TECHNICAL REPORT

Catalogue of interventions addressing vaccine hesitancy

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The following experts were consulted for additional input on interventions addressing vaccine hesitancy: Adriana Baban (Babes-Bolyai University, Romania), Agoritsa Baka (Hellenic Centre for Disease Control and Prevention, Greece), Liesbeth Mollema (National Institute for Public Health and the Environment (RIVM), The Netherlands), Pierluigi Lopalco (University of Pisa, Italy), Pierre Van Damme (University of Antwerp, Belgium), Pierre Verger (National Institute of Health and Medical Research (INSERM), France), Xavier Bosch (Catalan Institute of Oncology (ICO), Spain).

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Contents

Abbreviations

DTaP	Diphtheria, Tetanus, and Pertussis
EMR	Electronic medical records
EU/EEA	European Union/European Economic Area
FDA	Food and Drug Administration
GP	General Practitioner
HCP	Healthcare professionals
HPV	Human Papilloma Virus
JRC	Joint reporting form
MMR	Measles, Mumps and Rubella
PACV	Parent Attitudes about Childhood Vaccines
SIC	Specialist immunisation clinics
STI	Sexually transmitted infections
TIP	Tailoring Immunisation Programmes
UNICEF	United Nations Children's Fund
US CDC	US Centers for Disease Control and Prevention
VPD	Vaccine-preventable diseases
WHO SAGE	World Health Organization Strategic Advisory Group of Experts on Immunization.

Introduction

Vaccines and immunisation programmes have prevented major epidemics of life threatening diseases since the beginning of their widespread use in the 1900s. For this reason, vaccination is considered one of the greatest public health achievements of the 20th century [1]. The history of public concerns about and questioning of vaccines, however, is as old as vaccines themselves. As the widespread use of vaccines has grown, so have anxieties about vaccine safety and their regulation [2]. Modern day communication capacities have provided many new platforms for speeding up the spread of these anxieties. Currently, most countries in Europe and many globally, are dealing with pockets of people who are reluctant or refuse recommended vaccination(s), or who chose to delay some vaccines. This phenomenon is defined as vaccine hesitancy (to be further described below).

This catalogue developed by the London School of Hygiene and Tropical Medicine Vaccine Confidence Project is part of the European Centre for Disease Prevention and Control's activities aimed to provide tools and information resources to support EU/EEA countries in addressing the challenging issue of vaccine hesitancy. The project was developed in the context of ECDC's support to EU/EEA Member States in prevention and control of vaccine-preventable diseases, including effective communication to promote immunisation.

Vaccine hesitancy is defined as

> 'a behaviour, influenced by a number of factors including issues of confidence (level of trust in vaccine or provider), complacency (do not perceive a need for a vaccine, do not value the vaccine), and convenience (access). Vaccine-hesitant individuals are a heterogeneous group that are indecisive in varying degrees about specific vaccines or vaccination in general. Vaccine-hesitant individuals may accept all vaccines but remain concerned about vaccines, some may refuse or delay some vaccines, but accept others, and some individuals may refuse all vaccines' [3].

Due to the diversity of situations in which vaccine hesitancy can arise, interventions have to be contact specific (depending on the public involved) and problem specific (depending on the type of concern).

This catalogue provides examples of practices that can serve as a bank of ideas for other countries. It takes into consideration the importance of identifying the underlying issues that generate vaccine hesitancy in order to appropriately address them. Hence, the catalogue is divided into two parts: first, interventions to diagnose the hesitancy (metric tools and assessment instruments); and secondly, interventions to address the issue once defined (what to do at the individual and community level to tackle the problem).

The current project will further complement the work done by ECDC in the area of supporting countries when addressing vaccine hesitancy to effectively promote vaccination uptake, by providing supplementary data and practical resources that countries can use and adapt according to their national and local approaches and needs.

Aim

The aim of this catalogue it to provide a practical tool for public health organisations and immunisation stakeholders in the EU/EEA to address the challenging problem of vaccine hesitancy. The catalogue offers a collection of interventions developed in EU/EEA countries as well as in other regions to measure and address vaccine hesitancy, and showcases examples of practices that can be adapted according to national and local needs and strategies.

Methods

The interventions included in this catalogue were identified through four different routes:

- review of ECDC's technical reports on understanding vaccine hesitancy [4, 5]
- review of the WHO Strategic Advisory Group of Experts (SAGE) on Immunization report on strategies to address vaccine hesitancy [6, 7]
- web search and review of the literature on strategies to address vaccine hesitancy published since the completion of the above two reviews
- consultations with relevant experts.

1. Inclusion and exclusion criteria for the selection of interventions

The catalogue includes interventions and strategies that directly and specifically address vaccine hesitancy by focusing on specific issues and specific sub-populations which are vaccine hesitant, have shown concerns about vaccines, or are resistant to vaccination. Interventions were therefore excluded if they focused on improving vaccine uptake more generally, attitudes to vaccination more generally, or knowledge in the general population without referring to vaccine hesitancy. All population groups within hesitant populations were included: parents, teenagers and children, healthcare workers, vaccine providers, adults, religious communities, etc. Interventions were included if they focused on any human vaccines and regardless of the nature of the drivers of hesitancy, settings, approaches, or geographical location. The catalogue includes interventions that meet these criteria from any country or region of the world.

Both evaluated and non-evaluated interventions showing promising practice were included in the catalogue. The catalogue includes interventions described in reports or scientific literature but excludes guidelines and interventions that are only suggested or recommended without having been put in practice.

2. Review of the ECDC and WHO SAGE reports on understanding and addressing vaccine hesitancy

Three prominent reports on vaccine hesitancy were reviewed to identify relevant interventions for the catalogue: ECDC's two technical reports on understanding vaccine hesitancy [4, 5] and the WHO SAGE report on strategies to address vaccine hesitancy [6]. One of ECDC's technical reports is a rapid literature review of determinants of vaccine hesitancy in Europe and strategies addressing these determinants. The other report is a more in depth study looking at vaccine hesitancy among vaccine providers in Europe. The WHO SAGE report is a global systematic literature review of strategies addressing vaccine hesitancy conducted in 2014.

The interventions described and analysed in these three reports were identified and reviewed for inclusion in the catalogue based on the inclusion criteria described above. A total of 212 unique interventions were identified after duplicates were removed. The selected interventions included 149 identified through the SAGE systematic literature review and 63 through ECDC's technical reports. After full text appraisal, 16 interventions (eight identified through SAGE and eight through the ECDC reports) were included in the catalogue as they specifically address vaccine hesitancy.

3. Additional web search and review of the literature

In order to identify the most recent interventions addressing vaccine hesitancy, an additional web search and a literature review were performed.

The literature search was performed in February 2016, in MEDLINE, and used the following keywords and search strategy: (strateg* or intervent* or campaign* or evaluation* or approach* or program*) AND (vaccin* or immunis* or immuniz*) AND (hesitan* or confiden*). The search was conducted in English for articles published since 2014 (the year the SAGE systematic review was performed). The search yielded 555 unique articles, which were screened by title and abstract. A total of 36 articles were selected for full text appraisal and 13 of these were included in the catalogue based on the inclusion and exclusion criteria described above.

A rapid web search was conducted on Google in March 2016 to complement the literature search and identify grey literature. The search was conducted up to page five and used the following keywords: vaccine hesitancy strategy (207k results), vaccine hesitancy intervention (168k results), vaccine hesitancy strategy WHO (164k results), vaccine hesitancy intervention WHO (128k results), vaccine hesitancy strategy ECDC (8,960 results), and vaccine hesitancy intervention ECDC (6,220 results). No additional relevant reports were identified for full text appraisal and inclusion in the catalogue.

4. Consultations with experts

A first draft of the catalogue was sent to seven experts on vaccine hesitancy to enquire about any additional interventions addressing vaccine hesitancy. Experts from different European countries and with varied background were identified through relevant literature on vaccine hesitancy:

Name	Institution	Country
Adriana Baban	Babes-Bolyai University	Romania
Agoritsa Baka	Hellenic Centre for Disease Control and Prevention	Greece
Liesbeth Mollema	National Institute for Public Health and the Environment (RIVM)	the Netherlands
Pierluigi Lopalco	University of Pisa	Italy
Pierre Van Damme	University of Antwerp	Belgium
Pierre Verger	National Institute of Health and Medical Research (INSERM)	France
Xavier Bosch	Catalan Institute of Oncology (ICO)	Spain

Experts were contacted by email in March 2016. A further nine interventions were included in the catalogue based on their feedback. An additional two interventions were added following discussions within ECDC and the final version of the catalogue was produced. The latest update of the information was done in October 2016.

5. Structure of the catalogue and standardised description of interventions

Extensive research on vaccine hesitancy has shown that the first step in responding to vaccine hesitancy should consist of identifying determinants of vaccine hesitancy and concerns raised by hesitant populations. Therefore, the first section of the catalogue lists relevant interventions that focus on developing tools to measure the scope and scale of vaccine hesitancy in various populations. These diagnostic tools can then be used by public health professionals to inform the development of targeted interventions to address vaccine hesitancy.

The second section of the catalogue focuses on interventions designed to address or respond to vaccine hesitancy. It is subdivided into three categories: individual-level interventions focusing on parents; individual-level interventions focusing on improving healthcare workers' confidence and communication skills to respond to hesitant patients; and interventions focusing on responding to hesitancy at a community level.

Each intervention included in the catalogue addressing vaccine hesitancy is described in a standardised way:

- aim
- determinants of hesitancy targeted (safety issues, trust, religious and philosophical views, misinformation, mandates, perceived benefits, and general vaccine hesitancy).
- country of intervention
- setting
- target population
- organisation/individuals administering the intervention
- particular vaccine(s) of focus
- type of intervention (dialogue-based, incentive-based, reminder-recall based, diagnostic tool, advocacy campaign)
- funding
- main components of the intervention
- evaluation
- links to relevant publications or resources

The different determinants of hesitancy were chosen to reflect the most important drivers of vaccine hesitancy present in Europe (identified in ECDC's technical report on understanding vaccine hesitancy [5]) and were based on the SAGE determinants of vaccine hesitancy. The types of intervention were also informed by the SAGE categories of interventions addressing vaccine hesitancy.

Finally, a summary of practical tips and lessons learnt is provided at the end of the catalogue in order to support countries with the adaptation of interventions, making them context specific and culturally appropriate.

1. Diagnosing the problem: Measurements and metrics of vaccine hesitancy

1A. Global vaccine confidence index

Intervention details

Aim	The aim of the Global Vaccine Confidence Index is to measure vaccine hesitancy and provide information about hesitant populations and the nature of their concerns
Country	Global/All countries
Setting	N/A (varies by country, see description of the intervention)
Target population	Vaccine-hesitant populations
Administrator	Core Confidence index is administered globally through a joint collaboration between Gallup International and the London School of Hygiene and Tropical Medicine Vaccine Confidence Project. Additional local level surveys using the index are administered by national immunisation programmes and research institutions
Vaccine(s)	All vaccines
Type of intervention	Diagnostic tool
Funding	Not specified

Main components

The intervention consists of a survey which was designed by the Vaccine Confidence Project and administered in collaboration with Gallup International's Global Public Health Polling Network. The survey was administered face-to-face (Nigeria, Pakistan, Georgia), online (UK), and with computer-assisted telephone (India). The questions in the survey varied slightly by country but included the following:

- in general, how much confidence do you have in immunisation/vaccines? In family planning services/contraceptives? In emergency services? In government healthcare facilities? In community health workers?
- have you ever hesitated/been reluctant to have your youngest child vaccinated? (If yes, for which vaccine? Did you eventually have him/her vaccinated or missed that vaccine?)
- why were you reluctant or refused to get your youngest child immunised? (Did not think it was needed, too far away, timing inconvenient, not possible to leave work, did not think the vaccine was effective, did not think the vaccine was safe, religious reasons, other beliefs/traditional medicine, had a bad experience or reaction with previous vaccination, had a bad experience with previous vaccinator/health clinic, someone else told me they/their child had a bad reaction, someone else told me that the vaccine was not safe, can't say, other)
- in your opinion, how many people in your community get their children immunised?

Evaluation

No evaluation. The survey was piloted in five countries (Nigeria, UK, Georgia, Pakistan, and India), and showed that all countries faced confidence gaps and are addressing these confidence challenges with differing levels of success.

Relevant resources

Larson HJ, Schulz WS, Tucker JD, Smith DM. Measuring vaccine confidence: introducing a global vaccine confidence index. PLoS currents. 2015;7. Available from: http://www.ncbi.nlm.nih.gov/pubmed/25789200

Larson HJ, Schulz WS. The State of Vaccine Confidence – 2015 report. London: London School of Hygiene & Tropical Medicine. Available from: http://www.vaccineconfidence.org/The-State-of-Vaccine-Confidence-2015.pdf

1B. Guide to Tailoring Immunisation Programmes (TIP)

Intervention details

Aim	The Guide to Tailoring Immunisation Programmes (TIP) aims to provide support to national immunisation programmes in designing strategies to increase vaccination uptake. It also includes tools to identify vaccine-hesitant population, identify barriers and enablers of vaccination in these populations, and develop adapted responses and strategies that are setting- and context-specific
Country	WHO European Region
Setting	National immunisation programmes
Target population	Susceptible population groups
Administrator	National immunisation programme managers, together with WHO Europe technical officers
Vaccine(s)	All vaccines
Type of intervention	Diagnostic tool
Funding	Not specified

Main components

TIP is a diagnostic tool, which can be used to define and diagnose vaccine hesitancy and offer appropriate interventions.

Evaluation

An evaluation of the TIP tool was done in 2016. TIP has been applied successfully in a few countries (Bulgaria, Lithuania, Montenegro, Sweden, and the UK) to improve the understanding of concerns in vaccine-hesitant populations and develop targeted strategies. Other countries have initiated application of TIP and the process is ongoing.

Relevant resources

Butler R, MacDonald NE, SAGE working group on vaccine hesitancy. Diagnosing the determinants of vaccine hesitancy in specific subgroups: The Guide to Tailoring Immunisation Programmes (TIP). Vaccine. 2015;33(34):4176-9. Available from: http://www.ncbi.nlm.nih.gov/pubmed/25896376

World Health Organisation Regional Office for Europe (2013). The Guide to Tailoring Immunisation Programmes – Increasing coverage of infant and child vaccination in the WHO European Region. WHO, Copenhagen. Available from: http://www.euro.who.int/__data/assets/pdf_file/0003/187347/The-Guide-to-Tailoring-Immunisation-Programmes-TIP.pdf?ua=1

1C. Joint Reporting Form on immunisation

Intervention details

Aim	The Joint Reporting Form (JRF) on Immunisation was developed to collect information on vaccination in all WHO member states. A section on 'vaccine hesitancy' allows WHO to identify hesitant populations and assess the nature of their concerns.
Country	Global
Setting	Online reporting form
Target population	Vaccine-hesitant populations
Administrator	National immunisation programme managers, WHO/UNICEF
Vaccine(s)	All vaccines
Type of intervention	Diagnostic tool
Funding	Not specified

Main components

The JRF is a tool developed by WHO and UNICEF to collect information in a standardised manner about vaccines in WHO Member States, including the scope and nature of vaccine hesitancy. Every year, national immunisation programme managers are asked to complete the JRF, which includes the following four questions on vaccine hesitancy:

- What are the top three reasons for not accepting vaccines according to the national schedule?
- Is this response based on or supported by some type of assessment or is it an opinion based on your knowledge and expertise?
- Has there been some assessment of vaccine hesitancy or refusal among the public at national or sub-national level?
- If yes, please provide assessment title(s) and reference(s) to any publication/report

Evaluation

No evaluation. The questions on vaccine hesitancy included in the JRF were piloted and revised according to the results. The pilot revealed that only 14% of countries completed the questions on vaccine hesitancy in 2012 and 69% in 2013 (question 1).

Relevant resources

Larson HJ, Jarrett C, Schulz WS, Chaudhuri M, Zhou Y, Dube E, et al. Measuring vaccine hesitancy: The development of a survey tool. Vaccine. 2015;33(34):4165-75. Available from: http://www.ncbi.nlm.nih.gov/pubmed/25896384

World Health Organization. The WHO/UNICEF Joint Reporting Process (online) http://www.who.int/immunisation/monitoring_surveillance/routine/reporting/reporting/en/

1D. The Parent Attitudes About Childhood Vaccines Survey

Intervention details

Aim	The aim of the Parent Attitudes About Childhood Vaccines (PACV) survey is to identify vaccine-hesitant parents, and assess their behaviour and concerns around childhood vaccines
Country	United States
Setting	Healthcare facilities
Target population	Parents
Administrator	Vaccine providers
Vaccine(s)	Childhood vaccines
Type of intervention	Diagnostic tool, dialogue-based
Funding	Not specified

Main components

The PACV survey is a short self-administered survey designed to identify vaccine-hesitant parents and to measure their attitudes and beliefs about immunisation. The survey contains 15 items under three domains: behaviour, safety and efficacy, and general attitudes. A 'PACV score' is calculated for each parent by assigning points for hesitant responses. The survey is administered to parents before appointments with health supervision visits, which allows healthcare providers to be immediately informed of the possible hesitancy of parents and to tailor and adapt their messages and communication strategies for each patient.

Evaluation

A prospective cohort study was conducted to evaluate the predictive validity and test-retest reliability of the PACV among 220 participants. The evaluation confirmed the success of the intervention, which found that parents of two-months old children with an increase in scores of at least 50 predicted a significant and incremental increase in under immunisation at 19-months of age. The evaluation concluded that the PACV survey is a robust measure of parental immunisation attitudes and beliefs. The estimated mean scoring time was one minute. In 2015, the PACV survey was once again evaluated in relation to acceptance of seasonal influenza vaccine in a paediatric emergency department setting. The survey was found to be a successful tool to identify vaccine-hesitant parents.

Relevant resources

- Opel DJ, Mangione-Smith R, Taylor JA, Korfiatis C, Wiese C, Catz S et al.. Development of a survey to identify vaccine-hesitant parents: The parent attitudes about Childhood Vaccines Survey. Human Vaccines 2011: 7(4), 419-425. Available from: http://www.ncbi.nlm.nih.gov/pubmed/21389777
- Opel DJ, Taylor JA, Zhou C, Catz S, Myaing M, Mangione-Smith R. The relationship between parent attitudes about childhood vaccines survey scores and future child immunisation status: a validation survey. Jama Pediatr; 2013: 167(11):1065-1071. Available from: http://www.ncbi.nlm.nih.gov/pubmed/24061681
- Strelitz B, Gritton J, Klein EJ, Bradford MC, Follmer K, Zerr DM, et al. Parental vaccine hesitancy and acceptance of seasonal influenza vaccine in the pediatric emergency department. Vaccine. 2015;33(15):1802-7. Available from: http://www.ncbi.nlm.nih.gov/pubmed/25744225

1E. The Vaccine Confidence Scale

Intervention details

Aim	The aim of the Vaccine Confidence Scale is to measure and assess parental beliefs and confidence in adolescent vaccination across diverse population groups
Country	United States
Setting	Telephone surveys
Target population	Parents (of 13- to 17- year old adolescents)
Administrator	Researchers
Vaccine(s)	Adolescent vaccines
Type of intervention	Diagnostic tool
Funding	Not specified

Main components

The Vaccine Confidence Scale can be used to assess parental beliefs about the vaccination of teenagers on a scale from 0 (strongly disagree) to 10 (strongly agree). It has been developed based on the Health Belief Model and asks parents to evaluate the following statements about the perceived benefits of and/or barriers to vaccination, as well as their trust in healthcare providers:

- Vaccines are necessary to protect the health of teenagers
- Vaccines do a good job in preventing the diseases they are intended to prevent
- Vaccines are safe
- If I do not vaccinate my teenager, he/she may get a disease such as meningitis and cause other teenagers or adults also to get the disease
- Teenagers receive too many vaccines
- If I vaccinate my teenager, he/she may have serious side effects
- In general, medical professionals in charge of vaccinations have my teenager's best interest at heart
- I have a good relationship with my teenager's healthcare provider

Evaluation

An exploratory factor analysis was used amongst a sample of parents to evaluate and refine the Vaccine Confidence Scale. The scale was found to be consistent and to maintain a good fit across different demographic subgroups of parents. It is a brief and efficient measure of parental beliefs about adolescent vaccination. The scale can also be used to identify which clusters of beliefs (trust, perceived benefits or perceived barriers) contribute to confidence in different populations.

Relevant resources

Gilkey MB, Magnus BE, Reiter PL, McRee AL, Dempsey AF, Brewer NT. The Vaccination Confidence Scale: a brief measure of parents' vaccination beliefs. Vaccine. 2014;32(47):6259-65. Available from: http://www.ncbi.nlm.nih.gov/pubmed/25258098

1F. The Vaccine Sentimeter

Intervention details

Aim	The aim of the Vaccine Sentimeter is to monitor mainstream and social media for content on vaccination
Country	Global
Setting	Online
Target population	Online users
Administrator	Online tool
Vaccine(s)	All vaccines
Type of intervention	Diagnostic tool
Funding	Free-to-use online tool

Main components

The vaccine Sentimeter is a web-based tool which can be used to collect media articles from over 100 000 online sources every hour, in English, Spanish, and French. The Vaccine Sentimeter was developed by Epidemico, ProMEd-mail, and Sanofi Pasteur. Keywords used by the tool to search mainstream media include names of vaccines, ingredients, vaccine-preventable diseases, as well as colloquial terms for vaccines. Social media posts are collected through the Twitter Application Program Interface, a publicly available interface, by searching for English vaccine-specific taxonomy. Data processing is automatically done using HealthMap technology and tagging date, source, vaccine type, and location. Automated tagging is then followed by human curation of each article to control the tags and assign sentiments to the articles (positive, negative, or neutral). The tool offers the possibility for analysis of data by displaying articles geographically, by percentage of negative sentiment in each countries, dates, article title, vaccine, category, sentiment and location. The tool is available online and is open-access.

Evaluation

The tool was tested on two cases of low vaccine confidence. The settings were polio vaccination in Pakistan after a news story about a Central Intelligence Agency vaccination nurse and subsequent attacks on healthcare workers, and a controversial episode in a television program about adverse events following human papillomavirus vaccination. Data was collected between October 2012 and November 2014.

The tests confirmed that the Vaccine Sentimeter can be used to monitor real-time sentiments about vaccination and identify trends in misinformation.

Relevant resources

Bahk CY, Cumming M, Paushter L, Madoff LC, Thomson A, Brownstein JS. Publicly Available Online Tool Facilitates Real-Time Monitoring Of Vaccine Conversations And Sentiments. Health Affairs. 2016;35(2):341-7. Available from: http://www.ncbi.nlm.nih.gov/pubmed/26858390

Vaccine Sentimeter: Global monitoring of vaccine coverage. http://www.healthmap.org/viss/

1G. Tools for the measurement of vaccine hesitancy

Intervention details

Aim	Different tools were developed to facilitate the measurement of vaccine hesitancy, identification of hesitant populations, and assessment of the nature and scope of concerns in hesitant populations
Country	Global
Setting	Not specified
Target population	Vaccine hesitant populations
Administrator	Not specified
Vaccine(s)	All vaccines
Type of intervention	Diagnostic tool
Funding	Not specified

Main components

A set of three different research tools were developed to facilitate the measurement of vaccine hesitancy, identification of hesitant population, and assessment of the nature and scope of concerns in hesitant populations. These are based on a comprehensive literature search. The set of survey questions were developed following an initial review of existing vaccine hesitancy surveys, and consultations within the SAGE Vaccine Hesitancy Working Group as well as with SAGE members. Additionally, vaccine hesitancy questions were piloted in the annual WHO-UNICEF joint reporting form, completed by National Immunisation Managers globally.

Three types of research tools are described: two surveys and one open-ended qualitative questionnaire.

These tools can be used, modified and developed further by researchers. They constitute a help for anyone wanting to do research to measure vaccine hesitancy.

Main components part 1

Five-point Likert scale questions

How much do you agree with each of the following statement on vaccinations? (Scale: 1- strongly disagree, 2- disagree, 3- neither agree nor disagree, 4- agree, 5- strongly agree)

1. Childhood vaccines are important for my child's health
2. Childhood vaccines are effective
3. Having my child vaccinated is important for the health of others in my community
4. All childhood vaccines offered by the government programme in my community are beneficial
5. New vaccines carry more risks than older vaccines
6. The information I receive about vaccines from the vaccine program is reliable and trustworthy
7. Getting vaccines is a good way to protect my child/children from disease
8. Generally I do what my doctor or healthcare provider recommends about vaccines for me chid/children
9. I am concerned about serious adverse effects of vaccines
10. My child/children does or do not need vaccines for diseases that are not common anymore

Main components part 2

Survey questions

1. Do you believe that vaccines can protect children from serious diseases? (Y/N)
2. Do you think that most parents like you have their children vaccinated with all the recommended vaccines? (Y/N)
3. Have you ever been reluctant or hesitated to get a vaccination for your child? (Y/N)
4. Have you ever refused a vaccination for your child? (Y/N)

5. If response is yes to question 3 or 4, please check (√) which one(s) and whether hesitated and/or refused: Chickenpox vaccine, Haemophilus influenza b (Hib) Vaccine, Hepatitis B vaccine, Human Papilloma Virus (HPV) vaccine, influenza vaccine, polio vaccine, measles vaccine, meningococcal vaccine, mumps vaccine, rubella vaccine, pentavalent or other combination infant vaccine, pneumococcal vaccine, rotavirus vaccine, Tetanus Diphtheria Pertussis vaccine
    - What was/were the reasons (check √ if applicable): did not think it was needed, did not know where to get vaccination, did not know where to get good/reliable information, heard or read negative media, did not think the vaccine was effective, did not think the vaccine was safe/concerned about side effects, someone else told me that the vaccine was not safe, had a bad experience with previous vaccinator/health clinic, had a bad experience or reaction with previous vaccination, someone else told me they/their child had a bad reaction, fear of needles, not possible to leave other work (at home or other), religious reasons, other beliefs/traditional medicine, other (please specify)
6. Has distance, timing of clinic, time needed to get to clinic or wait at clinic and/or costs in getting to clinic prevented you from getting your child immunised? (Y/N)
7. Are there other pressures in your life that prevent you from getting your child immunised? (Y/N)
8. Are there any reasons you can think of why children should not be vaccinated? (Y/N) If yes, please specify
9. Do you think that it is difficult for some ethnic or religious groups in your community/region to get vaccinations for their children? (Y/N) If yes, what do you think are the reason(s)? check (√) if applicable: They choose not to vaccinate, they do not feel welcome at the health service, health services do not reach them
10. Have you ever received or heard negative information about vaccinations? (Y/N) If yes, please give an example. Did you still take your child to get vaccinated after you heard the negative information (Y/N)?

Do leaders (religious or political leaders, teachers, healthcare workers) in your community support vaccines for infants and children? Please check (√) if applicable: religious, political, teachers, healthcare workers, others (please specify)

Main components part 3

Open-ended survey questions

1. What are the three major reasons why you should immunise your child?
2. Do you have any worries or concerns when you take your child for immunisation? If yes, what are they?
3. For parents/guardians that are known to have accepted immunisation in the last one year: in your family, what was the reason behind your decision to vaccinate your child last week/month/year?
4. For parents/guardians that are known to have refused immunisation in the last one year: in your family, what was the reason behind your decision not to vaccinate your child last week/month/year?
5. In your personal opinion, why do some persons refuse to vaccinate their children?

Evaluation

No evaluation

Relevant resources

- Larson HJ, Jarrett C, Schulz WS, Chaudhuri M, Zhou Y, Dube E, et al. Measuring vaccine hesitancy: The development of a survey tool. Vaccine. 2015;33(34):4165-75. Available from: http://www.ncbi.nlm.nih.gov/pubmed/25896384

1H. Questionnaire measuring vaccine hesitancy among GPs

Intervention details

Aim	Measure, and to some extent quantify, vaccine hesitancy among general practitioners (GPs)
Country	France
Setting	Telephone
Target population	GPs
Administrator	Professional investigators
Vaccine(s)	MMR, Meningococcal meningitis C, HPV, Hepatitis B, Seasonal influenza
Type of intervention	Diagnostic tool
Funding	Directorate of Research, Studies, Evaluation and Statistics (DREES) of the French Ministry of Social Affairs and Health, and the French Public Health Agency (SANTE PUBLIQUE, FRANCE)

Main components

The questionnaire aims to assess vaccine hesitancy in GPs by assessing perceptions about vaccines (risk, utility), recommended behaviours towards patients, personal vaccination behaviours, and confidence in various sources of information about the benefits and risks of vaccines.

Questions included in the questionnaire:

QI0. Concerning vaccination in general in your daily practice, are you: not at all favourable, somewhat unfavourable, somewhat favourable, or very favourable?

QI1. How many half-days or evenings of continuing medical education have you done in the past 12 months on the topic of infectious diseases and/or vaccination? /——/

QI2. Do you feel the need for training in vaccination? (yes/no)

QI3. Do you trust the following sources to give you reliable information on the benefits and risks of vaccines? (the Health Ministry (do not trust at all, distrust somewhat, trust somewhat, trust completely); health agencies; the pharmaceutical industry; the media (TV, press, radio); scientific sources (learned societies, scientific journals); your specialist colleagues (for example, in a hospital or vaccination centre)

QI4. Do you consult the INPES vaccination guide? (never, sometimes, often, very often)

QI5. Have you ever visited websites giving unfavourable opinions on vaccination or certain vaccines? (No never, yes by chance, yes deliberately) If no, go to **QC1**.

QI6. Do you agree with the following statements about these unfavourable sites? These sites: provide useful information; question the very principle of vaccination; help to understand the reticence of some patients

QC1. Personally, were you vaccinated against the seasonal flu vaccine for winter 2013-14? (yes/no/don't remember)

QC3. When was your last DTP booster? (Less than 10 years ago; 10-20 years ago; Over 20 years ago; Don't remember)

QC4. Are you vaccinated against Hepatitis B? (Yes, 3 or more doses; Yes, fewer than 3 doses; No, don't remember; Not concerned)

QC5. You have a child/children aged between 2 and 25: did you have him or her vaccinated against: Hepatitis B (yes, all/yes, some/no); Meningococcal meningitis C (yes all/yes some/no); MMR (yes all/yes some/no)

QC6. You have one daughter/daughters aged between 11 and 25: did you have her vaccinated against HPV? (Yes all of them; yes, some of them; No but you are intending to; No, because the indications didn't seem to apply to her; No, you do not intend to for a different reason)

QC7. Do you recommend the following vaccines (never, sometimes, often, always)? Measles, mumps and rubella (MMR) for non-immunised adolescents or young adults; Meningococcal meningitis C catch-up vaccine for ages 2 – 24; Meningococcal meningitis C for infants aged 12 months; Human Papilloma Virus for girls aged 11-14; Hepatitis B catch-up vaccine for adolescents; Seasonal flu vaccine for adults with diabetes younger than 65

QC8. Do you give parents a list of the diseases covered by the hexavalent vaccine? (never, sometimes, often, always)

QG2. In the last five years, have you experienced the following situations? Measles in adolescents or young adults; recently discovered chronic Hepatitis B; hospitalisation for complications of seasonal flu; bacterial meningitis; cervical cancer

QG3. You have seen at least one case of measles: was it reported to the health authorities? (yes, by you/yes, by someone else (hospital for example)/no)

QR1. Do you believe that your role in vaccinating your patients is to encourage them to have a vaccination even if they are reticent?

QA1. Do you feel that you easily obtain your patients' adhesion to vaccination in the following situations?

- Against seasonal flu in people with diabetes younger than 65: not at all easily, not easily, somewhat easily, yes, very easily
- Against meningococcal meningitis C in adolescents and young adults
- Against human papillomaviruses in girls aged 11–14
- Against hepatitis B in previously unvaccinated adolescents
- Against MMR in adolescents or young adults

QA2. Do you agree with the following statements on vaccination?

- The health authorities are influenced by the pharmaceutical industry: strongly disagree, disagree, agree, strongly agree
- Patients should mistrust what they find on internet
- You trust your own judgement rather than the official recommendations

QP1. Do you think the following vaccines are likely to cause these diseases?

- Vaccine against seasonal flu to cause Guillain-Barré syndrome: not at all likely, not very likely, fairly likely, very likely, no opinion
- Vaccine against hepatitis B to cause multiple sclerosis
- Vaccines containing aluminium to cause Alzheimer's disease
- Pandemrix vaccine against H1N1 pandemic flu to cause narcolepsy
- Papillomavirus to cause multiple sclerosis

QP2. Do your patients ask you about the risks of adjuvants in vaccines? (never, sometimes, often, always)

QP3. Do you think that adjuvants in vaccines are linked to long-term complications? (no; unlikely; likely; yes)

QP6. In your opinion, aluminium is present:

- In most of the vaccines used in France (yes/no/no opinion)
- In the vaccine against seasonal flu

QP7. Have you ever been confronted with a SERIOUS health issue, i.e. one which led to a hospitalisation, disability, etc**.**, potentially linked to a vaccination in one of your patients? yes/no If yes: **QP7**. Did you notify the health authorities? Yes/No

QF1. Do you agree with the following statements?

- In general, your patients overestimate the risks related to some vaccines (strongly disagree, disagree, agree, strongly agree)
- In general, your patients underestimate the INDIVIDUAL benefits of vaccination
- In general, your patients underestimate the COLLECTIVE benefits of vaccination
- Today, certain vaccines recommended by the authorities are pointless
- The media publish too many negative messages about vaccination
- Children are vaccinated against too many diseases

QF2. Do you think that the vaccines in the immunisation schedule should be compulsory? (Yes, all; Yes, only some; No, none)

QF8. In general, do you feel comfortable giving explanations to your patients about: the value of vaccines (not at all comfortable, somewhat uncomfortable, somewhat comfortable, very comfortable); the safety of vaccines; the role of adjuvants

QF9. Do you agree with compulsory vaccination for doctors against seasonal flu? yes/no

QOU1. Have you consulted the new immunisation schedule published in 2013? yes/no

QOU2. Does it make your work easier? yes/no

QOU3. Do you think the following would be useful in your practice?

- An electronic vaccination record in your professional software
- An automatic text message to remind patients of their dates of vaccination
- A special procedure payment for a consultation about vaccination
- A free hotline for doctors about vaccines
- A free electronic letter providing updates on vaccination for GPs
- Vaccines kept in your surgery
- Leaflets on the benefits and risks of each vaccine for GPs
- Information leaflets for patients on the benefits and risks of vaccination
- Public awareness campaigns on vaccines.

QDT1. If there was a law allowing for a nurse to work in your surgery, paid by the national health insurance fund, would you agree to delegate to him or her the task of (check all that apply): monitoring vaccinations for your patients; noting down these vaccinations in medical records; administering vaccinations; prescribing vaccines

Evaluation

The tool has not been evaluated, but future plans include piloting it to other healthcare workers.

Relevant resources

- Le Maréchal M, Collange F, Fressard L, Peretti-Watel P, Sebbah R, Mikol F et al. Design of a national and regional survey among French general practitioners and method of the first wave of survey dedicated to vaccination. MMI, 2015;45:403-10. DOI: 10.1016/j.medmal.2015.09.005
- Verger P, Fressard L, Collange F, Gautier A, Jestin C, Launay O et al. Vaccine Hesitancy Among General Practitioners and Its Determinants During Controversies: A National Cross-sectional Survey in France. EBioMedicine, 2015, 2:889-895. DOI: http://dx.doi.org/10.1016/j.ebiom.2015.06.018
- Raude J, Fressard L, Gautier A, Pulcini C, Peretti-Watel P, Verger P. Opening the 'Vaccine Hesitancy' black box: how trust in institutions affects French GPs' vaccination practices. Expert Review of vaccines, 2016 Jul;15(7):937-948. Epub 2016 May 21.

1I. Questionnaire measuring public vaccine hesitancy

Intervention details

Aim	Measure vaccine hesitancy in the public
Country	France
Setting	Telephone
Target population	Parents of young children, parents of adolescents, adults, the elderly
Administrator	Health Barometer (national survey)
Vaccine(s)	Influenza, measles, HPV, Hepatitis B
Type of intervention	Diagnostic tool
Funding	French Public Health Agency (SANTE PUBLIQUE, FRANCE), Agence nationale du médicament et des produits de santé (ANSM) and Institut national de la santé et de la recherche médicale (INSERM)

Main components

The questionnaire was designed to measure vaccine hesitancy among various population groups, with wording adapted to each of those groups. It was administered via a telephone national survey (Health Barometer) with questions on perceptions (benefits and risks) and behaviours about several vaccines, measurement of vaccine hesitancy, confidence towards physicians, public health authorities or the media, engagement in vaccination activities, and operationalisation of the SAGE definition of vaccine hesitancy.

Questions included in the questionnaire:

For everyone

1. Are you very or somewhat favourable or not especially or not at all favourable to vaccinations in general?
2. Are you unfavourable to some kinds of vaccinations in particular? which ones?

If the respondent is the parent of a 1–15 year old child, or is 15–35 years old:

3. Do you think that measles is a serious disease?
4. Do you think that measles occurs frequently?
5. Do you think that the vaccine against measles is effective in preventing it?
6. Do you think that the vaccine against measles can cause serious side effects?

If the respondent is 15–35 years old

7. Are you vaccinated against measles, mumps, and rubella (MMR vaccination)?

If the respondent is the parent of a 1–15 year old child - ask for each child between 1 and 15 in the household

8. Is (s)he vaccinated against measles, mumps, and rubella (MMR vaccine)?

For everyone

9. Do you think that hepatitis B is a serious disease?
10. Do you think that hepatitis B is a frequent disease?
11. Do you think that the vaccine against hepatitis B is effective in preventing this disease?
12. Do you think that the vaccine against hepatitis B can cause serious side effects?
13. Are you vaccinated against hepatitis B?

If the respondent is the parent of a 1-15 year old child - ask for each child between 1 and 15 in the household

14. Is (s)he vaccinated against hepatitis B?

For non-vaccinated children: concerning the vaccination of < first name> against hepatitis b:

15. A doctor proposed it but you refused; a doctor proposed it but you didn't take the time to do it; no doctor proposed it; none of these statements
16. **For non-vaccinated children:** today, if a doctor proposed this vaccination against hepatitis B for < first name >, would you agree to have him/her vaccinated?

If the respondent is between 65 and 75 years old

17. Do you think that the flu is a serious disease?
18. Do you think that the flu occurs frequently?
19. Do you think that the vaccine against the flu is effective in preventing it?
20. Do you think that the vaccine against the flu can cause serious side effects?
21. Were you vaccinated against the flu for the winter 2015–2016?

If the respondent is not vaccinated against the flu

22. Why weren't you vaccinated against the flu?

If the respondent is pregnant or the mother of a two year or younger child

23. During your (last) pregnancy, did a doctor or a midwife recommend that you be vaccinated against the flu?
24. Were you vaccinated against the flu during this pregnancy?

If the respondent is a 15 to 25 year old woman or the parent of any daughters 11 to 19 years old

25. Have you heard about the HPV vaccination against papillomavirus?

If the respondent has not heard about HPV vaccination or doesn't know:

26. This is a vaccination against the virus that causes cervical cancer: have you heard about it?

If the respondent has heard of the HPV vaccine or the vaccine against cervical cancer:

27. Do you think that papillomavirus infections are serious?
28. Do you think that papillomavirus infections occur frequently?
29. Do you think that the vaccine against papillomavirus is effective in preventing cervical cancer?
30. Do you think that the vaccine against papilloma virus can cause serious side effects?

If the respondent is a 15 to 25 year old woman and has heard of the HPV vaccine or the vaccine against cervical cancer

31. Are you vaccinated against the papillomavirus, called HPV?

If not vaccinated

32. About this HPV vaccination: a doctor suggested it but you refused; a doctor suggested it but you didn't take the time to do it; no doctor proposed it; none of these statements
33. **Ask for each 11 to 19 year old girl in the household, using her first name**: is she vaccinated against the papillomavirus, called HPV?

If only one girl is not vaccinated, ask the following question for that girl:

34. About HPV vaccination for your daughter(s): a doctor proposed it but you or your daughter refused; a doctor proposed it but she didn't take the time to do it; no doctor proposed it; none of these statements

If the respondent is pregnant or the mother of a two year or younger child

35. During your last/current pregnancy, were/are you up to date on your vaccination against whooping cough?
36. Did someone recommend that you be vaccinated against whooping cough right after your delivery?
37. Were you vaccinated against whooping cough right after delivery?

Vaccine hesitancy

38. To what extent do you agree with the following statement: when you get vaccinated, it's not only to protect yourself, but also to protect others.
39. For your child's vaccinations/for your vaccinations, have you ever refused a vaccine recommended by your physician, because you considered the vaccine to be dangerous or useless?
40. For your child's vaccinations/your vaccination, have you ever decided yourself to delay a vaccination recommended by your doctor because you were hesitant about the child being vaccinated?
41. Have you ever agreed to a vaccination for your child/for yourself even though you were doubtful about its effectiveness?
42. When you ask yourself questions about a vaccine for your child/yourself, where do you look for information? (from your doctor (or from a doctor); from a pharmacist; on the internet; from parents, relatives, friends; from another source of information; not concerned: never looks for information about vaccination; don’t know)]
43. Do you have confidence in the information about vaccinations that are given by…? (the doctor caring for your child/your physician; the pharmacist; the Ministry of Health; the pharmaceutical industry)

44. Has a doctor ever talked to you about his/her doubts about a vaccine?
45. Does your doctor practice homeopathy or acupuncture?
46. About your (child's) vaccination, tell me if you agree very much, somewhat, not especially or not at all with the following statements:
    - As a parent, it's my responsibility to ask questions about the vaccines recommended by my (child's) doctor.
    - For my (child's) vaccinations, I always follow the doctor's advice.
    - It is difficult to have an opinion about my (child's) vaccines because the available information is often contradictory.
47. Tell me if you agree very much, somewhat, not especially or not at all with the following statements:
    - For my child to stay healthy/to stay healthy, I just need to follow the advice of the (child's) doctor
    - When my child is/I am sick, it's often by bad luck or accident

Evaluation

The tool has not been evaluated.

Relevant resources

No publication at the time of development of this catalogue because data have just been collected and analyses have just started.

1J. Multi-country survey assessing vaccine confidence

Intervention details

Aim	Assessing national public vaccine confidence in multiple countries
Country	Global
Setting	Telephone, online, face-to-face surveys
Target population	Populations around the world
Administrator	Gallup International Association/Vaccine confidence project
Vaccine(s)	All vaccines
Type of intervention	Diagnostic tool
Funding	Gallup International Association

Main components

Tool to conduct a global survey to assess vaccine confidence in countries around the world. The survey asks four questions about vaccination to examine perceptions of vaccine importance, safety, effectiveness, and religious compatibility. It has been administered as part of a larger Gallup International survey by telephone, online, or face-to-face interviews.

Each respondent was asked to rate – on the five-point Likert scale: strongly agree, tend to agree, do not know, tend to disagree, strongly disagree – the extent to which they agreed with four statements pertaining to vaccination: 'vaccines are important for children to have'; 'overall I think vaccines are safe'; 'overall I think vaccines are effective'; and 'vaccines are compatible with my religious beliefs.'

Evaluation

The tool has not been evaluated at the time of development of this catalogue, but the survey has been conducted in 67 countries.

Relevant resources

Larson, H.J., et al. The State of Vaccine Confidence 2016: Global Insights Through a 67-Country Survey, EBioMedicine (2016), https://www.ncbi.nlm.nih.gov/pubmed/27658738

2. Addressing the problem

2.1 Individual-level interventions focusing on parents

2.1A. Behavioural intervention to increase HPV vaccination acceptability

Determinants targeted

General vaccine hesitancy

Intervention details

Aim	This educational intervention aims to decrease mothers' concerns about vaccination by giving them information about risks in different formats
Country	United States
Setting	Online
Target population	Mothers
Administrator	Online
Vaccine(s)	HPV
Type of intervention	Dialogue-based
Funding	Not specified

Main components

This is an online educational intervention, which starts by asking mothers two rhetorical questions: Do you want to protect your daughter from cancer? If there was a vaccine to protect your daughter against cancer, would you have her get it? These questions are asked to provoke high levels of agreement and ensure mothers' commitment to general principles. Then, mothers are either provided with textual information developed by the US Centers for Disease Control and Prevention (CDC) on various risks (basic non-statistical information about cervical cancer, HPV, and the HPV vaccine) or numerical information on the risks of cervical cancer and HPV vaccination efficacy. The numerical information is complemented by graphics to facilitate visualisation of girls who would get cervical cancer with and without vaccination (using a stadium graphic and contrasting colours).

Evaluation

The intervention was evaluated and it was found that mothers who viewed graphics representations of HPV vaccination risks and benefits had significantly stronger intentions to vaccinate their daughters. The use of rhetorical questions also had a significant positive impact on mothers' intention to vaccinate. However, each intervention was found to be stronger in the absence of the other.

Relevant resources

Cox DS, Cox AD, Sturm L, Zimet G. Behavioral interventions to increase HPV vaccination acceptability among mothers of young girls. Health Psychol 2010;29(January (1)):29–39. Available from: http://www.ncbi.nlm.nih.gov/pubmed/20063933

2.1B. Educational brochure for parents questioning immunisation

Determinants targeted

Misinformation | Perceived benefits | Safety issues

Intervention details

Aim	Improve attitudes to vaccination by handing out educational brochures to questioning parents
Country	United States
Setting	Not specified
Target population	Parents (questioning immunisation)
Administrator	Not specified
Vaccine(s)	Childhood vaccines
Type of intervention	Dialogue-based
Funding	Not specified

Main components

The intervention consists of a brochure given to parents questioning immunisation. The brochure, entitled 'Why vaccinate your child', answers the following questions:

- Should I vaccinate my child?
- What is in a vaccine?
- Do children still get these diseases?
- Are these diseases really serious?
- How are vaccines tested?
- Are there long-term effects of vaccines?
- What about autism?
- What about mercury in vaccines?
- Can vaccines "overload my child's immune system?
- Would my child get a disease if not vaccinated?
- Reference

Evaluation

The brochure was evaluated during focus groups with parents questioning immunisations as well as through a mailed survey. The evaluation showed no significant impact on attitudes about vaccination. Parents reported positive impressions of the brochure, trust in the (new) information provided, and improved opinions of the CDC. Their suggestions for an improved brochure included being direct and honest, adding more information, and a better balance between the risks and benefits of vaccination.

Relevant resources

Gust DA, Kennedy A, Weber D, Evans G, Kong Y, Salmon D. Parents questioning immunisation: evaluation of an intervention. American Journal of Health Behavior. 2009;33(3):287-98. Available from: http://www.ncbi.nlm.nih.gov/pubmed/19063650

2.1C. Educational tool to address vaccine hesitancy

Determinants targeted

Misinformation | Perceived benefits | Safety issues

Intervention details

Aim	This intervention aims to address parents' concerns about childhood vaccination using an educational tool consisting of three elements
Country	United States
Setting	Healthcare facilities
Target population	Parents (vaccine hesitant)
Administrator	Not specified
Vaccine(s)	Childhood vaccines
Type of intervention	Dialogue-based
Funding	Not specified

Main components

The educational tool consists of three elements:

- An eight-minute video showing parents of children who contracted a vaccine-preventable disease
- An educational handout addressing common concerns about vaccination
- A handout explaining how parents can find reliable and accurate information about vaccines on the internet.

Evaluation

The evaluation of this intervention found that the educational tool significantly improved their PACV score (see measurement of vaccine hesitancy section). However, this did not lead to a significant difference in vaccination rates between the intervention and the control groups.

Relevant resources

Williams SE, Rotham RL, Offit PA, Schaffner W, Sullivan M, Edwards KM. A Randomized Trial to Increase Acceptance of Childhood Vaccines by Vaccine-hesitant parents: A Pilot Study. Acad Pediatr. 2013; 13(5): 475-480. Available from: http://www.ncbi.nlm.nih.gov/pubmed/24011750

2.1D. Individually tailored education

Determinants targeted

Misinformation | Safety issues

Intervention details

Aim	This intervention uses tailored messaging to increase intention to vaccinate with the MMR vaccine
Country	United States
Setting	Healthcare facilities (Clinic waiting rooms or coordinator's research office)
Target population	Parents (vaccine hesitant)
Administrator	Online
Vaccine(s)	MMR
Type of intervention	Dialogue-based
Funding	Not specified

Main components

While in clinics waiting rooms, parents are asked to access an online survey which aims to assess their attitudes towards vaccination and their intention to vaccinate. Parents' responses are then used to offer parents access to tailored web pages. The websites are tailored in four different ways:

- Image tailoring: pictures on the website match the self-reported race of parents
- Content tailoring: the information provided on the website addresses the specific concerns parents reported in the survey
- Experiential tailoring: messages are adapted to parents' past experiences with the vaccine
- Name tailoring: the website uses the child's name into the content

Evaluation

The intervention was evaluated using a randomised pilot study involving vaccine-hesitant parents, guardians and primary caretakers. It was found that parents' intention to vaccinate increased significantly in both arms of the study but would be more pronounced in the tailored messaging group (not statistically significant). The most important changes were found in parents that were unsure or neutral before the intervention. Untailored information was found to result in a worsening of parental intentions.

Relevant resources

Gowda C, Schaffer SE, Kopec K, Markel A, Dempsey AF. A pilot study on the effects of individually tailored education for MMR vaccine-hesitant parents on MMR vaccination intention. Human Vaccines and Immunotherapeutics. 2013;9(2):437-45. Available from: http://www.ncbi.nlm.nih.gov/pubmed/23291937

2.2E. Messages to inform parents about MMR vaccination

Determinants targeted

Misinformation | Safety issues

Intervention details

Aim	Messages about MMR vaccination are sent to parents with the aim of addressing misinformation and improving their intention to vaccinate
Country	United States
Setting	Online
Target population	Parents
Administrator	Not specified
Vaccine(s)	MMR
Type of intervention	Dialogue-based
Funding	Not specified

Main components

The first element of the intervention consists of assessing parental attitudes towards vaccination. Then, four different types of messages with text adapted from CDC materials can be administered:

- Messages correcting misinformation, for instance by providing scientific evidence showing that there is no link between the MMR vaccine and autism
- Messages on the risks of measles, mumps and rubella, including symptoms and complications
- Messages using dramatic narratives such as a mother sharing her experience of her infant's hospitalisation for measles
- Messages with visuals showing the risks of measles, mumps, and rubella (i.e. children suffering from these diseases)

Evaluation

Three outcomes were assessed in an evaluation of this intervention: misperceptions about vaccines causing autism, perceptions of side effects, and intention to vaccinate their children. Corrective messages were successful in correcting misperceptions about MMR but also reduced vaccination intent in parents that were identified as having the least favourable vaccine attitudes. Messages using dramatic narratives and visuals were found to increase misperceptions about MMR. Finally, no message increased intention to vaccinate in parents' with the least favourable attitudes towards vaccines, while those with more favourable attitudes were found to be extremely likely to vaccinate.

Relevant resources

Nyhan, B., Reifler, J., Richey, S. Freed, GL. 2014. Effective messages in vaccine promotion: a randomized trial. Pediatrics, 133, e835-42. Available from: http://www.ncbi.nlm.nih.gov/pubmed/24590751

2.1F. Specialist immunisation clinics

Determinants targeted

Misinformation | Perceived benefits | Safety issues

Intervention details

Aim	This intervention aims to increase vaccination uptake amongst vaccine hesitant parents by referring them to specialist immunisation clinics
Country	Australia
Setting	Healthcare facilities (specialist immunisation clinics (SICs))
Target population	Parents (vaccine-hesitant)
Administrator	Vaccine providers (in SIC)
Vaccine(s)	All vaccines
Type of intervention	Dialogue-based
Funding	SICs are publicly funded

Main components

Specialist immunisation clinics are used for four different purposes:

- to assist children after the report of an adverse event following immunisation
- to work on catch-up immunisation of children who have recently migrated to Australia,
- to develop immunisation plans for people with special risk medical conditions, and
- to provide advice to vaccine hesitant parents.

Hesitant parents are identified by primary care providers, paediatricians, and/or emergency physicians as parents with concerns about vaccination but that have given all vaccines to their children, parents that have delayed all or most vaccines, or parents that have refused all vaccines. These parents are referred to SICs for 30-minute initial consultations with paediatricians, potentially followed by 15-minute review appointments. These consultations offer paediatricians a chance to understand parents' concerns about vaccines and to address those concerns with specific and balanced information on the risks and benefits of vaccination using surveillance data, fact sheets, decision aids, videos and websites.

Evaluation

Retrospective audits (1990–1992, 2006–2007, and 2012–2013) have shown that SIC consultations led to a small increase in vaccination uptake amongst children of vaccine hesitant parents. The latest evaluation showed that 26% of all vaccine-hesitant parents fully vaccinated their children and 42% of all vaccine-hesitant parents selectively vaccinated their children 14.5 months after their SIC consultation. The intervention was more successful in parents that have concerns about vaccination but still vaccinate than in parents who delay all or most vaccines. All refusers remained unimmunised.

Relevant resources

- Forbes TA, McMinn A, Crawford N, Leask J, Danchin M. Vaccination uptake by vaccine-hesitant parents attending a specialist immunisation clinic in Australia. Human vaccines & Immunotherapeutics. 2015;11(12):2895-903. Available from: http://www.ncbi.nlm.nih.gov/pubmed/26366978
- Baxter DN, Ghebrehewet S, Falconer M. Referrals to a pediatric immunisation service: findings from a practice-based audit of a UK specialist immunisation clinic. Hum Vaccin 2010; 6:420-4; PMID:20534973; http://dx.doi.org/10.4161/hv.6.5.11234
- Baxter D. The organization, delivery and audit of a specialist immunisation clinic. J Manag Med 1995; 9:58-65; PMID:10142780; http://dx.doi.org/10.1108/02689239510080494
- Ko MLB, Rao M, Teare L, Bridgman GC, Kurian A. Outcome of referrals to a district immunisation advisory clinic. Commun Dis Rep CDR Rev 1995; 5:R146-9; PMID:7550586
- Hall R, Williams AL. Special advisory service for immunisation. Arch Dis Child 1988; 3:1498-500; PMID:3233001; http://dx.doi.org/10.1136/adc.63.12.1498
- Lamden K, Baxter D, Weighell J. Survey of general practitioner satisfaction with a district communicable disease control service. Commun Dis Public Health 2003; 6:51-4; PMID:12736973

2.1G. Vaccine information pamphlets

Determinants targeted

Misinformation | Perceived benefits | Safety issues

Intervention details

Aim	Changing mothers' attitudes and beliefs about vaccine safety by giving vaccine information materials
Country	United States
Setting	Healthcare facilities
Target population	Mothers (concerns about vaccination)
Administrator	Vaccine providers
Vaccine(s)	Childhood vaccines
Type of intervention	Dialogue-based
Funding	Not specified

Main components

This intervention consists of two-sided colour pamphlets presenting basic information about the need and safety of all vaccines given during the first year of life. It also includes information about the Food and Drug Administration (FDA) vaccine licensing procedure and about the Vaccine Adverse Events Reporting System's role in vaccine safety monitoring. Finally, it describes potential serious adverse events following the DTaP, MMR, measles, hepatitis B, and rubella vaccines and answers the following questions:

- Why do children need so many vaccines?
- Why does my child have to receive so many vaccines in one visit?
- Why give my child combination vaccines?
- Why does my child have to get so many doses of the same vaccine?
- Why does my child have to receive different vaccines at different ages?
- When should my child not receive a vaccine?
- Is there some kind of natural immunity I could get for my child instead of vaccines?
- How can I pay for all the vaccines?

Evaluation

The pamphlet was developed and piloted by focus group discussions with mothers, who mostly liked the brochures but believed it did not provide sufficient information. Another study showed that mothers believed the pamphlet was more visually pleasing and easier to understand than the typical Vaccine Information Statements provided by CDC. They viewed the pamphlet as a good tool to facilitate discussions with providers. The intervention was also found to increase mothers' confidence in vaccination. More specifically, it had an impact on the belief that multiple vaccines overload the immune system but it did not decrease the fear of side effects in mothers. Finally another study looked at the timing of the distribution of the pamphlet and found no clear benefit of providing study materials earlier (except from mothers' reported preference). Repeated provision of vaccine-information materials had a positive impact on attitudes and beliefs but did not have a significant impact on fear of side effects.

Relevant resources

- Gust DA, Kennedy A, Wolfe S, Sheedy K, Nguyen C, Campbell S. Developing tailored immunisation materials for concerned mothers. Health Educ Res. 2008;23(3):499-511. Available from: http://www.ncbi.nlm.nih.gov/pubmed/17959583
- Klein NP, Kissner J, Aguirre A, Sparks R, Campbell S, Edwards KM, et al. Differential maternal responses to a newly developed vaccine information pamphlet. Vaccine. 2009;28(2):323-8. Available from: http://www.ncbi.nlm.nih.gov/pubmed/19879994
- Vannice KS, Salmon DA, Shui I, Omer SB, Kissner J, Edwards KM, et al. Attitudes and beliefs of parents concerned about vaccines: impact of timing of immunisation information. Pediatrics 2011;127(May (Suppl. 1)): S120–6. Available from: http://www.ncbi.nlm.nih.gov/pubmed/21502250

2.1H. Vaccine risk communication messages

Determinants targeted

Safety issues

Intervention details

Aim	Improve mother's attitudes and beliefs towards vaccine safety by providing an educational intervention containing vaccine risk assessment and/or consequences of reduced vaccination coverage.
Country	United States
Setting	Not specified
Target population	Mothers (concerns about vaccination)
Administrator	Not specified
Vaccine(s)	Childhood vaccines
Type of intervention	Dialogue-based
Funding	Not specified

Main components

The intervention consists of three different written educational messages:

- A risk comparison message: 'There are many things parents do to prevent their kids from getting sick or hurt. Sometimes, these things have risks as well as benefits, and doing them means taking on that risk of harm. For example, seatbelts and car seats help protect kids in car crashes but can cause harm if not used the right way. Vaccines help keep kids safe from serious diseases like measles, but also have an extremely small risk of serious side effects. It's true that we don't know when or if these things will ever happen. Parents take these steps because the risks of disease or injury are far higher than the risks of taking preventive action.'
- A reduced coverage message: 'Last year, 93% of children in the United States got their MMR shot on time. Only 56 people got measles last year in the whole country. This could change if too many parents chose not to have their child get the MMR shot. If only 73% of people had their MMR shot, many more people would get measles. For example, in a town of 50,000 people, about 1,900 would get measles. About 380 of those people would be sick enough to have to go to the hospital'.
- Both a risk comparison and a reduced coverage message.

Evaluation

The intervention was designed after formative research with women. Then, it was evaluated using a randomised pre- and post-test control group survey design. Mother's opinions of childhood vaccines improved after all interventions (1,2,3) but there were no significant changes in specific vaccine related attitudes. The reduced coverage message was remembered easily and well received by respondents. There was a preference for the use of numbers instead of more subjective terms. The risk comparison message did not result in a large proportion of mothers reporting a positive opinion of vaccines (only if paired with reduced coverage).

Relevant resources

- Kennedy A, Glasser J, Covello V, Gust D. Development of vaccine risk communication messages using risk comparisons and mathematical modeling. JHealth Commun 2008;13(December (8)):793–807. Available from: http://www.ncbi.nlm.nih.gov/pubmed/19051114

2.1I. Countering anti-vaccination attitudes

Determinants targeted

Misinformation | Safety issues

Intervention details

Aim	This intervention aims to measure parents' attitudes towards vaccination and alter such attitudes by drawing attention to the consequences of not vaccinating their children.
Country	United States
Setting	Online
Target population	Parents and general public
Administrator	Not specified
Vaccine(s)	All vaccines
Type of intervention	Dialogue based
Funding	Not specified

Main components

- Pre-test of attitudes towards vaccines: a five-item vaccine attitude scale was developed to measure people's general attitudes towards vaccines.
- Exposure to information about consequences of not vaccinating: respondents were invited for a second phase in which they would be randomly assigned to read information contained in disease risk, autism correction, or control interventions.
- Post-test of attitudes towards vaccines: participants were asked questions about their past vaccine behaviours and their intentions to vaccinate their children in the future. The authors created a vaccination attitude change score, which was computed as the difference between participants' post-test and pre-test vaccination attitude scores.

Evaluation

The evaluation of this intervention found that information about disease risk led to larger changes in vaccination attitudes. Attitude change scores were also more positive when informed about disease risk rather than when informed about autism correction. In fact, the autism correction had no greater effect on people's vaccination attitude than did the control condition. Presenting participants with evidence that there is no link of autism between vaccinations and autism did not meaningfully alter, neither positively nor negatively, people's existing attitudes about vaccination. Findings hold equal for both parents and non-parents.

Relevant resources

- Horne Z, Powell D, Hummel JE, Holyoak KJ. Countering antivaccination attitudes. 2015; 112 (3): 10321 – 10324. Available from: http://www.pnas.org/content/112/33/10321.abstract

2.2. Individual-level interventions focusing on improving healthcare workers' confidence and communication skills to respond to hesitant patients

2.2A. Ask, Acknowledge, Advise

Determinants targeted

General vaccine hesitancy

Intervention details

Aim	Improve physician confidence in communication and reduce vaccine hesitancy among parents
Country	United States
Setting	Healthcare facilities
Target population	Physicians
Administrator	Paediatrician immunisation experts and health educators
Vaccine(s)	All vaccines
Type of intervention	Dialogue-based
Funding	Not specified

Main components

This intervention aims to improve physician's confidence in communicating with vaccine-hesitant parents in three different steps: ask, acknowledge and advise.

- Ask: physicians should encourage parents to ask questions and share their concerns
- Acknowledge: physicians should show respect and empathy for parents' concerns, thereby creating a trusting environment
- Advise: physicians should advise and recommend vaccination by discussing the benefits and risks of vaccines and vaccine-preventable diseases. Consultations should end with a mutually agreed action such as vaccination or another meeting to discuss concerns further

Physicians are trained in these three steps in a 45-minute course administered by a paediatrician immunisation expert and a health educator. The training consists of a didactic presentation of data on vaccine hesitancy, the importance of trust and the role and influence of vaccine providers. Physicians are provided with printed materials explaining the framework and receive monthly email newsletters, a link to the study website, and technical assistance.

Evaluation

An initial evaluation showed that the strategy is feasible and has been well received. A cluster-randomised trial showed that the intervention had no effect on maternal vaccine hesitancy, nor on physician self-efficacy.

Relevant resources

- Henrikson NB, Opel DJ, Grothaus L, Nelson J, Scrol A, Dunn J, et al. Physician Communication Training and Parental Vaccine Hesitancy: A Randomized Trial. Pediatrics. 2015;136(1):70-9. Available from: http://www.ncbi.nlm.nih.gov/pubmed/26034240

2.2B. Becoming a vaccine champion

Determinants targeted

Mandate | Misinformation | Safety issues | Religious and philosophical views | Trust

Intervention details

Aim	The aim of this intervention is to improve vaccination uptake in the general population by focusing on vaccine-hesitant parents
Country	United States
Setting	Healthcare facilities
Target population	Parents (vaccine hesitant)
Administrator	Vaccine providers
Vaccine(s)	All vaccines
Type of intervention	Dialogue-based
Funding	Not specified

Main components

This intervention aims to improve vaccine uptake in the general population but also focuses on parents which are part of the 'philosophical group', or in other words, parents who are opposed to vaccination. It consists of the following elements, to be administered every visit:

- Parents opposed to vaccination are told that doctors will work with them and their children regardless of their beliefs and decision to vaccinate. This step is important to prevent parents from feeling marginalised.
- Vaccine providers then explain to parents that they strongly believe in vaccines and that they are not in a position to force parents to vaccinate but they are there to share their knowledge and experience, talk about the benefits, risks and consequences of vaccination and allow parents to decide after balancing the pros and cons. This step serves to improve trust between parents and vaccine providers.
- Vaccine providers ask hesitant parents the following questions: 'Why are you opposed to vaccination? What are your specific concerns?' These are questions that can be addressed easily, and will allow providers to show that the benefits of vaccination outweigh the risks, thereby reassuring parents.

The intervention should be similar for vaccine refusers, except that these discussions should not take place during every visit but every 2–3 visits to avoid being perceived as too persistent. Parents will also need to sign an exemption form, which also explains the benefits and risks of vaccination.

Evaluation

No evaluation

Relevant resources

- Temoka E. Becoming a Vaccine Champion: Evidence-based Interventions to address the Challenges of Vaccination. South Dakota Medicine: The Journal of the South Dakota State Medical Association. 2013;Special edition:68-72. Available from: http://sdsma.org/docs/pdfs-new_site/Journal/2013/SDMSpecial%20Issue2013l.pdf#page=70

2.2C. C.A.S.E.

Determinants targeted

General vaccine hesitancy | Misinformation | Safety issues

Intervention details

Aim	The aim of this intervention is to improve communication between physicians and parents, and address their concerns about vaccines
Country	United States
Setting	Healthcare facilities
Target population	Parents and adolescents
Administrator	Vaccine providers
Vaccine(s)	HPV
Type of intervention	Dialogue-based
Funding	Not specified

Main components

C.A.S.E. stands for Corroborate, About me, Science, and Explain/advise. It is a strategy to help vaccine providers communicate with vaccine-hesitant parents. It consists of the following steps:

- Corroborate: physicians corroborate with their patients' the concerns and try to understand their questions, find common ground for discussion. They could say the following: 'Tell me what is bothering you'; 'I can see why you might worry about that, a number of my patients' parents have raised that same concern'; 'You and I both want your teen to be protected against things that might harm her'
- About me: physicians discuss what they have done to understand and to improve their knowledge of the topics that cause concerns for parents or adolescents: 'As a result of my own questions, I've read the studies and attended lectures on the topic.'
- Science: physicians summarise facts and scientific evidence related to the concerns raised by parents or adolescents: 'studies now involving hundreds of thousands of teens demonstrate the vaccine's safety with no development of injury or disease.'
- Explain/advise: physicians advise patients by framing their explanation according to the concerns parents or adolescents have raised. This involves persuasion as well as informing: 'I really recommend that you get them today. In my experience, my patients your age handle the pain of that shot easily. If I were in your shoes, I would get the shot.'

Evaluation

Not evaluated

Relevant resources

- Jacobson RM. Making the C.A.S.E. for the human papillomavirus vaccine: how to talk to parents and adolescents. Minnesota Medicine. 2014;97(2):38-42. Available from: http://www.ncbi.nlm.nih.gov/pubmed/24724248

2.2D. CD-ROM-based tutorial

Determinants targeted

General vaccine hesitancy | Misinformation | Safety issues | Religious and philosophical views | Trust

Intervention details

Aim	Provide a CD-ROM tutorial for healthcare providers to increase knowledge and change attitudes about parental resistance to routine childhood immunisation
Country	United States
Setting	CD-ROM
Target population	Primary healthcare providers in the last stage of training, community providers
Administrator	Not specified
Vaccine(s)	Childhood vaccines
Type of intervention	Dialogue-based
Funding	Not specified

Main components

The intervention consists of a CD-ROM entitled 'Addressing Parents' concerns about childhood immunisation: a tutorial for primary care providers'. It provides historical, ideological, and scientific reasons for vaccine hesitancy and addresses the clinical implications of resistance to immunisation. Finally, it describes the ethical and professional obligations of physicians to their patients and explains how they can address vaccine hesitancy effectively.

Evaluation

The intervention was evaluated among resident physicians and showed a significant improvement in residents' general knowledge and knowledge of adverse events. Residents also reported changes in their attitudes toward parents who oppose vaccination.

Relevant resources

- Levi BH. Addressing parents' concerns about childhood immunisations: a tutorial for primary care providers. Pediatrics. 2007;120(1):18-26. Available from: http://www.ncbi.nlm.nih.gov/pubmed/17606557

2.2E. Electronic medical record linked clinical decision support

Determinants targeted

General vaccine hesitancy | Trust

Intervention details

Aim	Improve vaccination rates by educating clinicians about parental concerns
Country	United States
Setting	Healthcare facilities
Target population	Parents (concerns about vaccination)
Administrator	Vaccine providers
Vaccine(s)	HPV
Type of intervention	Reminder-recall
Funding	Not specified

Main components

Vaccine providers are provided with a tool linked to electronic medical records (EMR) supporting their clinical decisions and providing educational content, reminders and feedback reports.

- Educational content: vaccine providers are offered a training, offered online and in live sessions to help them feel more comfortable discussing HPV vaccination. They are also educated on addressing concerns and motivating timely vaccination. The content of the course includes a review of published guidelines about vaccination, epidemiology of VPD, vaccine efficacy and safety information, and data on local HPV vaccination rates.
- Reminders: vaccine providers are alerted when a patient eligible for HPV vaccination visits them. Patients identified through the EMR are also contacted by phone and reminded to schedule a visit for the vaccine. They are also provided with a reference to online vaccine education materials.
- Feedback reports: vaccine providers are sent quarterly reports with information on vaccination rates to compare their results with those of other physicians.

Evaluation

A nested cohort study involving telephone interviews was conducted to evaluate the intervention. The family-focused decision support was acceptable to families and encouraged seeking out information, discussing the vaccine with others, or giving through to their decision. A third of parents who remembered the call reported behaviour change. None of the families visited the website.

Relevant resources

- Mayne S, Karavite D, Grundmeier R, Localio R, Feemster K, DeBartolo E, et al. The Implementation and Acceptability of an HPV Vaccination Decision Support System Directed at both Clinicians and Families 2012. 2012 Nov 3.:[616-24]. Available from: http://www.ncbi.nlm.nih.gov/pubmed/23304334.

2.2F. Framework for communicating with vaccine hesitant parents

Determinants targeted

General vaccine hesitancy | Misinformation | Safety issues | Religious and philosophical views | Trust

Intervention details

Aim	The aim of the framework is to improve communication between clinicians and vaccine-hesitant parents
Country	Australia
Setting	Healthcare facilities
Target population	Parents (concerns about vaccination)
Administrator	Vaccine providers
Vaccine(s)	All vaccines
Type of intervention	Dialogue-based
Funding	Not specified

Main components

This intervention aims to develop communication strategies for all types of vaccine-hesitant parents that focus on helping clinicians tailor their conversations with patients and avoid confrontational arguments. It uses the principles of motivational interviewing, thereby guiding patients rather than directing them and focusing on developing an empathic relationship. This respectful, non-judgemental approach which can be supported by factsheets, pictorial representation of risk, and information about the number of cases of VPD aims to build trust between vaccine providers and their patients. The intervention has two different communication approaches for different types of vaccine-hesitant parents.

For vaccine-hesitant or delaying parents:

- Spend adequate time with child/parents
- Ask permission to discuss concerns
- Carefully elicit concerns and try to address each one specifically
- Accept concerns and try not to minimise or dismiss them
- Use a guiding style
- Discuss disease and vaccine risks as well as vaccine benefits
- Communicate risks with words and numbers or even simple graphics
- Support discussions with downloadable resources
- Avoid trying to overwhelm with detailed scientific information
- Offer another appointment if needed or attendance at a specialist immunisation clinic.

For refusing parents:

- Ask permission to discuss refusal
- Aim to keep discussion brief but leaving the door open
- Check importance of vaccines and confidence
- Don’t dismiss concerns, acknowledge them
- Don’t overstate vaccine safety
- Challenging firmly held philosophical, religious or scientific beliefs is unhelpful
- Avoid overt confrontation and scientific ping pong
- Provide links to resources if wanted
- Explore receptivity to a tailored schedule to get them started, and explain the risks
- Offer another appointment when ready or attendance at a specialist immunisation clinic.

Evaluation

Not evaluated

Relevant resources

- Danchin M, Nolan T. A positive approach to parents with concerns about vaccination for the family physician. Australian Family Physician. 2014;43(10):690-4. Available from: http://www.ncbi.nlm.nih.gov/pubmed/25286425

2.2G. Fifty-eight responses to anti-vaccination questions: A handbook against misinformation

Determinants targeted

General vaccine hesitancy | Misinformation | Safety issues | Religious and philosophical views | Trust

Intervention details

Aim	To provide healthcare workers with 58 common anti vaccination questions and effective answers to them.
Country	Italy
Setting	Healthcare facilities
Target population	Healthcare providers
Administrator	Not specified
Vaccine(s)	All vaccines
Type of intervention	Dialogue based
Funding	Not specified

Main components

The handbook contains 58 questions that anti-vaccination people pose at vaccination centres. Questions include a variety of issues presented by anti-vaccinators and it is aimed to be a guide for healthcare professionals on how to address these in the most efficient manner.

Evaluation

There is no evaluation of the use of this handbook.

Relevant resources

- Società Italiana di Igiene, Medicina Preventiva e Sanità Pubblica. Vaccini: un vademecum contro la disinformazione http://www.sitiappulolucana.it/notizie/principali/122-vaccini-un-vademecum-contro-la-disinformazione.html

2.2H. PROMOVAC: motivational interviewing session at birth increases vaccination acceptance and uptake

Determinants targeted

General vaccine hesitancy | Misinformation | Safety issues | Trust

Intervention details

Aim	To provide an early strategy for avoiding delays in first vaccines using a motivational interviewing method and not just providing information alone.
Country	Canada
Setting	Healthcare facilities
Target population	Healthcare providers
Administrator	Not specified
Vaccine(s)	All vaccines
Type of intervention	Dialogue based
Funding	Not specified

Main components

Motivational interviewing techniques are conducted in nurseries, identified as a place for an early strategy of promoting vaccination. This motivational interviewing is an adaptation to vaccine promotion of the Miller and Rollnick model and the trans-theoretical model of Prochaska. Motivational interviewing is a collaborative, goal-oriented style of communication with particular attention to the language of change. It is designed to strengthen personal motivation for and commitment to a specific goal, by eliciting and exploring the person's own reasons for change (solving their own ambivalence) within an atmosphere of acceptance and compassion. The motivational interview emerges at the intersection of collaboration, acceptance, evocation and compassion. The Prochaska model defines stages: pre-contemplation (not ready), contemplation (getting ready), preparation (ready), action (ready). Each step requires a different strategy to increase vaccine acceptance and reduce/mitigate hesitancy.

Evaluation

Parents knowledge, attitudes, beliefs and vaccination intention were evaluated before and after motivational interviewing by means of a questionnaire (based on the Health Belief Model) administered to all participants. A significant increase in vaccination intention was observed in each centre after intervention, with global increase of 12%.

Relevant resources

- Evaluation of an intervention promoting vaccination in maternity in Quebec (PROMOVAQ): https://clinicaltrials.gov/ct2/show/NCT02666872

2.2I. SARAH: an approach to vaccine communication in primary care – strategies to increase vaccine acceptance and uptake

Determinants targeted

General vaccine hesitancy | Misinformation | Safety issues | Trust

Intervention details

Aim	To support and offer resources, communicating adequately, to assist parents with vaccination.
Country	Australia
Setting	Healthcare facilities
Target population	Healthcare providers
Administrator	Not specified
Vaccine(s)	All vaccines
Type of intervention	Dialogue based
Funding	Not specified

Main components

This intervention aims to give providers the capacity to communicate appropriately and offer the resources for hesitant parents to choose to vaccinate. A presumptive or paternalistic style of communication does not meet the needs of the very hesitant and can backfire with those that decline. A participatory approach is associated with increased rates of a highly rated experience by parents. There are different pathways to follow depending on where in the vaccine hesitancy spectrum the parents find themselves: accepting, hesitant or declining. The intervention suggests five knowledge tools for the hesitant, available at http://www.ncirs.edu.au/research/social--research/sarah--project/. If parents are declining, the best approach is to have open questions designed to focus the conversation, using moderate language. Providers are advised to explore the parents' decision to not vaccinate, reflecting on it and clarifying their views, sharing your views and adequately closing the conversation.

Evaluation

A feasibility study aligned to Medical Research Council guidance is expected to happen between January 2017 and June 2018.

Relevant resources

- National Centre for Immunisation Research and Surveillance. The Sarah Project. http://www.ncirs.edu.au/research/social-research/sarah-project/

2.2J. ECBT (Every Child by Two) – increasing vaccine confidence using evidence based research

Determinants targeted

General vaccine hesitancy | Misinformation | Trust

Intervention details

Aim	To serve as the largest source of evidence-based vaccine information on social media. It develops and shares best practice with partners/coalitions.
Country	United States
Setting	Internet
Target population	General population
Administrator	Not specified
Vaccine(s)	All vaccines
Type of intervention	Dialogue based
Funding	Not specified

Main components

Increasingly, families are seeking health information online; 79% of mothers use social media daily and 80% of internet users seek health information online. This intervention moved from a website to accompanying social media platform with a heavy focus on safety for childhood vaccines. This website and social media program focuses on benefits of vaccines across the lifespan. The ECBT aims to contribute to alleviate concerns via social media efforts by using the 'bite, snack, meal' approach. This is a content writing and editing strategy where bite is the headline of message, snack is a concise summary that provides enough information for content overview and meal is the full, original content.

Evaluation

The impact was measured and ECBT had a 134% increase in Facebook followers, doubled Facebook reach and engagement in six months. On Twitter, there was a 125% increase in followers and 147% increase in monthly Twitter impressions. Hence there was a marked increase in the sharing of evidence based messaging on vaccines by followers.

Relevant resources

- Every Child By Two. http://www.ecbt.org/

2.3 Community-level interventions

2.3A. Educational intervention with religious leaders

Determinants targeted

Misinformation | Religious and philosophical views

Intervention details

Aim	Use religious leaders as supporters of vaccination during educational campaigns
Country	Iraq
Setting	Community
Target population	Adults (<20% coverage rates areas)
Administrator	Religious leaders
Vaccine(s)	All vaccines
Type of intervention	Dialogue-based
Funding	Not specified

Main components

The intervention is based on a collaboration with local Sheikhs, who are the most influential spiritual leaders in the region. The Sheikhs send messages to their representatives in tribal villages, explaining vaccination is a great benefit for people and prompting all families to vaccinate their children. Villages are also visited by research teams (supported by local peer leaders) for health education activities which include health talks, posters, and a film.

Evaluation

The intervention was evaluated and showed a decrease in dropout rates.

Relevant resources

- Abdul Rahman MA, Al-Dabbagh S, Al-Habeeb Q. Health education and peer leaders' role in improving low vaccination coverage in Akre district, Kurdistan Region, Iraq. Eastern Mediterranean Health Journal. 2013. Available from: http://www.ncbi.nlm.nih.gov/pubmed/23516821

2.3B. Grassroots mobilisation campaign Majigi

Determinants targeted

General vaccine hesitancy | Misinformation | Safety issues | Religious and philosophical views | Trust

Intervention details

Aim	Using a grassroots mobilisation campaign to increase uptake of polio vaccination in areas where there is strong resistance
Country	Nigeria
Setting	Communities (Community events)
Target population	Parents (in resistant areas)
Administrator	Community gatekeepers
Vaccine(s)	Polio
Type of intervention	Dialogue-based
Funding	Not specified

Main components

The 'Majigi' campaign uses community gatekeepers such as political, traditional, religious leaders, traditional healers, birth attendants, town criers, and traditional surgeons. The entire community is invited to a community event which starts with an opening prayer, a welcome speech from the village head, an introduction by the team leader, and a drama on the consequences of polio. Participants are also shown a PowerPoint presentation and a computer simulation model which discusses polio transmission, signs, symptoms and complications. Then, participants watch different films for 1–2 hours, which focus on misconceptions about the cause of polio and other negative attitudes towards vaccination. Emotional movies of victims of polio and their relatives show their frustrations, experiences and disabilities. This is followed by a discussion with the community.

Evaluation

The intervention was evaluated by monitoring the number of children who received polio vaccination. There was a relative increase in children vaccinated of 310% after the campaign and a net reduction of 29% of never vaccinated children. This represents an absolute increase of 73% in vaccinated children (96% coverage).

Relevant resources

- Nasiru SG, Aliyu GG, Gasasira A, Aliyu MH, Zubair M, Mandawari SU, Waziri H, Nasidi A, El-Kamary SS. Breaking community barriers to polio vaccination in northern Nigeria: the impact of a grass roots mobilization campaign (Majigi). Pathogens and global health. 2012;106(3):166-171. Available from: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4001576/

2.3C. I Immunise

Determinants targeted

Religious and philosophical views

Intervention details

Aim	Advocate vaccination to a community with alternative lifestyles and alter community discourse against vaccination
Country	Australia
Setting	Community
Target population	Community (alternative lifestyles)
Administrator	Immunisation Alliance of Western Australia (not-for-profit advocacy organisation) together with community members who support vaccination
Vaccine(s)	All vaccines
Type of intervention	Advocacy campaign
Funding	Immunisation Alliance of Western Australia (not-for-profit advocacy organisation)

Main components

The 'I Immunise' campaign is a community advocacy campaign that promotes vaccination by appealing to local values and alternative lifestyle. Community members with alternative lifestyles took part in the development of the campaign by writing a 300-word testimonial explaining why they vaccinate and how it is also part of their alternative lifestyle. These testimonials are published on a website with pictures of the community members. Posters were also created based on the testimonials with the following information: first name, age, number of children, two other core lifestyle attributes, a picture and the words 'I Immunise'. Posters were displayed on billboards, on public buildings, in healthcare facilities, and also featured in newspapers and published on Facebook.

Evaluation

An evaluation of the campaign revealed that 59.2% of individuals involved in the study (with no difference between those with alternative and non-alternative lifestyles) felt the campaign had a positive impact, 16.8% a negative impact and 24% no impact. Vaccine-hesitant participants reported more negative thoughts and feelings in response to the campaign than non-hesitant individuals.

Relevant resources

- Attwell K, Freeman M. I Immunise: An evaluation of a values-based campaign to change attitudes and beliefs. Vaccine. 2015;33(46):6235-40. Available from: http://www.ncbi.nlm.nih.gov/pubmed/26458802
- Immunise website: http://immunise.org.au/
- Facebook page: https://www.facebook.com/i.immunise/

2.3D. Interactive social media tool for parents with concerns about vaccines

Determinants targeted

Misinformation

Intervention details

Aim	Use a theory-driven social media intervention tool to reduce parental concerns about childhood vaccination
Country	United States
Setting	Online
Target population	Parents
Administrator	Experts in vaccination, researchers
Vaccine(s)	Childhood vaccines
Type of intervention	Dialogue-based
Funding	Not specified

Main components

This intervention consists of an interactive online tool that provides evidence-based information and a platform for parents to discuss their concerns with each other and with vaccine experts. The intervention is based on a 'multidirectional communication model', which represents a social marketing strategy where both developers and users can create information and contribute messages. Parents become active participants in the communication process which establishes trust and credibility in an open and empathetic conversational tone. The tool consists of a blog (text, multimedia posts, photos, videos, and audio), a discussion forum, a chatroom (topics scheduled in advance), a newsletter, and a portal for parents to ask questions to experts. The tool is regularly updated, with quick responses to questions (monitored twice a day and weekly searches on the internet and scientific databases to update content). Parents are treated as experts, and a respectful tone is used by experts when responding to their questions and acknowledging their potential concerns. Activity is monitored on a daily basis, to identify and filter abuse (language, bullying, and disclosure of personal identifying health information).

Evaluation

The intervention was first piloted among parents who accepted, delayed or refused vaccination for their children to assess their trust in and their use of the tool. Parents reported they would use it to ask questions and to find vaccine information, but also to review vaccination schedules and discuss their experiences and concerns. They asked for more balanced information, transparency, moderation and diversity in the content provided.

Relevant resources

- Shoup, J. A., Wagner, N. M., Kraus, C. R., Narwaney, K. J., Goddard, K. S. & Glanz, J. M. 2015. Development of an interactive social media tool for parents with concerns about vaccines. Health Education & Behavior, 42, 302-12. Available from: http://www.ncbi.nlm.nih.gov/pubmed/25413375

2.3E. Messages with corrective information against influenza vaccination myths

Determinants targeted

Misinformation | Safety issues

Intervention details

Aim	Using corrective information against myths to reduce beliefs in the misperception that the flu vaccine can give people the flu, increase perceptions that the flu vaccine is safe, and increase vaccination intent
Country	United States
Setting	Online
Target population	Adults
Administrator	Existing survey (Cooperative Congressional Election Survey, a multi-investigator online study)
Vaccine(s)	Influenza
Type of intervention	Dialogue-based
Funding	Not specified

Main components

The intervention consists of corrective messages adapted from the US CDC webpage 'misconceptions about seasonal flu and flu vaccines'. Individuals are also told that it is not possible to contract flu from the flu vaccine (whether injection or nasal spray).

Evaluation

The evaluation consisted of comparing the impact of the intervention to the one of delivering a pro-vaccination information message (for instance about the risks posed by influenza) and to the impact of not giving any additional information. Corrective information was found to be effective at reducing misperceptions but the effect on intention to vaccinate was found to vary depending on original concerns about side effects. It had no effect on intention to vaccinate among respondents with low side effects concern but it significantly decreased the likelihood of receiving a flu vaccine among those with side effect concerns. Pro-vaccination messages had no significant effect on misperceptions or intentions to vaccinate.

Relevant resources

- Nyhan, B. & Reifler, J. 2015. Does correcting myths about the flu vaccine work? An experimental evaluation of the effects of corrective information. Vaccine, 33, 459-64. Available from: http://www.ncbi.nlm.nih.gov/pubmed/25499651

2.3F. Reducing resistance against polio drops through house visits

Determinants targeted

Misinformation | Safety issues | Religious and philosophical views

Intervention details

Aim	The intervention aims to provide health information about the polio eradication programme and improve vaccination in resistant communities
Country	India
Setting	Communities (resistant households in Muslim communities)
Target population	Community (Muslim)
Administrator	Medical college interns, social workers, and local influential people
Vaccine(s)	Polio
Type of intervention	Dialogue-based
Funding	Not specified

Main components

Interns visit resistant families to impart correct health education in a friendly atmosphere. They try to convince resistant parents that the polio drops do not have any side effects such as sterility. If parents are convinced, children are vaccinated. If not, a second visit is organised by more motivated and enthusiastic teams.

Evaluation

The intervention was trialled and evaluated. The evaluation found that 79% of families visited by interns accepted the polio drops.

Relevant resources

- Ansari MA, Khan Z, Khan IM. Reducing resistance against polio drops. Journal of The Royal Society for the Promotion of Health. 2007;127(6):276-9. Available from: http://www.tandfonline.com/doi/abs/10.1586/14760584.2015.964212

2.3G. Social Marketing Strategies to Promote HPV vaccination

Determinants targeted

Misinformation | Perceived benefits | Safety issues

Intervention details

Aim	Address barriers to vaccination and improve HPV vaccination uptake by discussing STIs with parents
Country	United States
Setting	Healthcare facilities
Target population	Parents, adolescents
Administrator	Not specified
Vaccine(s)	HPV
Type of intervention	Dialogue-based, reminder-recall
Funding	Not specified

Main components

The intervention suggested is a social marketing strategy, which is based on formative research with parents of pre-teens and healthcare providers. It consists of messages focusing on children's risks of getting an STI which can lead to cancer and includes the use of text messages to contact pre-teens.

Evaluation

Not evaluated

Relevant resources

- Cates JR, Coyne-Beasley T. Social marketing to promote HPV vaccination in pre-teenage children: talk about a sexually transmitted infection. Human vaccines & Immunotherapeutics. 2015;11(2):347-9. Available from: http://www.ncbi.nlm.nih.gov/pubmed/25692313

2.3H. Web-based MMR decision aid

Determinants targeted

Misinformation | Safety issues

Intervention details

Aim	Empowering parents to make informed decisions about MMR
Country	United Kingdom, Australia
Setting	Online
Target population	Parents
Administrator	Online
Vaccine(s)	MMR
Type of intervention	Dialogue-based
Funding	Not specified

Main components

The intervention consists of a decision aid, comprised of nine sections. It was adapted from an original version developed in Australia (modified presentation of information, content adapted to the UK).

1. Introduction: overview of who the decision aid is for and how parents can use the decision aid for help (In the UK version, it was adapted to be consistent with the UK vaccination schedule).
2. How to use this site: instructions for navigating the decision aid, terms of use and an 'initial thoughts' question on whether the user is currently leaning away from MMR vaccination, undecided, or leaning towards MMR vaccination.
3. Frequently asked questions: frequently asked questions and answers such as: what are measles, mumps and rubella, how common are these diseases, what is the MMR vaccine, is there any proof of a link between autism, inflammatory bowel disease, and the MMR vaccine? (In the UK, questions were adapted to the UK context).
4. How to compare the risks: numerical and graphic data comparing the potential risks of the MMR vaccine with the potential risks of measles, mumps and rubella (In the UK, it was adapted with relevant data and changes were made to formatting and graphical data).
5. What are my options? Current options available to the user. For example: I could vaccinate my child at 12 months and again at 4 years of age. I could delay vaccination until my child is older (Adapted to the UK national vaccination schedule).
6. Making a decision: a clarifying values exercise where the user reviews the importance they place on the advantages and disadvantages of choosing the MMR vaccination (i.e. my child will be better protected from the potentially serious complications of these diseases; if my child experiences a severe complication I may feel guilty or responsible for getting them vaccinated). Users review their information needs (i.e. do you know what options are available to you? Yes, no, unsure). Users are then asked again whether they are leaning away from MMR vaccination, undecided, or leaning towards MMR vaccination.
7. Useful websites: relevant websites are provided (adapted to the UK).
8. References: users a provided with a list of references used in the decision aid (adapted to UK).
9. Contact us: contact details for the decision aid developers (adapted to UK).

Evaluation

The intervention was evaluated both in the UK and in Australia. In the UK, the evaluation was done through a questionnaire and semi-structured telephone interviews. Parents found the decision aid acceptable and useful in supporting their informed decision-making for MMR. However, they also felt the aid was slanted towards MMR. It may increase knowledge about MMR, measles, mumps and rubella, and reduce decisional conflict to a level where parents can make an informed decision about MMR. In Australia, the evaluation revealed that more parents were leaning towards vaccination after using the aid (statistically significant).

Relevant resources

- Jackson C, Cheater F M, Rose P, Julie L, Lyndal T. Evaluating a web-based MMR decision aid to support informed decision-making by UK parents: A before-and-after feasibility study. Health Educ J. 2010;1:74–83. Available from: http://hej.sagepub.com/content/69/1/74.short
- Wallace C, Leask J, Trevena LJ. Effects of a web based decision aid on parental attitudes to MMR vaccination: a before and after study. Br Med J 2006;332(January (7534)):146–9. Available from: http://www.bmj.com/content/332/7534/146?ecoll

2.3I. ECDC communication guide: Let's talk about hesitancy

Determinants targeted

General vaccine hesitancy | Misinformation | Safety issues | Trust

Intervention details

Aim	A practical guide for public health programme managers and communicators on enhancing confidence in vaccination uptake
Country	ECDC (EU/EEA Member States)
Setting	Not specified
Target population	Vaccine-hesitant populations
Administrator	Public health programme managers (PHPMs) and communicators involved with immunisation services
Vaccine(s)	All vaccines
Type of intervention	Dialogue-based
Funding	Not specified

Main components

This guide identifies ways to enhance peoples' confidence in vaccination and addresses common issues which underlie vaccination hesitancy. PHPMs are the target audience for this guide, as they are uniquely positioned to initiate, coordinate and monitor the comprehensive system-wide action needed to address the many social determinants of hesitancy and provide support to healthcare professionals in their efforts to enhance vaccination confidence and uptake. The guide serves as a supplement to the next guide listed in this catalogue (Let's talk about protection). It covers the following areas:

Strengthening vaccine trust in populations by improving communication/information:

- listening to gain insights into what are the determinants of vaccination hesitancy in the specific context;
- match interventions to determinants of hesitancy;
- contextualise design, format and content.

Support healthcare professionals by:

- addressing their hesitancy;
- be transparent: ensure that information on vaccination policy, licensing and quality control practices are publicly available;
- support HCPs with specific hesitancy related communication training and tools.

Evaluation

Not evaluated

Relevant resources

- European Centre for Disease Prevention and Control. Let's talk about hesitancy. Stockholm: ECDC; 2016. Available from: http://ecdc.europa.eu/en/publications/Publications/lets-talk-about-hesitancy-vaccination-guide.pdf

2.3J. ECDC communication guide: Let's talk about protection

Determinants targeted

General vaccine hesitancy | Misinformation | Safety issues | Religious and philosophical views | Trust

Intervention details

Aim	A behaviour-related health communication guide for healthcare providers to increase childhood vaccination uptake
Country	ECDC (EU/EEA Member States)
Setting	Healthcare setting
Target population	Parents (particularly from groups of un- or under-vaccinated children)
Administrator	Healthcare providers
Vaccine(s)	Childhood vaccines
Type of intervention	Dialogue-based
Funding	Not specified

Main components

The focus of the guide is to facilitate communication between healthcare providers and parents in a way that it results in an effective change of behaviour that would contribute to an increase of childhood vaccination uptake. Perspectives provided include

- A parent and carer perspective:
  - match own actions to recommendations;
  - teach parents about risks of non-vaccination (for their children and others);
  - tell stories as well as sharing scientific facts;
  - take time to listen to concerns about possible side effects and risks;
  - make vaccination easier to access and less stressful;
  - recognise some individuals will need more time to make a decision;
  - help enhance understanding of vaccinations.
- A social marketer, health promoter and media specialist perspective:
  - focus on behaviour and its determinants - not just in the message;
  - develop accessible, friendly and adapted places for vaccination services;
  - make the discussion about 'being protected' rather than about vaccine safety;
  - make those who accept vaccination more visible;
  - show that being unprotected is socially unacceptable;
  - ensure any decision to remain unprotected is an active one;
  - guide patients to reliable sources of information.
- A vaccination expert and provider (peer) perspective:
  - keep your immunisation knowledge current;
  - strengthen your communication skills;
  - use the team and other settings to provide information and address concerns;
  - maintain your skills to ensure safe vaccine administration.
- Reaching a 'hard to reach' population (groups of people who are unprotected or under-protected because of social and/or geographical isolation or who resist vaccination on religious and philosophical grounds);
  - understand socially disadvantaged groups and their intricacies better;
  - integrate them into mainstream vaccination programmes;
  - involve them in all stages of programmes enhancing inclusion and health;
  - adapt governance and health systems to be more inclusive;
  - health mediators and other community health workers are critically important resources.

Evaluation

The guide itself has not been evaluated yet; however, ECDC interviewed experts who indicated that key outcome measures of the use of the guide should be vaccination uptake and the importance of disaggregated data that could be used to monitor and compare uptake rates related to different providers, institutions, communities, sub national areas and social groups. Pilot interventions are ongoing in countries adapting the guide. Plans for further formal evaluation of usage and impact are envisioned over the coming years in countries where the tool was piloted.

Relevant resources

- European Centre for Disease Prevention and Control. Let's talk about protection. Stockholm: ECDC; 2016 (revised edition). Available from: http://ecdc.europa.eu/en/publications/Publications/lets-talk-about-protection-vaccination-guide.pdf

2.3K. WHO Best Practice Guidance: How to respond to vocal vaccine deniers in public

Determinants targeted

General vaccine hesitancy | Misinformation

Intervention details

Aim	Guidance document providing basic broad principles to respond to vocal vaccine deniers
Country	WHO - Global
Setting	Media
Target population	Health and immunisation spokespersons
Administrator	Health authorities
Vaccine(s)	All vaccines
Type of intervention	Dialogue-based
Funding	No funding

Main components

Guidance providing basic, broad principles for spokespersons of health authorities on how to behave when confronted by vocal vaccine deniers (VVD), and how to respond to them. VVDs are defined as individuals who 'do not accept recommended vaccines, are not open to a change of mind no matter what the scientific evidence says'. The document offers strategies that address the three main elements of successful communication: the audience, the speaker, and the argument. Two main rules serve as guidance principles:

- the general public is the target audience, not the vaccine deniers;
- aim to correct the content AND unmask the techniques that vocal vaccine deniers use.

The goal of communication should be to make the public audience more resilient against anti-vaccine statements and support those who are vaccine-hesitant in their vaccine acceptance decision (not to change the mind of vaccine deniers).

The guidance provides advice on whether or not to participate in a discussion/public audience with VVDs, who the spokesperson should be (charismatic speakers, being a good listener, participation in media training), do's and don'ts of verbal communication (prepare three key messages, keep messages simple, repeat key messages, do not repeat anti-vaccine arguments, emphasise high safety instead of low risk, use inclusive terms, do not question the deniers' motivation, tell the truth, communicate what has been achieved, avoid humour, underline scientific consensus, emphasise social benefit of vaccines), and do's and don'ts of nonverbal communication (keep eye contact, stay calm, wear suitable clothing, be interviewed in sitting position).

The document also provides three steps recommended for responding to vaccine denial in a public discussion:

- disentangle core points and address each separately;
- identify the technique the denier is using to misinform the public;
- respond with key messages.

The document then provides keys messages that correct the content of the vaccine deniers' main criticism (about threat of disease, alternatives, effectiveness, trust, and safety), and examples of techniques used by vaccine deniers' (fake experts, selectivity, misrepresentation and false logic, impossible expectations, conspiracies). It also discusses how to behave in a passionate discussion (remaining patient) and how to protect oneself in rare circumstances where one's personal safety would be compromised.

Evaluation

The guidance has not been evaluated.

Relevant resources

- World Health Organisation. Best practice guidance: how to respond to vocal vaccine deniers in public. Copenhagen. 2016: WHO Europe. Available from: http://www.euro.who.int/__data/assets/pdf_file/0005/315761/Best-practice-guidance-respond-vocal-vaccine-deniers-public.pdf?ua=1

Additional relevant resources

- European centre for Disease Prevention and Control (ECDC). Social marketing guide for public health managers and practitioners. Stockholm, 2014. Available from: http://ecdc.europa.eu/en/publications/Publications/social-marketing-guide-public-health.pdf
- World Health Organization (WHO)/ Strategic Advisory Group of Experts on Immunization (SAGE). Summary WHO SAGE conclusions and recommendations on Vaccine Hesitancy. 2015. Available from: http://www.who.int/immunization/programmes_systems/summary_of_sage_vaccinehesitancy_2pager.pdf?ua=1
- World Health Organization (WHO)/ Strategic Advisory Group of Experts on Immunization (SAGE). Strategies for Addressing Vaccine Hesitancy – a Systematic Review. 2014. Available from: http://www.who.int/immunization/sage/meetings/2014/october/3_SAGE_WG_Strategies_addressing_vaccine_hesitancy_2014.pdf?ua=1

3. Summary of interventions addressing vaccine hesitancy

A total of 40 interventions have been included in the catalogue of interventions, strategies and tools addressing vaccine hesitancy. Ten of these are diagnostic tools, developed to measure or monitor vaccine hesitancy. The majority (27/40) of interventions responding to vaccine hesitancy are based on dialogue, communication or information tools for parents or healthcare workers. Only one intervention is based on an advocacy campaign, another one on a reminder-recall system (using varied tools to remind patients or healthcare workers about vaccination), and finally one on a multi-component approach, using both reminder-recall tools and dialogue-based tools. No incentive-based intervention addressing vaccine hesitancy, financial or non-financial, was identified. The majority of these interventions focus on two determinants of vaccine hesitancy: misinformation (23 interventions) and/or safety issues (20 interventions). Some also target issues around trust (nine interventions), religious and philosophical views (eight interventions), and perceived benefits of or need for vaccination (five interventions). Finally, fourteen interventions aim to improve vaccine hesitancy in general, without targeting specific determinants.

Almost all of the interventions identified for inclusion in this catalogue were developed and evaluated outside of Europe. Two diagnostic tools were developed for use globally, two response tools were developed in the US, one in Canada, one in Australia, and one was adapted from Australia to the United Kingdom. Furthermore, most interventions addressing vaccine hesitancy were developed to take place in healthcare facilities (15/40) and to be delivered by vaccine providers. Some interventions are also delivered online (9/40). Finally, several interventions included in this catalogue focus on parents, including mothers (21/40) and on either all vaccines (19/40) or childhood vaccines (8/40). A few interventions are vaccine-specific (HPV, influenza, MMR, Polio, etc.).

The table below provides an overview of the interventions included in the catalogue.

Table 1. Summary of interventions addressing vaccine hesitancy

Name	Type of intervention	Determinants targeted	Country	Setting	Target population	Actors administering intervention	Vaccine	Outcome of evaluation
Diagnostic tools								
Global vaccine confidence index	Diagnostic tool	N/A	Global	N/A	Vaccine-hesitant populations	Existing survey	All	No evaluation
Guide to Tailoring Immunisation Programmes (TIP)	Diagnostic tool	N/A	WHO Europe	National immunisation programmes	Susceptible population groups	National immunisation programme managers, WHO Europe technical officers	All	The tool was evaluated in 2016
Joint Reporting Form on immunisation	Diagnostic tool	N/A	Global	Online reporting form	Vaccine-hesitant populations	National immunisation programme managers, WHO/UNICEF	All	No evaluation
The Parental Attitudes About Childhood Vaccines Survey	Diagnostic tool	N/A	United States	Healthcare facilities	Parents	Vaccine providers	Childhood vaccines	(+) The tool is successful in measuring vaccine hesitancy and in predicting increased uptake
The Vaccination Confidence Scale	Diagnostic tool	N/A	United States	Telephone surveys	Parents	Researchers	Adolescent vaccines	(+) The scale was found to be consistent and to maintain a good fit across different demographic subgroups of parents. It is a brief and efficient measure of parental beliefs
The Vaccine Sentimeter	Diagnostic tool	N/A	Global	Online	Online users	Online tool	All	(+) The Vaccine Sentimeter can be used to monitor real-time sentiments about vaccination and identify trends in misinformation
Tools for the measurement of vaccine hesitancy	Diagnostic tool	N/A	Global	N/A	Vaccine-hesitant populations	N/A	All	No evaluation
Questionnaire measuring VH among GPs	Diagnostic tool	N/A	France	Telephone survey	GPs	Professional investigators	MMR, Meningococcal meningitis C, HPV, Hepatitis B, influenza	No evaluation
Questionnaire measuring public vaccine hesitancy	Diagnostic tool	N/A	France	Telephone survey	Parents, adults, elderly	Health Barometer (national survey)	Influenza, measles, HPV, Hepatitis B	No evaluation
Multi-country survey assessing vaccine confidence	Diagnostic tool	N/A	Global	Telephone, online, face-to-face surveys	Adults	Gallup International Association/Vaccine Confidence Project	All	No evaluation

Name	Type of intervention	Determinants targeted	Country	Setting	Target population	Actors administering intervention	Vaccine	Outcome of evaluation
Individual-level interventions focusing on parents								
Behavioural intervention to increase HPV vaccination acceptability	Dialogue based	General vaccine hesitancy	United States	Online	Mothers	Online	HPV	(+) Viewing graphical representations: increased intentions to vaccinate (+) Use of rhetorical questions: increased intentions to vaccinate (-) Both: lower impact on intention to vaccinate
Educational brochure for parents questioning immunisation	Dialogue based	Misinformation, perceived benefits, safety issues	United States	N/A	Parents (questioning vaccination)	N/A	Childhood vaccines	(-) No significant impact on attitudes about vaccination (+) Positive impressions of the brochure, trust in information provided, improved opinions of CDC
Educational tool to address vaccine hesitancy	Dialogue based	Misinformation, perceived benefits, safety issues	United States	Healthcare facilities	Parents (vaccine-hesitant)	N/A	Childhood vaccines	(+) Improved PACV score (-) No significant improvement in vaccination rates
Individually tailored education	Dialogue based	Misinformation, safety issues	United States	Healthcare facilities (Clinic waiting rooms or coordinator's research office)	Parents (vaccine-hesitant)	Online	MMR	(+) Tailored messaging: increases intention to vaccinate (not statistically significant), more important in parents who were unsure/neutral about vaccination before the intervention than refusers (-) Untailored messaging: worsened parental intentions to vaccinate
Messages to inform parents about MMR vaccination	Dialogue based	Misinformation, safety issues	United States	Online	Parents	N/A	MMR	(+) Corrective messages: successful in correcting misperceptions about MMR (-) Corrective message: not successful in increasing intention to vaccinate (reduced intention in parents with the least favourable vaccine attitudes) (-) Messages using dramatic narratives and visuals: not successful: increase misperceptions about MMR, did not increase intention to vaccinate in parents with least favourable vaccine attitudes
Specialist Immunisation Clinics	Dialogue based	Misinformation, perceived benefits, safety issues	Australia	Healthcare facilities (Specialist immunisation clinics)	Parents (vaccine-hesitant)	Vaccine providers (in SIC)	All	(+) Increase in vaccination uptake (vaccine-hesitant parents) but more successful in parents that have concerns but still vaccinate than parents who delay vaccination (-) All refusers remained unimmunised
Vaccine information pamphlets	Dialogue based	Misinformation, perceived benefits, safety issues	United States	Healthcare facilities	Mothers (concerns about vaccination)	Vaccine providers	Childhood vaccines	(+) Visually pleasing, easy to understand, good tool to facilitate discussions with vaccine providers (+) Increases mothers' confidence in vaccination (+) Reduced belief that multiple vaccines overload the immune system (+) Positive impact of repeated provision of vaccine-information on attitudes and beliefs but not on fear of side effects (-) No decrease in fear of side effects (-) No benefit of providing intervention earlier

Name	Type of intervention	Determinants targeted	Country	Setting	Target population	Actors administering intervention	Vaccine	Outcome of evaluation
Vaccine risk communication messages	Dialogue based	Safety issues	United States	N/A	Mothers (concerns about vaccination)	N/A	Childhood vaccines	(+) Overall: improved mothers' opinions about childhood vaccines (not significant) (+) Reduced coverage message: remembered easily, well received, preference for use of numbers (-) Risk comparison message: no significant improvement in positive opinions
Countering anti-vaccination attitudes	Dialogue based	Misinformation, safety issues	United States	Online	Parents and general public	N/A	All	(+) information about disease risk led to changes in attitudes (-) autism correction had no effect on vaccination attitudes
Individual-level interventions focusing on improving healthcare workers' confidence and communication skills to respond to hesitant patients								
Ask, Acknowledge, Advise	Dialogue based	General vaccine hesitancy	United States	Healthcare facilities	Physicians	Immunisation experts, health educators	All	(+) Feasible, well received (-) No effect on hesitancy or physician self-efficacy
Becoming a vaccine champion	Dialogue based	Mandate, misinformation, religious and philosophical views, safety issues, trust	United States	Healthcare facilities	Parents (vaccine-hesitant)	Vaccine providers	All	No evaluation
C.A.S.E.	Dialogue based	General vaccine hesitancy, misinformation, safety issues	United States	Healthcare facilities	Parents, adolescents	Vaccine providers	HPV	No evaluation
CD-ROM-based tutorial	Dialogue based	General vaccine hesitancy, misinformation, religious and philosophical views, safety issues, trust	United States	CD-ROM	Primary healthcare providers	N/A	Childhood vaccines	(+) Improvement in general knowledge, knowledge of adverse events (+) Reported changes in attitudes towards patients who oppose vaccination
Electronic medical record linked clinical decision support	Reminder-recall	General vaccine hesitancy, trust	United States	Healthcare facilities	Parents (concerns about vaccination)	Vaccine providers	HPV	(+) Intervention acceptable to families, encouraged seeking out information (+) third of parents who remembered the call reported behaviour change
Framework for communicating with vaccine hesitant parents	Dialogue based	General vaccine hesitancy, misinformation, religious and philosophical views, safety issues, trust	Australia	Healthcare facilities	Parents (concerns about vaccination)	Vaccine providers	All	No evaluation
58 responses to anti-vaccines: a handbook against misinformation	Dialogue based	General vaccine hesitancy, misinformation, safety issues, religious and philosophical views, trust	Italy	Healthcare facilities	Healthcare providers	N/A	All	No evaluation

Name	Type of intervention	Determinants targeted	Country	Setting	Target population	Actors administering intervention	Vaccine	Outcome of evaluation
PROMOVAC: motivational interviewing session at birth increases vaccination acceptance and uptake	Dialogue based	General vaccine hesitancy, misinformation, safety issues, trust	Canada	Healthcare facilities	Healthcare providers	N/A	All	(+) significant increase in vaccination intention after motivational interviewing (global increase of 12%)
SARAH: an approach to vaccine communication in primary care	Dialogue based	General vaccine hesitancy, misinformation, safety issues, trust	Australia	Healthcare facilities	Healthcare providers	N/A	All	No evaluation
ECBT (Every Child By Two)	Dialogue based	General vaccine hesitancy, misinformation, trust	United States	Online	General population	N/A	All	(+) ECBT had a 134% increase in Facebook followers, doubled reach and engagement in six months (+) 125% increase in Twitter followers and 147% increase in monthly Twitter impressions
Community-level interventions								
Educational intervention with religious leaders	Dialogue based	Misinformation, religious and philosophical views	Iraq	Community	Adults (low coverage areas)	Religious leaders	All	(+) Decrease in dropout rates
Grass roots mobilization campaign Majigi	Dialogue based	General vaccine hesitancy, misinformation, religious and philosophical views, safety issues, trust	Nigeria	Community	Parents (in resistant areas)	Community gatekeepers	Polio	(+) Increase in children vaccinated of 310% after the campaign and a net reduction of 29% of never vaccinated children
I Immunise	Advocacy campaign	Religious and philosophical views	Australia	Community	Community (alternative lifestyles)	Immunisation Alliance of Western Australia, community members	All	(+) Campaign had a positive impact for 59.2% of participants but (-) a negative one for 16.8% (-) Negative impact in vaccine hesitant participants
Interactive social media tool for parents with concerns about vaccines	Dialogue based	Misinformation	United States	Online	Parents	Experts in vaccination, researchers	Childhood vaccines	(+) Parents would use it to ask questions, find vaccine information, review vaccination schedule, discuss experiences and concerns
Messages with corrective information against influenza vaccination myths	Dialogue based	Misinformation, safety issues	United States	Online	Adults	Existing survey	Influenza	(+) Corrective information: effective at reducing misperception, (-) Corrective information: no effect on intention to vaccinate among respondents with low side effects concern, decreased intention to vaccinate in respondents with side effect concerns (-) Pro-vaccination messages: no significant effect on misperceptions or intentions to vaccinate
Reducing resistance against polio drops through house visits	Dialogue based	Misinformation, religious and philosophical views, safety issues	India	Community	Community (Muslim)	Medical college interns, social workers, local influential people	Polio	(+) 79% of families visited by interns accepted the polio drops

Name	Type of intervention	Determinants targeted	Country	Setting	Target population	Actors administering intervention	Vaccine	Outcome of evaluation
Social Marketing Strategies to Promote HPV vaccination	Dialogue based, reminder-recall	Misinformation, perceived benefits, safety issues	United States	Healthcare facilities	Parents, adolescents	N/A	HPV	No evaluation
Web-based MMR decision aid	Dialogue based	Misinformation, safety issues	United Kingdom, Australia	Online	Parents	Online	MMR	(+) In the UK: parents found the decision aid acceptable, useful in supporting their informed decision-making for MMR, but (-) they felt the aid was slanted towards MMR. (+) In Australia: more parents were leaning towards vaccination after using the aid
Let's talk about hesitancy	Dialogue based	General vaccine hesitancy, misinformation, religious and philosophical views, safety issues, trust	ECDC (EU/EEA member states)	Not specified	Vaccine hesitant populations	Public health programme managers and communicators	All vaccines	No evaluation
Let's talk about protection	Dialogue based	General vaccine hesitancy, misinformation, religious and philosophical views, safety issues, trust	ECDC (EU/EEA member states)	Healthcare settings	Parents	Healthcare providers	Childhood vaccines	No evaluation (contains expert's guidance on how to evaluate after use)
WHO Best practice guidance: how to respond to vocal vaccine deniers in public	Dialogue based	General vaccine hesitancy, misinformation	WHO - Global	Media	Health and immunisation spokespersons	Health authorities	All	No evaluation

4. Practical tips and lessons learnt

4.1 Diagnostic tools

In recent years, different types of tools have been developed to measure, assess or monitor vaccine hesitancy. Some of these aim to measure hesitancy at an individual level, identifying hesitant parents or adults and detecting their concerns and worries about vaccination. Interventions that have been evaluated showed that such tools are effective to measure vaccine hesitancy and that they can also be useful predictors of vaccine uptake or serve as comparative tools to assess hesitancy in different populations of the world. Other tools are used to measure vaccine hesitancy at a country level, by gathering information from national immunisation programme managers. These tools have not been evaluated yet but have been implemented successfully in various countries. Finally, a tool was also developed to monitor vaccine hesitancy through mass and social media and was found to be effective in identifying concerns and sentiments about vaccination online.

Measurement and/or monitoring of concerns about vaccination is an important first step of any intervention aiming to address vaccine hesitancy. All countries should have a system in place to regularly listen to concerns and worries the population might have about vaccines. The tools described in this catalogue have been implemented in different countries and can be used and adapted to different contexts, vaccines or populations. They can serve as a basis for either reactive or proactive interventions aiming to reduce vaccine hesitancy.

4.2 Individual-level interventions focusing on parents

Table 2. Summary of practical tips by evaluation outcome for individual-level interventions focusing on parents (evaluated interventions)

	Improved vaccine hesitancy or vaccine uptake	No impact	Worsened vaccine hesitancy or vaccine uptake
Online educational information, graphical representation (Intervention 2.1A)	Increases intention to vaccinate		
Online educational information, rhetorical questions (Intervention 2.1A)	Increases intention to vaccinate		
Online educational information, graphical representation and rhetorical questions (Intervention 2.1A)		Note: Each intervention was found to be stronger in the absence of the other	
Online educational information tailored to concerns (intervention 2.1D)	Tailored messages increased intention to vaccinate (not statistically significant)		Untailored information decreases intentions to vaccinate
Online educational information, corrective messages (Intervention 2.1E)	Corrects misperceptions about vaccination	No impact on intention to vaccinate in parents with most favourable vaccine attitudes	Reduces intention to vaccinate in parents with least favourable vaccine attitudes
Online educational information, emotional messages (intervention 2.1E)		No impact on intention to vaccinate	Increases misperceptions about vaccination
Educational information in brochures (intervention 2.1B)	Positive impressions	No significant impact on attitudes about vaccination	
Educational and emotional information in handouts and videos (intervention 2.1C)	Improves PACV score (that measures vaccine hesitancy)	No significant improvement in vaccination rates	
Educational information in pamphlets (intervention 2.1G)	Positive impressions, increases confidence in vaccines, reduces some beliefs	No impact on concerns about side effects	
Mailed educational information on risk comparison (intervention 2.1H)		No significant improvement in positive opinions about vaccines	

	Improved vaccine hesitancy or vaccine uptake	No impact	Worsened vaccine hesitancy or vaccine uptake
Mailed educational information on reduced vaccination coverage (intervention 2.1H)	Positive impressions		
Mailed educational information on risk comparison and on reduced vaccination coverage (intervention 2.1H)	Improves opinions about vaccines (not statistically significant)		
Consultations with experts in specialist immunisation clinics, tailored discussions and educational information (intervention 2.1F)	Increases vaccination uptake in vaccine hesitant parents	No impact on vaccination uptake in vaccine refusers	

The first type of interventions addressing vaccine hesitancy directly target hesitant or concerned parents. These types of interventions use a dialogue-based approach and provide information or educational material to parents during consultations with healthcare workers, in written hand-outs such as pamphlets or brochures, or online.

The use of written materials has had varied effects on hesitancy and vaccination rates depending on the type of strategy, content and material used. Brochures with simple, general educational information about vaccination did not have a significant impact on attitudes about vaccination, even though parents reported positive impressions. Similarly, pamphlets providing educational information did not decrease concerns about side effects but showed a reduction in the belief that multiple vaccines overload the immune system and an increase in mothers' confidence in vaccination. Mailed information comparing the different risks associated with vaccination or non-vaccination and information addressing the impact of reduced vaccination coverage on disease prevalence did not significantly improve parents' opinions about vaccines either. Finally, handouts providing educational material, supplemented by videos with emotional content such as reports of children suffering from vaccine-preventable diseases showed an improvement in vaccine confidence but did not significantly increase vaccination rates.

Dialogue-based online interventions also had varied effects on parental vaccine hesitancy. Tailored messages, adapted to individual parents' concerns were found to increase intentions to vaccination, although this increase was not statistically significant. On the other hand, untailored messages had a negative effect and worsened parental intentions to vaccinate. The use of graphical educational information and rhetorical questions had a positive impact on intentions to vaccinate when used separately. Using corrective information to respond to specific concerns corrected misperceptions but did not increase intentions to vaccinate, and even reduced intentions in some groups of parents. Emotional, dramatic messages did not have any effect on misperceptions or on intentions to vaccinate.

Only one intervention referred parents for a consultation with healthcare workers in specialist vaccine hesitancy clinics. These consultations provided tailored educational information and time for parents to discuss their concerns with a physician. It was found to increase vaccine uptake in vaccine-hesitant parents but did not have any impact in vaccine refusers.

Interventions that directly target vaccine-hesitant parents have not been entirely successful in increasing intentions to vaccinate, decreasing concerns, or improving vaccination rates. Some of these interventions were also counterproductive, worsening parental concerns or intentions to vaccinate. Furthermore, a higher impact was almost always observed in parents who have concerns about vaccination but still vaccinate, than in parents who delay vaccination, with no impact at all in parents who refuse vaccination.

4.3 Individual-level interventions focusing on improving healthcare workers' confidence and communication skills to respond to hesitant patients

Table 3. Summary of practical tips by evaluation outcome for individual-level interventions focusing on improving healthcare workers' confidence and communication skills to respond to hesitant patients (evaluated interventions)

	Improved vaccine hesitancy or vaccine uptake	No impact	Worsened vaccine hesitancy or vaccine uptake
Training HCWs in communication skills: parents ask questions, doctors acknowledge concerns, doctors advise vaccination by discussion risks/benefits (intervention 2.2A)	Positive impressions	No impact on hesitancy or physician self-efficacy	
Training HCWs in communication skills (CD-ROM): what are common concerns and how to address them (intervention 2.2D)	Improves general knowledge, knowledge of adverse events Changes attitudes towards patients who oppose vaccination		
Training HCWs in communication skills (online): how to address vaccine hesitancy (and reminder system for parents/HCWs) (intervention 2.2E)	Positive impressions Parental behaviour change		

Many interventions aim to address vaccine hesitancy by improving communication between healthcare workers and their patients, as well as by training healthcare workers to improve their confidence in responding to hesitancy. Different communication guides have been suggested to structure consultations with vaccine-hesitant patients, offering different steps and topics to address. The training offered to healthcare workers aims to improve their knowledge of vaccine hesitancy, parental concerns, but also vaccination in general. Interventions that focus on allowing parents to ask questions, acknowledging their concerns and recommending vaccination by discussing the risks and benefits of vaccines were well received but did not have any effect on patient hesitancy, nor on healthcare worker confidence. However, interventions that focus on training healthcare workers about parental concerns using tailored information and discussions improved healthcare workers' knowledge about vaccine hesitancy and their attitudes towards hesitant patients. Interventions that complemented such trainings with vaccination reminders sent to both parents and healthcare workers were successful in improving patient behaviour and acceptability of the intervention.

Although it is important to improve communication between healthcare workers and patients, most interventions did not have a significant impact on improving vaccine confidence or vaccine uptake. Combining discourse-based interventions with reminder-recall tools seems to be more successful than interventions that only focus on improving healthcare workers' communication skills. Finally, although many interventions focused on improving healthcare workers' confidence in responding to hesitancy, none addressed potential vaccine hesitancy amongst healthcare workers themselves.

4.4 Community-level interventions

Table 4. Summary of practical tips by evaluation outcome for community-level interventions (evaluated interventions)

	Improved vaccine hesitancy or vaccine uptake	No impact	Worsened vaccine hesitancy or vaccine uptake
Community educational and promotional activities supported by religious leaders (talks, videos, posters) (intervention 2.3A)	Decrease in dropout rates		
Community educational and emotional activities supported by community gatekeepers (talks, videos, presentations, discussions) (intervention 2.3B)	Increase in vaccinated children and reduction of never vaccinated children		
Advocacy campaign supported by community members with alternative lifestyles (intervention 2.3C)	Positive impact for some participants		Negative impact on vaccine hesitant individuals
Educational house visits by medical interns, social workers, local influential people (intervention 2.3F)	High vaccination after intervention		
Online platform for discussion, information, parental engagement (intervention 2.3D)	Positive impressions		
Online platform using corrective messages (intervention 2.3E)	Reduces misperceptions	No impact on intention to vaccinate among individuals with low side effects concerns	Decreases intention to vaccinate among respondents with side effect concerns
Online platform using pro-vaccination messages (intervention 2.3E)		No significant impact on misperceptions or intentions to vaccinate	
Online decision-aid for parents and educational information (intervention 2.3H)	Positive impressions Increases intentions to vaccinate		

Community-level interventions were found to either target the online community of vaccine-hesitant populations or to improve community confidence in vaccination by the engagement of local figures and leaders. Many of these interventions were vaccine-specific, and/or developed in low-income settings. All of them followed a dialogue-based approach, apart from an advocacy campaign.

Most of the community-level interventions supported by community leaders and local figures had a positive impact on vaccine hesitancy. Some community educational activities backed by religious leaders and other community gatekeepers promoted vaccination and the sharing of information about vaccines (including emotional and informative talks, videos, presentations and posters). They led to a decrease in overall dropout rates and an increase in vaccination rates. Similarly, health education activities provided through house visits from medical interns, social workers and other local influential people led to an increase in vaccination rates. The advocacy campaign which made use of community members of a local group with alternative lifestyles had a positive impact for some participants but a negative one amongst vaccine-hesitant participants.

Different types of online tools can be used to improve vaccination confidence in some communities. A platform was developed to share information about vaccination but more importantly to engage parents in discussions and to allow them to share their concerns with other parents and vaccination experts. The platform was positively reviewed by parents, but the impact on hesitancy or coverage rates was not evaluated. Another intervention used corrective information in educational online messages. It was successful in reducing misperception but decreased intentions to vaccinate amongst hesitant individuals. Similarly, the use of pro-vaccination messages was found to have no significant effect on misperceptions or intentions to vaccinate. Finally, a decision-aid for parents, supported by educational information, was found to be acceptable and to improve parents' intention to vaccinate.

5. Adapting the interventions

The overall goal of this catalogue is to compile interventions designed specifically to address vaccine hesitancy so that health professionals elsewhere can use them as an inspiration to deal with challenges they face. However, they are not sufficiently explicitly tailored to address hesitancy in specific contexts. Added to this, most vaccine hesitancy interventions presented took place in non-European countries. This highlights the need for more European research on the topic, in particular focusing on interventions and evaluating different strategies in different European contexts, as interventions need to be context specific and addressing countries' specific issues. Therefore, in order to use these interventions as a set of best practices in Europe and elsewhere, it is of key importance to take in consideration that adaptations need to be made. For this purpose, the following approaches need to be considered:

5.1 Listen, evaluate, categorise

Active listening can help identify hesitancy. Not only is it important to let the population express their concerns, but it is also important to understand the reasons that underlie these concerns. The reasons why a population is hesitant can vary drastically from one situation to another and listening is the first step to understanding their reasons. These determinants can fall under different categories, they can be contextual (historic, social, cultural, environmental, economic, political and institutional determinants), individual, be group influenced and be vaccination specific issues [8]. The more specific knowledge you have about the situation you are confronted with, the more likely this catalogue will be useful as a set of best practices.

5.2 Engage accordingly

Once there is more information available about what is motivating vaccine hesitancy, it is important to contextualise design, format and content of the interventions. Match these interventions to the determinants of hesitancy. Most effective interventions are tailored to specific populations and addressing specific concerns pointing to the importance of understanding the drivers of vaccine hesitancy to inform the interventions [7].

Communication is key; improve methods to connect with the targeted group. Find creative ways to get the dialogue going; find means to make sure people know they are not being brushed away. Also be transparent: ensure all information on vaccination is publically available.

Maintain an overall spirit of sensitivity to local group or individual behavioural traits. Openness is necessary to understand local realities and practices embedded in the lives of those refusing or hesitating about vaccines.

5.3 'Country specific' case for vaccination

To be 'country specific' means taking into consideration a nation's circumstances to engage accordingly with vaccine hesitancy. While interventions can focus on education or informing about vaccine safety, other national elements such as public confidence in health systems might be playing a role in vaccine hesitancy. A general lack of trust in health authorities and government can undermine vaccine trust, as well as other state-related issues. National campaign programmes should have the capacity to identify determinants of social, cultural, political and/or economic nature.

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