonstrated How to Prepare ORS:** # of individuals able to demonstrate how to prepare ORS
SI		**HE-119 Women Reporting Their Child Had Diarrhea and Received ORS AND**

Appendix A: Peace Corps Senegal Community Health Project Framework

	480	**They Continued to Give Food:** # of children aged 0-59 months who had diarrhea since the last reporting period, whose caregivers/mothers report that they received either oral rehydration therapy or increased fluids AND that they continued to give them food
SI	**480**	**HE-120* Children Who Had a Cough and Fast or Difficult Breathing and Received Antibiotics by a Provider:** # of children aged 0-59 months who had a cough and fast or difficult breathing since the last reporting period whose mothers report that their child received treatment by an appropriate health provider
Goal 3: Community members adopt water and sanitation hygiene practices and behaviors resulting in improved health		
Objective 3.1 By 2018, 14,400 individuals will have increased access to clean water and improved sanitation.		
Activities: Each year, **40** of volunteers and their community work partners will work with **4032** individuals to improve access to clean water and sanitation systems through: • conducting baseline surveys (community diagnostics) • organizing water and sanitation committees • facilitating the development of community water and sanitation action plans • mobilizing community members, • trainings, • workshops, • health promotion, • construction and maintenance of systems • other capacity building activities related to clean, safe water systems, and sanitation facilities		
SI/PDI	**Targets**	**Output Indicator**
SI	**240**	**HE-045 Conducted Baseline Water and Sanitation Survey:** # of community diagnostics conducted that assess baseline water and sanitation access and behaviors
SI/PDI	**Targets**	**Outcome Indicator**
PDI	**1152**	**HE-047: Constructed or Improved water and sanitation systems -** - Number of community water and sanitation systems constructed, improved, or rehabilitated
SI	**14400**	**HE57 – People in households having access to clean, safe drinking water -** Number of people in households having access to clean, safe drinking water
SI	**5760**	**HE62: Individuals in households with access to latrines: -** Number of individuals in households with access to an improved or rehabilitated latrine
Objective 3.2 By 2018, 6480Individuals will adopt at least one WASH behavior and practice		
Activities: Each year, **60** volunteers and their community counterparts will educate **2160** individuals on methods to prevent water- related diseases through: • informal household training sessions, • community trainings on hand washing stations and water treatment and storage methods • Identifying potential counterparts as hand washing promoters. • Celebration of hand washing days • Other capacity building activities related to clean water, improved hand hygiene and sanitation.		
SI/PDI	**Targets**	**Output Indicator**
SI	**849**	**HE 49 - Trained People to Build Hand Washing Stations and to Correctly Wash Their Hands -** Number of people trained to build hand washing stations and to correctly clean their hands with soap and water at the station.

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PDI	**8640**	**Community members attending WASH Behavior Change communication –** Number of individuals receiving BCC/IEC outreach promoting WASH
SI/PDI	**Targets**	**Outcome Indicators**
SI	**2160**	**HE52- Households Having a Hand Washing Station with Soap and Safe Water -** Number of households having soap or ash, or other disinfecting material, AND safe water for proper hand washing at a hand washing station commonly used by household members.
SI	**2160**	**HE-053 Household Members Using the Hand Washing Station:** # of household members using the hand washing station
SI	**6480**	**HE 58 Individuals Drinking and Cooking With Properly Stored and Treated Water -** Number of individuals reporting that in the day preceding the assessment they only drank and cooked with properly stored and treated water.

Appendix B: Observation and Recording

Service Journal Examples

Example Activity Entry

Date: 23 June 2013
Activity: LLIN Care and Repair Tournée
Location: Poste de Santé Affe, Thiargny, Lindy, Linguere Region
Work Partners: Ndeye Sock, Mati Sall, PCV Katie Van Es, PCV Erandy Gonzalez, PCV Leeya Carroll
Attendees: 102 total
Participant Breakdown: Women: 72,Girls: 18, Men: 6, Service providers: 6
Project Framework: Malaria: Community members attending Malaria Behavior Change Communication =102 Individuals who slept under an insecticide-treated bed net= 0-5yrs: 21 6-14yrs: 15 15-17yrs: 12 18+:32
Description: PCVs Leeya, Katie, and Erandy did a three day tourney, one day in each of our villages. The tourney was focused on educating the population on Bed net care and repair and also reinforcing the idea of using your bed net all year long. People were able to come and learn about how to sew and wash your net. They were also given a pre and post test about what type of soap to use, how to repair a hole, and how often they wash their net. Community work partners Ndeye and Mati did most of the teaching while the PCV's gave and gathered the tests and information. All supplies were provided by the PCV's and health posts.
Comments: Well attended causerie; however people generally wanted to just leave their nets for somebody else to sew and wash. This was not the idea of the tourney. We wanted people to learn and do it themselves.

Example #2 (Nutrition Activity)

Date: 03 January 2014
Activity: Hearth Model
Location: 12 different homes in Affe, Linguere Region
Partners: Malow Sow, Adama Ndiaye, Mati Sall, Ata Niang, Say Ka, Soukaye Niang, PCV Katie Van Es
Attendees: 25
Participant Breakdown: Women: 13, Girls: 5, Boys: 7
Project Framework: Nutritious meal: # of women who demonstrate how to make a nutritious meal from locally available foods=12
Description: PCV Katie did a 12 day hearth program with six of her health relais. The program consisted of teaching and making four different kinds of nutritional porridges with mothers of children under the age of 5. They met every day at a different woman's house and while making the porridge the woman for the day taught a health lesson, such as nutrition, vaccinations, malaria, and Diarrhea. The children were weighed at the beginning of the program, at the end of the program, and at one month. The supplies for cooking were supplied by the women themselves.
Comments: Mother's appeared to have fun with the program. 10 mothers report that they still make the porridges for their children. The big obstacle is that it is not ensured that the child will be the only one eating the porridge in the family.

English Translation – Supervision of Program Activities Related to Community Health

Appendix B: Observation and Recording

(Supervision of Health Point/Health Hut activities)
Supervision Date_____

1. **Geographic information.**
   - **Medical Region_____ Health District _____**
   - **Health Post _____**
   - **Name of Health Hut/Health Point_____**
   - **Name of ASC_____ Name of Matron_____**
2. **Displays in the Health Hut**
   - **Map of villages that are referred to the health hut**
   - **Targets covered by the health hut's programs**
   - **Distance between the health hut and the health post**
   - **Names of the members of the health committee and other community actors**
   - **Graph/Data of morbidity statistics of the major illnesses in the community**
   - **Graph/Data of SPC (rate of malnutrition, coverage)**
   - **Graph/Data on Vitamin A supplementation**
   - **Graph/Data on Mébendazole distribution**
3. **State of the Case de Santé**
   - **The state, aeration, cleanliness of the space**
   - **Confidentiality of the case de santé – is it enclosed, is there some ensured sense of patient confidentiality**
4. **Review of the management tools and the quality of health hut management**

Factors reviewed	Yes/no	Observations
The registers and notebooks for record keeping are in good condition (not ripped and damaged)		
All the standard record keeping documents are available		
Are the records done according to the model approved by the consortium		
Are all the records completely filled out		
Consultations are accurately recorded and differentiated in the general consultation record		
The children that are recorded in the baby weighing records are recorded in the 'Registre SPC' of the Health Hut		
The old cases are differentiated from the new cases in the 'Registre de SPC'		
The women who have given birth with the assistance of the trained Matron are recorded in the 'Registre de Maternité' of the health hut		
The women who gave birth at their homes with		

Appendix B: Observation and Recording

the assistance of the matron are differentiated from the women who gave birth without assistance		
The women who gave birth with the help of qualified health personnel are registered as well as the place of birth		
The number of visits by a mother who recently gave birth (3rd, 8th, 15th, and 45th day) are registered in the Registre de maternité		
The cases referred to health post or hospital due to a difficult birth, or serious infant illness are noted in the maternity records or in the general consultation records (underlined or written in red in the 'TRAITEMENT' column		
The cross referenced cases are noted in the records		

Quality of case management

Pick three cases at random that have been managed by the ASC and/or Matron and verify their conformity to the standard procedures	**Yes/no**	**Observations**
The cases are appropriately classed (according to symptoms/signs of class)		
The cases appropriately classed/diagnosed are managed (diagnosis, appropriate treatment assigned)		
The cases are appropriately treated		
The counsel given by the health personnel are appropriate and pertinent to the case		
The treated patient returns at least one time on the third day or is seen by the ASC between the fourth and sixth day		
The serious cases are underlined in the records		
There is concordance between the signs/symptoms recorded at the health hut visit and the decision to refer a case to the hospital or health post		

Medication and medical products

Verify the conformity of the different forms of medication sold by the ASC and the Matron		
The health hut has a 'fiche de stock' for each medication		
The 'fiche de stock' is up to date for each		

Appendix B: Observation and Recording

medication		
The physical/actual amount of medication available corresponds with the theoretical amount available according to the health hut's records		
If there is no 'fiche de stock' for a medication, is there physical amount corresponding to the total number of cases recorded in the case		
The price of treatment is clearly indicated		
The ASC/Matron has efficiently and effectively requested more medication after using up the first stock		
The request for restock from the ASC/Matron was sold by the health or was overseen by the ICP		
What was the price of the pills/syrup bought by the ASC at the level of the ICP/Health Center (calculate the margin of profit at each level and then verify the appropriate price at the case de santé level)		
Indicate the number of days of stock-outs for each tracked medication in the health hut		
Indicate the origin of the stock-out (ASC/Health Post/District)		
The materials needed to track the medications, is it available?		
If the tracking materials are not available, indicate how long there has been a rupture in functional tracking		
Verify the ASC/Matron's capability to use the correct tracking materials		

Supervision Activities for the ASC in the field

	Yes/No	**Observations**
Does the health hut have a supervision booklet/record keeper?		
Is this booklet signed after each visit?		
Are the number of visits indicated for the trimester under review?		
(as the ASC directly) Has the ICP performed a visit to supervise this health hut?		
(ask the ASC directly) At the end of the visit does the ICP give feed back to the ASC on the strong points and weak points of the health hut operation?		

Appendix B: Observation and Recording

(Ask directly to the ASC) After the visit , did the ICP help the ASC resolve the problems that were identified during his/her visit?		

Information/Education/Communication Activities

	Yes/No	Observations
Evaluate the IEC activities planned and realized during the period under review		
Evaluate the pertinence of the activities that were realized during the period under review		
Evaluate the pertinence and appropriateness of the targets of each IEC activity		
Was the meeting for self evaluation meeting and programming organized and realized during the period under review?		
Are the IEC materials available?		

ImpreMILDAs

The mosquito nets are distributed according to procedure and targets		
Reduced price targets are available in the health hut		
The reduced price coupons are appropriately exchanged for mosquito nets		

5. **The Supply of 'Fiche de Reference' et 'Fiche de Contre Reference' (materials for referring patients to other structures)**

The health hut is regularly supplied with 'fiches'		
The ASC and the Matron regularly archive the fiches signed by the ICP		

6. Level of knowledge of ASC

	Yes/no	Observations
The ASC understands the general signs of danger for a newborn		
The ASC knows how to look for the 'tirage sous-costal' for cases of severe pneumonia		
The ASC can identify the symptoms of severe tuberculosis		
The ASC knows the counsel that needs to be given to patients and family of patients in each case of illness		

7. Administrative and Financial Management of the Health Hut

Appendix B: Observation and Recording

The members of the Health Committee have been trained in financial management of the health hut		
The members of the committee are oriented and aware of the basic services/products that the health hut should provide		
The committee meets regularly (each month)		
The stock of medicines is regularly renewed		
The ASC and Matron and Relais receive a 'motivation' (small amount of money from the health hut profits		

Recommendations/Summary of visit:

Appendix C: Non-Formal Education in Senegal

Non-formal education in Senegal between Peace Corps volunteers and community members relates to any avenue of education carried out beyond the classroom or formal education centers.

Types of activities that may be considered as non-formal education are:

- Grassroots Soccer Initiative
- Mass Media/ Radio Shows
- Murals
- Theater/ Shows at Events
- Causeries
- Club (i.e. Sports Club, English Club, etc.)

Non-formal education at times may be the best option for a Peace Corps Volunteer to make change in his or her community as not all communities are equipped with elementary, middle, and high schools. The choice to partake in a non-formal educational event is solely up to the volunteer and should be consulted with community leaders, counterparts, and or one's APCD prior to carrying out the event.

Funding is available for non-formal education. The type of funding available depends specifically on the type of activity and its aims. A volunteer should contact his or her APCD for further instruction prior to pursuing grant writing for a non-formal educational event/training in his or her community.

Non-formal education places the responsibility on the volunteer and/or on his or her host country national participants. Endeavoring goals must be clearly constructed prior to beginning process as there is no formal ground for carrying out actions which may be found in an educational center or school.

The potential for a non-formal educational event is limitless as the event may be continuous and everlasting within the community depending upon the amount of effort invested by community members. Non-formal education is a great tool for motivating one's community and making contacts on a personal level, which otherwise may be more difficult to do at a formal education post.

Murals

Murals are great ways to disseminate information and add color throughout your service. Visual presentations are well received, last a really long time, and aren't limited to one medium. The mural guide is a wonderful resource that can help anyone become an artist, thanks to the easy to use grid method.

Pictures are universal and you don't need to have great local language skills in order to share information in the early stages of your service. Murals in your first couple months can be a great project that is productive and will motivate you to go out and about to discover your village. As you progress in your service, the mural guide can be adapted and used as a tool in causeries. The images are not intended solely for murals and can are easily transferred to cloth and rice sacks to make transportable visuals aides. These can be carried from venue to venue, community to community and be used during various health talks, community events, and within various venues such as markets and schools.

Causeries

Appendix C: Non-Formal Education in Senegal

A causerie is a group lecture or discussion about a certain topic. Causeries can take place at a health structure, a school, a community event or any central location. They work best with smaller groups—less than about 20 people—because it is easier to foster audience participation and check for understanding. Causeries work well for a wide variety of subjects including malaria prevention, handwashing, nutrition and family planning. This type of intervention is effective for improving knowledge and awareness about complicated subjects, modelling desired behaviors and building skills. They can also be useful for increasing positive attitudes towards a behavior, fostering normative support, as wells as increasing a sense of importance and intention to act.

Tips:

- Visual aids can be a good way to show people something about a complex topic. However, keep in mind the written and visual literacy levels of your audience. Simple pictures are better than a lot of words. Test out your visual aids by asking a work partner or family member what they see.
- Always conduct a causerie with a counterpart, especially one who knows the local language. Also, go over the material with the counterpart ahead of time to make sure everything is phrased in an understandable way and that you are on the same page with messaging.
- Bringing attaya or boisson can be a good way to attract people to your causerie and reward them for coming. It is normal for a fancy meal, tea or drinks to be provided at trainings and people tend to expect the same of your events.
- Make your causerie fun and interactive. They could include songs, skits or interesting demonstrations. Doing so helps keep people's attention and makes them want to attend your events.
- Ask questions to get your audience involved and check for understanding. Pose questions throughout to find out what people already know and have your participants explain to each other. Ask the questions again at the end as a form of monitoring and evaluation to make sure audience members have learned the take away points. Call on people if no one speaks up.
- While presenting, circulate around the group so everyone can hear you.
- Take attendance so you can follow up with participants later. Also mark down the age and gender of your participants so it will be easy to report on your event when it is time to fill out your VRF.

Appendix D: PECADOM Plus

PECADOM Plus

An Active Approach to Community-Based Malaria Management

The region of Kedougou has the highest rates of malaria in the country, and geographic, educational and financial barriers often prohibit rural populations from accessing care. A home-based care model called PECADOM was implemented in Senegal starting in 2008 and addresses many of these barriers to care and care seeking. Volunteer home-based care providers (DS-DOMs) are trained to perform rapid diagnostic tests and administer treatment for cases of uncomplicated malaria, referring all negative and severe cases. Despite these advances, some limitations are still evident in the existing model. As case detection is passive, malaria detection and treatment rely on the patient to seek the DS-DOM. Peace Corps and the Saraya Health District have partnered in 2012 and 2013 to pilot an innovative new model to address these barriers.

To implement the PECADOM Plus model with the objectives of reducing the incidence of both simple and complicated malaria, PCV Annē Linn wrote a research protocol in conjunction with the chief doctor in her district. Using SPA funds, the methodology of the new model was this: pay a small wage to previously volunteer health workers to conduct sweeps of every household in their village once a week during the rainy season to actively seek out suspected cases of malaria. Rapid tests are administered to anyone with symptoms, and treatment is provided on the spot for positive cases. One woman from each compound is also trained to recognize the symptoms of malaria in order to facilitate the sweeps. This active model was implemented in 15 villages in the Saraya Health District from July 8 through November 25, 2013. 15 comparison villages were also chosen among villages benefiting from the original, passive PECADOM model, and village sweeps were conducted to estimate baseline, midline, and endline prevalence of symptomatic malaria in those villages.

At baseline in early July, a similar prevalence of symptomatic malaria of just over 1% of the total population was found in both sets of villages. Sweeps continued on a weekly basis in the intervention villages. Midway through the program, sweeps of the comparison villages were again conducted, and the prevalence was found to be 2.5 times higher in the comparison villages than in the intervention villages. The program concluded on November 25th, and this time, the prevalence in comparison villages was nearly 16 times higher than in the intervention villages, where only six cases of symptomatic malaria were found, showing great promise for this model. Results were also shown at the post level, where both total cases and severe cases decreased at a greater rate between 2012 and 2013 than the other villages seen at the intervention posts.

These results have been shared with the National Malaria Control Program, the President's Malaria Initiative, and several potential NGO partners, and it is hopeful that the program will be scaled up throughout Southern Senegal in 2014.

Appendix E: Peace Care

Peace Care is a confusingly named organization that is conducting its pilot project in my site, the Saraya Health District in southeastern Senegal. The idea behind *peace care* is to connect Peace Corps volunteers to academic medical institutions, thus combining the strength of the PCV's on-the-ground presence and linguistic/cultural expertise with the resources and technical expertise of academia. The pilot project started in Saraya in 2010, after the director of *peace care*, an RPCV himself, met the chief doctor of the Saraya Health District at a global health conference. I am part of the 4th generation of PCVs in the Kedougou region to facilitate *peace care*'s work. Volunteers facilitate biannual visits from the American team and coordinate activities throughout the year.

After conducting focus groups with the health district staff and the communities, a programmatic area for intervention was chosen for the *peacecare* pilot: comprehensive cervical cancer preventive services. The first major activity was the training of midwives and nurses within the Kedougou medical region in a low-tech method for screening for cervical dysplasia known as Visual Inspection with Ascetic Acid (VIA). Three midwives were then trained to become master trainers. This lead midwife team has no trained all midwives and female nurses in the Kedougou Medical Region in VIA. Since I have been at site, a major activity has been training 2 midwives and one doctor in Cryotherapy, which can treat most pre-cancers found during VIA screenings. Matrones and bajenugox have also been trained on cervical cancer communications. In 2013, *peace care* financed a prevalence study of cervical cancer and dysplasia in the region of Kedougou. This activity, conducted through mass screenings in 40 randomly selected villages, will serve as a counterbalance to the grassroots activities in order to impact cervical cancer preventative services at the policy level by providing data to illustrate the issue.

Now that the program is largely in place, the next steps for 2014 will be to take the district teams through the COPE quality improvement process and use that as a springboard for identifying new programmatic areas in which the *peace care* team can provide technical expertise and training.

Appendix F: WASH Activities

Handwashing Promotion Activities

Some Key Points on Hand Washing

Hand washing with soap is a very important preventive practice. Studies show that if done as recommended, it prevents almost half of the cases of diarrhea and almost a third of the cases of pneumonia in children. These two conditions are among the top causes of children's illness and deaths. Hand washing with soap can also prevent many cases of influenza and other respiratory diseases, such as the so-called swine flu.

Hand washing with water only does not remove many germs. To be effective, hand washing requires some cleansing agent to be used with running (falling) water and good rubbing, especially of fingers. As long as the water is running water, it does not have to be treated first.

The best cleaning agent is hand soap. Detergent or laundry soap works fine but is not preferred because, if used frequently, it can dry out/irritate skin. Ashes, sand, or even mud can do almost as good a job as soap when used well.

Once washed, hands should be air dried or dried on a clean cloth – not on a dirty cloth or clothes. In many settings in developing countries, it is extremely unlikely that a clean cloth will be available, so the best advice in general is to dry hands by shaking them then waving them in the air.

There are various key times when it is advisable to wash hands with soap; however, outreach workers may well need to negotiate these times with mothers because washing at all of these times for busy mothers is not usually possible.

The most important times for handwashing are after defecating, after cleaning the baby's bottom or diaper or otherwise coming into contact with feces.

Other important times for handwashing are before preparing, eating food, or feeding, especially when hands come into direct contact with the food.

Mothers need to wash the hands often of young children who are allowed to play on the ground, especially when the children are putting their hands into their mouths, which they often do when they are teething.

Most people in most developing countries wash their hands with water when their hands look dirty; so the main task of the outreach worker is to convince and help people wash their hand *more often* (at key times) and *properly* (with soap if possible), even if their hands to not look dirty.

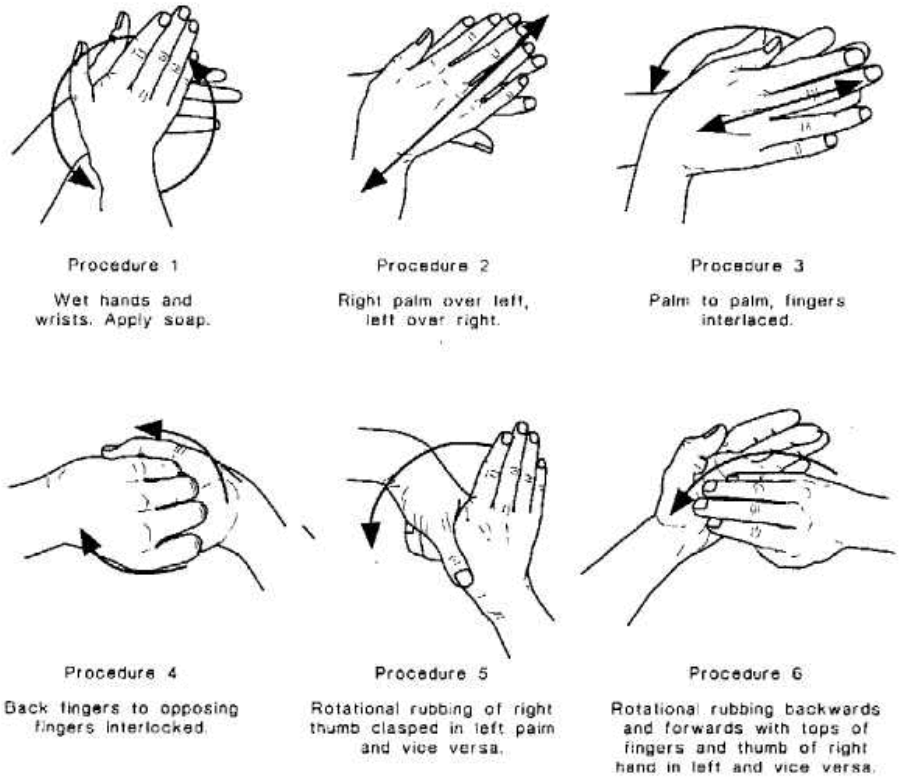
It is difficult to monitor how well and how often people are washing their hands. You should not rely simply on what people say, because people tend to tell you what they know they *should* be doing rather than what they *are* doing. A few good ideas are: ask to see the place(s) where people wash their hands, ask if they know the critical times, ask them to demonstrate how they usually wash their hands, ask if the young children have had diarrhea in the past two weeks.

Handwashing Techniques

Repeat each movement five times:

Appendix F: WASH Activities

1. Palm to palm
2. Right palm over left dorsum
3. Left palm over right dorsum
4. Fingers interlace palm to palm
5. Back of fingers to opposing palms
6. Rotational rubbing of thumbs
7. Rotational rubbing of palms



NOTE: Repeat procedures 1-6 until the hands are clean. Rinse hands and pat dry.

Brief Q&A on Hand Washing

Who should wash their hands?

Everyone should wash their hands: adults, the elderly, young people, children and babies. If children are unable to wash their hands by themselves, an adult should help them.

When should we wash our hands?

Key times:

- After going to the latrine or the bathroom
- After changing diapers or otherwise contacting feces
- Before eating
- Before preparing food

Other times:

- After returning from the field

Appendix F: WASH Activities

- Before breastfeeding

With what should we wash our hands?
We should wash our hands with water and soap. To wash our hands correctly, we wet them, soap them, rub them together at least three times, clean under our nails, and rinse them with running water. We air dry them by shaking them or we use a clean towel or rag. Note that a clean towel or rag is unlikely to be available in many settings, if available at all.

Is "clean" water, i.e. pure or treated water, necessary for washing my hands?
No, washing your hands with any water makes them cleaner if you also use a cleaning agent such as soap, sand or ash. It is better to rinse your hands with running water.

This material is extracted, and slightly modified, from the draft Global Resource Materials from the USAID-funded Hygiene Improvement Project (HIP).

Appendix F: WASH Activities

Tips for Counseling People on Hand Washing

Common reasons why people don't wash their hands as recommended (barriers to good hand washing)	**What an outreach worker can do to address this barrier**
People don't know how important the practice is. They don't connect dirty hands with diarrhea or respiratory disease, and/or they consider diarrhea as "normal" and not dangerous condition.	Explain/teach/demonstrate about the concept of dehydration…that diarrhea leads to children losing so much water that they get sick and can die. Mention what happens to crops when they don't get enough water. Acknowledge that children with diarrhea are too common now, but that it doesn't have to be, and that one of they key ways to reduce it is good hand washing. For respiratory disease, explain that dirt on hands can contain the germs (or substance) that cause the illness, which is why proper hand washing can protect people.
Hands don't look dirty.	Use a demonstration to show that just because something that looks clean doesn't mean it is. (1) Put salt in a clean glass of water. Ask people if the water looks pure. Then ask for a volunteer to taste it. (2) Drag a hair or threat throw feces. Then put the material in a glass of water. Ask if there are any volunteers who want to drink the water and if the water is pure. (Don't let anyone drink!)
Hand soap is not easily available to purchase or affordable.	First try to *motivate* people to purchase hand soap, even if it is difficult. If people feel that they cannot, then ask them to wash with ashes, sand, or mud…whichever is most acceptable and available.
People have poor access to water, so they don't want to use too much for things like hand washing.	There are three basic ideas to consider together with the mothers or families: (1) use a Tippy Tap or some other water-saving device; (2) figure out a way to get more water for the family; (3) when water is most scarce, wash only at the most critical times (in most places, after defecating, cleaning the baby's bottom or diaper, or otherwise coming into contact with feces).
People are too busy.	Try to motivate hand washing with soap as often as possible, but emphasize the most critical times.
People don't have a good place to wash, where all the supplies (soap, water, etc.) are located in one place	Encourage every family to prepare hand washing stations at the latrine and cooking area; engage respected community members to encourage this practice.
People don't wash at critical times.	Teach what the most critical times are; prioritize critical times if washing at all recommended times is not acceptable or feasible.
People don't wash thoroughly enough.	Organize public demonstrations, using children and adults, to demonstrate good hand washing technique.
People dry hands on whatever soft material is available (often dirty).	Encourage people to air dry.

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Clean Water Interventions and Well Construction

Water Wells

A water well is an excavation or structure created in the ground by digging, driving, boring or drilling to access groundwater in underground aquifers. The well water is drawn by an electric submersible pump, a handpump, or a mechanical pump. It can also be drawn up using containers, such as buckets, that are raised mechanically or by hand which is most common in rural areas.

Wells can vary greatly in depth, water volume and water quality. Well water typically contains more minerals in solution than surface water and may require treatment to soften the water by removing minerals such as arsenic, iron and manganese.

Hand Dug Wells: provide a cheap and low-tech solution to accessing groundwater in rural locations, with a high degree of community participation. Hand dug wells have been successfully excavated to 60m. Hand dug wells are cheap and low tech (compared to drilling) as they use mostly hand labor for construction. Hand dug wells have low operational and maintenance costs. Even if the hand pump is broken, water can still be extracted. In many cases, hand dug wells are similar to traditional abstraction methods and are readily accepted by the host community. The construction of hand dug wells can incorporate a high degree of community participation (e.g. pre-fabrication of concrete rings). Hand dug wells can be easily deepened, if the ground water level drops, by telescoping the lining further down into the aquifer. The yield of existing hand dug wells may be improved by deepening or introducing vertical tunnels or perforated pipes.

Hand dug wells are not suited to hard ground formations and take time to dig and line.

Construction of hand dug wells can be dangerous due to collapsing soils, falling objects and asphyxiation. Hand dug well construction generally requires the use of a trained well construction team. Construction of hand dug wells can require large capital costs for equipment such as concrete ring molds, heavy lifting equipment, well shaft formwork, motorized de-watering pumps, and fuel. Since most hand dug wells exploit shallow aquifers, the well may be susceptible to yield fluctuations and possible surface contamination.

Safety during hand dug well construction is paramount due to the risk of collapse, falling objects and suffocation from exhaust fumes from dewatering pumps.

Driven wells: may be very simply created in unconsolidated material with a "well point", which consists of a hardened drive point and a screen (perforated pipe). The point is simply hammered into the ground, usually with a tripod and "driver", with pipe sections added as needed. A driver is a weighted pipe that slides over the pipe being driven and is repeatedly dropped on it. When groundwater is encountered, the well is washed of sediment and a pump installed.

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Drilled wells: can be excavated by simple hand drilling methods (augering, sludging, jetting, driving, hand percussion) or machine drilling (rotary, percussion, down the hole hammer). Drilled wells can get water from a much deeper level than by dug wells - often up to several hundred meters.

Drilled wells with electric pumps are currently used throughout the world, typically in rural or sparsely populated areas, though many urban areas are supplied partly by municipal wells.
Drilled wells are typically created using either top-head rotary style, table rotary, or cable tool drilling machines, all of which use drilling stems that are turned to create a cutting action in the formation, hence the term 'drilling'. Most shallow well drilling machines are mounted on large trucks, trailers, or tracked vehicle carriages. Water wells typically range from 20 to 600 feet (180 m), but in some areas can go deeper than 3,000 feet (910 m).

Drilled wells are usually cased with a factory-made pipe, typically steel (in air rotary or cable tool drilling) or plastic/PVC (in mud rotary wells, also present in wells drilled into solid rock). The casing is constructed by welding, either chemically or thermodynamically, segments of casing together. If the casing is installed during the drilling, most drills will drive the casing into the ground as the bore hole advances, while some newer machines will actually allow for the casing to be rotated and drilled into the formation in a similar manner as the bit advancing just below. PVC or plastic is typically welded and then lowered into the drilled well, vertically stacked with their ends nested and either glued or splined together. The sections of casing are usually 20' (6 m) or more in length, and 6"–12" (15 to 30 cm) in diameter, depending on the intended use of the well and local groundwater conditions.

At the bottom of wells, based on formation, a screening device, filter pack, slotted casing, or open bore hole is left to allow the flow of water into the well. Constructed screens are typically used in unconsolidated formations (sands, gravels, etc.), allowing water and a percentage of the formation to pass through the screen. Allowing some material to pass through creates a large area filter out of the rest of the formation, as the amount of material present to pass into the well slowly decreases and is removed from the well. Rock wells are typically cased with a PVC liner/casing and screen or slotted casing at the bottom, this is mostly present just to keep rocks from entering the pump assembly. Some wells utilize a 'filter pack' method, where an undersized screen or slotted casing is placed inside the well and a filter medium is packed around the screen, between the screen and the borehole or casing. This allows the water to be filtered of unwanted materials before entering the well and pumping zone.

Classification
Two broad classes of drilled-well types may be distinguished, based on the type of aquifer which the well is completed in:

- **Shallow** or **unconfined wells** are completed in the uppermost saturated aquifer at that location (the upper unconfined aquifer); or
- **Deep** or **confined wells**, which are sunk through an impermeable stratum down into an aquifer which is sandwiched between two impermeable strata (aquitards or aquicludes). The majority of confined aquifers are classified as artesian because the hydraulic head in a confined well is higher than the level of the top of the aquifer. If the hydraulic head in a confined well is higher than the land surface it is a "flowing" artesian well.

Two additional broad classes of well types may be distinguished, based on the use of the well:

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- **Production** or **pumping wells**, are large diameter (> 15 cm in diameter) cased (metal, plastic, or concrete) water wells, constructed for extracting water from the aquifer by a pump (if the well is not artesian).
- **Monitoring wells** or **piezometers**, are often smaller diameter wells used to monitor the hydraulic head or sample the groundwater for chemical constituents. Piezometers are monitoring wells completed over a very short section of aquifer. Monitoring wells can also be completed at multiple levels, allowing discrete samples or measurements to be made at different vertical elevations at the same map location.

Obviously, a well constructed for pumping groundwater can be used passively as a monitoring well and a small diameter well can be pumped, but this distinction by use is common.
Well Siting: Before excavation, information about the geology, water table depth, seasonal fluctuations, recharge area and rate must be found.

Well Contamination
Shallow pumping wells can often supply drinking water at a very low cost, but because impurities from the surface easily reach shallow sources, a greater risk of contamination occurs for these wells when they are compared to deeper wells. Dug and driven wells are relatively easy to contaminate, and dug wells are unreliable in most of the U.S.

The quality of the well water can be significantly increased by lining the well, sealing the well head, fitting a self-priming hand pump, constructing an apron, ensuring the area is kept clean and free from stagnant water and animals, moving sources of contamination (latrines, garbage pits) and carrying out hygiene education. It is important that the well is cleaned with 1% chlorine solution after construction and periodically every 6 months.

Microorganisms
Most of the bacteria, viruses, parasites, and fungi that contaminate well water comes from fecal material from humans and other animals. Common bacterial contaminants include *E. coli*, *Salmonella*, *Shigella*, and *Campylobacter jejuni*. Common viral contaminants include *norovirus*, *sapovirus*, *rotavirus*, enteroviruses, and hepatitis A and E. Parasites include *Giardia lamblia*, *Cryptosporidium*, *Cyclospora*, and microsporidia.

Chemical
Chemical contamination is a common problem with groundwater. Nitrates from sewage or fertilizer are a particular problem for children. Pesticides and volatile organic compounds from gasoline, dry-cleaning, and many other sources are the most commonly occurring pollutant chemicals in the U.S., and may be identifiable in more than a third of all U.S. wells, although this is mostly at levels below U.S. water standards. Other notable chemical contaminants include the fuel additive methyl tert-butyl ether (MTBE), and perchlorate from rocket fuel, airbag inflators, and other artificial and natural sources. Several minerals are also contaminants, including lead leached from brass fittings or old lead pipes; chromium VI from electroplating and other sources; naturally occurring arsenic, radon, and uranium, all of which can cause cancer; and naturally occurring fluoride, which is desirable in low quantities to prevent tooth decay, but which can cause dental fluorosis in concentrations above recommended levels.
Some chemicals are commonly present in water wells at levels that are not toxic, but which can cause other problems. Calcium and magnesium cause what is known as hard water, which can

precipitate and clog pipes or burn out water heaters. Iron and manganese can appear as dark flecks that stain clothing and plumbing, and can promote the growth of iron and manganese bacteria that can form slimy black colonies that clog pipes.

Mitigation

Cleanup of contaminated groundwater tends to be very costly. Effective remediation of groundwater is generally very difficult. Contamination of groundwater from surface and subsurface sources can usually be dramatically reduced by correctly centering the casing during construction and filling the casing annulus with an appropriate sealing material. The sealing material (grout) should be placed from immediately above the production zone back to surface, because, in the absence of a correctly constructed casing seal, contaminated fluid can travel into the well through the casing annulus. Centering devices are important (usually 1 per length of casing or at maximum intervals of 9 m) to ensure that the grouted annular space is of even thickness.

Upon the construction of a new test well, it is considered best practice to invest in a complete battery of chemical and biological tests on the well water in question. Point-of-use treatment is available for individual properties and treatment plants are often constructed for municipal water supplies that suffer from contamination. Most of these treatment methods involve the filtration of the contaminants of concern, and additional protection may be garnered by installing well-casing screens only at depths where contamination is not present.

Well water for personal use is often filtered with reverse osmosis water processors; this process can remove very small particles. A simple, effective way of killing microorganisms is to bring the water to a full boil for one to three minutes, depending on location. A household well contaminated by microorganisms can initially be treated by shock chlorination using bleach, generating concentrations hundreds of times greater than found in community water systems; however, this will not fix any structural problems that led to the contamination and generally requires some expertise and testing for effective application.

Water Purification

Water purification is the process of removing undesirable chemicals, materials, and biological contaminants from raw water. The goal is to produce water fit for a specific purpose. Most water is purified for human consumption (drinking water) but water purification may also be designed for a variety of other purposes, including meeting the requirements of medical, pharmacology, chemical and industrial applications. In general the methods used include physical process such as filtration and sedimentation, biological processes such as slow sand filters or activated sludge, chemical process such as flocculation and chlorination and the use of electromagnetic radiation such as ultraviolet light.

The purification process of water may reduce the concentration of particulate matter including suspended particles, parasites, bacteria, algae, viruses, fungi; and a range of dissolved and particulate material derived from the surfaces that water may have made contact with after falling as rain.

It is not possible to tell whether water is of an appropriate quality by visual examination. Simple procedures such as boiling or the use of a household activated carbon filter are not sufficient for treating all the possible contaminants that may be present in water from an unknown source. Even

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natural spring water – considered safe for all practical purposes in the 1800s – must now be tested before determining what kind of treatment, if any, is needed. Chemical analysis, while expensive, is the only way to obtain the information necessary for deciding on the appropriate method of purification.

According to a 2007 World Health Organization report, 1.1 billion people lack access to an improved drinking water supply, 88% of the 4 billion annual cases of diarrheal disease are attributed to unsafe water and inadequate sanitation and hygiene, and 1.8 million people die from diarrheal diseases each year. The WHO estimates that 94% of these diarrheal cases are preventable through modifications to the environment, including access to safe water. Simple techniques for treating water at home, such as chlorination, filters, and solar disinfection, and storing it in safe containers could save a huge number of lives each year. Reducing deaths from waterborne diseases is a major public health goal in developing countries.

Sources of water

- **Groundwater**—The water emerging from some deep ground water may have fallen as rain many decades, hundreds, thousands or in some cases millions of years ago. Soil and rock layers naturally filter the ground water to a high degree of clarity before it is pumped to the treatment plant. Such water may emerge as springs, artesian springs, or may be extracted from boreholes or wells. Deep ground water is generally of very high bacteriological quality (i.e., pathogenic bacteria or the pathogenic protozoa are typically absent), but the water typically is rich in dissolved solids, especially carbonates and sulfates of calcium and magnesium. Depending on the strata through which the water has flowed, other ions may also be present including chloride, and bicarbonate. There may be a requirement to reduce the iron or manganese content of this water to make it pleasant for drinking, cooking, and laundry use. Disinfection may also be required. Where groundwater recharge is practised; a process in which river water is injected into an aquifer to store the water in times of plenty so that it is available in times of drought; it is equivalent to lowland surface waters for treatment purposes.
- **Upland lakes and reservoirs**—Typically located in the headwaters of river systems, upland reservoirs are usually sited above any human habitation and may be surrounded by a protective zone to restrict the opportunities for contamination. Bacteria and pathogen levels are usually low, but some bacteria, protozoa or algae will be present. Where uplands are forested or peaty, humic acids can colour the water. Many upland sources have low pH which require adjustment.
- ***Rivers, canals and low land reservoirs*—**Low land surface waters will have a significant bacterial load and may also contain algae, suspended solids and a variety of dissolved constituents.
- ***Atmospheric water generation***—is a new technology that can provide high quality drinking water by extracting water from the air by cooling the air and thus condensing water vapor.
- **Rainwater harvesting or fog collection**—which collects water from the atmosphere can be used especially in areas with significant dry seasons and in areas which experience fog even when there is little rain.
- **Desalination—**of seawater by distillation or reverse osmosis.

Treatment

The processes below are the ones commonly used in water purification plants. Some or most may not be used depending on the scale of the plant and quality of the water.

Pre-treatment

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- **Pumping and containment**—The majority of water must be pumped from its source or directed into pipes or holding tanks. To avoid adding contaminants to the water, this physical infrastructure must be made from appropriate materials and constructed so that accidental contamination does not occur.
- **Screening (see also screen filter)—**The first step in purifying surface water is to remove large debris such as sticks, leaves, trash and other large particles which may interfere with subsequent purification steps. Most deep groundwater does not need screening before other purification steps.
- **Storage—**Water from rivers may also be stored in bankside reservoirs for periods between a few days and many months to allow natural biological purification to take place. This is especially important if treatment is by slow sand filters. Storage reservoirs also provide a buffer against short periods of drought or to allow water supply to be maintained during transitory pollution incidents in the source river.
- **Pre-conditioning**—Water rich in hardness salts are treated with soda-ash (sodium carbonate) to precipitate calcium carbonate out utilizing the common-ion effect.
- **Pre-chlorination**—In many plants the incoming water was chlorinated to minimize the growth of fouling organisms on the pipe-work and tanks. Because of the potential adverse quality effects (see chlorine below), this has largely been discontinued.

Widely varied techniques are available to remove the fine solids, micro-organisms and some dissolved inorganic and organic materials. The choice of method will depend on the quality of the water being treated, the cost of the treatment process and the quality standards expected of the processed water.

Flocculation

Flocculation is a process which clarifies the water. Clarifying means removing any turbidity or color so that the water is clear and colorless. Clarification is done by causing a precipitate to form in the water which can be removed using simple physical methods. Initially the precipitate forms as very small particles but as the water is gently stirred, these particles stick together to form bigger particles - this process is sometimes called flocculation. Many of the small particles that were originally present in the raw water adsorb onto the surface of these small precipitate particles and so get incorporated into the larger particles that coagulation produces. In this way the coagulated precipitate takes most of the suspended matter out of the water and is then filtered off, generally by passing the mixture through a coarse sand filter or sometimes through a mixture of sand and granulated anthracite (high carbon and low volatiles coal). Coagulants / flocculating agents that may be used include:

1. **Iron (III) Hydroxide**—This is formed by adding a solution of an iron (III) compound such as iron(III) chloride to pre-treated water with a pH of 7 or greater. Iron (III) hydroxide is extremely insoluble and forms even at a pH as low as 7. Commercial formulations of iron salts were traditionally marketed in the UK under the name Cuprus.
2. **Aluminium Hydroxide—**This is also widely used as the flocculating precipitate although there have been concerns about possible health impacts and mis-handling led to a severe poisoning incident in 1988 at Camelford in south-west UK when the coagulant was introduced directly into the holding reservoir of final treated water.
3. **PolyDADMAC**—is an artificially produced polymer and is one of a class of synthetic polymers that are now widely used. These polymers have a high molecular weight and form very stable and readily removed flocs, but tend to be more expensive in use**.**

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Sedimentation
Water exiting the flocculation basin may enter the sedimentation basin, also called a clarifier or settling basin. It is a large tank with slow flow, allowing floc to settle to the bottom. The sedimentation basin is best located close to the flocculation basin so the transit between does not permit settlement or floc break up. Sedimentation basins can be in the shape of a rectangle, where water flows from end to end, or circular where flow is from the center outward. Sedimentation basin outflow is typically over a weir so only a thin top layer - furthest from the sediment - exits. The amount of floc that settles out of the water is dependent on the time the water spends in the basin and the depth of the basin. The retention time of the water must therefore be balanced against the cost of a larger basin. The minimum clarifier retention time is normally 4 hours. A deep basin will allow more floc to settle out than a shallow basin. This is because large particles settle faster than smaller ones, so large particles bump into and integrate smaller particles as they settle. In effect, large particles sweep vertically through the basin and clean out smaller particles on their way to the bottom.

As particles settle to the bottom of the basin, a layer of sludge is formed on the floor of the tank. This layer of sludge must be removed and treated. The amount of sludge that is generated is significant, often 3%-5% of the total volume of water that is treated. The cost of treating and disposing of the sludge can be a significant part of the operating cost of a water treatment plant. The tank may be equipped with mechanical cleaning devices that continually clean the bottom of the tank or the tank can be taken out of service when the bottom needs to be cleaned.

Filtration
After separating most floc, the water is filtered as the final step to remove remaining suspended particles and unsettled floc. The most common type of filter is a rapid sand filter. Water moves vertically through sand which often has a layer of activated carbon or anthracite coal above the sand. The top layer removes organic compounds, which contribute to taste and odour. The space between sand particles is larger than the smallest suspended particles, so simple filtration is not enough. Most particles pass through surface layers but are trapped in pore spaces or adhere to sand particles. Effective filtration extends into the depth of the filter. This property of the filter is key to its operation: if the top layer of sand were to block all the particles, the filter would quickly clog.

To clean the filter, water is passed quickly upward through the filter, opposite the normal direction (called **backflushing or backwashing**) to remove embedded particles. Prior to this, compressed air may be blown up through the bottom of the filter to break up the compacted filter media to aid the backwashing process; this is known as *air scouring*. This contaminated water can be disposed of, along with the sludge from the sedimentation basin, or it can be recycled by mixing with the raw water entering the plant.

Some water treatment plants employ pressure filters. These work on the same principle as rapid gravity filters, differing in that the filter medium is enclosed in a steel vessel and the water is forced through it under pressure.

Advantages:
- Filters out much smaller particles than paper and sand filters can.
- Filters out virtually all particles larger than their specified pore sizes.

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- They are quite thin and so liquids flow through them fairly rapidly.
- They are reasonably strong and so can withstand pressure differences across them of typically 2-5 atmospheres.
- They can be cleaned (back flushed) and reused.

Membrane filters are widely used for filtering both drinking water and sewage (for reuse). For drinking water, membrane filters can remove virtually all particles larger than 0.2 um—including Giardia and cryptosporidium. Membrane filters are an effective form of tertiary treatment when it is desired to reuse the water for industry, for limited domestic purposes, or before discharging the water into a river that is used by towns further downstream. They are widely used in industry, particularly for beverage preparation (including bottled water). However no filtration can remove substances that are actually dissolved in the water such as phosphorus, nitrates and heavy metal ions.

Other mechanical and biological techniques

In addition to the many techniques used in large-scale water treatment, several small-scale, less (or non)-polluting techniques are also being used to treat polluted water. These techniques include those based on mechanical and biological processes. An overview:

- **Mechanical Systems**—sand filtration, lava filter systems and systems based on UV-radiation)
- **Biological Systems**—
  - plant systems as constructed wetlands and treatment ponds (sometimes incorrectly called reedbeds and living walls) and
  - compact systems as activated sludge systems, biorotors, aerobic biofilters and anaerobic biofilters, submerged aerated filters, and biorolls

In order to purify the water adequately, several of these systems are usually combined to work as a whole. Combination of the systems is done in two to three stages, namely primary and secondary purification. Sometimes tertiary purification is also added.

Disinfection

Disinfection is accomplished both by filtering out harmful microbes and also by adding disinfectant chemicals in the last step in purifying drinking water. Water is disinfected to kill any pathogens which pass through the filters. Possible pathogens include viruses, bacteria, including *Escherichia coli*, *Campylobacter* and *Shigella*, and protozoa, including *Giardia lamblia* and other cryptosporidia. In most developed countries, public water supplies are required to maintain a residual disinfecting agent throughout the distribution system, in which water may remain for days before reaching the consumer. Following the introduction of any chemical disinfecting agent, the water is usually held in temporary storage - often called a contact tank or clear well to allow the disinfecting action to complete.

Chlorine Disinfection

The most common disinfection method involves some form of chlorine or its compounds such as chloramine or chlorine dioxide. Chlorine is a strong oxidant that rapidly kills many harmful micro-organisms. Because chlorine is a toxic gas, there is a danger of a release associated with its use. This problem is avoided by the use of sodium hypochlorite, which is a relatively inexpensive solution that releases free chlorine when dissolved in water. Chlorine solutions can be generated on site by electrolyzing common salt solutions. A solid form, calcium hypochlorite exists that releases chlorine

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on contact with water. Handling the solid, however, requires greater routine human contact through opening bags and pouring than the use of gas cylinders or bleach which are more easily automated. The generation of liquid sodium hypochlorite is both inexpensive and safer than the use of gas or solid chlorine. All forms of chlorine are widely used despite their respective drawbacks. One drawback is that chlorine from any source reacts with natural organic compounds in the water to form potentially harmful chemical by-products trihalomethanes (THMs) and haloacetic acids (HAAs), both of which are carcinogenic in large quantities and regulated by the United States Environmental Protection Agency (EPA) and the Drinking Water Inspectorate in the UK. The formation of THMs and haloacetic acids may be minimized by effective removal of as many organics from the water as possible prior to chlorine addition. Although chlorine is effective in killing bacteria, it has limited effectiveness against protozoa that form cysts in water (*Giardia lamblia* and *Cryptosporidium*, both of which are pathogenic).

Various portable methods of disinfection

Available for disinfection in emergencies or in remote locations. Disinfection is the primary goal, since aesthetic considerations such as taste, odour, appearance, and trace chemical contamination do not affect the short-term safety of drinking water.

Solar water disinfection

One low-cost method of disinfecting water that can often be implemented with locally available materials is solar disinfection (SODIS). Unlike methods that rely on firewood, it has low impact on the environment.

One recent study has found that the wild Salmonella which would reproduce quickly during subsequent dark storage of solar-disinfected water could be controlled by the addition of just 10 parts per million of hydrogen peroxide.

Additional treatment options

- **Water Fluoridation**—in many areas fluoride is added to water with the goal of preventing tooth decay. Fluoride is usually added after the disinfection process. In the U.S., fluoridation is usually accomplished by the addition of hexafluorosilicic acid, which decomposes in water, yielding fluoride ions.
- **Water Conditioning**—This is a method of reducing the effects of hard water. Hardness salts are deposited in water systems subject to heating because the decomposition of bicarbonate ions creates carbonate ions that crystallise out of the saturated solution of calcium or magnesium carbonate. Water with high concentrations of hardness salts can be treated with soda ash (sodium carbonate) which precipitates out the excess salts, through the common-ion effect, producing calcium carbonate of very high purity. The precipitated calcium carbonate is traditionally sold to the manufacturers of toothpaste. Several other methods of industrial and residential water treatment are claimed (without general scientific acceptance) to include the use of magnetic or/and electrical fields reducing the effects of hard water.
- **Plumbosolvency Reduction**—In areas with naturally acidic waters of low conductivity (i.e surface rainfall in upland mountains of igneous rocks), the water may be capable of dissolving lead from any lead pipes that it is carried in. The addition of small quantities of phosphate ion and increasing the pH slightly both assist in greatly reducing plumbo-solvency by creating insoluble lead salts on the inner surfaces of the pipes.
- **Radium Removal**—Some groundwater sources contain radium, a radioactive chemical element. Typical sources include many groundwater sources north of the Illinois River in Illinois. Radium

can be removed by ion exchange, or by water conditioning. The back flush or sludge that is produced is, however, a low-level radioactive waste.

- **Fluoride Removal**—Although fluoride is added to water in many areas, some areas of the world have excessive levels of natural fluoride in the source water. Excessive levels can be toxic or cause undesirable cosmetic effects such as staining of teeth. Flouride is also a known carcinogen. One method of reducing fluoride levels is through treatment with activated alumina.

Other water purification techniques

Other popular methods for purifying water, especially for local private supplies are listed below. In some countries some of these methods are also used for large scale municipal supplies. Particularly important are distillation (de-salination of seawater) and reverse osmosis.

- **Boiling—**Water is heated hot enough and long enough to inactivate or kill micro-organisms that normally live in water at room temperature. Near sea level, a vigorous rolling boil for at least one minute is sufficient. At high altitudes (greater than two kilometres or 5000 feet) three minutes is recommended.[18] In areas where the water is "hard" (that is, containing significant dissolved calcium salts), boiling decomposes the bicarbonate ions, resulting in partial precipitation as calcium carbonate. This is the "fur" that builds up on kettle elements, etc., in hard water areas. With the exception of calcium, boiling does not remove solutes of higher boiling point than water and in fact increases their concentration (due to some water being lost as vapour). Boiling does not leave a residual disinfectant in the water. Therefore, water that has been boiled and then stored for any length of time may have acquired new pathogens.
- **Granular Activated Carbon Filtering**—a form of activated carbon with a high surface area, adsorbs many compounds including many toxic compounds. Water passing through activated carbon is commonly used in municipal regions with organic contamination, taste or odors. Many household water filters and fish tanks use activated carbon filters to further purify the water. Household filters for drinking water sometimes contain silver as metallic silver nanoparticle. if water is held in the carbon block for longer period, microorganisms can grow inside which results in fouling and contamination. Silver nanoparticles are excellent anti-bacterial material and they can decompose toxic halo-organic compounds such as pesticides into non-toxic organic products.
- **Distillation**—involves boiling the water to produce water vapour. The vapour contacts a cool surface where it condenses as a liquid. Because the solutes are not normally vaporised, they remain in the boiling solution. Even distillation does not completely purify water, because of contaminants with similar boiling points and droplets of unvapourised liquid carried with the steam. However, 99.9% pure water can be obtained by distillation.
- **Reverse Osmosis**—Mechanical pressure is applied to an impure solution to force pure water through a semi-permeable membrane. Reverse osmosis is theoretically the most thorough method of large scale water purification available, although perfect semi-permeable membranes are difficult to create. Unless membranes are well-maintained, algae and other life forms can colonize the membranes.
- **Direct Contact Membrane Distillation (DCMD)—**Applicable to desalination. Heated seawater is passed along the surface of a hydrophobic polymer membrane. Evaporated water passes from the hot side through pores in the membrane into a stream of cold pure water on the other side. The difference in vapour pressure between the hot and cold side helps to push water molecules through.

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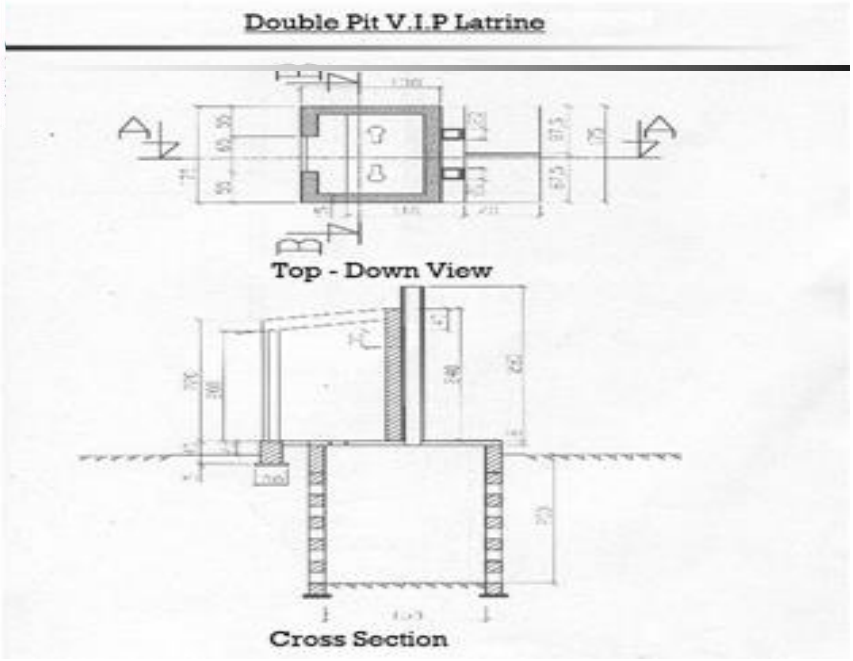
- **Gas Hydrate Crystals Centrifuge Method**—If carbon dioxide gas is mixed with contaminated water at high pressure and low temperature, gas hydrate crystals will contain only clean water. This is because the water molecules bind to the gas molecules at molecule level. The contaminated water is in liquid form. A centrifuge may be used to separate the crystals and the concentrated contaminated water.

The Management of Excrement

The Double Pit VIP Latrine

The Double Pit VIP (Ventilated Improved Pit) Latrine is composed of the following elements:

- A Superstructure which assures user privacy and protects against the elements. This rests for the most part over the pit so that the hole of defecation is visible directly from the interior of the cabin via a direct connection to the pit.
- A rectangular pit, divided into two compartments which are used alternatingly. In addition to its role of storage of fecal material, it supports superstructure and acts as a stable foundation. It is covered by two types of concrete slab covering:
- A slab for defecation and ventilation, with a hole for usage, under which are the chambers for waste storage
- Two slabs which cover the waste disposal pits and allow the empting of their contents when they reach capacity.
- Two chimneys for ventilation which are each connected with a compartment. They assure the aeration of the pits and dissipate the odors into the outside air. The mosquito netting placed at the top of each, prevents flies and mosquitos from entering or exiting the pit.



Advantages of Double Pit VIP Latrine

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- Construction and maintenance are simple
- Works with either toilet paper or water alone
- Requires very little water
- Minimum sanitation risk
- Permanent System
- Utilization of the contents of the pit can be done in total safety

Disadvantages of Double Pit VIP Latrine

- Waste is visible during use
- Difficult to construct in rocky soil
- Does not allow for recycling of waste water
- Essentially dark on the interior of the pit

Conditions Suitable for Construction for Double Pit VIP Latrine:

- Depth of the pit must be at least 3 m.
- It cannot be placed in an area which is not sufficient for digging another pit because another in the immediate area is full.
- There need not be a supply

Manual Flushing Double Pit Latrine

The Manual Flushing Double Pit Latrine is composed of the following elements:

- A superstructure which assures private usage and protection against the elements
- In the floor of the stall, there is installed a Turkish style toilet, furnished with a siphon at the base which receives urine and fecal material. The siphon ensures water pressure and hinders the odors from entering the stall and insects from entering into the pits.
- A note about the repartition which is a small valve usually situated behind the cabinet and which selects which 110 PVC pipe is fed by the toilet. It is here that the two 110 PVC which supply the pits come together. By adjusting the valve, a user can choose into which pit the waste is evacuated.
- The pits provide for the storage of fecal material and facilitate the digestion of the waste. The two pits can also be easily emptied for alternative use. They are cylindrical and covered by concrete slabs 8 cm thick.

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Interior of Manual Flush Latrine

Advantages of Manual Flush Latrine

- Does not require a great deal of water for removing fecal material
- Eliminates odors and impairs the reproduction of insects
- Contents of the pit are invisible
- Construction and maintenance are relatively simple
- Permanent System;
- Utilization of the contents of the pit can be done in total safety

Disadvantages of Manual Flush Latrine

- Does not allow for recycling of waste water
- The water must be drained from the pits once a year
- May clog with the usage of certain types of toilet papers
- Pollution risk for nearby sources of potable water (there must be a minimum distance between the pits and sources of potable water).

Conditions Suitable for Construction of Manual Flush Latrine

- Depth of the pit must be at least 3 meters
- It cannot be placed in an area which is not sufficient for digging another pit because another in the immediate area is full
- There needs to be a water supply on site in order to fill the tank.

EcoSan Technology

Ecological Sanitation is a technology for the cleaning and recycling urine for agricultural use. These products are recovered by a latrine which employs a different configuration that facilitates the separation of solid and liquid excreta.

The pits are constructed in such a way that they only recieve the fecal material. Furthermore, they are constructed above ground, which lowers the risk of groundwater contamination. The urine and the washwater are evacuated elsewhere.

Appendix F: WASH Activities

Double Pit Vietnamese Style Latrine

These toilets are constructed entirely above ground. The pit is constructed on a base. It consists of two treatment chambers. The pit is composed of one stall furnished with two holes for defecation which connect to the composting box, two ventilation holes, another hole which connects with a 20 liter bucket by a PVC pipe for the collection of urine, and a final hole which connects to a pump via a PVC pipe for the evacuation of wash water. Behind the pit, two openings are provided for the evacuation of the stored solid waste material. These openings are closed with bricks until the moment one of the compartments needs to be emptied. The urine is evacuated to the exterior of the toilet by a PVC pipe and collected in a 20 liter bucket housed at the site for later use. The wash water is drained away with a pump via a PVC pipe.

In this way, in the treatment chambers, there is not the need there to do anything to the waste. The contents will therefore be dry and compact by the time of their use. The superstructure of the Vietnamese latrine is constructed entirely above the level of the pit. One enters the structure by stairs connected to the entrance of the latrine. It is equipped with two chimneys for ventilation for above the ventilation holes and serves to dissipate the odors of the pit.

Advantages of Double Pit Vietnamese Style Latrine

- Permits the user to obtain quality compost on a regular basis
- It is not necessary to dig anything
- The construction cost is affordable
- Bad smells are minimized
- No flies
- One has the means of simultaneous use and compost generation by alternating between the two pits.

Disadvantages of Double Pit Vietnamese Style Latrine

- Because of the stairs, access can be difficult for the elderly and the sick
- It can be demanding to move following defecation, in the case that the system of anal washing is installed outside.

Conditions Suitable for Construction of Double Pit Vietnamese Style Latrine

- Areas where the excavation of the terrain is difficult due to the nature of the ground (rocks, hard soil, roots, etc.)
- Areas where the water table is elevated
- Designated protected rural market zones (Zones Rurales Maraîchères)
- Designated protected urban market areas (Zones Maraîchères Urbaines)
- Periurban areas where water is scarce or the yards of small houses where the soil is hard

Appendix G: French Glossary

Abcess – abcès
AIDS (Acquired Immunodeficiency Syndrome) – SIDA, syndrome immunodéficience aquise
Allergies – Troubles allergiques
Amenorrhea – Aménorrhée
Anemia – Anémie
Antenatal Care – Soins prénatal, **Prenatal Consultation –**Consultation prénatal
Anthropometry –L'anthropométrie
Antibody – Un anticorps
Antibioitics – Les Antibiotiques
Antigen – antigène
ARV (Antiretrovirals): Antirétrovirals
Amoebas - Les amibes
Artemisinin Combination Therapy (ACT) – Thérapie Artemisinin combiné
Bacteria – Une bactérie
Behavior Change Communications (BCC) – Communication pour le changement de comportement
Biostatistics – Biostatstatistiques
Birth Asphyxia –Asphyxie de naissaince
Blind - Aveugle
Blister - Ampoule
Blood - Le sang
Blood Pressure – Tension
Bronchitis - Bronchite
Breast Cancer – Cancer du sein
Breastfeeding – L'allaitement au sein/ l'allitement maternel
The Body - Le corps/ l'organisme
Bottle-feeding – L'allaitement au biberon
Cervical Cancer – Cancer du col de l'utérus
Cervix – Col de l'utérus
District Medical Officer of a District - Médecin Chef du District (MCD)
Chief medical administrator for the Region - Médecin Chef de Region (MCR)
Acute Respiratory Infection - Infections Respiratoire Aigues (IRA)
Chief Nurse at the Health Post Structure - Infirmière Chef de Post (ICP)
Chickenpox – Varicelle
ChildFund-led USAID funded Community Health Program Consortium Phase II - Programme Santé Communautaire (PSC Phase II)
Child Marriage – Marriage précoce
Colostrum –Colostrum
Community Health Worker -Agent Santé Communautaire (ASC) – Community Health Worker who has been trained in basic administration, management, and duties of a functioning health point.
Complementary Foods –Akunebts complémentaire
Complementary Feeding – Alimentation complémentaire
Cone Bioassays – Essai Scientifique
Conjunctivitis – Conjonctivite
Constipated – Constipé
Contraceptive Prevalence Rate – Taux de prevalence de contraception
Cough - Tousser
Cryotherapy – Cryotherapie
Deaf - Sourd
Dehydration – Déshydration
Diarrheal Disease - Diarrhée
Diet - Le régime
Digestive Tract – Le tube digestif
Disease Carrying Agents – Un agent pathogène
Dizzy - Vertige
Dried up- Desséché
Dry Mouth – La bouche desséchée
Dumb - Muet
Dysentery – La dysenterie
Ear Infection – Maladie d'oreille
Eclampsia – Éclampsie
Ectopic Pregnancy – Grossesse ectopique
Edema – Oedème
Elimination – Elimination
Endometrial Cancer – Cancer endomètral
Endometrium – Endomètre
Environmental Health Sciences – Sciences de santé de l'environnement
Enzyme – Enzyme
Epidemic: Épdémie
Epidemiology – Épidémiologie
Epithelial: Épithélial

Appendix G: French Glossary

Episiotomy - Épisiotomie
Essential Nutrition Actions – Actions Essentielles en Nutrition
Estrogen –Oestrogène, estrogène
Faint – S'évanouir (slang: 'Tomber dans les pommes')
Feeding/Nutrition – L'alimentation
Female Circumcision – L'excision
Fever – La fièvre
Fistula – Fistule
Food Security –Sécurité Alimentaire
Food –La norriture
Foods – Les aliments
Gardasil – Gardasil
Growth Monitoring – Suivi de croissance
Gonnorrhea – Blennorragie
Gourd Baby – Bébé gourde
Health Care Management and Policy – Gestion de services de santé
Health Hut – Case de Santé
Health Point – Case de Santé
Health Promotion – Promotion de santé
Height-for-Age – Longuer/taille pour âge
Hepatomegaly – Hépatomégalie
High-risk groups: Groupes à haute risque
HIV (Human Immunodeficiency Virus) : VIH **–** Virus de l'immunodéficience humaine
Human Papillomavirus (HPV) – Virus papillome humain (VPH)
Immediate and Exclusive Breast Feeding – Allaitement immediate et éxclusif
Indoor Residual Spraying –Pulvérisation Domestique
Infant Mortality Rate –Taux de mortalité infantile
Information, Education, Communication (IEC) – Information, Education, Communication (IEC)
Insecticide-treated nets (ITNs) –Moustiquaire Impregnée à Longue Durée (MILDA)
Insomnia - nsomnie
Integrated Community Case Management of Childhood Illnesses (iCCM) – Gestion des cas des maladies d'enfance au niveau communautaire
Intestinal Worms – Les vers intestinaux
Intermittent Preventative Treatment (IPTp) **–** Traitement préventif intermittent du paludisme pendant la grossesse
Intravenous – Intravenieux, intrveineuse
Intramuscular – Intramusculaire
Jaundice –Jaunisse
Keratinization: kératinisation
Kwashiorkor – Kwashiorkor, Carence en protides
Lactational Amenorrhea – Aménorrhée lactationale
Latching – s'accrocher à (The babies latch onto their mothers' breasts – Les bébés s'accrochent aux seins de leurs mères)
Leprosy - Lèpre
Liquid – Un Liquide
Liquid Stools – Les selles liquids
Long-Lasting Insecticide Treated Nets (LLIN) – Moustiquaire Impregnée à Longue Durée (MILDA)
Loss of Water – La perte d'eau
Malaria - Paludisme
Malaria Early Treatment Theory – Theorie de traitement tôt de paludisme
Malnourished - Malnourri
Malnutrition – Malnutrition
Marasmus – Marasmus
Maternal Mortality Rate – Taux de mortalité maternelle
Medical Office - Cabinet Médicaux
Measles – Rougeole
Medicines – Les medicaments
Menarche – ménarche
Menopause –menopause
Menstrual Cycle – cycle menstrual
Men who have sex with men (MSM) – Les hommes qui ont les rapports sexuels avec les hommes (people use the acronymn 'MSM' in french as well
Mid-Upper Arm Circumference (MUAC) – Périmètre brachial (PB)
Midwife – Sage Femme
Millennium Development Goals – Objetifs du millénaire pour le développement
Minister of Health and Social Action - Ministère de Santé Publique et Action Sociale (MSP)

Appendix G: French Glossary

Moderate Acute Malnutrition (MAM) – Malnutrition modérée
Mother's milk (breast milk) – Le lait maternel
Mother-to-child transmission of HIV: transmission de VIH de la mère à l'enfant
Mucus – Le mucus
Mumps - Oreillons
Neonatal Mortality Rate – Taux de mortalité neonatal
A Nursing Baby – Le nourrisson
Nutrients - Les nutrients
Oral Rehydration Salts (ORS) – Sels de réhydratation (SRO)
Organisation non-gouvernementale (ONG) – Organisation non-gouvernementale ONG
Ovulation – Ovulation
Packet or Small bag – Un sachet
Parasite- Les parasites
Parasitemia – Parastemia
Partograph – Partographe
Placenta – Placenta
Pneumonia – Pneumonie
Postnatal Care – Soins postnatale, **Postnatal Consultation –** Consultation Postnatale
Postpartum – Post-partum
Postpartum Hemorrhage – Hémorragie post/partum
Pre-Eclampsia – Pré-éclampsie
Pre-Elimination: Pré-élimination
Premature Delivery – Accouchement premature
Prevalence: Prévalence
Primary Health Care – Soins de santé primaries (SSP) sont une stratégie sanitaire fortement basée sur la prevention et mise en oeuvre via la participation communautaire
Progesterone – progésterone
Progestin – progestin
Pus – Pus
Rapid Diagnostic Test (RDT) – Teste diagnostique rapide (TDR)
Rejection – La rejection
Registered Sex Worker: Travailleur/travailleuse de sexe déclaré/inscrit
Risk -Risque
Routine Distribution – Distribution de Routine
Schistosomiasis - Bilharziose
Sepsis – Sepsis
Severe Acute Malnutrition (SAM) – Malnutrition aiguë severe
Sickness - Maladie
Skin Sores - Plaies
STI (Sexually Transmitted Infection): Infection Sexuellement Transmissible (IST)
Skilled Birth Attendant – Matrone, sage femme
Skin-to-Skin Contact – Contacte peau-à-peau
Sneeze - Éternuer
Splenomegaly – Spénomégalie
Stunting – retard de croissance (due à la malnutrition)
Stools – Les selles
Sulfadoxine-Pyrimethamine (SP) – SUlfadoxine-Pyrimethamine (SP)
Sulfamides – Les sulfamides
Sunken eyes –Les yeux cernés
Sunken soft spot – La fontanelle efoncée
Swallow or Mouthful – Une petite gorge
Swollen - Gonflé
Syphilis - Syphilis
Tablespoon – Une cuillère à soupe
Teaspoon – Une cuillère à café
Tetanus – Tétanos
To advise, recommend – Conseiller
To advise against – Déconseiller
To be in labor – Travailler
To be pregnant – Être en état de grossesse
To be stuffed up – Être erhumé
To bleed - Saigner
To dehydrate, to become dehydrated – Déshydrater
To digest – Digérer
To eat – Manger
To evacuate, get rid of - Évacuer
To feed – Faire manger
To fight – Lutter
To give birth – accoucher
To lead to, to cause - Entraîner
To lose – Perdre
To nurse – Allaiter
To prevent – Prévenir
To risk, to run the chance of – Risquer

Appendix G: French Glossary

To swallow – Avaler
To sweat - Transpirer
To urinate – uriner
To weaken - Affaiblir
To worsen – Aggraver
To weigh - Peser
Total Fertility Rate – Taux de fécondité
Universal Coverage – Couverture universelle
Unmet Need for Family Planning – Besoin non satisfait pour le planning familial
Uterus – Utérus
Virus – Un virus
Vomiting - Vomissement
Wasting – Débilitant
Watery - Aqueuse
Weight-for-Age – Poids-pour-âge
Weight-for-Height – Poids pour longueur/hauteur/taille
Weight loss – Une perte de poids
Whooping Cough - Coqueluche
The World Health Organization (WHO) – L'Organisation Mondiale de Santé (OMS)