
Adverse Event

Measles vaccines (WHO position paper)

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.

[WER 2004, vol. 79, 14, pp 130-142](#)
page 131

Global Advisory Committee on Vaccine Safety, 34 December 2003

The attention of the Committee was drawn to the unavailability of a monovalent rubella vaccine in some countries and to the need to provide a rubella-containing combination vaccine to postpartum women seronegative for rubella. GACVS is not aware of any safety issues that would restrict the provision of a rubella-containing combination vaccine in place of single rubella vaccine in those circumstances.

[WER 2004, vol. 79, 3, pp 16-20](#)
page 19

BCG

WHO-UNICEF effective vaccine store management initiative: Modules 1 - 4

WHO recommended vaccine storage conditions (Appendix 17_3).

[WHO/IVB/04.16-20](#)
page 1

Immunization in practice: a practical resource guide for Health workers 2004 update _____ Module 3: The cold chain

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.

[WHO/IVB/04.06](#)
page 28

Temperature sensitivity of vaccines

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 -15oC and -25oC. Freeze-dried vaccines (i.e., BCG, measles, MMR and yellow fever) may also be kept frozen at -15oC to -25oC 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 +2oC and +8oC. All other vaccines should be stored at between +2oC and +8oC 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.

[WHO/IVB/06.10](#)
page 2

Ensuring the quality of vaccines at country level: Guidelines for health staff[WHO/V&B/02.16](#)
page 13

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 -15C and -25C.

Freeze-dried vaccines, i.e. BCG, measles, MMR and yellow fever vaccines, may also be kept in this temperature range (-15C and -25C) 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 +2C and +8C. All other national immunization service vaccines should be stored between +2C and +8C at all levels of the cold chain.

DPT

WHO-UNICEF effective vaccine store management initiative: Modules 1 - 4[WHO/IVB/04.16-20](#)
page 1

WHO recommended vaccine storage conditions (Appendix 17_3).

Temperature sensitivity of vaccines[WHO/IVB/06.10](#)
page 2

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Diphtheria

Temperature sensitivity of vaccines

[WHO/IVB/06.10](#)
page 2

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GACVS

Global Advisory Committee on Vaccine Safety, 34 December 2003

[WER 2004, vol. 79, 3, pp 16-20](#)
page 19

The attention of the Committee was drawn to the unavailability of a monovalent rubella vaccine in some countries and to the need to provide a rubella-containing combination vaccine to postpartum women seronegative for rubella. GACVS is not aware of any safety issues that would restrict the provision of a rubella-containing combination vaccine in place of single rubella vaccine in those circumstances.

General

Measles vaccines (WHO position paper)

[WER 2004, vol. 79, 14, pp 130-142](#)
page 138

Mumps-containing measles vaccine (MMR) is generally not recommended for large-scale measles SIAs in countries with limited resources.

Mumps virus vaccines (WHO position paper)

[WER 2001, vol. 76, 45, pp 346-356](#)
page 346

Large-scale mumps vaccination is recommended in countries with an efficient childhood vaccination programme and sufficient resources to maintain high-level vaccination coverage, and where reduction of mumps is a public health priority. Because WHO considers measles elimination and control of congenital rubella syndrome to be higher priorities than mumps control, it recommends that the introduction of mumps immunization should be considered only in countries that have or are establishing adequate vaccination programmes for measles elimination and control of the congenital rubella syndrome. In countries which decide to use mumps vaccine, the combination of mumps vaccine with measles and rubella vaccines is thus recommended.

National decisions to implement large-scale mumps vaccination should be based on careful cost-benefit analyses, including comparative analyses of mumps control versus control of other vaccine-preventable diseases in the country.

Immunization in practice: a practical resource guide for Health workers 2004 update_____Module 1: Target diseases[WHO/IVB/04.06](#)
page 11

Mumps vaccine should be given in combination with measles and rubella vaccines (MMR).

Immunization in practice: a practical resource guide for Health workers 2004 update_____Module 2: The vaccines[WHO/IVB/04.06](#)
page 6

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 2C-8C.
- _ Any remaining reconstituted vaccine must be discarded after six hours or at the end of the immunization session, whichever comes first.

WHO-UNICEF effective vaccine store management initiative: Modules 1 - 4[WHO/IVB/04.16-20](#)
page 1

WHO recommended vaccine storage conditions (Appendix 17_3).

Measles vaccines (WHO position paper)[WER 2004, vol. 79, 14, pp 130-142](#)
page 131

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%.

Measles vaccines (WHO position paper)[WER 2004, vol. 79, 14, pp 130-142](#)
page 131

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.

Rubella vaccines (WHO position paper)[WER 2000, vol. 75, 20, pp 161-169](#)
page 166

Rubella vaccine is usually administered at age 12-15 months, but can also be administered to children as young as 9 months of age. In most countries, the vaccine is given as MR or MMR, and the age of administration is chosen based on the appropriate age for measles vaccination. It may also be administered to older children, adolescents, students, child care personnel, health care workers, military personnel and adult men in contact with women of childbearing age.

WHO recommended standards for surveillance of selected vaccine-preventable diseases[WHO/V&B/03.01](#)

page 21

Where (mumps) vaccine is used and high coverage is achieved the monitoring of vaccine-associated mumps meningitis and its differentiation from meningitis due to other causes can be an important issue. The monitoring of mumps meningitis, whether related to vaccine or natural disease, can be integrated into overall meningitis surveillance activities.

The vast majority of mumps vaccine is used in combination with measles and rubella vaccines (MMR), and surveillance strategies for mumps should take surveillance for measles, rubella and congenital rubella syndrome into consideration.

Global Advisory Committee on Vaccine Safety, 34 December 2003[WER 2004, vol. 79, 3, pp 16-20](#)

page 19

The attention of the Committee was drawn to the unavailability of a monovalent rubella vaccine in some countries and to the need to provide a rubella-containing combination vaccine to postpartum women seronegative for rubella. GACVS is not aware of any safety issues that would restrict the provision of a rubella-containing combination vaccine in place of single rubella vaccine in those circumstances.

Immunization in practice: a practical resource guide for Health workers 2004 update _____ Module 3: The cold chain[WHO/IVB/04.06](#)

page 28

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.

Vaccine introduction guidelines. Adding a vaccine to a national immunization programme: decision and implementation[WHO/IVB/05.18](#)

page 47

While many countries have readily replaced single-antigen measles vaccine with measlesmumpsrubella (MMR) or measlesrubella (MR) vaccines, to prevent a potential gradual increase in rubella susceptibility among women of childbearing age and a paradoxical increase in congenital rubella syndrome (CRS) incidence, efforts are needed to assure that women of childbearing age are also protected against rubella.

A strong laboratory-based surveillance mechanism is a must for identification of rubella outbreaks following the introduction of MMR or MR into the NIP.

A screening programme should be available for females entering childbearing age because, once the vaccine is introduced into the NIP, the susceptibility of adults getting rubella will be increased.

Temperature sensitivity of vaccines[WHO/IVB/06.10](#)

page 2

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 -15oC and -25oC. Freeze-dried vaccines (i.e., BCG, measles, MMR and yellow fever) may also be kept frozen at -15oC to -25oC 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 +2oC and +8oC. All other vaccines should be stored at between +2oC and +8oC 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.

Temperature sensitivity of vaccines[WHO/IVB/06.10](#)

page 27

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 8C 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 2-8C. 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.

Ensuring the quality of vaccines at country level: Guidelines for health staff[WHO/V&B/02.16](#)

page 13

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 -15C and -25C.

Freeze-dried vaccines, i.e. BCG, measles, MMR and yellow fever vaccines, may also be kept in this temperature range (-15C and -25C) 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 +2C and +8C. All other national immunization service vaccines should be stored between +2C and +8C at all levels of the cold chain.

Measles vaccines (WHO position paper)

(W)hen 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.

[WER 2004, vol. 79, 14, pp 130-142](#)
page 138

Mumps virus vaccines (WHO position paper)

Primary mumps vaccination, especially in the recommended combination with rubella and measles vaccines, is easily adapted to the national vaccination programmes and does not interfere significantly with simultaneously-administered vaccines.

[WER 2001, vol. 76, 45, pp 346-356](#)
page 354

Mumps virus vaccines (WHO position paper)

Introduction of routine mumps immunization should be prioritized along with other potential prevention options. Introduction of mumps vaccine into national childhood immunization programmes should be considered only in countries that have or are establishing adequate vaccination programmes for measles elimination and control of the congenital rubella syndrome.

[WER 2001, vol. 76, 45, pp 346-356](#)
page 354

Mumps virus vaccines (WHO position paper)

The addition of mumps vaccine to the measles and rubella vaccination programmes using the MMR combined vaccine is logistically sound, and the MMR combination is strongly encouraged where affordable and where vaccine supply is sufficient.

[WER 2001, vol. 76, 45, pp 346-356](#)
page 355

Immunization in practice: a practical resource guide for Health workers 2004 update _____ Module 2: The vaccines

Administration summary: MR/MMR (see Appendix 2_39.)

[WHO/IVB/04.06](#)
page 9

Conclusions and recommendations from the Strategic Advisory Group of Experts (SAGE) - 10-11 April 2006

The WHO secretariat should make special efforts to collaborate with industry to increase global availability of MMR vaccines that contain strains of mumps vaccines with the best safety profile.

[WER 2006, vol. 81, 21, pp 210-220](#)
page 214

Hepatitis B

WHO-UNICEF effective vaccine store management initiative: Modules 1 - 4

WHO recommended vaccine storage conditions (Appendix 17_3).

[WHO/IVB/04.16-20](#)
page 1

Temperature sensitivity of vaccines[WHO/IVB/06.10](#)

page 2

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Hib

WHO-UNICEF effective vaccine store management initiative: Modules 1 - 4[WHO/IVB/04.16-20](#)

page 1

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Temperature sensitivity of vaccines[WHO/IVB/06.10](#)

page 2

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Measles

Immunization in practice: a practical resource guide for Health workers 2004 update _____ Module 2: The vaccines[WHO/IVB/04.06](#)

page 6

Measles vaccine (including MR and MMR - page 8):

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WHO-UNICEF effective vaccine store management initiative: Modules 1 - 4[WHO/IVB/04.16-20](#)

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[WER 2004, vol. 79, 14, pp 130-142](#)
page 131

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[WER 2004, vol. 79, 14, pp 130-142](#)
page 131

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[WHO/IVB/04.06](#)
page 28

Temperature sensitivity of vaccines

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[WHO/IVB/06.10](#)
page 2

Temperature sensitivity of vaccines[WHO/IVB/06.10](#)

page 27

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 8C 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 2-8C. 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.

Ensuring the quality of vaccines at country level: Guidelines for health staff[WHO/V&B/02.16](#)

page 13

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 -15C and -25C.

Freeze-dried vaccines, i.e. BCG, measles, MMR and yellow fever vaccines, may also be kept in this temperature range (-15C and -25C) 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 +2C and +8C. All other national immunization service vaccines should be stored between +2C and +8C at all levels of the cold chain.

Measles vaccines (WHO position paper)[WER 2004, vol. 79, 14, pp 130-142](#)

page 138

(W)hen 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.

Meningococcal

Temperature sensitivity of vaccines

[WHO/IVB/06.10](#)
page 2

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Mumps

Measles vaccines (WHO position paper)

[WER 2004, vol. 79, 14, pp 130-142](#)
page 138

Mumps-containing measles vaccine (MMR) is generally not recommended for large-scale measles SIAs in countries with limited resources.

Mumps virus vaccines (WHO position paper)

[WER 2001, vol. 76, 45, pp 346-356](#)
page 346

Large-scale mumps vaccination is recommended in countries with an efficient childhood vaccination programme and sufficient resources to maintain high-level vaccination coverage, and where reduction of mumps is a public health priority. Because WHO considers measles elimination and control of congenital rubella syndrome to be higher priorities than mumps control, it recommends that the introduction of mumps immunization should be considered only in countries that have or are establishing adequate vaccination programmes for measles elimination and control of the congenital rubella syndrome. In countries which decide to use mumps vaccine, the combination of mumps vaccine with measles and rubella vaccines is thus recommended.

National decisions to implement large-scale mumps vaccination should be based on careful cost-benefit analyses, including comparative analyses of mumps control versus control of other vaccine-preventable diseases in the country.

Immunization in practice: a practical resource guide for Health workers 2004 update _____ Module 1: Target diseases

[WHO/IVB/04.06](#)
page 11

Mumps vaccine should be given in combination with measles and rubella vaccines (MMR).

Measles vaccines (WHO position paper)

[WER 2004, vol. 79, 14, pp 130-142](#)
page 131

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%.

WHO recommended standards for surveillance of selected vaccine-preventable diseases

[WHO/V&B/03.01](#)
page 21

Where (mumps) vaccine is used and high coverage is achieved the monitoring of vaccine-associated mumps meningitis and its differentiation from meningitis due to other causes can be an important issue. The monitoring of mumps meningitis, whether related to vaccine or natural disease, can be integrated into overall meningitis surveillance activities.

The vast majority of mumps vaccine is used in combination with measles and rubella vaccines (MMR), and surveillance strategies for mumps should take surveillance for measles, rubella and congenital rubella syndrome into consideration.

Temperature sensitivity of vaccines

[WHO/IVB/06.10](#)
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Temperature sensitivity of vaccines[WHO/IVB/06.10](#)

page 27

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 8C 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 2-8C. 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.

Mumps virus vaccines (WHO position paper)[WER 2001, vol. 76, 45, pp 346-356](#)

page 354

Primary mumps vaccination, especially in the recommended combination with rubella and measles vaccines, is easily adapted to the national vaccination programmes and does not interfere significantly with simultaneously-administered vaccines.

Mumps virus vaccines (WHO position paper)[WER 2001, vol. 76, 45, pp 346-356](#)

page 354

Introduction of routine mumps immunization should be prioritized along with other potential prevention options. Introduction of mumps vaccine into national childhood immunization programmes should be considered only in countries that have or are establishing adequate vaccination programmes for measles elimination and control of the congenital rubella syndrome.

Mumps virus vaccines (WHO position paper)[WER 2001, vol. 76, 45, pp 346-356](#)

page 355

The addition of mumps vaccine to the measles and rubella vaccination programmes using the MMR combined vaccine is logistically sound, and the MMR combination is strongly encouraged where affordable and where vaccine supply is sufficient.

New Vaccines

Measles vaccines (WHO position paper)[WER 2004, vol. 79, 14, pp 130-142](#)

page 138

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National decisions to implement large-scale mumps vaccination should be based on careful cost-benefit analyses, including comparative analyses of mumps control versus control of other vaccine-preventable diseases in the country.

Measles vaccines (WHO position paper)

[WER 2004, vol. 79, 14, pp 130-142](#)
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Vaccine introduction guidelines. Adding a vaccine to a national immunization programme: decision and implementation

[WHO/IVB/05.18](#)
page 47

While many countries have readily replaced single-antigen measles vaccine with measlesmumpsrubella (MMR) or measlesrubella (MR) vaccines, to prevent a potential gradual increase in rubella susceptibility among women of childbearing age and a paradoxical increase in congenital rubella syndrome (CRS) incidence, efforts are needed to assure that women of childbearing age are also protected against rubella.

A strong laboratory-based surveillance mechanism is a must for identification of rubella outbreaks following the introduction of MMR or MR into the NIP.

A screening programme should be available for females entering childbearing age because, once the vaccine is introduced into the NIP, the susceptibility of adults getting rubella will be increased.

Measles vaccines (WHO position paper)

[WER 2004, vol. 79, 14, pp 130-142](#)
page 138

(W)hen 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.

Mumps virus vaccines (WHO position paper)

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Mumps virus vaccines (WHO position paper)

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Outbreak Control**Vaccine introduction guidelines. Adding a vaccine to a national immunization programme: decision and implementation**

[WHO/IVB/05.18](#)
page 47

While many countries have readily replaced single-antigen measles vaccine with measlesmumpsrubella (MMR) or measlesrubella (MR) vaccines, to prevent a potential gradual increase in rubella susceptibility among women of childbearing age and a paradoxical increase in congenital rubella syndrome (CRS) incidence, efforts are needed to assure that women of childbearing age are also protected against rubella.

A strong laboratory-based surveillance mechanism is a must for identification of rubella outbreaks following the introduction of MMR or MR into the NIP.

A screening programme should be available for females entering childbearing age because, once the vaccine is introduced into the NIP, the susceptibility of adults getting rubella will be increased.

Pentavalent**Temperature sensitivity of vaccines**

[WHO/IVB/06.10](#)
page 2

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 -15oC and -25oC. Freeze-dried vaccines (i.e., BCG, measles, MMR and yellow fever) may also be kept frozen at -15oC to -25oC 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 +2oC and +8oC. All other vaccines should be stored at between +2oC and +8oC 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.

Policy

Measles vaccines (WHO position paper)

[WER 2004, vol. 79, 14, pp 130-142](#)
page 138

Mumps-containing measles vaccine (MMR) is generally not recommended for large-scale measles SIAs in countries with limited resources.

Mumps virus vaccines (WHO position paper)

[WER 2001, vol. 76, 45, pp 346-356](#)
page 346

Large-scale mumps vaccination is recommended in countries with an efficient childhood vaccination programme and sufficient resources to maintain high-level vaccination coverage, and where reduction of mumps is a public health priority. Because WHO considers measles elimination and control of congenital rubella syndrome to be higher priorities than mumps control, it recommends that the introduction of mumps immunization should be considered only in countries that have or are establishing adequate vaccination programmes for measles elimination and control of the congenital rubella syndrome. In countries which decide to use mumps vaccine, the combination of mumps vaccine with measles and rubella vaccines is thus recommended.

National decisions to implement large-scale mumps vaccination should be based on careful cost-benefit analyses, including comparative analyses of mumps control versus control of other vaccine-preventable diseases in the country.

Immunization in practice: a practical resource guide for Health workers 2004 update _____ Module 1: Target diseases

[WHO/IVB/04.06](#)
page 11

Mumps vaccine should be given in combination with measles and rubella vaccines (MMR).

Immunization in practice: a practical resource guide for Health workers 2004 update _____ Module 2: The vaccines

[WHO/IVB/04.06](#)
page 6

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 2C-8C.
- _ Any remaining reconstituted vaccine must be discarded after six hours or at the end of the immunization session, whichever comes first.

WHO-UNICEF effective vaccine store management initiative: Modules 1 - 4

[WHO/IVB/04.16-20](#)
page 1

WHO recommended vaccine storage conditions (Appendix 17_3).

Measles vaccines (WHO position paper)

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%.

[WER 2004, vol. 79, 14, pp 130-142](#)
page 131

Measles vaccines (WHO position paper)

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.

[WER 2004, vol. 79, 14, pp 130-142](#)
page 131

Rubella vaccines (WHO position paper)

Rubella vaccine is usually administered at age 12-15 months, but can also be administered to children as young as 9 months of age. In most countries, the vaccine is given as MR or MMR, and the age of administration is chosen based on the appropriate age for measles vaccination. It may also be administered to older children, adolescents, students, child care personnel, health care workers, military personnel and adult men in contact with women of childbearing age.

[WER 2000, vol. 75, 20, pp 161-169](#)
page 166

WHO recommended standards for surveillance of selected vaccine-preventable diseases

Where (mumps) vaccine is used and high coverage is achieved the monitoring of vaccine-associated mumps meningitis and its differentiation from meningitis due to other causes can be an important issue. The monitoring of mumps meningitis, whether related to vaccine or natural disease, can be integrated into overall meningitis surveillance activities.

[WHO/V&B/03.01](#)
page 21

The vast majority of mumps vaccine is used in combination with measles and rubella vaccines (MMR), and surveillance strategies for mumps should take surveillance for measles, rubella and congenital rubella syndrome into consideration.

Immunization in practice: a practical resource guide for Health workers 2004 update_____Module 3: The cold chain

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.

[WHO/IVB/04.06](#)
page 28

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

[WHO/IVB/05.18](#)

page 47

While many countries have readily replaced single-antigen measles vaccine with measlesmumpsrubella (MMR) or measlesrubella (MR) vaccines, to prevent a potential gradual increase in rubella susceptibility among women of childbearing age and a paradoxical increase in congenital rubella syndrome (CRS) incidence, efforts are needed to assure that women of childbearing age are also protected against rubella.

A strong laboratory-based surveillance mechanism is a must for identification of rubella outbreaks following the introduction of MMR or MR into the NIP.

A screening programme should be available for females entering childbearing age because, once the vaccine is introduced into the NIP, the susceptibility of adults getting rubella will be increased.

Temperature sensitivity of vaccines

[WHO/IVB/06.10](#)

page 2

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 -15oC and -25oC. Freeze-dried vaccines (i.e., BCG, measles, MMR and yellow fever) may also be kept frozen at -15oC to -25oC 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 +2oC and +8oC. All other vaccines should be stored at between +2oC and +8oC 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.

Temperature sensitivity of vaccines

[WHO/IVB/06.10](#)

page 27

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 8C 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 2-8C. 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.

Ensuring the quality of vaccines at country level: Guidelines for health staff[WHO/V&B/02.16](#)

page 13

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 -15C and -25C.

Freeze-dried vaccines, i.e. BCG, measles, MMR and yellow fever vaccines, may also be kept in this temperature range (-15C and -25C) 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 +2C and +8C. All other national immunization service vaccines should be stored between +2C and +8C at all levels of the cold chain.

Measles vaccines (WHO position paper)[WER 2004, vol. 79, 14, pp 130-142](#)

page 138

(W)hen 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.

Mumps virus vaccines (WHO position paper)[WER 2001, vol. 76, 45, pp 346-356](#)

page 354

Primary mumps vaccination, especially in the recommended combination with rubella and measles vaccines, is easily adapted to the national vaccination programmes and does not interfere significantly with simultaneously-administered vaccines.

Mumps virus vaccines (WHO position paper)[WER 2001, vol. 76, 45, pp 346-356](#)

page 354

Introduction of routine mumps immunization should be prioritized along with other potential prevention options. Introduction of mumps vaccine into national childhood immunization programmes should be considered only in countries that have or are establishing adequate vaccination programmes for measles elimination and control of the congenital rubella syndrome.

Mumps virus vaccines (WHO position paper)[WER 2001, vol. 76, 45, pp 346-356](#)

page 355

The addition of mumps vaccine to the measles and rubella vaccination programmes using the MMR combined vaccine is logistically sound, and the MMR combination is strongly encouraged where affordable and where vaccine supply is sufficient.

Immunization in practice: a practical resource guide for Health workers 2004 update_____Module 2: The vaccines[WHO/IVB/04.06](#)

page 9

Administration summary: MR/MMR (see Appendix 2_39.)

Polio

WHO-UNICEF effective vaccine store management initiative: Modules 1 - 4

[WHO/IVB/04.16-20](#)
page 1

WHO recommended vaccine storage conditions (Appendix 17_3).

Temperature sensitivity of vaccines

[WHO/IVB/06.10](#)
page 2

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 -15oC and -25oC. Freeze-dried vaccines (i.e., BCG, measles, MMR and yellow fever) may also be kept frozen at -15oC to -25oC 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 +2oC and +8oC. All other vaccines should be stored at between +2oC and +8oC 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.

Ensuring the quality of vaccines at country level: Guidelines for health staff

[WHO/V&B/02.16](#)
page 13

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 -15C and -25C.

Freeze-dried vaccines, i.e. BCG, measles, MMR and yellow fever vaccines, may also be kept in this temperature range (-15C and -25C) 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 +2C and +8C. All other national immunization service vaccines should be stored between +2C and +8C at all levels of the cold chain.

Rubella

Measles vaccines (WHO position paper)

[WER 2004, vol. 79, 14, pp 130-142](#)
page 131

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%.

Rubella vaccines (WHO position paper)

[WER 2000, vol. 75, 20, pp 161-169](#)
page 166

Rubella vaccine is usually administered at age 12-15 months, but can also be administered to children as young as 9 months of age. In most countries, the vaccine is given as MR or MMR, and the age of administration is chosen based on the appropriate age for measles vaccination. It may also be administered to older children, adolescents, students, child care personnel, health care workers, military personnel and adult men in contact with women of childbearing age.

Immunization in practice: a practical resource guide for Health workers 2004 update_____Module 3: The cold chain

[WHO/IVB/04.06](#)
page 28

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.

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

[WHO/IVB/05.18](#)
page 47

While many countries have readily replaced single-antigen measles vaccine with measlesmumpsrubella (MMR) or measlesrubella (MR) vaccines, to prevent a potential gradual increase in rubella susceptibility among women of childbearing age and a paradoxical increase in congenital rubella syndrome (CRS) incidence, efforts are needed to assure that women of childbearing age are also protected against rubella.

A strong laboratory-based surveillance mechanism is a must for identification of rubella outbreaks following the introduction of MMR or MR into the NIP.

A screening programme should be available for females entering childbearing age because, once the vaccine is introduced into the NIP, the susceptibility of adults getting rubella will be increased.

Temperature sensitivity of vaccines

[WHO/IVB/06.10](#)
page 2

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 -15oC and -25oC. Freeze-dried vaccines (i.e., BCG, measles, MMR and yellow fever) may also be kept frozen at -15oC to -25oC 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 +2oC and +8oC. All other vaccines should be stored at between +2oC and +8oC 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.

Temperature sensitivity of vaccines[WHO/IVB/06.10](#)

page 27

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 8C 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 2-8C. 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.

Measles vaccines (WHO position paper)[WER 2004, vol. 79, 14, pp 130-142](#)

page 138

(W)hen 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.

SAGE - recommend to WHO

Conclusions and recommendations from the Strategic Advisory Group of Experts (SAGE) - 10-11 April 2006[WER 2006, vol. 81, 21, pp 210-220](#)

page 214

The WHO secretariat should make special efforts to collaborate with industry to increase global availability of MMR vaccines that contain strains of mumps vaccines with the best safety profile.

Schedule

Immunization in practice: a practical resource guide for Health workers 2004 update_____Module 1: Target diseases[WHO/IVB/04.06](#)

page 11

Mumps vaccine should be given in combination with measles and rubella vaccines (MMR).

Rubella vaccines (WHO position paper)[WER 2000, vol. 75, 20, pp 161-169](#)

page 166

Rubella vaccine is usually administered at age 12-15 months, but can also be administered to children as young as 9 months of age. In most countries, the vaccine is given as MR or MMR, and the age of administration is chosen based on the appropriate age for measles vaccination. It may also be administered to older children, adolescents, students, child care personnel, health care workers, military personnel and adult men in contact with women of childbearing age.

Tetanus

Temperature sensitivity of vaccines

[WHO/IVB/06.10](#)

page 2

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 -15oC and -25oC. Freeze-dried vaccines (i.e., BCG, measles, MMR and yellow fever) may also be kept frozen at -15oC to -25oC 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 +2oC and +8oC. All other vaccines should be stored at between +2oC and +8oC 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.

VPD Surveillance

WHO recommended standards for surveillance of selected vaccine-preventable diseases

[WHO/V&B/03.01](#)

page 21

Where (mumps) vaccine is used and high coverage is achieved the monitoring of vaccine-associated mumps meningitis and its differentiation from meningitis due to other causes can be an important issue. The monitoring of mumps meningitis, whether related to vaccine or natural disease, can be integrated into overall meningitis surveillance activities.

The vast majority of mumps vaccine is used in combination with measles and rubella vaccines (MMR), and surveillance strategies for mumps should take surveillance for measles, rubella and congenital rubella syndrome into consideration.

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

[WHO/IVB/05.18](#)

page 47

While many countries have readily replaced single-antigen measles vaccine with measlesmumpsrubella (MMR) or measlesrubella (MR) vaccines, to prevent a potential gradual increase in rubella susceptibility among women of childbearing age and a paradoxical increase in congenital rubella syndrome (CRS) incidence, efforts are needed to assure that women of childbearing age are also protected against rubella.

A strong laboratory-based surveillance mechanism is a must for identification of rubella outbreaks following the introduction of MMR or MR into the NIP.

A screening programme should be available for females entering childbearing age because, once the vaccine is introduced into the NIP, the susceptibility of adults getting rubella will be increased.

Vaccine Administration

Mumps virus vaccines (WHO position paper)

[WER 2001, vol. 76, 45, pp 346-356](#)
page 354

Primary mumps vaccination, especially in the recommended combination with rubella and measles vaccines, is easily adapted to the national vaccination programmes and does not interfere significantly with simultaneously-administered vaccines.

Immunization in practice: a practical resource guide for Health workers 2004 update_____Module 2: The vaccines

[WHO/IVB/04.06](#)
page 9

Administration summary: MR/MMR (see Appendix 2_39.)

Vaccine Handling

Immunization in practice: a practical resource guide for Health workers 2004 update_____Module 2: The vaccines

[WHO/IVB/04.06](#)
page 6

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 2C-8C.
- _ Any remaining reconstituted vaccine must be discarded after six hours or at the end of the immunization session, whichever comes first.

WHO-UNICEF effective vaccine store management initiative: Modules 1 - 4

[WHO/IVB/04.16-20](#)
page 1

WHO recommended vaccine storage conditions (Appendix 17_3).

Immunization in practice: a practical resource guide for Health workers 2004 update_____Module 3: The cold chain

[WHO/IVB/04.06](#)
page 28

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.

Temperature sensitivity of vaccines[WHO/IVB/06.10](#)

page 2

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Temperature sensitivity of vaccines[WHO/IVB/06.10](#)

page 27

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 8C 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 2-8C. 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.

Ensuring the quality of vaccines at country level: Guidelines for health staff[WHO/V&B/02.16](#)

page 13

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 -15C and -25C.

Freeze-dried vaccines, i.e. BCG, measles, MMR and yellow fever vaccines, may also be kept in this temperature range (-15C and -25C) 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 +2C and +8C. All other national immunization service vaccines should be stored between +2C and +8C at all levels of the cold chain.

Vaccine Quality

Conclusions and recommendations from the Strategic Advisory Group of Experts (SAGE) - 10-11 April 2006

[WER 2006, vol. 81, 21, pp 210-220](#)
page 214

The WHO secretariat should make special efforts to collaborate with industry to increase global availability of MMR vaccines that contain strains of mumps vaccines with the best safety profile.

Yellow Fever

WHO-UNICEF effective vaccine store management initiative: Modules 1 - 4

[WHO/IVB/04.16-20](#)
page 1

WHO recommended vaccine storage conditions (Appendix 17_3).

Temperature sensitivity of vaccines

[WHO/IVB/06.10](#)
page 2

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 -15oC and -25oC. Freeze-dried vaccines (i.e., BCG, measles, MMR and yellow fever) may also be kept frozen at -15oC to -25oC 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 +2oC and +8oC. All other vaccines should be stored at between +2oC and +8oC 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.

Ensuring the quality of vaccines at country level: Guidelines for health staff

[WHO/V&B/02.16](#)
page 13

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Freeze-dried vaccines, i.e. BCG, measles, MMR and yellow fever vaccines, may also be kept in this temperature range (-15C and -25C) 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 +2C and +8C. All other national immunization service vaccines should be stored between +2C and +8C at all levels of the cold chain.