Program Management

With renewed global commitment to achieving measles mortality reduction, the 2003 World Health Assembly stressed the importance of achieving the goals adopted by the United Nations General Assembly Special Session on children (2002) to reduce measles deaths by half by the end of 2005 compared with the 1999 levels, and the United Nations Millennium Declaration target to reduce the mortality rate of children under five by two-thirds by the year 2015. Member States are urged to fully implement the WHO/UNICEF 2001 to 2005 strategic plan, provide the necessary financial support and use the strategic approach of reducing global measles mortality as a tool for strengthening national immunization programmes.

Phases of accelerated measles control activities (measles mortality reduction and measles elimination) are indicated in Appendix 80_5.

A second opportunity for measles immunization reduces the proportion of susceptible individuals in a given population, thereby preventing measles outbreaks while concurrently raising immunization coverage for measles-containing vaccines (MCV) in the population. Experience from PAHO’s measles elimination achievement shows that this is best done through:
• maintaining very high routine immunization coverage of >90% to interrupt indigenous transmission; and
• periodic SIAs targeting the susceptible age groups.
Unlike mass polio campaigns, which must be completed within a few days, measles campaigns may be conducted as rolling campaigns in very large areas over several weeks. However, the campaign should be completed as soon as possible.

It is strongly recommended that SIAs be conducted in large contiguous districts or preferably nationwide. In the absence of the experience or resources needed for a campaign in a large area, a rolling approach can be adopted whereby SIAs are conducted in smaller contiguous regions.

Where feasible, integration (of measles campaigns) may be considered with other mass vaccination, such as polio vaccination, and with vitamin A supplementation. However, integration with other such interventions must not compromise the quality of measles SIAs.

Examples of public health interventions that have been integrated with measles SIAs include:
- Injectables: rubella vaccine, yellow fever vaccine, tetanus toxoid; for these, immunization safety and injection safety issues must be implemented with utmost care.
- Orally-administered medication or interventions: oral polio vaccine (OPV), vitamin A, anthelminthic treatment.
- Others: distribution of insecticide-treated nets.

The objectives of the four-part strategy (for sustainable measles mortality reduction that was endorsed by the World Health Assembly in 2003) are to:
1. provide every child with a dose of measles vaccine by 12 months of age;
2. give all children from nine months to 15 years of age a second opportunity for measles immunization;
3. establish effective surveillance; and
4. improve clinical management of complicated cases, including vitamin A supplementation.
Measles

The global goal now is to reduce annual global measles deaths by 90% by 2010 from 2000 estimates. In 2000, the UN Millennium Summit set a goal to reduce the under-five mortality rate by two-thirds, between 1990 and 2015.

In conflict or emergency areas, WHO and UNICEF have a commitment to ensure that, at a minimum, measles vaccine and vitamin A supplements are administered. (WHO/UNICEF joint statement: reducing measles mortality in emergencies, 2002.)

The primary responsibility for reducing measles deaths lies with national governments.

It is important that measles activities be fully integrated into multi-year immunization plans.

To maximize the impact of the strategy and ensure continuity in sustainable measles mortality reduction activities, measles activities must be included in national immunization financial sustainability plans.

The majority of resources for measles mortality reduction activities need to be mobilized from national governments and their local partners. International partners can help to fill financing gaps, but should not be considered as a primary source for long-term funding.
Measles

All children should have a second opportunity to receive measles vaccine. This increases the proportion of children who receive at least one dose and helps to assure measles immunity in previously vaccinated children who failed to develop such immunity. This opportunity may be delivered either through routine immunization services or through periodic mass campaigns.

In emergencies, immunizing children against measles is among the most cost-effective preventive public health measures, particularly for displaced populations housed in camps.

Urgent, structured and coordinated supplementary immunization activities, together with vitamin A supplementation, are the most effective means of reducing measles mortality during and after complex emergencies. UNICEF and WHO will fully support national authorities and other partners to ensure that all children are immunized against measles.

(In complex emergencies) national authorities should develop and implement a measles control plan as rapidly as possible, ensuring high coverage and the maintenance of cold chain/logistics and immunization safety.
Although global measles eradication may be technically feasible, a step-wise elimination strategy, such as that implemented by many industrialized countries and now also adopted by 4 of 6 WHO regions, may be more realistic. The strategy of strengthening routine immunization services, combined with periodic SIAs, has proved cost-effective in developed as well as in less-developed countries. However, the initial focus should be on reducing measles morbidity and mortality in countries where the burden of the disease is highest.

In many countries, large-scale measles (or measles-rubella) SIAs are used to rapidly increase population immunity and bring measles transmission under control. Periodic SIAs may also provide children with a second opportunity for measles immunization as an alternative to routine immunization services. However, the duration of impact of SIAs will be limited unless there is a strong routine immunization programme to prevent the rapid accumulation of susceptible children.

In 2002, the United Nations General Assembly Special Session on Children (World Fit for Children), attended by 191 heads of state, established the goal of a 50% reduction of global measles deaths by the end of 2005 compared with 1999 levels. WHO and the United Nations Children’s Fund have developed a joint strategic plan for measles mortality reduction. The recommended strategy consists of four components: to achieve high (>80%) routine measles vaccination coverage in every district; to provide children with a second opportunity for measles immunization either through the routine immunization services or through periodic supplementary immunization activities; to develop and implement a strong surveillance system; and to improve measles case management. In 2003, the World Health Assembly passed a resolution requesting countries to implement this strategy and to contribute actively and without delay towards achievement of this global goal.

SAGE Recommendations (Opportunities for integrating anthelmintic treatment into immunization services):
• notes the evidence in support of the efficacy of the intervention; however, the absence of adverse effects on seroconversion would need to be demonstrated in a scientifically robust manner (this would be expensive and require an inter-disciplinary approach and funding arrangement);
• encourages countries to include anthelmintic treatment with vitamin A during immunization campaigns that include school-age children in their target population.
Measles

The goal of the GLOBAL MEASLES STRATEGIC PLAN is:
- To halve the annual number of measles deaths by 2005.
- To achieve and maintain interruption of indigenous measles transmission in large geographical areas with established elimination goals: the Region of the Americas by 2000 (nearly achieved); the European Region by 2007; and the Eastern Mediterranean Region by 2010.
Measles

If conducted, supplemental campaigns should target large populations (entire nations or large regions) and achieve coverage of over 90 per cent with safe and high quality service.

Measles immunization provides an opportunity to reach children with other measures that improve overall child health, including:

- supplemental vitamin A doses;
- rubella immunization and surveillance activities.

Countries are encouraged to:

- Assess progress on measles control. They should also review their measles epidemiology.
- Identify the reasons for low routine coverage.
- Take advantage of the priority given to measles to improve immunization safety. The safety of immunization is based on ensuring that the following elements are addressed: behavioural change, the provision of safe injection equipment (e.g., auto-disable syringes and safety boxes) and the adequate management and disposal of immunization waste.
- Plan and integrate measles activities with other health initiatives.
- Use advocacy for measles mortality reduction to promote the further development of routine immunization services.
- Develop a 3- to 5-year plan for measles mortality reduction. Countries should develop plans together with the national inter-agency coordinating committees. Measles plans should be part of a comprehensive plan for strengthening immunization services.
Measles

Vaccine Quality

WHO requirement for heat stability of freeze-dried measles and measles-containing vaccines . . . uses two indices of stability:
1. Freeze-dried vaccine should retain at least 1000 live virus particles in each human dose at the end of incubation at 37°C for seven days; and
2. If, during incubation, the virus titer has been decreased, then it shall have done so by not more than 1 log10 (162).

Temperature sensitivity of vaccines

WHO requirement for heat stability of freeze-dried measles vaccine have made a considerable impact on the quality of measles vaccines on the market. This requirement uses two indices of stability:
1. Freeze-dried vaccine should retain at least 1000 live virus particles in each human dose at the end of incubation at 37°C for seven days; and
2. If, during incubation, the virus titre has been decreased, then it shall have done so by not more than 1 log10.
Measles

Vaccine Handling

In all circumstances during measles campaigns, only qualified health workers should perform vaccinations and vaccine reconstitution.

(Measles) vaccines must therefore always be protected against light. In field conditions, they must be stored below +8°C. Though less sensitive to heat, the vaccine diluent should be kept in the cold chain as well if space permits. However, at reconstitution the diluent must have the same temperature as the vaccine. Therefore, sufficient diluent for daily needs must be kept in the cold chain for at least 24 hours prior to use in reconstituting vaccine.

• Keep reconstituted vaccine cool.
• Discard reconstituted vaccine after six hours or at the end of a session, whichever comes first.

Reconstituted (measles) vaccine must be discarded immediately if:
• sterile procedures have not been fully observed;
• there is any suspicion that the opened vial has been contaminated;
• the cold chain has not been maintained at any point in time prior to administering the vaccine to the child;
• there is visible evidence of contamination, e.g., change in appearance, floating particles, cold chain obviously broken;
• more than six hours have passed by since reconstitution or the end of the session has been reached – whichever occurs first.

All reconstituted measles vaccine must be discarded at the end of each vaccination day. It must never be placed in a refrigerator with a view to using it the following day.
Measles

The recommended conditions for storing vaccines used in immunization programmes are shown in Appendix 81_1. This diagram also indicates the maximum times and temperatures in each case. At the higher levels of the cold chain, i.e., at national (primary), and regional or province level, OPV must be kept frozen between -15°C and -25°C. Freeze-dried vaccines (i.e., BCG, measles, MMR and yellow fever) may also be kept frozen at -15°C to -25°C if cold chain space permits, but this is neither essential nor recommended. At other levels of the cold chain (intermediate vaccine stores and health facilities), these vaccines should be stored between +2°C and +8°C. All other vaccines should be stored at between +2°C and +8°C at all levels of the cold chain. Liquid formulations of vaccines containing diphtheria, pertussis, tetanus, hepatitis B, Haemophilus influenzae type b, IPV and their combinations should not be frozen.

There is a serious risk when reconstituted (measles, mumps, and rubella vaccines and their combinations are) stored at any temperature for longer than six hours or above 8°C for any period. This is not only because of the lack of potency, but also because of the possibility of contamination of the product, which could cause serious adverse consequences in those being vaccinated. When used, measles vaccine should be protected from elevated temperature and from light (light may inactivate the virus). Reconstituted vaccines must be discarded at the end of each immunization session and should NEVER be kept for use in subsequent sessions.

After reconstitution, measles and MMR vaccine rapidly lose their potency when kept at temperatures above 2-8°C. Reconstituted measles and MMR vaccines should be kept cold during immunization procedures, must be discarded at the end of each immunization session and must never be kept for use in subsequent sessions.

WHO recommended vaccine storage conditions (Appendix 17_3).

WHO no longer recommends that freezedried vaccines (measles, yellow fever, Hib and BCG) be shipped and stored at -20°C. Storing them at -20°C is not harmful but is unnecessary. Instead, these vaccines should be stored and transported at +2°C to +8°C.
**Measles**

Measles vaccine (including MR and MMR - page 8):
_ It is essential that only the diluent supplied with the vaccine be used._
_ After reconstitution measles vaccine should be kept at 2°C-8°C._
_ Any remaining reconstituted vaccine must be discarded after six hours or at the end of the immunization session, whichever comes first._

BCG, measles, MR, MMR and rubella vaccines are equally sensitive to light (as well as to heat). Normally, these vaccines are supplied in vials made from dark brown glass, which gives them some protection against light damage, but care must still be taken to keep them covered and protected from strong light at all times.

The (measles) vaccine is also very sensitive to sunlight, hence the need to keep it in coloured glass vials; following reconstitution, the vaccine must be stored in the dark at 2-8 °C and used within 6 hours.

At the higher levels of the cold chain, i.e. at the national (central) and regional or provincial levels, OPV must be kept frozen between -15°C and -25°C.

Freeze-dried vaccines, i.e. BCG, measles, MMR and yellow fever vaccines, may also be kept in this temperature range (-15°C and -25°C) if there is sufficient space in the cold chain, but this is neither essential nor recommended. At other levels of the cold chain these vaccines should be stored between +2°C and +8°C. All other national immunization service vaccines should be stored between +2°C and +8°C at all levels of the cold chain.
Measles

To avoid programme errors (involving measles vaccine):
• vaccines must only be reconstituted with the diluent supplied by the manufacturer
• reconstituted vaccines must be discarded at the end of each immunization session and never kept longer than 6 hours.
• no other drugs or substances should be stored in the refrigerator of the immunization centre
• immunization workers must be adequately trained and closely supervised to ensure that proper procedures are being followed

Proper handling and reconstitution of vaccines avoids programme errors

Proper handling and reconstitution of vaccines avoids programme errors

Proper handling and reconstitution of vaccines avoids programme errors

Proper handling and reconstitution of vaccines avoids programme errors

Thermostability of vaccines

27 June 2008

Page 12 of 28
Measles

Reconstituting (measles) vaccine with a warm diluent may be harmful.

Thermostability of vaccines

Reconstituted measles vaccine must be used in the same immunization session. There is a serious risk when reconstituted measles vaccine is stored at any temperature for longer than six hours or above 8°C for any period.

When used, measles vaccine should be protected from elevated temperature and from light.

Thermostability of vaccines

Reconstituted vaccines against measles, yellow fever and tuberculosis (BCG) are unstable vaccines; they should be used as soon as possible after reconstitution, be kept in a ice bath during the immunization session and should be discarded at the end of the session.

Thermostability of vaccines

Multi-dose Open Vials

Opened vials of measles, yellow fever and BCG vaccines MUST be discarded at the end of each immunization session or after 6 hours whichever comes first.

Open vials of measles, yellow fever, BCG and freeze-dried Hib vaccine cannot be used after an initial immunization session, (even if the VVM has not reached the discard point.). They must be discarded within six hours of reconstitution or at the end of the session, whichever comes first. The VVMs for these vaccines are attached to the vial caps and should be discarded when the vaccine is being reconstituted.

Schedule

SAGE accepted the proposal (of its working group on measles) to maintain the current recommendation for administration of the first dose of measles vaccine at 9 months in settings where the transmission is widespread and mortality is high. Where transmission has been substantially reduced (for example, following high quality nationwide SIAs), increasing the age from 9 months to 12 months represents a rational and desirable policy change. However, before implementing a change, policy-makers should review local data on the actual age at which infants receive measles vaccine, the coverage expected at 12 months compared with 9 months, age-specific measles incidence and review the immunogenicity and effectiveness of measles vaccine administered at 9 months compared with 12 months.
Measles

With respect to introducing a routine second dose of measles vaccine, SAGE emphasizes the principle that this should be considered only in settings where high coverage of the first dose has been achieved and sustained and where measles transmission has been reduced to a low level, indicating a well functioning routine immunization programme. Criteria that could be used to determine if the routine programme is strong enough and the coverage sufficiently high to benefit from a routine second dose require further analysis and consultation.

Conclusions and recommendations from the meeting of the immunization Strategic Advisory Group of Experts (SAGE) - November 2006

With respect to the optimal interval between SIAs (for measles), SAGE noted a number of examples where delays in conducting follow-up SIAs have led to large outbreaks (for example, in Brazil, Kenya and Uganda). SAGE agreed with the approach developed by the Regional Office for the Americas and adapted by the Technical Advisory Group on Measles in the African Region that follow-up SIAs should be conducted before the estimated number of susceptible children reaches the size of a birth cohort. This approach has been found to be programmatically useful and sufficiently accurate to prevent large outbreaks.

Conclusions and recommendations from the meeting of the immunization Strategic Advisory Group of Experts (SAGE) - November 2006

It is recommended that (measles vaccine) be administered as from the age of nine months, when most children have lost the protection afforded by maternal antibodies.

Global field guide for planning and implementing measles supplementary immunization activities

Appendix 80_7 indicates the relationship between routine measles vaccination coverage and the recommended interval between follow-up supplementary immunization campaigns.
Measles

Supplementary immunization activities - SIAs, (measles):

- All children in the target-age group should be vaccinated, regardless of their history of measles immunization or illness.
- In normal circumstances the lower age limit for measles vaccination during SIAs should be nine months. However, children as young as six months should be vaccinated if a significant proportion of measles cases occur in children aged six to nine months. Children who are vaccinated before the age of nine months should receive another dose at nine months in order to ensure protection, as up to half of those vaccinated earlier do not develop immunity.
- Catch-up SIAs should target children aged up to 15 years at the inception of accelerated measles control activities. With regard to follow-up SIAs, the target-age group should include those children born since the last campaign.
- The best time to schedule measles SIAs is during seasons of low transmission, as determined on the basis of local experience and reviews of epidemiological data.

Global field guide for planning and implementing measles supplementary immunization activities

A second opportunity for measles immunization is essential to ensure protection against measles.

WHO/UNICEF joint statement - Global plan for reducing measles mortality 2006-2010

In conflict or emergency areas, WHO and UNICEF have a commitment to ensure that, at a minimum, measles vaccine and vitamin A supplements are administered. (WHO/UNICEF joint statement: reducing measles mortality in emergencies, 2002.)

WHO/UNICEF joint statement - Global plan for reducing measles mortality 2006-2010

WHO recommends the following schedule for infants (Appendix 39_5).

Vaccine introduction guidelines. Adding a vaccine to a national immunization programme: decision and implementation
Measles

To reduce the risk of infection in hospitals, all children between the ages of six and nine months who have not received measles vaccine and who are admitted to a hospital should be immunized against measles. If the children’s parents do not know whether they have received measles vaccine, the child should still be immunized. If a child has received measles vaccine before nine months of age, a second dose should be administered at nine months or as soon as possible after nine months.

Immunization in practice: a practical resource guide for health workers – 2004 update

Module 1: Target diseases

Year 2004

Note: an infant with known or suspected HIV infection and/or signs and symptoms of AIDS should receive measles vaccine at six months and then again at nine months.

Immunization in practice: a practical resource guide for health workers – 2004 update

Module 2: The vaccines

Year 2004

In complex emergencies, immunization should include all children from 6 months through 14 years of age. At a minimum, children from 6 months through 4 years of age must be immunized. The choice of the ages covered will be influenced by vaccine availability, funding, human resources and local measles epidemiology.

Reducing measles mortality in emergencies (WHO/UNICEF Joint Statement)

Year 2004

Immunization against measles is recommended for all susceptible children and adults for whom measles vaccination is not contraindicated.

Measles vaccines (WHO position paper)

Measles

Asymptomatic HIV infection is an indication, not a contraindication, for measles vaccination. Ideally, the vaccine should be offered as early as possible in the course of HIV infection. In areas where measles is prevalent, or during outbreaks, individuals with early signs of HIV-induced immunosuppression may also be considered for vaccination.

The recommended age for measles vaccination depends on the local measles epidemiology as well as on programmatic considerations. In most developing countries, high attack rates and serious disease among infants necessitate early vaccination, usually at 9 months of age, despite the relatively low (80-85%) seroconversion rates following vaccination in this age group. Unless severely immunocompromised, HIV-infected infants should receive measles vaccine at 6 months of age, followed by an additional dose at 9 months.

In most industrialized countries, national health systems are consistently able to provide measles vaccine to a high proportion of infants, with a concomitant reduction in measles virus circulation. The probability of an infant being exposed to measles before his or her first birthday is low. It is therefore recommended that measles vaccination be deferred until a child is 12-15 months old, when seroconversion rates in excess of 90% may be expected.

In countries with measles elimination goals, a one-time only measles SIA (supplementary immunization activity) should be considered, targeting all children aged 9 months to 14 years, regardless of disease history or previous vaccination status. Efforts are also needed to target specific groups of young adults who may be at increased risk for measles infection, including military recruits, university students, health care workers, refugees and international travellers to measles-endemic areas.
**Measles**

**Vaccine Administration**

Do not use childhood immunization cards to record doses of measles vaccine given during SIAs.

Global field guide for planning and implementing measles supplementary immunization activities

For the countries where yellow fever is endemic, the vaccine can be routinely administered at the time of measles vaccination. If yellow fever vaccine is not administered at the same time as measles vaccine, to assure an optimal immune response, it is generally recommended that there is at least a one month interval between measles and yellow fever vaccination.

Global field guide for planning and implementing measles supplementary immunization activities

See Appendix 6_19 for chart entitled, "Administering vaccines to infants" BCG, DTP, DTP-HepB, HepB, measles, yellow fever, OPV"


The live, attenuated measles vaccines that are now internationally available are safe, effective and relatively inexpensive and may be used interchangeably in immunization programmes.

Measles vaccines (WHO position paper)

Measles vaccine is generally injected subcutaneously but is also effective when administered intramuscularly.

Measles vaccines (WHO position paper)
Measles

Administration of immunoglobulins or other antibody-containing blood products may interfere with the immune response to the vaccine. Vaccination should be delayed for 3-11 months after administration of blood or blood products, depending on the dose of measles antibody. Following measles vaccination, administration of such blood products should be avoided for 2 weeks, if possible.

Measles vaccines (WHO position paper)

Contraindications

There are no contraindications for measles vaccination.

- During SIAs, health workers or volunteers may encounter children who have had a dose of measles vaccine less than four weeks previously. This is not a contraindication to measles vaccination and these children should receive a dose of measles during SIAs.
- Children aged 9 months to 14 years who are admitted to hospital while SIAs are in progress should receive measles vaccination.

Global field guide for planning and implementing measles supplementary immunization activities

Mild, concurrent infections are not considered a contraindication, and there is no evidence that measles vaccination exacerbates tuberculosis. However, vaccination should be avoided if there is high fever or other signs of serious disease. On theoretical grounds, measles vaccine should also be avoided in pregnancy.

Measles vaccines (WHO position paper)

Persons with a history of an anaphylactic reaction to neomycin, gelatin or other components the vaccine should not be vaccinated (with measles vaccine.) Furthermore, measles vaccine is contraindicated in persons who are severely immunocompromised as a result of congenital disease, HIV infection, advanced leukaemia or lymphoma, serious malignant disease, or treatment with high-dose steroids, alkylating agents or antimetabolites, or in persons who are receiving immunosuppressive therapeutic radiation.

Measles vaccines (WHO position paper)
Measles

Adverse Event

Database ID 75_5  Year 2006

The (GACVS) Committee reviewed the purported relationship between measles immunization and the occurrence of SSPE.

Available epidemiological data are consistent with a directly protective effect of vaccine against SSPE mediated by preventing measles.

Available epidemiological data, in line with virus genotyping data, do not suggest that measles vaccine virus can cause SSPE. Furthermore, epidemiological data do not suggest that the administration of measles vaccine can accelerate the course of SSPE or trigger SSPE in an individual who would have developed the disease at a later time without immunization. Neither can the vaccine lead to the development of SSPE where it would not otherwise have occurred in a person who has already a benign persistent wild measles infection at the time of vaccination.

Global Advisory Committee on Vaccine Safety, 1–2 December 2005


Database ID 58_3  Year 2004

Several carefully conducted studies have been unable to confirm preliminary reports alleging an association between receipt of live attenuated measles vaccine or MMR and the occurrence of autism or chronic bowel inflammation.

Measles vaccines (WHO position paper)


Database ID 42_2  Year 2002

Parents should be given advance notice of the chance of ‘mild measles’ 6-12 days after immunization.

Mass measles immunization campaigns: Reporting and investigating adverse events following immunization

Page 3
To avoid programme errors (involving measles vaccine):
• careful epidemiological investigation of an AEFI is needed to pinpoint the cause and to correct immunization practices.

Even if a national programme has not yet developed a functioning adverse events surveillance system, some form of adverse event monitoring is essential in mass (measles) campaigns. The surveillance should be simple, flexible and rapid.
A list of reportable events is suggested in Appendix 42_5; countries with limited reporting capacity should decide which of these events should be reported during a campaign.

The reported AEFI (following mass measles immunization campaign) must be investigated if it:
• may have been caused by programme error
• is a serious event requiring hospitalization or resulting in death
• is a serious event of unexplained cause
• is causing significant parental or community concern
Certain events (toxic shock syndrome, sepsis, and abscess) are likely to arise from programme errors (and may result in clusters) and must always be investigated so the appropriate corrective action can be taken.

When an (AEFI) investigation is deemed necessary, it is important to initiate it urgently so that the cause may be determined (where possible) and additional cases prevented, in order to avoid compromising the rest of the (measles immunization) campaign as a result of ongoing community concern.
A working hypothesis should be established as soon as there is sufficient information. The working hypothesis may change during the course of the investigation. The focus of the investigation should then be to seek to confirm the working hypothesis. No action should be taken based on the hypothesis, until it is confirmed with reasonable certainty. Laboratory testing may sometimes confirm or rule out the suspected cause: the vaccine and diluent may be tested for sterility and chemical composition; and the needles and syringe for sterility. Testing should be requested on a clear suspicion and not as routine, and never before the working hypothesis has been formulated.
Measles

Appropriate actions to protect the community should be taken throughout the (AEFI) investigation. Upon completion of the investigation, the cause of the event(s) needs to be communicated to the community. This must include information about the steps being taken to remedy the situation and to prevent a recurrence, if such steps are needed. If the cause is identified as a programme error, it is vital not to lay personal blame on anyone, but to focus on system-related problems which resulted in the programme error(s) and steps being taken to correct the problem. It is never appropriate to discontinue the immunization programme while awaiting the completion of the investigation.

Mass measles immunization campaigns: Reporting and investigating adverse events following immunization

Outbreak Control

Asymptomatic HIV infection is an indication, not a contraindication, for measles vaccination. Ideally, the vaccine should be offered as early as possible in the course of HIV infection. In areas where measles is prevalent, or during outbreaks, individuals with early signs of HIV-induced immunosuppression may also be considered for vaccination.

Measles vaccines (WHO position paper)

Measles

To protect individual high-risk patients during an outbreak, vaccination within 2 days of exposure may modify the clinical course of measles or even prevent clinical symptoms. In cases where vaccination is contraindicated, the administration of immunoglobulin within 3-5 days of exposure may have a similar beneficial effect.

Measles vaccines (WHO position paper)

The (measles) vaccine should be used to prevent outbreaks; large-scale vaccination to control ongoing outbreaks is of limited value.

Measles vaccines (WHO position paper)

Recommended types of surveillance for measles:
1. Mortality reduction phase: When measles is endemic, routine monthly reporting of aggregated data on clinical measles cases is recommended by district, age group and immunization status. Only outbreaks (not each case) should be investigated. During outbreaks it is useful to attempt to document measles mortality. Laboratory confirmation may be attempted by sampling approximately 10 cases per outbreak. Under special circumstances, the isolation of wild strains from selected cases occurring in outbreaks could be performed to enable genetic characterization of circulating measles virus and determine patterns of importation and exportation for countries in the low-incidence or elimination phase.
2. Low-incidence or elimination phase: Case-based surveillance should be conducted and every case should be reported and investigated immediately (and also included in the weekly reporting system). Laboratory specimens should be collected from every sporadic suspect case. Suspected measles outbreaks should be confirmed by conducting serology on the first 5-10 cases only. Urine, nasopharyngeal or lymphocyte specimens (for virus detection and genetic characterization) should be collected from sporadic/outbreak cases (approximately 10 cases from each chain of transmission) to characterize viral circulation and importation patterns.
3. During all phases: Designated reporting sites at all levels should report at a specified frequency (e.g. weekly or monthly) even if there are zero cases (often referred to as “zero reporting”).

WHO–recommended standards for surveillance of selected vaccine-preventable diseases
Measles

Immunization Safety

Administering measles vaccine:
• The injection site should be cleaned with cotton wool dipped in clean water so as to remove visible dirt.

Global field guide for planning and implementing measles supplementary immunization activities

Careful safety surveillance must remain a crucial component of all immunization programmes.

Measles vaccines (WHO position paper)

Immunization Coverage

Appendix 80_7 indicates the relationship between routine measles vaccination coverage and the recommended interval between follow-up supplementary immunization campaigns.

Whether a country is in the phase of measles mortality reduction or measles elimination, accelerated measles control activities must be accompanied by simultaneous actions aimed at improving and/or maintaining high routine immunization coverage.
Measles

Coverage surveys should be conducted after measles SIAs.

Global field guide for planning and implementing measles supplementary immunization activities

If conducted, supplemental campaigns should target large populations (entire nations or large regions) and achieve coverage of over 90 per cent with safe and high quality service.

Surveillance of Vaccine Preventable Disease

(Measles) elimination programmes require careful surveillance, including the laboratory confirmation of suspected measles cases, and access to modern tools of molecular epidemiology for determining the geographical origin of measles importations.

Efforts to eliminate measles require careful surveillance, including the capacity for laboratory confirmation of suspected measles cases.

27 June 2008
Measles

The global Measles Mortality Reduction and Regional Elimination Strategic Plan 2001-2005 (WHO/V&B/01.13) seeks to reduce the number of measles deaths by half by 2005 (compared with 1999 estimates) and to achieve and maintain interruption of indigenous measles transmission in large geographical areas with established elimination goals. Surveillance for measles should evolve with each phase of measles control. Countries in the mortality reduction phase, where the disease is endemic should concentrate on raising routine measles immunization coverage and focusing supplemental immunization efforts in areas with high measles mortality. Countries with more advanced measles control or in the elimination phase are achieving high levels of population immunity against measles and low incidence with or without periodic outbreaks. Surveillance in these countries should be used to identify high-risk populations and to predict and prevent potential outbreaks. Countries in which the objective is to completely interrupt measles transmission (or countries with very low incidence) require intensive case-based surveillance to detect, investigate and confirm every suspected measles case in the community.

Recommended types of surveillance for measles:
1. Mortality reduction phase: When measles is endemic, routine monthly reporting of aggregated data on clinical measles cases is recommended by district, age group and immunization status. Only outbreaks (not each case) should be investigated. During outbreaks it is useful to attempt to document measles mortality. Laboratory confirmation may be attempted by sampling approximately 10 cases per outbreak. Under special circumstances, the isolation of wild strains from selected cases occurring in outbreaks could be performed to enable genetic characterization of circulating measles virus and determine patterns of importation and exportation for countries in the low-incidence or elimination phase.
2. Low-incidence or elimination phase: Case-based surveillance should be conducted and every case should be reported and investigated immediately (and also included in the weekly reporting system). Laboratory specimens should be collected from every sporadic suspect case. Suspected measles outbreaks should be confirmed by conducting serology on the first 5-10 cases only. Urine, nasopharyngeal or lymphocyte specimens (for virus detection and genetic characterization) should be collected from sporadic/outbreak cases (approximately 10 cases from each chain of transmission) to characterize viral circulation and importation patterns.
3. During all phases: Designated reporting sites at all levels should report at a specified frequency (e.g. weekly or monthly) even if there are zero cases (often referred to as “zero reporting”).

27 June 2008
Introduction of Vaccines

Measles

Where measles vaccine has been combined with rubella vaccine (MR) or mumps and rubella vaccine (MMR), the protective immune response to the individual components remains unchanged. The use of such combined vaccines is logistically and programmatically sound and is recommended in areas where the disease burden of mumps and rubella disease burden is high, when the vaccine is affordable and, in the case of rubella, where vaccine coverage rates can be sustained at >80%.

When affordable, the MR combination should be considered in countries with a persistently high (>80%) routine measles vaccination coverage, where prevention of congenital rubella syndrome is a public health priority and where an immunization programme has been established for women of childbearing age.