CATALOGUE OF KEY EYE HEALTH INDICATORS IN THE AFRICAN REGION

World Health Organization
REGIONAL OFFICE FOR Africa

Catalogue of key Eye Health indicators in the African Region

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Background

In the past two decades, the pattern of blinding and vision-impairing eye diseases in Africa has shifted significantly. Socioeconomic development, improved living standards as well as concerted public health actions in many societies have resulted in substantial reduction of exposure to specific risk factors, and in greater control of major communicable causes of visual impairment, such as trachoma and onchocerciasis. Collaborative efforts, and a renewed momentum resulting also from the implementation of VISION 2020—The Right to Sight, an international initiative, has led to lessening the number of people with sight-threatening eye conditions. Based on the WHO Global data on Visual Impairment (2010), the greatest decrease in magnitude of Visual Impairment (VI) was estimated to be in the African Region[1].

This decline is related to increased socioeconomic development, but it is also the direct consequence of investments and interventions by governments and international partners. Despite this, Africa is still home to 32 million visually-impaired people, and the rapid growth of its ageing population urges governments and international partners to reinforce eye health systems in order to adequately meet current and future needs. Indeed, cataract, a completely curable blinding disease is still the leading cause of blindness in the world and throughout Africa, representing 50% or more of all causes. There is an estimated significant backlog of un-operated cases due to various causes, among which is the inability of health systems to cope with demand for eye-care services; added to this are the significant socio economic and cultural barriers that affect access to health services where available.

While it is essential to continue efforts at eliminating communicable eye diseases as causes of visual impairment and blindness, the challenge emerging in Africa now is providing eye-care services for managing chronic eye diseases. Unless additional eye-care services are made available to people in need, the number of those suffering from avoidable vision loss, due to chronic eye diseases, will rise thereby reducing education and employment opportunities, and sometimes hindering social interactions of those affected.

In order to avoid visual impairment at community level, it is necessary for primary eye-care services to be strengthened. At national level, provision of adequate eye-care services requires development of specific human resource skills, technology and infrastructure. Further development of high-quality, sustainable, affordable, equitable, and comprehensive eye-care services as an integral part of national health systems is needed.

Successful implementation of VISION 2020 in Africa has led to increased sensitization and awareness about eye health. Increasing literacy rates will, probably, also lead to enhanced access to general education and therefore to expected heightened consciousness about the importance of maintaining a good eye health in general above and beyond blinding conditions. In order to ensure adequate monitoring of eye-care system provision at different levels of the health system, as well as in different countries of the Region, it is crucial to develop effective, standardized, user-friendly, inexpensive tools to monitor needs, performances and gaps. Having standardized and clearly-defined indicators will allow comparisons to be made on clinical quality measures, human resource availability and performance, patient outcomes, and financial and operational statistical data.

Selection Criteria

AND RATIONALE OF THE AFRICAN REGION EYE HEALTH INDICATORS

In order to assess trends in the prevalence and causes of visual impairment, including blindness, to measure progress made by Member States in preventing visual impairment, including blindness, and to monitor implementation of the Global Action Plan 2014-2019 for a universal eye health[2], a set of core process and outcome indicators has been identified and defined as relevant for the African Region.

These performance indicators provide quantitative measurable achievements reached within a specific timeframe, and constitute a valuable tool for identifying trends, informing decision-making and policy, and evaluating implementation of various interventions. They will complement other measures of public health objectives expressed in terms of disease reduction or public health improvements.

The majority of Eye Health Indicators in this catalogue are derived primarily from two existing WHO documents on prevention of blindness and visual impairment. The first source is the framework and indicators developed by the WHO for monitoring VISION 2020—The Right to Sight in 2002, which were revised towards end 2006 for inclusion in the Global Initiative for the Elimination of Avoidable Blindness: action plan 2006-2011[3]. The second source is the Global Action Plan 2014-2019[2], endorsed by the 66th World Health Assembly in May 2013 as part of Resolution WHA66.4. The current Global Action Plan aims to sustain and expand efforts by Member States, the Secretariat and international partners to further improve eye health.

Key indicators of the Global Action Plan are included in this catalogue and are complemented with additional indicators included in the catalogue to measure health service provision in the African regional context. Development of indicators should be a dynamic process that evolves accordingly, in response to a changing operating environment.

Indicators were selected because they meet all or some of the following criteria:

- worth measuring;
- measurable for diverse populations;
- understood by people who need to act;
- useful to stimulate action;
- relevant to policy and practice;
- measurement over time will reflect results of taken actions;
- feasible to collect and report;
- comply with national processes of data gathering.

Indicators in this catalogue are grouped into 3 categories set out in the Global Action Plan 2014-2019:

Indicators in this catalogue are grouped into 3 categories set out in the Global Action Plan 2014-2019:

- Indicators for trends in the magnitude and causes of visual impairment;
- Indicators to monitor develop-ment and implementation of integrated national eye health policies, plans, programmes and eye-care services to enhance universal eye health with activities in line with WHO's framework for action for strengthening health systems to improve health outcome;
- Indicators to address multi-sectoral engagement and effective partnerships to strengthen eye health.

Following the first draft of this selection, input/feedback was sought from experts and stakeholders for further assessment and refinement of indicators; and so subsequent shortlisting of indicators took this input into consideration. Refinement measured selected indicators against criteria to ascertain whether the Set:

Refinement measured selected indicators against criteria to ascertain whether the Set:
• Covers the spectrum of eye health; • Provides indications on areas for improvement; • Identifies and responds to new and emerging issues; • Reflets a balance of indicators for all appropriate parts of the operating frameworks capable of leading change.

In September 2013, another review and revision panel of experts meeting was held. At this meeting, the draft catalogue was examined; the indicators were aligned to the African Health Observatory data warehouse, to global blindness indicators, to the current global action plan as well as to existing databases such as the IAPB data base. Indicators under objectives 2 and 3 above were also aligned to the WHO Health Systems Framework, taking into consideration the New Sustainable Development Agenda.

Countries may, individually, develop their own set of indicators, based on priorities and resources; however, in order to track progress globally and regionally, data and information collection needs to be standardized. These indicators for the African Region will assist countries to report in a standardized format.

Structure of selection of indicators

Selection of indicators is based on the format of WHO Catalogue of Health Indicators (1996) and the African Health Observatory where each indicator description includes the:

Structure
• Title; • Rationale: A brief description of the purpose of each indicator; • Definition: The indicator is described textually or by describing the numerator and denominator;

Structure - Cont'd

- Underlying definition: Description of specific terms which have a specific meaning in the context of the indicator;
- Measurement methods and data sources: The recommended data collection methods for the indicator;
- Use of the Indicator: How the indicator is used at facility, regional or national level;
- Limitations: Issues the indicator may not address adequately;
- Frequency: How often the indicator information is updated.

The selected indicators fall into the three major categories described above.

1. Indicators for trends in the magnitude and causes of visual impairment (5)

1.1 Prevalence of visual impairment, including blindness, at country level;

1.2 Prevalence of blindness at country level;

1.3 Prevalence of visual impairment, including blindness, at country level, due to:

- Cataract
- Diabetic Retinopathy
- Glaucoma
- Uncorrected Refractive Errors
- Paediatric eye diseases
- Blinding trachoma

1.4 Number of districts in the country where blinding trachoma is a public health problem;

1.5 Number of onchocerciasis endemic communities identified and stratified.

Please provide the source of information (reference to published paper, report, etc...) for each indicator.

2. Indicators to monitor development and implementation of integrated national eye health policies, plans, programmes and eye-care services in line with WHO's framework for action for strengthening health systems (25)

Human Resources for Eye Health (3)

Human resources have to be certified by national institutions based on government-approved certification criteria.

2.1 Number of ophthalmologists active at country level;

2.2 Number of Allied Eye Health Professionals (ophthalmic nurses, opticians, orthoptists, ophthalmic and optometric assistants or technicians, etc...) at country level;

2.3 Number of optometrists at country level;

Please provide the source of information (Ministry of Health – MoH, national institution) for each indicator.

Service Delivery (13)

2.4 Number of cataract surgeries performed in the previous year;

2.5 Cataract surgical rate at national level (# of cataract surgeries performed per million population);

2.6 Cataract surgical coverage at national level (proportion of people with unilateral or bilateral cataract who underwent surgery in the previous year);

2.7 Number of cataract operated people with Visual Acuity >6/18 in the operated eye in the previous year;

2.8 Number of public health facilities at country level that dispense spectacles (glasses) for managing refractive errors;

2.9 Number of centres offering paediatric ophthalmology services in the country;

2.10 Number of centres providing laser treatment for diabetic retinopathy;

2.11 Number of centres which have a functioning visual field perimeter for glaucoma;

2. Indicators to monitor development and implementation of integrated national eye health policies, plans, programmes and eye-care services in line with WHO's framework for action for strengthening health systems (25) - contn'd

Service Delivery (13)

2.12 In endemic countries, proportion of endemic communities covered by the SAFE strategy;

2.13 In endemic countries, geographic ivermectin coverage of total area;

2.14 In endemic countries, therapeutic ivermectin coverage rate of total population at high risk of onchocerciasis;

2.15 Is Primary Eye Care part of the Primary Health Care programme?

2.16 Does the national programme for Community Health Workers include eye health?

Health Information (1)

2.17 Number of patient consultations for eye diseases in the country per year;

Health Financing (1)

2.18 Do budgetary appropriations for Eye Health exist at MoH level?

Consumables and Technology (2)

2.19 Number of eye care drugs included in the essential medicines list; *

2.20 Intraocular lens implantation rate: Proportion of all cataract operations performed with intraocular lens implantation in the previous year;

**Please provide a copy of the last updated essential medicines list.*

Leadership and Governance (5)

2.21 Does the country have a national coordinator/focal person for Eye Health?

2.22 Is there a National Prevention of Blindness/Eye Health plan endorsed by the Ministry of Health?

2.23 If yes, is the National Prevention of Blindness/Eye Health plan implemented at country level?

2.24 Number of meetings of the Prevention of Blindness/Eye Health committee, led by Ministry of Health or with the participation of MoH representative, and held in the previous year;

2.25 Observance of World Sight Day with recognition from MoH or other governmental institutions.

3. Indicators to address multisectoral engagement and effective partnerships to strengthen eye Health (2)

3.1 Number of international partners and alliances supporting eye care in the country; *

3.2 Is the National Eye Health plan/strategy compliant with the current National Health Strategic Plan?

** Please provide a list of partners and alliances supporting eye care in the country.*

Indicator Descriptions

Indicator Descriptions

1. Indicators for trends in the magnitude and causes of visual impairment

   1.1 **Prevalence** of visual impairment, including blindness, at country level

Rationale	The World Health Organization (WHO), in 2010 released new estimates of visual impairment worldwide (based on data from 2008), refractive error included: 245.5 million with low vision and 39.8 million with blindness; thus total visual impairment is 285.3 million[1]. While these estimates are not yet final and may need minor adjustments, they indicate a significantly lower level of blindness than would have been expected, considering that the percentage of the population over age 50 (the population most vulnerable to visual impairment) is estimated to have grown by 18% between 2004 and 2008. The previous WHO estimate for total visual impairment was 314 million people with 45 million blind, so the new estimate represents a 9.23% decline. This is very positive news. Regular monitoring through surveys is needed to provide the most accurate estimates globally.
Definition	Regional and **national prevalence of visual impairment** disaggregated by age, gender and socioeconomic status.
Underlying definition	Blindness: Presenting visual acuity < 3/60 in the better eye. Low vision: Presenting visual acuity < 6/18 but ≥ 3/60 in the better eye.
Measurement methods and data sources	Estimates from surveys or rapid assessments given, as ***absolute numbers*, then divided by the total of country population used as denominator data (source: UN Census data) expressed as a percentage of the number of cases per 100 000 population.**
Use of the Indicator	To identify the magnitude of the problem of visual-impairing eye diseases. This information is crucial for resource allocation, planning, and developing synergies with other programmes.
Limitations	Requires population-based studies, some of which are of limited generalizability.
Frequency	Nationally, at least every five (5) years.

1.2 **Prevalence** of blindness at country level

Rationale	The World Health Organization (WHO), in 2010 released new estimates of visual impairment worldwide (based on data from 2008), refractive error included: 39.8 million people worldwide are affected by blindness[1]. While these estimates are not yet final and may need minor adjustments, they indicate a significantly lower level of blindness than would have been expected, considering that the percentage of the population over age 50 (the population most vulnerable to visual impairment) is estimated to have grown by 18% from 2004 to 2008.The previous WHO estimate for blindness was 45 million people, so the new estimate represents a 13% decline. This is very positive news. Regular monitoring through surveys is needed to provide the most accurate estimates globally.
Definition	Regional and **national prevalence of blindness** disaggregated by age, gender and socioeconomic status.
Underlying definition	Blindness: Presenting visual acuity < 3/60 in the better eye.
Measurement methods and data sources	Estimates from surveys or rapid assessments, given as ***absolute numbers*, then divided by the total of the country population used as denominator data (source: UN Census data) expressed as a percentage of the number of cases per 100 000 population.**
Use of the Indicator	To identify the magnitude of the problem of blinding eye diseases. This information is crucial for resource allocation, planning, and developing synergies with other programmes.
Limitations	Requires population-based studies, some of which are of limited generalizability.
Frequency	Nationally, at least every five (5) years.

1.3 **Prevalence of visual impairment,** including blindness, at country level, due to: Cataract or diabetic retinopathy or glaucoma or uncorrected refractive errors or paediatric eye diseases or blinding trachoma

Rationale	In the very low-income and low-income countries, and in particular in Sub-Saharan Africa, the causes of avoidable blindness are: Cataract, diabetic retinopathy glaucoma, uncorrected refractive errors, childhood blindness, and blinding trachoma.[1,4] With today's knowledge and technology, up to 80% of global blindness is preventable or treatable. Cost-effective interventions are available for the major causes of avoidable blindness. Determining the causes and magnitude of blindness is necessary for setting priorities, designing targeted strategies and establishing international blindness-prevention cooperation and alliances.
Definition	Regional and **national prevalence of visual impairment** disaggregated by disease.
Underlying definition	Presenting visual acuity < 6/18 in the better eye.
Measurement methods and data sources	Regional and ***national numbers of visually impaired persons due to avoidable causes*, divided by the total of the country population used as denominator data (source: UN Census data) expressed as a percentage of the number of cases per 100 000 population.**
Use of the Indicator	Monitoring of trends, public relations and advocacy.
Limitations	Limited accuracy.
Frequency	Nationally, at least every five (5) years.

1.4 **Number of districts** in the country where blinding trachoma is a public health problem

Rationale	Chlamydia trachomatis causes trachoma, which is the commonest infectious cause of blindness. Children who have the active stages of the disease are the reservoir of infection, while blindness, which occurs after repeated episodes of infection, principally affects adults. Trachoma is endemic in 30 countries in the WHO African Region and reports need to be constantly updated. Since 1997, when the WHO Alliance for the Global Elimination of Blinding Trachoma (GET 2020) was created, intersectoral collaboration is growing, and use of the SAFE strategy for eliminating the disease is increasing.[5] GET 2020 is active at the global level. It is an international partnership, bringing together WHO, national coordinators, nongovernmental organizations, donors and international experts, with support from the pharmaceutical industry. The GET 2020 secretariat is responsible for trachoma within the WHO department focusing on neglected tropical diseases. The WHO GET 2020 secretariat is also coordinating the drawing up of guidelines for validation of elimination of blinding trachoma, as requested by several WHO Member States.
Definition	**Number of districts** in the country (by category) in which blinding trachoma is a public health problem.
Underlying definition	**Number of endemic districts** for trachoma, as per WHO definition.
Measurement methods and data sources	***Absolute number*** from population-based surveys in endemic areas or rapid assessments from GET2020 initiative.
Use of the Indicator	To monitor elimination of trachoma as a cause of blindness.
Limitations	Data not available for some endemic countries.
Frequency	Annually from GET 2020 Alliance or every 3 years in endemic areas.

1.5 **Number of onchocerciasis endemic communities** identified and stratified

Rationale	Onchocerciasis is caused by infection with the filarial parasite Onchocerca volvulus, which is transmitted by the bite of the blackfly species. The vast majority of the 37 million infected people live in West, Central and East Africa, with smaller foci in Latin America and Yemen. Currently, about 300 000 people are blind from onchocerciasis. The first empirical evidence on the feasibility of onchocerciasis elimination with ivermectin treatment in Africa became available from studies in three onchocerciasis foci in Senegal and Mali. In each endemic focus there will be a need to evaluate progress towards elimination; generate evidence to support decision-making on stopping treatment, and ensure there is no recrudescence of transmission after cessation of treatment.
Definition	**Number of endemic communities** infected with or at risk for onchocerciasis in the region.
Underlying definition	Endemicity as defined by the African Programme for Onchocerciasis Control (APOC), which has adopted the technique known as the rapid epidemiological mapping of onchocerciasis (REMO), that provides data on the distribution and prevalence of onchocerciasis. Integration of the REMO data into a geographical information system (GIS) enables delineation of zones of various levels of endemicity.
Measurement methods and data sources	***Absolute number*** from the programmes for onchocerciasis control.
Use of the Indicator	As a starting point to evaluate progress towards elimination.
Limitations	Data not available from certain areas (e.g. those in conflict).
Frequency	Annual

2. Indicators to monitor development and implementation of integrated national eye health policies, plans, programmes and eye-care services in line with WHO's framework for action for strengthening health systems

Human Resources for Eye Health

2.1 **Number of ophthalmologists** active at country level

Rationale	The categories of health-care related personnel who provide eye care at different levels of the health-care system vary from country to country. Personnel required for comprehensive eye care include, not only health personnel, but also support staff, such as those in management and information technology. Africa continues to be the Region with the greatest need for human resource development, including for eye care. However, the targets set for Africa are, paradoxically, lower than for other regions: because of the smaller numbers in the health workforce generally, there is a limited pool from which trainees for eye care could be drawn. Ophthalmologists are the primary cadre that delivers medical and surgical eye care interventions.
Definition	**Number of ophthalmologists** per million population.
Underlying definition	Number of medical doctors certified as ophthalmologists by national institutions based on government-approved certification criteria. Ophthalmologists are medical doctors who have been trained in ophthalmic medicine and/or surgery and who evaluate and treat diseases of the eye.
Measurement methods and data sources	***Absolute number*** from the most recently updated registers of national professional and regulatory bodies and country reports.
Use of the Indicator	To assess availability of the eye health workforce in order to formulate a capacity-development response for strengthening national health systems.
Limitations	Numbers do not denote performance.
Frequency	Annual

2.2 **Number of Allied Eye Health Professional**s (ophthalmic nurses, opticians, orthoptists, ophthalmic and optometric assistants or technicians, etc...) at country level

Rationale	Professionals who provide vision care include ophthalmic nurses, orthoptists, ophthalmic and dispensing opticians, ophthalmic and optometric assistants or technicians, and mid-level eye-care personnel.
Definition	**Number of allied eye health professionals** per million population.
Underlying definition	Cadres as defined in country.
Measurement methods and data sources	***Absolute number*** from the most recently updated health management information system and country reports.
Use of the Indicator	To assess availability of the eye health workforce in order to formulate a capacity-development response for strengthening national health systems.
Limitations	Numbers do not denote performance.
Frequency	Annual

2.3 **Number of optometrists** at country level

Rationale	The categories of health-care and related personnel who provide eye care at different levels of the health-care system vary from country to country. In an increasing number of countries, optometrists are often the first point of contact for persons with eye diseases. To assess availability of the eye health workforce in order to formulate a capacity-development response for strengthening national health systems.
Definition	**Number of optometrists** per million population.
Underlying definition	Cadre as defined in country.
Measurement methods and data sources	***Absolute number*** from the most recently updated health management information system and country reports.
Use of the Indicator	To assess availability of the eye health workforce in order to formulate a capacity-development response for strengthening national health systems.
Limitations	Numbers do not denote performance.
Frequency	Annual

Service Delivery

2.4 **Number of cataract surgeries** performed in the previous year

Rationale	Globally, cataract (opacification of the lens) is the single most important cause of blindness, and cataract surgery has been shown to be one of the most cost-effective health-care interventions[6]. Most cataracts are related to ageing and cannot be prevented, but cataract surgery and insertion of an intraocular lens are highly effective, resulting in almost immediate visual rehabilitation. In well-managed eye units, high-quality, high-volume surgery is possible, one ophthalmologist being able to undertake 1000–2000 or more operations a year, as long as there are adequate support staff, infrastructure and patients who are able and willing to access the facilities.
Definition	**Number cataract operations** performed in the country per year.
Underlying definition	Cataract surgery.
Measurement methods and data sources	***Absolute number*** compiled from district and national data.
Use of the Indicator	Monitor trends, public relations and advocacy.
Limitations	Incomplete reporting (e.g. private sector).
Frequency	Annual

2.5 **Cataract surgical rate** at national level (# of cataract surgeries performed per million population)

Rationale	The cataract surgical rate—the number of cataract operations per million population per year—is a quantifiable measure of the delivery of cataract surgical services. It is meaningful, however, only when it includes all cataract operations performed in a country, including those in the private sector and during outreach, and when the population size and age structure can be defined.
Definition	**Number of cataract operations performed per million population** per year.
Underlying definition	Cataract surgery.
Measurement methods and data sources	***Absolute numbers*** of cataract operations and total population, by country, disaggregated (subnational).
Use of the Indicator	To identify countries in need of capacity-building, track trends in output, advocacy at national level.
Limitations	Incomplete reporting (e.g. private sector).
Frequency	Annual

2.6 **Cataract surgical coverage** at national level (proportion of people with unilateral or bilateral cataract who underwent surgery in the previous year)

Rationale	Cataract surgical coverage indicates the number of individuals with diagnosis of unilateral or bilateral cataract causing visual impairment, who have undergone cataract surgery on one or both eyes. In other words, the proportion who were eligible for surgery and who actually had it. This indicator is used to assess the degree to which cataract surgical services meet the need. Data are obtained from population-based surveys or rapid assessments.
Definition	**Proportion of people with diagnosis of cataract** (unilateral or bilateral) **who have undergone surgery** in one or both eyes (at 3/60 and 6/18 level).
Underlying definition	Proportion eligible for surgery who have undergone surgery.
Measurement methods and data sources	***Proportion*** *(Number of people operated/number of cataract-diagnosed people)* obtained from estimates from population-based surveys and national data on cataract output.
Use of the Indicator	To assess the degree to which cataract surgical services are meeting the need.
Limitations	Requires population-based studies, which are of limited generalizability.
Frequency	Annual

2.7 **Number of cataract operated people** with Visual Acuity >6/18 in the operated eye in the previous year

Rationale	Cataract (opacification of the lens) is the single most important cause of blindness, and cataract surgery has been shown to be one of the most cost-effective health-care interventions[6]. Most cataracts are related to ageing and cannot be prevented, but cataract surgery and insertion of an intraocular lens are highly effective, resulting in almost immediate visual rehabilitation. In well-managed eye units, high-volume and high-quality surgery is possible. The quality of the surgery is crucial to restore visual capacity and to implement the number of people requesting for the surgery.
Definition	**Number of operated eyes with a final VA >6/18** with or without spectacles.
Underlying definition	Number of eyes that have been operated on with objectively improved visual capacity of the patient.
Measurement methods and data sources	***Absolute number*** obtained from district and national data on cataract output.
Use of the Indicator	To assess the degree of quality of cataract surgical services.
Limitations	Incomplete reporting (e.g. private sector).
Frequency	Annual

2.8 **Number of public health facilities** at country level that dispense spectacles (glasses) for managing refractive errors

Rationale	Refractive errors (myopia, hypermetropia, astigmatism, and presbyopia) affect persons of all ages and ethnic groups, and are the main cause of vision impairment[1,4]. However, the task of meeting the needs of all of those with uncorrected refractive errors remains a monumental one. Refraction services are often only available in the private sector. Having prescription and dispensing of glasses within the public system would improve access and affordability for a larger number of patients.
Definition	**Number of centres** where patients can receive a pair of spectacles within public hospitals at all levels.
Underlying definition	Availability of spectacles (glasses) within public health facilities.
Measurement methods and data sources	***Absolute number*** obtained from health records from hospitals and Ministry of Health.
Use of the Indicator	To assess refraction service provision.
Limitations	Availability does not mean affordability or reflect utilisation of the service.
Frequency	Annual

2.9 **Number of centres offering paediatric ophthalmology** services in the country

Rationale	It has been estimated that there are 1.4 million blind children in the world, 1 million of whom live in Asia and 300 000 in Africa[7]. The prevalence ranges from 0.3/1000 children aged 0–15 years in high-income countries to 1.5/1000 children in very poor communities. Although the number of blind children is relatively low, they have a lifetime of blindness ahead, with an estimated 75 million blind-years, (number blind × length of life), second only to cataract. The main causes of blindness in children change over time. As a consequence of child survival programmes (for example, integrated management of childhood illness), corneal scarring due to measles and vitamin A deficiency is declining in many developing countries, while the proportion due to cataract is increasing. Limitations in provision of eye care for children include: • Inadequate population-based data on the prevalence and causes of blindness in children; • Lack of awareness among parents and the community about preventive measures and possible rehabilitation programmes; • Barriers to accessing services, including lack of awareness, distance, cost, fear and competing demands for scarce resources within the family; • Shortage of paediatric eye-care professionals and inadequate opportunities for training in paediatric ophthalmology in most low-income countries; • Fragmentation of paediatric eye-care services in many countries, so that children who need specialist expertise are managed by general ophthalmologists; and • Inadequate provision of special education for children with irreversible visual loss, particularly in low-income countries.
Definition	**Number of child eye-care centres** in the country.
Underlying definition	Child: age 0-15 years.
Measurement methods and data sources	***Absolute number*** from national reports and national population data.
Use of the Indicator	Track availability of services for the control of avoidable causes of childhood blindness.
Limitations	May not indicate geographical coverage.
Frequency	Annual

2.10 **Number of centres providing laser treatment** for diabetic retinopathy

Rationale	Diabetes Mellitus (DM) is associated with the development of a number of complications. One of these is the development of diabetic retinopathy, potentially resulting in blindness. Timely and appropriate care for people with diabetes can significantly reduce visual loss over time, improve patients' quality of life, and reduce the financial burden associated with the complications of visual impairment. Laser photocoagulation is the standard technique for treating diabetic retinopathy. In general, it is advised for patients with high-risk proliferative diabetic retinopathy, clinically significant macular oedema, or neovascularization of the anterior chamber angle. [8]
Definition:	**Number of centres offering photocoagulation** management services **for diabetic retinopathy.**
Underlying definition	Number of centres that have performed photocoagulation in the reporting period.
Measurement methods and data sources	***Absolute number*** of centres where laser services for diabetic retinopathy are available and functional, obtained from national reports.
Use of the Indicator	Measure availability and geographic coverage.
Limitations	Does not measure access.
Frequency	Annual

2.11 **Number of centres which have a functioning visual field perimeter** for glaucoma

Rationale	Glaucoma is not a single disease entity but a group of conditions characterized by damage to the optic nerve (detected by pathological cupping of the optic disc), and loss of the field of vision. Primary open-angle glaucoma is the more frequent type in the African Region. In many African countries, eye-care services lack the necessary equipment and expertise for diagnosing and managing glaucoma. Visual Field tests check the function of the Optic Nerve and can detect early deficits. Visual field testing is mandatory to confirm diagnoses and also useful for monitoring progression.
Definition	**Number of centres offering visual field testing for glaucoma.**
Underlying definition	Health facilities with a FUNCTIONAL automated visual field analyser.
Measurement methods and data sources	***Absolute number*** of centres where visual field services for glaucoma are available **and** functioning obtained from national reports.
Use of the Indicator	Proxy measure for quality of glaucoma management.
Limitations	Does not measure access and quality.
Frequency	Annual

2.12 In endemic countries, **proportion of endemic communities** covered by SAFE strategy

Rationale	The 10th Meeting of GET2020[9] adopted recommendations to facilitate implementation of the SAFE strategy; they included, among others: • Countries should develop their strategic five-year national trachoma plans, in collaboration with national and international partners, reflecting the commitment to implement the SAFE strategy (WHA Resolution 56.26); • WHO should design methods and tools for assessing the trachoma burden and for validating elimination of the disease; • Countries should endeavour to increase coverage of all the components of the SAFE strategy to the highest possible level; • Increased intersectoral collaboration should be instituted at national and district levels to ensure comprehensive implementation of all components of the SAFE strategy.
Definition	**Proportion of endemic communities covered by SAFE strategy.**
Underlying definition	Progress towards elimination.
Measurement methods and data sources	***Number of endemic communities covered by the SAFE Strategy / total number of endemic communities in the country*** (AIO/UIG) as per population-based surveys in endemic areas, or rapid assessment.
Use of the Indicator	To assess coverage and progress.
Limitations	Resources, socioeconomic development, environmental conditions.
Frequency	Annually at GET 2020 meetings or every three (3) years in endemic areas.

2.13 In endemic countries, **geographic ivermectin coverage** of total area

Rationale	Control measures for onchocerciasis entail larviciding of blackfly breeding sites, and treatment of endemic communities with the microfilaricide Mectizan® (ivermectin). Distribution of Mectizan® started in 1992 in 19 African countries. Progress has been made in reaching the ultimate treatment goal in most of these countries.
Definition	**Proportion of total population at risk receiving treatment annually with Mectizan®** defined as geographic coverage and therapeutic coverage.
Underlying definition	Geographic coverage target is 100%.
Measurement methods and data sources	***Proportion of total population at risk receiving treatment.***
Use of the Indicator	To assess coverage and progress.
Limitations	Resources, socioeconomic development, environmental conditions.
Frequency	Annual

2.14 In endemic countries, **therapeutic ivermectin coverage rate** of total population at high risk of onchocerciasis

Rationale	In onchocerciasis control, using mass treatment with ivermectin, coverage needs to be monitored regularly so that communities with poor or insufficient coverage can be identified for timely and appropriate interventions.
Definition	**Proportion of total population at risk receiving treatment annually with Mectizan®** defined as therapeutic coverage.
Underlying definition	Therapeutic coverage goal for Africa (APOC countries) is 65%
Measurement methods and data sources	***Proportion of total population at risk receiving treatment.***
Use of the Indicator	To assess coverage and progress.
Limitations	Resources, socioeconomic development, environmental conditions.
Frequency	Annual

2.15 Is **Primary Eye Care part of the Primary Health Care programme**?

Rationale	Primary Eye Care (PEC) is a frontline activity, providing care and identifying disease before it becomes a serious medical issue. Basic eye examination is carried out, with its scope varying from country to country, depending on the development of health services. It is crucial for prevention, treatment or referral of eye diseases. Primary eye care cannot be considered as a stand-alone activity but should be integrated into existing primary health care systems, and ideally be managed as a national programme.
Definition	**Number of countries** with a national policy and ongoing programme of integrating eye health into primary health care networks.
Underlying definition	National primary health care activities include Primary Eye Care.
Measurement methods and data sources	***Yes or No response*** from annual health reports.
Use of the Indicator	To identify countries in need of capacity-building, and for advocacy at national level.
Limitations	Does not measure level of implementation.
Frequency	Annual

2.16 Does the **national programme for Community Health Workers** include eye health?

Rationale	Community Health Workers (CHW's) form a vital link between formal health services and the community. They have logistical, administrative, and eye health duties. Logistical tasks include coordinating screening schedules, home visitations, and keeping patients informed of subsequent visits. Community Health Workers also arrange screening sites for outreach teams before arrival; inform community members about the time and location; and arrange transportation for surgeries and post-operative care. Administrative duties include keeping basic records of community visits, patients attended to and dates of visit. Community Health Workers must be able to identify basic eye conditions and refer these patients for examination and diagnoses to the nearest health facility or to the outreach team visiting the community. Community Health Workers also give appropriate basic hygiene education.
Definition	**Number of countries** with recorded strategies for integrating eye health into their Community Health Workers programme.
Underlying definition	Tasks of Community Health Workers include promoting eye health-related activities.
Measurement methods and data sources	***Yes or No response*** from annual health reports.
Use of the Indicator	To identify countries in need of capacity-building, and for advocacy at national level.
Limitations	Does not measure implementation.
Frequency	Annual

Health Information

2.17 **Number of patient consultations** for eye diseases in the country per year

Rationale	The spectrum of eye diseases experienced by a population may be termed 'ocular morbidity'. Ocular morbidity describes eye diseases that are either significant to the individual (the individual is concerned enough about the condition to seek care) or to professionals (an eye health professional determines that the individual would benefit from advice). Without adequate data, advocating for more efficient and responsive eye-care services is not possible. There is an urgent need to understand both the burden of ocular morbidity and health-seeking behaviour associated with these diseases in resource-poor settings. Such information is essential to support decision-making processes, shifting of care and planning of services which meet population needs.
Definition	**Number of patients** with eye problems **visited** at all health facilities.
Underlying definition	Patients presenting at health facilities because they have an eye problem.
Measurement methods and data sources	***Absolute number of visits for eye health problems*** obtained from national level reports derived from health facility and HMIS records.
Use of the Indicator	To monitor morbidity from eye conditions; and to monitor trends in increasing service delivery to the least served.
Limitations	Some HMIS systems may not include an indicator for eye conditions.
Frequency	Annual

Health Financing

2.18 Do **budgetary appropriations for Eye Health** exist at MoH level?

Rationale	In some countries, the impact of Health Assembly resolutions on allocation of new resources for development and implementation of blindness-prevention plans has fallen short of expectations. In most countries, action is slow and progress in implementing adequate blindness-prevention activities is limited. Governments have limited and often decreasing resources for eye health care. Furthermore, prevention of blindness is usually not seen as a priority, despite the evidence that restoration or preservation of sight is a cost-effective health intervention. Governments should be made aware of the benefits of preventing and curing blindness.
Definition	**Ministry of Health Budget includes budget for Eye Health.**
Underlying definition	Support for implementation and strengthening of activities for prevention of visual impairment.
Measurement methods and data sources	***Yes or No response*** with details.
Use of the Indicator	Marker of sustainability.
Limitations	Amount may vary.
Frequency	Annual

Consumables and Technology

2.19 **Number of eye care drugs** included in the essential medicines list

Rationale	Essential medicines, as defined by the World Health Organization, are "those drugs that satisfy the health-care needs of the majority of the population; they should therefore be available at all times in adequate amounts and in appropriate dosage forms, at a price the community can afford." Training of primary health care workers in primary health care should go hand in hand with providing these workers with the relevant drugs for conditions encountered at that level. Inclusion of eye drugs in the essential medicines list should be considered as an important first step for integration of Primary Eye Care into PHC.
Definition	Drugs needed by primary eye care workers to treat eye conditions at that level.
Underlying definition	Basic antibiotic drops and ointments, non-steroidal anti-allergy drugs, lubricants (i.e. eye drops or gel) as determined by country policies.
Measurement methods and data sources	***Numbered last updated list of drugs.***
Use of the Indicator	To improve primary eye care services.
Limitations	May not reflect availability.
Frequency	Annual

2.20 **Intraocular lens implantation rate:** Proportion of all cataract operations performed with intraocular lens implantation in the previous year

Rationale	There are two main surgical techniques for removing a cataract: Extracapsular cataract extraction and phacoemulsification. An intraocular lens (IOL), implanted after the cataract has been removed, is the optimal method of correcting the resultant aphakia (absence of the lens in the eye), as it eliminates the use of thick spectacles. Currently most cataract surgery in the world is extracapsular with IOL inserted. However, in pockets of African countries intracapsular cataract extraction (ICCE) is still practised. The level of ICCE in a country can be a proxy measure of poor cataract services. The target for intraocular lens implantation rate should be 100%.
Definition	**Proportion of all cataract operations with intraocular lens implantation.**
Underlying definition	Cataract surgery with intraocular lenses.
Measurement methods and data sources	***Proportion derived from absolute numbers*** of operated eyes with intraocular lenses implanted/cataract operations. Data obtained from district and national data on cataract output.
Use of the Indicator	Proxy measure of quality.
Limitations	Incomplete reporting, e.g. private sector.
Frequency	Annual

Leadership and Governance

2.21 Does the country have **a national coordinator/focal person for Eye Health**?

Rationale	WHO Member States are urged to establish and support national coordinating mechanisms, such as national coordinator posts for Eye Health and prevention of blindness at Health Ministries and other key institutions, as appropriate. The national Eye Care Coordinator is also responsible for networking and programme monitoring.
Definition	National Coordinator post exists in the country.
Underlying definition	Expert Ophthalmologist recognized by the MoH as the focal point of the National Eye Health programme.
Measurement methods and data sources	***Yes or No response,*** details.
Use of the Indicator	Identify countries in need of more advocacy and support at national level.
Limitations	Does not reflect performance.
Frequency	Annual

2.22 Is there a **National Prevention of Blindness/Eye Health plan endorsed** by the Ministry of Health?

Rationale	WHO Member States are urged to establish national plans and programmes for eye health and blindness prevention. National plans and programmes have to determine national targets; identify gaps; develop approaches; and plan activities and evaluation mechanisms to prevent avoidable blindness and visual impairment.
Definition	National plan/programme exists in the country.
Underlying definition	Recognition of Eye Health as a priority at country level.
Measurement methods and data sources	***Yes or No response***, details.
Use of the Indicator	Identify countries in need of more advocacy and support at national level.
Limitations	Does not reflect performance.
Frequency	3-5 years

2.23 If yes, is the **National Prevention of Blindness/Eye Health plan implemented** at country level?

Rationale	WHO Member States are urged to implement existing national plans and programmes for eye health and blindness prevention. National plans and programmes have to determine national targets; identify gaps; develop approaches; and plan activities and evaluation mechanisms to prevent avoidable blindness and visual impairment.
Definition	National plan/programme is implemented at country level, at least >50% of the targets or actions achieved.
Underlying definition	Recognition of Eye Health as a priority at country level.
Measurement methods and data sources	***Yes or No response***, details.
Use of the Indicator	Identify countries in need of more advocacy and support at national level.
Limitations	Does not reflect performance.
Frequency	3-5 years

2.24 **Number of meetings** of the Prevention of Blindness/Eye Health committee, led by Ministry of Health or with the participation of MoH representative, and held in the previous year

Rationale	It is important to establish national committees and programmes for eye health promotion and blindness prevention. Their role is to liaise with all key domestic and international partners, to share information and to coordinate such activities as implementing the national eye health and blindness-prevention plan. A functional national committee is a prerequisite for developing the national eye health/blindness-prevention plan and ensuring its implementation, monitoring and periodic assessment. Some countries, particularly those with decentralized or federated management structures, have similar committees at subnational level.
Definition	National committees are composed of MoH representatives; eye-care professionals; WHO country office representatives; nongovernmental organizations; civil society and the private sector; they plan, provide resources, implement and monitor in a coordinated manner.
Underlying definition	Any Technical Working group, National committee, Forum as defined by each country overseeing eye health in the country.
Measurement methods and data sources	***Absolute number of meetings*** that the committee holds per calendar year as reported by the committee.
Use of the Indicator	To enhance advocacy, mobilize resources, set priorities and increase implementation and coverage.
Limitations	Does not reflect willingness of partners to work together; or availability of resources.
Frequency	Periodic review of active committees.

2.25 **Observance of World Sight Day** with recognition from MoH or other governmental institutions

Rationale	In order to raise the profile, relevance and effectiveness of Eye Health promotion in key audiences and, in particular, among governments, bilateral and multilateral development agencies, eye-care professionals, corporate companies and other potential donors, the media and international nongovernmental development organizations observing 'World Sight Day' (held every year on the second Thursday in October) is particularly important.
Definition	National observation of World Sight Day (second Thursday in October) to enhance VISION 2020 advocacy and awareness.
Underlying definition	Any activity held nationally in commemoration of World Sight Day with the recognition of governmental institutions.
Measurement methods and data sources	***Yes or No response***, description of activities.
Use of the Indicator	Identify the number of countries that recognize World Sight Day.
Limitations	The actual effectiveness of communication might be limited.
Frequency	Annual

3. Indicators to address multisectoral engagement and effective partnerships to strengthen Eye Health

3.1 **Number of international partners and alliances** supporting eye care in the country

Rationale	Over the past decade, major international partnerships have been forged to assist WHO in providing support to Member States in their efforts to prevent blindness, such as "VISION 2020: the Right to Sight". The partnerships have made substantial progress, mostly in combating infectious causes of blindness. They have also encouraged and supported long-term resource mobilization, including donation programmes (e.g. the "Merck Donation Program" for ivermectin to control onchocerciasis, and distribution of azithromycin under a donation programme by Pfizer to control trachoma). Coordination and timely evaluation of work undertaken by international partners are required so that their approaches are aligned with other activities in the area of blindness prevention.
Definition	**Number and names** of international partners supporting eye care in the country.
Underlying definition	INGOs, International Cooperation Agencies, Bilateral donors.
Measurement methods and data sources	***Absolute number*** from country reports, with details.
Use of the Indicator	Coordination and identification of countries in need of support and available partners.
Limitations	Support is not uniform.
Frequency	Annual

3.2 Is the **National Eye Health plan/strategy** compliant with the current National Health Strategic Plan

Rationale	Experience has shown that, in low- and middle-income countries, a comprehensive national plan containing targets and indicators that are clearly specified, time-linked and measurable leads to substantially improved provision of eye health-care services. Eye-care services in Member States can best be improved if the Eye Health Plan is integrated and implemented through coordinated actions in the framework of a comprehensive strategy for the health-care system as a whole. Where appropriate, Eye Health plans should be included in broader noncommunicable and communicable disease frameworks, with the identification of appropriate interventions to contribute to poverty eradication.
Definition	Number of countries in which the plan has been made compliant or part of the National Health Strategic Plan.
Underlying definition	Eye health plans should be included in broader disease frameworks, with the identification of appropriate integrated approaches and interventions.
Measurement methods and data sources	***Yes or No response***, details.
Use of the Indicator	To assess whether eye health is engaged with the wider health, socioeconomic and political frameworks existing in the country.
Limitations	Difficult to evaluate success of the plan.
Frequency	Periodic review of existing plans being implemented.

References

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2. *Universal eye health: a global action plan 2014–2019, available at http://www.who.int/blindness/actionplan/en/*

3. *VISION2020: the Right to Sight. Global Initiative for the Elimination of Avoidable Blindness: action plan 2006-2011, available at www.who.int/blindness/Vision2020_report.pdf*

4. *WHO Magnitude and causes of blindness and visual impairment, available at http://www.who.int/mediacentre/factsheets/fs282/en/*

5. *WHA51.11 Global elimination of blinding trachoma. Tenth plenary meeting, 16 May 1998 - Committee A, fourth report , available at http://www.who.int/blindness/causes/WHA51.11/en/*

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9. *World Health Organization. 10th Meeting of GET 2020 report. Making progress towards the global elimination of blinding trachoma. Geneva, 2006.*

10. *World Health Organization: Ouagadougou Declaration on Primary Health Care and Health Systems in Africa: Achieving Better Health in Africa in the New Millennium. Brazzaville: WHO; 2008.*

Annexes

Annex 1

DEFINITION OF VISUAL IMPAIRMENT, LOW VISION AND BLINDNESS

- **Visual Impairment** includes low vision as well as blindness.

- **Low Vision** is defined as presenting visual acuity of less than 6/18, but equal to or better than 3/60 in the better eye with best possible correction (ICD-10 visual impairment categories 1 and 2).

- **Blindness** is defined as visual acuity of less than 3/60, or a corresponding visual field of less than 10 degrees from the point of fixation in the better eye with best possible correction (ICD-10 visual impairment categories 3, 4 and 5).

For the definition of visual impairment, low vision and blindness, please refer to:

International statistical classification of diseases, injuries and causes of death, 2016 (ICD-10): H54

Annex 2

DEFINITION AND CLASSIFICATION OF EYE DISEASES

Cataract

Definition

A cataract is a degradation of the optical quality of the crystalline lens (ICD-10 H25-28).

Classification and grading

The most common forms of cataract are:

- **Nuclear Cataract (NUC),** leading to a gradual opacification of the nucleus of the lens;
- **Cortical Catarct (COR),** involving the cortex from the periphery towards more central opacification, often with typical, wedge-shaped "spokes";
- **Posterior Subcapsular Cataract (PSC)**, giving rise to usually distinct opacities centrally or paracentrally on the posterior capsule.

For additional definitions and grading of the above-mentioned forms, please refer to the

WHO/PBL/01.81 – A Simplified Cataract Grading System.

Diabetic Retinopathy

Definition

Diabetic retinopathy (DR) is the specific microvascular complication of diabetes mellitus (DM), a global epidemic with significant morbidity.

Classification and grading

Diabetic retinopathy progresses in an orderly fashion from mild to severe stages when there is no appropriate intervention.

The main phases of DR are:

- **Nonproliferative Diabetic Retinopathy** is the early stage of diabetic retinopathy;
- **Proliferative Diabetic Retinopathy (PDR)** is a severe stage of diabetic retinopathy and represents an angiogenic response of the retina to extensive ischaemia and capillary closur.

Diabetic Macular Edema (DME) is an important complication that is assessed separately from the stages of retinopathy, since it can be associated with any of the diabetic retinopathy stages and can run an independent course.

The stages of diabetic retinopathy can be classified using the International Classification of Diabetic Retinopathy Scale shown in Table 1.

Table 1: International Classification of Diabetic Retinopathy (a) and Diabetic Macular Edema (b)

(a) International Classification of Diabetic Retinopathy

Diabetic Retinopathy	Findings observable on dilated Ophthalmoscopy
No apparent retinopathy	No abnormalities
Mild nonproliferative DR	Microaneurysms only
Moderate nonproliferative diabetic retinopathy	More than just microaneurysms, but less than severe nonproliferative DR
Severe nonproliferative DR	Any of the following: • Intraretinal haemorrhages (≥20 in each quadrant); • Definite venous beading (in 2 quadrants); • Intraretinal microvascular abnormalities (in 1 quadrant); • and no signs of proliferative retinopathy
Proliferative DR	Severe nonproliferative DR and 1 or more of the following: • Neovascularization • Vitreous/preretinal haemorrhage

(b) International Classification of Diabetic Macular Edema

Diabetic Macular Edema	Findings observable on dilated Ophthalmoscopy
DME absent	No retinal thickening or hard exudates in posterior pole
DME present	Retinal thickening or hard exudates in posterior pole
Mild DME	Retinal thickening or hard exudates in posterior pole but outside the central subfield of the macula (diameter 1000 µm)
Moderate DME	Retinal thickening or hard exudates within the central subfield of the macula but not involving the centre point
Severe DME	Retinal thickening or hard exudates involving the centre of the macula

For additional clarifications on definitions and classification of diabetic retinopathy, please refer to the ***International Council of Ophthalmology - Guidelines for Diabetic Eye Care,*** February 2014.

Glaucoma

Definition

Glaucoma is an optic neuropathy caused by a heterogeneous group of ocular conditions and associated with characteristic structural damage of the optic nerve and with typical visual field changes. The increase of the intraocular pressure (IOP) is one of the major risk factors that can contributes to the damage of the optic nerve and to the visual field abnormalities, but it is a sign not always associated with the optic neuropathy.

Classification

The most common forms of glaucoma in adults are:

- **Primary Open-Angle Glaucoma** is a progressive, chronic optic neuropathy in which, in the absence of other identifiable causes, there are characteristic acquired morphological changes of the optic nerve and loss of retinal ganglion cells and their axons. This condition is associated with an anterior chamber angle that is open by gonioscopic appearance.

- **Secondary Glaucomas** are a heterogeneous group of conditions, in which elevated intraocular pressure (IOP) is the leading pathological factor causing glaucomatous optic neuropathy. Most forms of secondary glaucoma like uveitic or traumatic glaucoma have complex pathomechanisms including both an open or closed angle.

- **Primary Angle-Closure Glaucoma** is a glauco-matous optic neuropathy associated with appositional or synechial closure of the anterior chamber angle caused by multiple mechanisms. Angle closure may or may not be associated with elevated intraocular pressure (IOP) or glaucomatous optic neuropathy, and may occur in either an acute or chronic form.

Secondary forms of angle closure can also occur (for example, iridocorneal endothelial syndrome, inflammation, or neovascularization).

For additional clarifications on definitions and classification of glaucoma, please refer to:

European Glaucoma Society – Terminology and Guidelines for Glaucoma, 4th Edition, June 2014.

American Academy of Ophthalmology Preferred Practice Pattern – Primary Open-Angle Glaucoma Suspect, Oct 2010.

American Academy of Ophthalmology Preferred Practice Pattern – Primary Open-Angle Glaucoma, Oct 2010.

American Academy of Ophthalmology Preferred Practice Pattern – Primary Angle-Closure, Oct 2010.

Refractive Errors

Definition

Refractive error (ametropia) is a very common eye disorder and is present when parallel rays of light entering the non-accommodating eye do not focus on the retina. The visual effect is a blurred vision, which is sometimes so severe that it causes visual impairment.

Refractive errors cannot be prevented, but they can be diagnosed by an eye examination and treated with corrective glasses, contact lenses or refractive surgery. If corrected in time and by eye-care professionals, they do not impede the full development of good visual function. Correction is provided in different forms according to the defect, the age of the person, the requirements in terms of work or activity performed.

Uncorrected Refractive Errors are classified as presenting vision defects resulting in visual acuity of less than 6/18, with or without correction in use.

Classification

The four most common refractive errors are:

- **Myopia** is a common optical aberration in which the eye has too much optical power and parallel light rays from a distant image are focused on a point anterior to the retina.
- **Hyperopia** is also a common optical aberration in which the eye does not have enough optical power and distant light rays strike the retina before converging on the retina.
- **Astigmatism** is an optical aberration that occurs when incident light rays do not converge at a single focal point. Total refractive astigmatism can be divided into corneal (or keratometric) astigmatism, lenticular astigmatism, and retinal astigmatism. Most astigmatism is corneal in origin.
- **Presbyopia** is a condition that develops with aging and results in insufficient accommodation for near work in a patient whose distance refractive error is fully corrected.

High refractive errors are defined as 6.00 D or more of myopia, 3.00 D or more of hyperopia, and 3.00 D or more of regular astigmatism.

For additional clarifications on definitions and examination procedures of refractive errors, please refer to:

World Health Organization and National Institute of Health: Assessment of the prevalence of visual impairment attributable to refractive error or other causes in school children - Protocol and Manual of Procedures. Geneva, November 2007.

American Academy of Ophthalmology Preferred Practice Pattern – Refractive Errors and Refractive Surgery, Jul 2013.

Paediatric eye diseases

Definition

Paediatric eye diseases are a heterogeneous group of ocular conditions affecting infants and children through the age of 18 years which can threaten the healthy growth and development of the eye and visual system.

Classification

Childhood ocular problems include:

- **Congenital Cataract**
- **Congenital Glaucoma**
- **Retinoblastoma** is a vision- and life-threatening malignancy.
- **Retinopathy Of Prematurity** is the most common ocular problem in preterm infants and is inversely related to gestational age and birth weight. It can cause severe visual impairment and blindness.
- **Strabismus** is any binocular misalignment. The common types of strabismus are esotropia (inwardly deviating eyes) and exotropia (outwardly deviating eyes).
- **Amblyopia** is an abnormality of visual development characterized by decreased best-corrected visual acuity in a normal eye or in an eye with a structural abnormality in which visual acuity is not fully attributable to the structural anomaly of the eye. Amblyopia may be unilateral or bilateral. Approximately half of amblyopia is secondary to strabismus (mainly esotropia) and the other half is from other causes such as high refractive errors and anisometropia (asymmetric refractive errors), or they occur in conjunction with structural ocular problems.

- **Refractive Errors** are a common cause of visual problems in children. Visually important refractive errors include high hyperopia, moderate to high astigmatism, moderate to high myopia, and asymmetric refractive errors.

- **Uveitis** is a form of eye inflammation and can be due to infectious or inflammatory causes, but the most frequent specific causes in children are juvenile idiopathic arthritis and toxoplasma retinochoroiditis.

For additional clarifications on definitions, classifications and examination procedures of paediatric eye diseases, please refer to:

World Health Organization and National Institute of Health – Assessment of the prevalence of visual impairment attributable to refractive error or other causes in school children - Protocol and Manual of Procedures. Geneva, Nov 2007.

American Academy of Ophthalmology Preferred Practice Pattern – Paediatric Eye Evaluations, Sep 2012.