Maternal immunization against tetanus

INTEGRATED MANAGEMENT OF PREGNANCY AND CHILDBIRTH **(IMPAC)**

The standard

All women giving birth and their newborn babies should be protected against tetanus.

Aim

To prevent maternal and neonatal tetanus (MNT).

Requirements

- ☐ A national policy and national strategies to achieve high vaccination coverage with tetanus toxoid (TT or Td) among pregnant women are available and are correctly implemented.
- ☐ In countries with areas at high risk for MNT, strategies and plans to implement a "high-risk approach", including vaccination of women of childbearing age, are in place.
- ☐ All pregnant women attend antenatal clinic or can be reached by health staff in the community.
- ☐ Antenatal care (ANC) providers have been trained in tetanus immunization.
- ☐ The vaccine, equipment and supplies (refrigerator, syringes, needles, etc.) needed to conduct tetanus immunization are readily available in the health facilities, particularly at ANC services.
- ☐ An effective tetanus vaccination monitoring system is in place, including immunization register, personal vaccination cards and maternal health records.
- ☐ All pregnant women are issued a personal immunization card, which should be available for reference at each ANC visit and at any other contact with the health system throughout life.
- ☐ Health education activities to increase community awareness of the importance of tetanus immunization are carried out.
- ☐ Maternal and neonatal tetanus are included in the national surveillance system.

Applying the standard

Health providers of maternal and neonatal health care, in particular, must:

- Follow universal standards for prevention of infection in all circumstances.
- If the woman has a tetanus-prone wound, including a woman who underwent an unsafe abortion, protect her against future tetanus risks by immunizing her immediately if she is considered not protected (see table 1). In addition, offer prophylaxis with tetanus immunoglobulins if the wound is large and possibly infected with soil or instruments contaminated with animal excreta.

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- Before administering the vaccine, shake the vial with TT so that the sediment at the bottom mixes completely with the liquid. If it is suspected that the vaccine has been frozen and thawed, check for damage using the shake test. Previously frozen vaccine should not be administered.
- In the ANC service, check the immunization status of the pregnant woman (either by history or by card), regardless of whether there is an intention to continue the pregnancy. Administer tetanus toxoid if the woman qualifies for it:
  - if the woman has not previously been vaccinated, or if her immunization status is unknown, give two doses of TT/Td one month apart before delivery, and further doses as per table 1;
  - if the woman has had 1–4 doses of tetanus toxoid in the past, give one dose of TT/Td before delivery (a total of five doses protects throughout the childbearing years);

Table 1 Tetanus toxoid immunization schedule for women of childbearing age and pregnant women without previous exposure to TT, Td or DTP[a]

Dose of TT or Td (according to card or history)	When to give	Expected duration of protection
1	At first contact or as early as possible in pregnancy	None
2	At least 4 weeks after TT1	1-3 years
3	At least 6 months after TT2 or during subsequent pregnancy	At least 5 years
4	At least one year after TT3 or during subsequent pregnancy	At least 10 years
5	At least one year after TT4 or during subsequent pregnancy	For all childbearing age years and possibly longer

[a] Source: *Core information for the development of immunization policy. 2002 update*. Geneva. World Health Organization, 2002 (document WHO/V&B/02.28), page 130.

  - if the woman can show written proof of vaccination in infancy, childhood or adolescence with tetanus-containing vaccine (e.g. DTP, DT, Td, TT) administer doses as indicated in the table 2.

Table 2 Guidelines for tetanus toxoid immunization of women who were immunized during infancy, childhood or adolescence[b]

Age at last vaccination	Previous immunizations (based on written records)	Recommended Immunizations	
		At present contact/pregnancy	Later (at intervals of at least one year)
Infancy	3 DTP	2 doses of TT/Td (min.4 weeks interval between doses)	1 dose of TT/Td
Childhood	4 DTP	1 dose of TT/Td	1 dose of TT/Td
School age	3 DTP + 1 DT/Td	1 dose of TT/Td	1 dose of TT/Td
School age	4 DTP + 1 DT/Td	1 dose of TT/Td	None
Adolescence	4 DTP + 1 DT at 4-6 yrs + 1 TT/Td at 14-16 yrs	None	None

[b] Adapted from: Galazka AM. *The immunological basis for immunization series. Module 3: tetanus*. Geneva, World Health Organization, 1993 (WHO/EPI/GEN/93.13), page 17.

- For the woman to be protected during pregnancy, the last dose of tetanus toxoid must be given at least two weeks prior delivery.
- Record the doses given on a standard tetanus toxoid immunization register and on a personal immunization card or maternal health record. The personal immunization card should be kept with the woman.

- If a case of neonatal tetanus is identified, give the mother one dose of tetanus toxoid as soon as possible and treat the baby according to national guidelines. A second dose should be given (at least) four weeks after the first, and a third dose should be given (at least) six months after the second. A search should be made for other non-immunized women living in the same area, and vaccination provided accordingly.
- Record all cases of NT and report to the district authority. All NT cases from low-risk areas should be investigated.
- Record and report all cases of tetanus occurring in other age groups separately. Where possible, cases of maternal tetanus should be highlighted, for example through reporting.

Audit

Input indicators

- A national policy and strategies and plans related to MNT are available in health facilities.
- ANC care providers are acquainted with the vaccination schedule and know how to check whether tetanus toxoid vaccine has been damaged.
- Tetanus vaccines (TT and/or Td) are available in health facilities offering maternal care.
- Community-based health education activities are carried out in order to increase ANC and TT immunization coverage.
- Outreach activities are carried out in order to increase ANC and TT immunization coverage.

Process and output indicators

- The proportion of ANC services providing tetanus immunization services.
- The proportion of pregnant women immunized with at least two doses of tetanus toxoid (TT2+) or the proportion of neonates "protected at birth" (PAB).
- Monthly reports on NT cases are completed and delivered on time.

Outcome indicators

- Incidence of neonatal tetanus (the target is less than 1 case per 1000 live births at district level).
- Incidence of maternal tetanus.

Rationale

Burden of suffering

Worldwide, tetanus kills an estimated 180 000 neonates *(1)* (about 5% of all neonatal deaths (2002 data)) and up to 30 000 women *(2)* (about 5% of all maternal deaths) each year. If the mother is not immunized with the correct number of doses of tetanus toxoid vaccine, neither she nor her newborn infant is protected against tetanus at delivery.

Tetanus is caused by a toxin produced during the anaerobic growth of *Clostridium tetani*. Infection is acquired through environmental exposure of any broken skin or dead tissue —such as a wound or when the umbilical cord is cut—to the spores of the bacteria. These spores are universally present in the soil. Poverty, poor hygiene and limited access to health services increase the risk of MNT. WHO estimates that only 5% of NT cases are reported, even from countries with well-developed surveillance systems. Since 1989, when the World Health Assembly called for the elimination of NT, 110 out of 161 developing countries are thought to have achieved elimination (as of the end of 2004). UNICEF, WHO and UNFPA agreed in 1999 to set the year 2005 as the target date for worldwide elimination. Elimination is defined as the reduction of NT cases to less than 1 per 1000 live births in every district of every country. This definition is also being used as a proxy for the elimination of maternal tetanus.

Efficacy and effectiveness

The purpose of giving the vaccine to women of childbearing age and to pregnant women is to protect them from tetanus and to protect their newborn infants against NT *(3,4)*. Tetanus vaccination produces protective antibody levels in more than 80% of recipients after two doses *(1–3)*. Two doses protect for 1–3 years, although some studies indicate even longer protection *(3)*. Tetanus vaccine is safe to give during pregnancy *(4,5)*.

Because tetanus spores are ubiquitous in the environment, eradication is not biologically feasible. High immunization coverage of pregnant women, clean delivery and the identification and implementation of corrective action in high-risk areas are the three primary strategies for eliminating MNT (see also standard 2.4.2 "Care of the umbilical cord"). Antenatal services provide a convenient opportunity for vaccinating pregnant women *(6,7)*. Where ANC coverage is inadequate, mass immunization of women of childbearing age could be an alternative though more costly option *(3,5)*. About US$ 1.20 is needed to protect a woman with three doses of TT/Td using the high-risk approach. Reminding patients, tracking and outreach activities are effective in increasing immunization coverage *(8)*.

Services dealing with patients with a tetanus-prone wound, including women who underwent an unsafe abortion, should also immunize the patient if she is considered not protected to ensure that she is no longer at risk in the future. In addition, prophylaxis with tetanus immunoglobulins may be required if the wound is large and possibly infected with soil or instruments contaminated with animal excreta *(9)*.

Effective surveillance is crucial to monitoring progress, and is possible even where resources are scarce *(9)*. However, obtaining complete and reliable data has proven to be difficult, as shown by the low efficacy of reporting. In circumstances where abortion is illegal or socially unacceptable, post-abortion tetanus cases are neglected and underreporting can be even more common.

The table below summarizes the evidence from the most relevant studies. The level of evidence is presented using the NICE methodology which applies a coding from 1 (high level) to 4 (low level). For details, see also the *Introduction to the Standards for Maternal and Neonatal Care* and the *Process to develop the Standards for Maternal and Neonatal Care* on http://www.who.int/making_pregnancy_safer/publications/en. For an overview of a comprehensive list of evidence, please refer to the reference section of the standard.

Study (Type & Level of evidence)	Population & Setting	Objective & Intervention	Outcomes considered for the Standard	Results	
3. Koenig et al. 1998 **Observational study nested in a randomized controlled trial** **2+**	41 571 non-pregnant adult women Bangladesh (Matlab cholera trial 1974) Baseline NT* mortality rate: 14.4/1000 live births	To assess vaccine efficacy to reduce mortality from NT 1 or 2 injections of tetanus toxoid vs control given to pregnant women	Vaccine efficacy rate Neonatal mortality on days 4–14 (suspected NT) – 3 years post-immunization – 10 years post-immunization NT mortality – 10 years post-immunization	*1 dose vs. control* 91 (33-99) NS [a] NS	*2 doses vs. control* 56 (17-76) 48 (3-73) 74 (23-91)
8. Szilagyi et al. 2003 Most recent substantive amendment August 2002 **Systematic review** **1++**	41 studies; more than 50 000 patients (children and adults over 20 years of age) Community setting Australia, Canada, Denmark, New Zealand, USA Baseline immunization rate: – minimum 3% – maximum 95%	To identify effective intervention to improve immunization rate Utilization of patient reminder/recall systems	Increased immunization rate – minimum – maximum	*Patient reminders vs. control* NNT [b] 24 (17-35) NNT 34 (30-41)	

* Neonatal tetanus [a] Non-significant [b] Number needed to treat

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9. D. Heymann. *Control of communicable diseases manual*, 18th Edition, WHO and APHA 2004, p.531.
10. John TJ et al. Disease surveillance at district level: a model for developing countries. *Lancet*, 1998, 352:58–61.

Links and additional sources

I. *Field manual for neonatal tetanus elimination*. Geneva, World Health Organization, 1999 (document WHO/V&B/99.14) (http://www.who.int/vaccines-documents/DocsPDF/www9563.pdf, accessed 7 December 2004).

II. *Maternal and neonatal tetanus elimination by 2005. Strategies for achieving and maintaining elimination*. Geneva, UNICEF, WHO, UNFPA, 2000 (document WHO/V&B/02.09) (http://www.who.int/vaccines-documents/DocsPDF02/www692.pdf, accessed 7 December 2004).

III. *WHO-recommended standards for surveillance of selected vaccine-preventable diseases*. Geneva, World Health Organization, 2003 (document WHO/V&B/03.01) (http://www.who.int/vaccines-documents/DocsPDF06/843.pdf, accessed 8 March, 2006).

IV. *Immunization in practice. A practical resource guide for health workers. 2004 update. Module 3: The cold chain. Module 8: Building community support for immunization*. Geneva, World Health Organization, 2004 (http://www.who.int/vaccines-documents/DoxTrng/h4iip.htm, accessed 7 December 2004).

V. Galazka AM. *The immunological basis for immunization series. Module 3: tetanus*. Geneva, World Health Organization, 1993 (document WHO/EPI/GEN/93.13) (http://www.who.int/vaccines-documents/DocsPDF-IBI-e/mod3_e.pdf, accessed 7 December 2004).

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VII. *Postpartum care of the mother and newborn: a practical guide. Report of a technical working group*. Geneva, World Health Organization, 1998 (document WHO/RHT/MSM/98.3) (http://whqlibdoc.who.int/hq/1998/WHO_RHT_MSM_98.3.pdf, accessed 7 December 2004).

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