November 2000

Maternal and Neonatal Tetanus Elimination by 2005

Strategies for achieving and maintaining elimination

UNICEF WHO UNFPA

Contents

Cover photo credit: UNICEF/92-0044/Charton

Acronyms

AFP	acute flaccid paralysis
ANC	antenatal care
DHS	Demographic and Health Surveys
DPT	diphtheria/pertussis/tetanus
GAVI	Global Alliance for Vaccines and Immunization
GNP	gross national product
MNT	maternal and neonatal tetanus
NGO	non-governmental organization
NT	neonatal tetanus
PAB	protection at birth
TBA	traditional birth attendant
Td	tetanus diphtheria toxoid
TT	tetanus toxoid
UNICEF	United Nations Children's Fund
UNFPA	United Nations Population Fund
VVM	vaccine vial monitor
WHO	World Health Organization

Introduction

Maternal and neonatal tetanus elimination goal

Since 1989, when the World Health Assembly called for the elimination of neonatal tetanus, 104 of 161 developing countries have achieved elimination. However, because neonatal tetanus continues to be a significant problem in the countries remaining, UNICEF, WHO and UNFPA recently (in December 1999) agreed to set the year 2005 as the target date for worldwide elimination.

> **Neonatal tetanus elimination:** The reduction of neonatal tetanus cases to fewer than 1 case per 1,000 live births in every district of every country.

Maternal tetanus has now been added to the elimination goal. The inclusion recognizes that tetanus threatens mothers as well as babies during pregnancy and delivery and that the elimination of tetanus benefits them equally. Because maternal tetanus elimination has not been defined, the achievement of neonatal tetanus elimination is being used as a proxy for maternal tetanus elimination.

Strategies to achieve and maintain elimination

The focus of global efforts with respect to maternal and neonatal tetanus (MNT) is now on the 57 countries that, as of mid-2000, have not eliminated MNT in all districts. While some of these countries will soon reach the goal, many will require more time and special strategies to deal with basic accessibility problems characterized by:

- lack of, or limited, immunization services;
- lack of, or limited, antenatal care; and
- lack of skilled birth attendants.

For these districts particularly, UNICEF, WHO and UNFPA recommend:

1. In high-risk districts/areas where women have not been reached by immunization services, conduct supplemental immunization activities to vaccinate at least 90 per cent of all women of childbearing age with three properly spaced doses of tetanus toxoid vaccine (TT).

2. Maintain elimination in formerly high-risk districts by routinely vaccinating pregnant women, through fixed sites, outreach or other methods.

The purpose of these guidelines

These guidelines describe the strategies for achieving elimination of maternal and neonatal tetanus by the year 2005 and, once elimination is achieved, for maintaining it. They are intended for public health managers at the national and district levels in countries that have not yet reached the goal and for the organizations that provide them with technical assistance. They will also be useful for development partners that are planning financial or other support.

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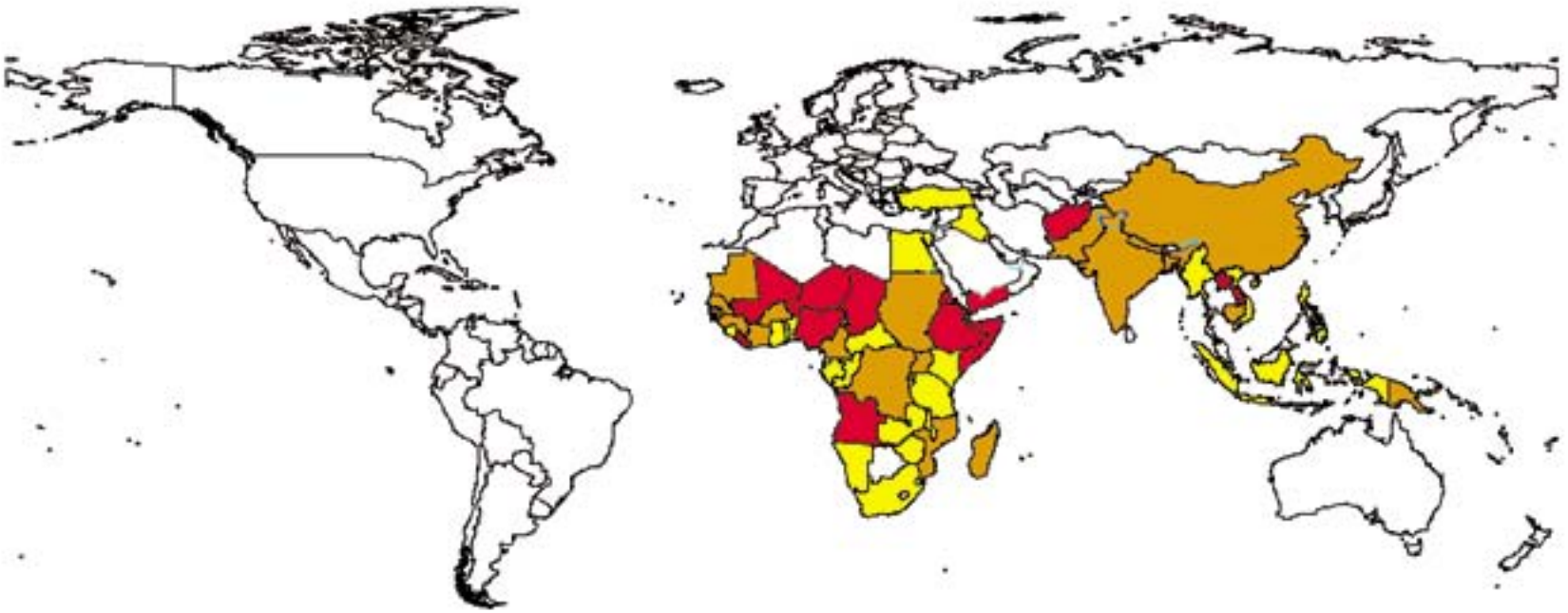
Global status of progress towards neonatal tetanus elimination (as of March 2000)



Neonatal tetanus elimination status

- Eliminated
- Eliminated from more than 50% of districts
- Eliminated from 10 - 49% of districts
- Eliminated from less than 10% of districts

The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever concerning the legal status of any country, territory, city or area or of its authoritieis, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement.

1. Maternal and neonatal tetanus: Current status

Neonatal tetanus

Neonatal tetanus: Tetanus occurring in a newborn between the 3rd and 28th day after birth.

Neonatal tetanus occurs as a result of unhygienic birth practices, most commonly when tetanus spores contaminate the umbilical cord at the time that it is cut or dressed after delivery. Symptoms of neonatal tetanus usually appear in the third day after birth. An apparently healthy baby will stop nursing, become progressively more rigid, develop an arching of the whole body and experience painful convulsions. It is a deadly disease for newborns, with a case fatality rate of 70 per cent to 100 per cent.

Neonatal tetanus is responsible for 14 per cent (215,000) of all neonatal deaths (WHO, 1998). Reducing deaths from neonatal tetanus is one of the simplest and most cost-effective means to reduce the neonatal mortality rate. However, because most of the deaths occur at home before the baby reaches two weeks of age and neither the birth nor the death is reported, the number of cases reported by countries is low. For this reason, neonatal tetanus is often called the invisible killer.

Paul Harrison/Still Pictures

Neonatal tetanus occurs most commonly in the lowest income countries and those with the least developed health infrastructure. Within these countries, it is frequently found among populations with little or no access to health care services or education.

Maternal tetanus

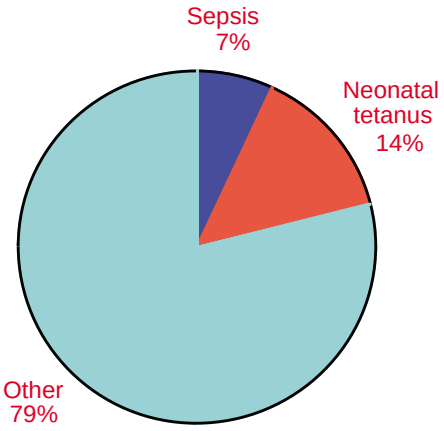
Maternal tetanus: Tetanus that strikes women during pregnancy or within six weeks of the termination of pregnancy.

Maternal tetanus is caused by contamination from tetanus spores through puncture wounds and is linked with abortions and deliveries that are unsafe or unclean. Symptoms are similar to those of neonatal tetanus, including tight jaw, stiff neck and body muscles, difficulty swallowing and convulsions. Cases occur between 2 and 21 days after the injury; most occur within 14 days.

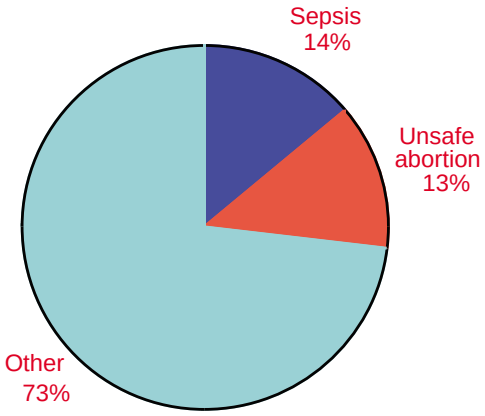
Mark Edwards/Still Pictures

Maternal tetanus is responsible for at least 5 per cent of maternal deaths, approximately 30,000 deaths annually (Fauveau, 1993). Sepsis related to pregnancy and delivery and other complications of unsafe abortions are also serious threats to women, as shown in the graph below. An estimated 90,000 women die annually from puerperal infections caused by unclean delivery practices. By improving delivery practices and by immunizing women at risk with tetanus toxoid, MNT elimination strategies should have an impact on reducing maternal deaths caused by sepsis and unsafe abortions that lead to tetanus.

Causes of neonatal deaths



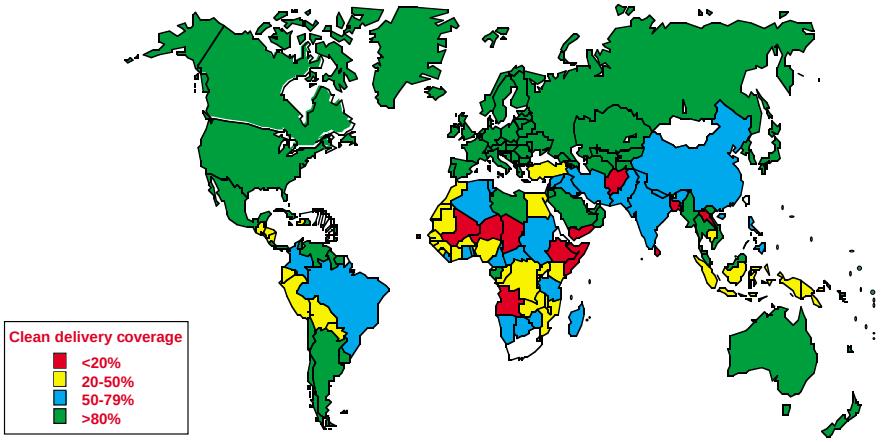
Causes of obstetrical deaths



Sources: WHO Mother and Baby Package, 1993.

The geographic distribution of maternal tetanus appears to mirror that of neonatal tetanus, although, like neonatal tetanus, its exact burden can only be estimated.

Clean delivery coverage* 1996



**Clean delivery coverage is defined as the percentage of births attended by professional health staff.*

Source: WHO, May 1996.

Country status

In June 2000, the 57 countries that have not yet achieved elimination of neonatal tetanus were ranked as follows below. The classifications will be updated yearly.

Class A. The 22 countries in Class A are close to maternal and neonatal tetanus elimination. Fewer than 10 per cent of the districts in each country are at high risk. Their immunization services reach at least 70 per cent of children as measured by DPT3 (diphtheria/pertussis/tetanus) coverage. Given their performance to date and their operational capabilities, they should be able to meet the elimination goal in 12 months.

Six Class A countries (Haiti, Namibia, South Africa, Turkey, the United Republic of Tanzania and Zimbabwe) have potentially eliminated MNT, but district assessments must confirm their achievement.

Class A

Benin	Myanmar
Central African Republic	Namibia
Comoros	Philippines
Egypt	Rwanda
Equatorial Guinea	South Africa
Gabon	Tanzania
Guinea	Togo
Haiti	Turkey
Indonesia	Uganda
Iraq	Viet Nam
Malawi	Zimbabwe

Class B. Between 11 per cent and 50 per cent of the districts in the 18 Class B countries are at high risk. The countries have limited health infrastructures (lack of facilities, lack of drugs and supplies, lack of technical and administrative manpower). It is recommended that these countries implement elimination activities in high-risk districts in stages over a three-year period.

Class B

Bangladesh	Kenya
Burundi	Lao PDR
Cambodia	Madagascar
China	Nepal
Congo	Papua New Guinea
Côte d'Ivoire	Senegal
Ghana	Sierra Leone
Guinea-Bissau	Sudan
India	Zambia

Class C. In each of these 17 countries, more than 50 per cent of the districts are at high risk. The health infrastructure in these countries is limited, as indicated by routine DPT3 immunization coverage, which is 50 per cent or lower. Serious manpower and logistical constraints, and in some cases war, mean that these countries will need three to four years to phase in elimination activities. New, simplified technology, such as TT-prefilled devices, may be necessary to achieve elimination in these countries.

Class C

Afghanistan	Mali
Angola	Mauritania
Burkina Faso	Mozambique
Cameroon	Niger
Chad	Nigeria
Congo, Dem. Rep.	Pakistan
Eritrea	Somalia
Ethiopia	Yemen
Liberia	

Twenty-seven of the 57 countries above account for 90 per cent of all neonatal tetanus cases in the world, 18 are in Africa. *(See chart below.)* In one third of these 27 countries, DPT3 coverage is below 50 per cent. Most of the countries are poor, as measured by per capita income and population size. UNICEF, WHO and UNFPA have concluded that external support will be needed for all, ranging from major financial commitments to relatively minor support for countries like China, India and Indonesia.

27 countries that account for 90% of NT cases, by DPT3 coverage and financial self-sufficiency

DPT3 coverage	Financial self-sufficiency*		
	Weak	**Moderate**	**Strong**
High >70%	Bangladesh Cambodia Ethiopia Ghana Guinea-Bissau Nepal Sudan	Senegal	China India Indonesia
Moderate 50-70%	Afghanistan Mauritania Mozambique Yemen	Côte d'Ivoire Pakistan	
Poor <50%	Angola Burkina Faso Chad Congo, Dem. Rep. Liberia Mali Niger Somalia	Cameroon Nigeria	

** Financial self-sufficiency is based on per capita income and population size.*

Source: WHO, 1998.

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2. Stages of maternal and neonatal tetanus elimination

The strategies for eliminating maternal and neonatal tetanus – tetanus toxoid immunization and clean delivery – are implemented differently depending on whether a country has met the goal or is still working toward it. The stages are described in this chapter.

Achieving elimination: The high-risk approach

Countries that have eliminated neonatal tetanus have found that supplementing routine immunization services in high-risk districts achieves elimination rapidly and cost-effectively. This approach focuses on providing tetanus toxoid vaccinations in districts, or in areas within districts, where women have no (or limited) access to these vaccinations routinely, limited or no antenatal care and where skilled delivery attendants are not available.

In addition to its focus on the unreached, the high-risk approach is different from routine services in the following ways:

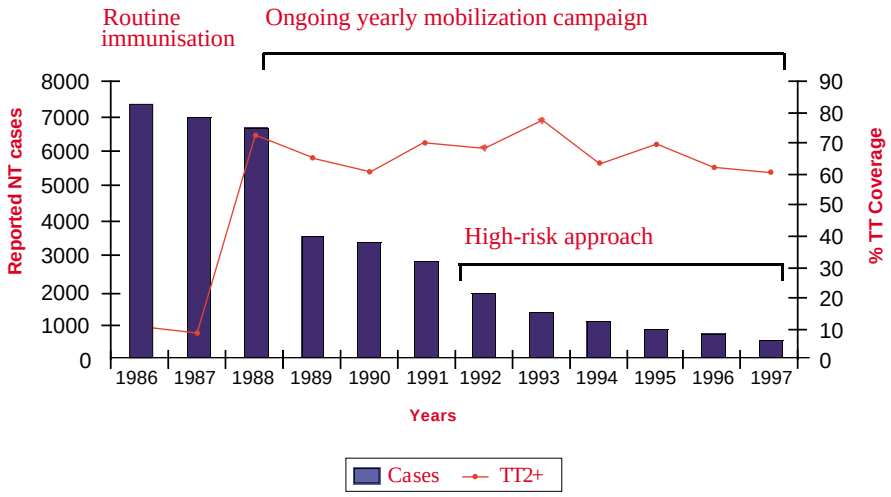
1. All women of childbearing age are included in the target population.
   Note: Routine immunization of women of childbearing age has proven impractical and ineffective, and for that reason pregnant women are the recommended target population for routine tetanus toxoid immunization services.

2. Three properly spaced rounds of tetanus toxoid vaccination are included.
   Note: Three doses of tetanus toxoid provide long-lasting immunity, which provides time for improvement of the health infrastructure to the point where protection against maternal and neonatal tetanus becomes routine. However, if this does not happen and an accumulation of women susceptible to tetanus occurs, another campaign targeting a smaller group of women aged 15 to 22 may be needed in five to seven years.

Examples of success

In **Egypt**, the reported number of neonatal tetanus cases dropped from 6,000 per year to fewer than 400 due to increases in routine tetanus toxoid coverage of pregnant women, supplemented by the high-risk approach. Every year over a five-year period, Egypt provided supplemental services to more high-risk districts until all were reached.

The high-risk approach in Egypt

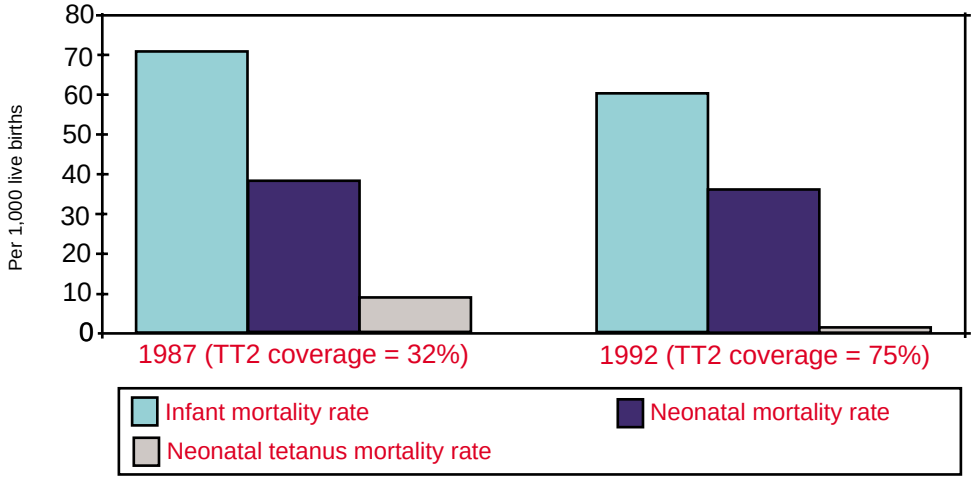


Source: Ministry of Health, Egypt, 1997.

Morocco provides another example. In 1987, the entire country, except the cities, was at high risk. Routine immunization services were not strong. Lack of access to antenatal care limited access to tetanus toxoid immunizations. To solve this and other coverage problems, national health authorities implemented a national catch-up campaign with all antigens, including tetanus toxoid for all women of childbearing age.

As a result, between 1987 and 1992, 75 per cent of all women of childbearing age were immunized. In addition, neonatal tetanus deaths, which accounted for 20 per cent of all neonatal deaths in 1987, were just 2 per cent in 1992 (DHS, 1992).

Elimination of MNT in Morocco



Source: Demographic and Health Surveys, 1992.

Clean delivery. Awareness-raising and education to increase demand for and use of clean deliveries and cord care practices should be the focus of clean delivery activities during and after the MNT elimination stage.

Women who have no access to routine tetanus toxoid vaccinations or antenatal care often have no access to clean deliveries. In this stage, the health workers who are giving tetanus toxoid vaccinations to these women should also provide information about the components of clean delivery and post-delivery practices, especially umbilical cord care, and discourage harmful traditional practices.

MNT elimination activities target remote communities, providing health workers an opportunity not only to promote clean delivery practices and reduce harmful unclean birth practices but also to deliver broader messages on safe motherhood to the women and their families in these communities.

Maintaining elimination status

Complete eradication of tetanus is not possible because tetanus spores are widespread, in dirt and in the stools of people and animals, and can survive and be transmitted without human contact. Therefore, countries that eliminate maternal and neonatal tetanus must routinely immunize all pregnant women with tetanus toxoid and all children with DPT, implement school immunization programmes with TT or tetanus diphtheria toxoid (Td) and expand the availability of clean delivery practices to all women in all districts.

The next two chapters describe the stages for achieving and maintaining MNT elimination in more detail.

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3. Achieving maternal and neonatal tetanus elimination

To achieve elimination:

1. Three properly spaced doses of TT must be administered to at least 80 per cent of all women of childbearing age in high-risk areas; and

2. Clean delivery practices must be promoted.

UNICEF, WHO and UNFPA recommend that countries follow the steps below to achieve maternal and neonatal tetanus elimination by the year 2005.

1. At the national level, identify all high-risk districts – that is, districts with a reported or estimated rate of neonatal tetanus cases greater than 1 per 1,000 live births. The algorithm in annex A illustrates the identification process.

2. At the national level, place the high-risk districts according to their priority for action. Implementation should start in 'easier' districts in which the infra-structure is relatively good, local staff is capable and other factors contribute to the likelihood of success. Success will breed success, and the experience gained in these districts should help in planning and implementation in the more difficult ones.

3. At the national level, develop two- to four-year plans for maternal and neonatal tetanus elimination as part of the national immunization plan. These plans should describe the activities needed to achieve and sustain elimination in the high-risk districts and include a schedule for implementing intensive outreach activities. Budgets and financing arrangements should be included and funding shortfalls identified.

4. At the district level, develop detailed plans, or 'microplans', for activities in the high-risk areas. At minimum, district microplans should include:

   ∑ A list and map of the areas in the district that have been identified as high risk and a justification for their selection.

   ∑ Description of strategies, for example, setting up posts to which women are asked to come for their vaccinations or making house-to-house visits.

   ∑ Description of methods to be used to inform women about the vaccination activities planned in their area to ensure full participation. Methods should be tailored to the situation, for example, women who have never had access to health services will need different information than will other women.

- ∑ A schedule for providing three properly spaced rounds of tetanus toxoid (or tetanus diphtheria toxoid) vaccinations for all women of childbearing age in each area. An interval of at least one month should be planned between the first and second rounds and six months to a year between the second and third rounds.

- ∑ Plans for:
  - Procurement and distribution of vaccines, vaccine carriers, auto-disable syringes, safety boxes, etc.
  - Safe disposal of used syringes and needles
  - Training of health workers.

- ∑ The individuals to be involved in the operation, their responsibilities, travel logistics, etc.

- ∑ Procedures for monitoring progress and quality before and during implementation.

- ∑ Strategies for improving access to and use of routine immunization and clean delivery services.

5. Monitor the coverage achieved during each of the three rounds by dose number. Initially, conduct validation studies to confirm coverage reports.

   Note: Health workers should keep track of the dose number for each woman in each round. In Round 1, women can only receive TT1, since previous doses are not counted. In Round 2, however, some women will be coming for the first time and receiving TT1 while others will be coming back for TT2. Similarly, in Round 3, women may get TT1, TT2 or TT3 depending on how many rounds they have attended.

6. Evaluate the quality and achievements in the first high-risk districts in which supplemental activities are implemented in order to adjust plans for later rounds and for activities in other high-risk districts.

7. Evaluate the impact of campaign activities on neonatal tetanus incidence through impact studies and other WHO-recommended methods to determine elimination status of the country.

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4. Maintaining maternal and neonatal tetanus elimination

To sustain elimination:

1. Increase routine TT coverage for pregnant women;
2. Increase routine DPT coverage for children; and
3. Increase women's access to and use of clean delivery services.

Achieving the status of maternal and neonatal tetanus elimination does not mean that women and newborns are forever protected against tetanus. That status must be maintained through continued tetanus toxoid immunization of pregnant women, routine immunization of children and clean delivery services in all districts. Activities recommended to maintain elimination in formerly high-risk MNT districts include:

1. At the national level, conduct a rapid assessment of performance in providing routine tetanus toxoid immunizations and clean delivery services to women and routine immunizations to infants in formerly high-risk MNT districts. Identify the main reasons for poor performance, for example, poorly functioning cold chain, failure of women to return for subsequent doses (drop-outs), missed opportunities, limited outreach and lack of supplies and equipment.

2. At the district level, prepare a microplan that addresses district-specific problems and causes of poor immunization performance and supports continued good performance for immunization and clean delivery practices. At minimum, a district microplan should describe plans for:

   ∑ Promoting public demand for immunizations and clean delivery.

   ∑ Increasing service quality.

   ∑ Increasing the availability and effectiveness of outreach services. Outreach should include other interventions, as in Child Health Days and Sustained Outreach Services. The integrated package of minimum health interventions for outreach activities may prove more effective in increasing utilization of services provided.

   ∑ Providing school-based immunization services, where appropriate.

School-based immunization services

Immunization of boys and girls with Td or TT during the first three years of school provides protection from tetanus for the next 10-15 years. Tetanus toxoid immunization before childbearing begins also helps prevent tetanus in *primaparae* (first-time) mothers and young women at risk.

District health officials should consider this strategy if school enrolment is above 70 per cent and female enrolment exceeds 50 per cent. A child who receives three TT or Td doses in school will be protected for 10 to 15 years.

∑ Improving delivery practices, including:
- Promoting the 'three cleans': clean hands (scrubbing hands with soap and water), a clean surface and clean cord cutting.
- Training birth attendants – relatives, traditional birth attendants (TBAs) and pregnant women themselves – in clean delivery practices.
- Upgrading equipment in delivery rooms.
- Educating the community about clean birth practices and danger signs that mean 'ask for help'.
- Distributing clean birth kits to pregnant women who will deliver at home. Clean birth kits can be used in health facilities as well.

> **Note:** A kit is available from UNFPA Procurement Services, e-mail: <saunders@unfpa.org>. Packed in a sturdy plastic bag with a self-sealing enclosure, it contains pictorial instructions, a bar of soap, a square metre of plastic, string for umbilical cord (3 x 15 cm) and a single-edge razor blade.

3. Improve surveillance for maternal and neonatal tetanus cases at the health facility and, where appropriate, at the community level.

Surveillance of maternal and neonatal tetanus

Surveillance of maternal and neonatal tetanus is an essential component of elimination. Maternal and neonatal tetanus surveillance data are needed to:

- ∑ identify districts and areas in which mothers and newborns are at risk of tetanus (although not as the sole indicator);
- ∑ measure the quality of immunization and clean delivery services; and
- ∑ monitor a country's elimination status and the sustainability of its achievement.

Maternal and neonatal tetanus case reporting should be an integral part of the routine surveillance system. Ideally, all health facilities should report maternal and neonatal tetanus cases monthly to their districts, which should report monthly to the next level. In districts formerly at high risk or never considered at high risk for MNT, health workers should investigate and report all suspected maternal and neonatal tetanus cases, and authorities should follow up with their own investigations. In districts known to be at high risk for MNT, resources should be prioritized to allow for vaccination of all women of childbearing age with three properly spaced doses of tetanus toxoid rather than investigating every case.

Mothers of newborns infected with tetanus should be vaccinated with tetanus toxoid, since these women are at especially high risk of a recurrence following the next pregnancy.

When a district exceeds 80 per cent in tetanus toxoid protection (for pregnant women or all women of childbearing age) or 70 per cent in clean delivery protection, a case response system should be established. Under this system, not only is the mother whose newborn has been infected with tetanus immunized with tetanus toxoid, but also all eligible women in the community where the case occurred are screened and immunized with at least two doses of tetanus toxoid, if appropriate.

Maternal and neonatal tetanus surveillance should be incorporated into acute flaccid paralysis (AFP) reporting and coordinated with other disease control and eradication initiatives, such as for polio and dracunculiasis. In particular, NT detection should be integrated into active surveillance visits.

WHO and UNICEF also recommend community-based surveillance, where feasible, in which health facility staff identify at least one person in every village to report suspected NT cases to a health worker.

4. Monitor routine tetanus toxoid immunization and clean delivery activities, including but not limited to:
   - ∑ number of outreach sessions planned versus number held;
   - ∑ TT2+ coverage in pregnant women;
   - ∑ DPT1 and DPT3 coverage;
   - ∑ drop-out rate between DPT1 and DPT3; and
   - ∑ antenatal care coverage.

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Annex A

Algorithm for identifying high-risk districts for MNT

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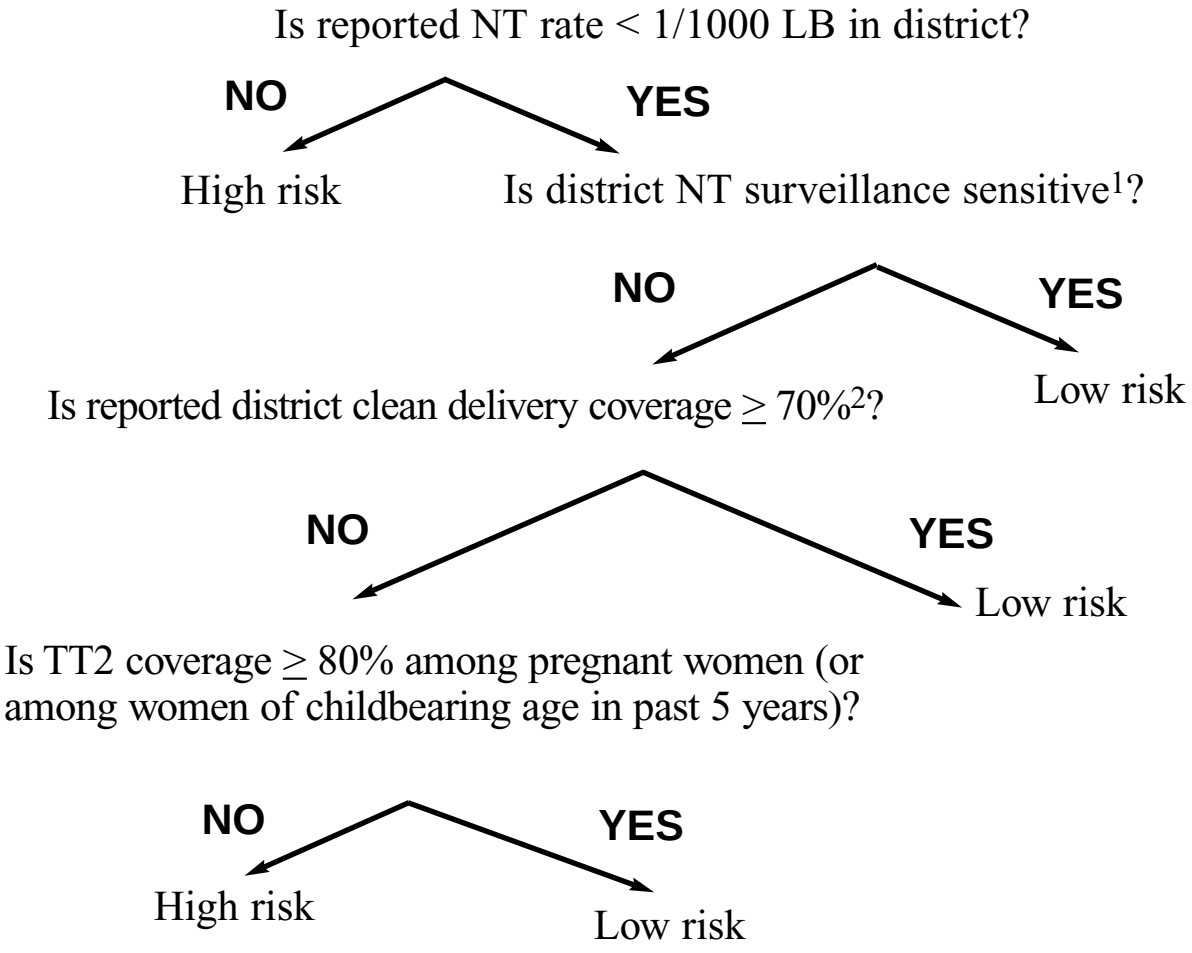


1. Sensitive = a. existence of zero reporting; b. completeness of reporting from all reporting sites > 80%; c. adequate number/distribution of reporting sites (based on subjective judgement); d. conduct of record reviews at least once annually or active surveillance in local hospital(s); e. if rural, functional community surveillance (subjective judgement).

2. Defined as "delivery by a physician, nurse or midwife" or as defined by the country according to national policy, if one exists.

Annex B

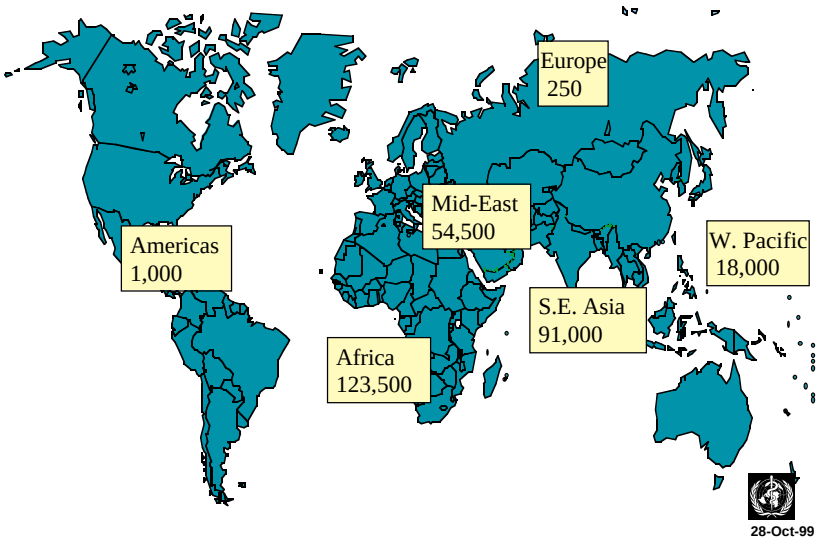
The global response

Over the next five years, at least 100 million women will need three rounds of tetanus toxoid vaccinations:

- 34 million in South Asia;
- 30 million in Africa;
- 21 million in the Middle East;
- 15 million in the West Pacific.

Such an enormous need demands a global response, as described in this annex.

289,000 cases of neonatal tetanus occur annually, resulting in the death of 215,000 infants



Needs for external support

All of the 57 countries that have yet to eliminate maternal and neonatal tetanus may need some external support, and each will have different types and levels of needs for advocacy, planning and technical assistance and financing.

Securing political commitment

Some countries have the operational capacity to eliminate maternal and neonatal tetanus and can apply that capacity to meet this challenge. However, these countries may be pulled by competing priorities within the health sector, such as malaria, HIV/AIDS and acute respiratory infections. For these countries, development partners can help collect the evidence needed to support a country's investment in maternal and neonatal tetanus elimination in the few remaining districts at high risk. They can also advocate for support from political leaders.

Providing planning assistance

External technical assistance in identifying high-risk districts, developing plans at national and district levels and ensuring effective implementation is needed by countries with major operational problems and insufficient large-scale planning experience. The countries listed in the box below have already developed plans. Those that are not listed should be approached by development partners to discuss the desirability and nature of assistance.

Update on national plans for MNT elimination

At least 17 countries have prepared national plans to eliminate maternal and neonatal tetanus. These countries are:

Bangladesh	Guinea	Nepal
Burkina Faso	India	Pakistan
Cambodia	Indonesia	Sudan
Côte d'Ivoire	Iraq	Viet Nam
Egypt	Mali	Yemen
Ethiopia	Myanmar	

Providing financial assistance

Experience has shown that approximately US$1.20 per woman is needed to eliminate maternal and neonatal tetanus using the recommended strategies. The target is estimated as at least 100 million women. In addition, an estimated US$10 million is needed for technical assistance and to reinforce other infrastructural deficiencies.

MNT elimination budget (in US dollars)

Direct costs		
Vaccines/syringe/safety boxes – 50 cents per woman		50,000,000
Operational costs – 50 cents per woman		50,000,000
Promotion of clean deliveries – 20 cents per woman		20,000,000
	Total	120,000,000
Other costs (technical and managerial assistance)		10,000,000
	Grand total	**130,000,000**

A table showing the estimated financial needs of each of the 57 countries over a five-year period is included in the next two pages.

Local contributions toward payment of these costs will vary depending on progress already made, operational capacity and national financial commitments. An estimated US$100 million is required from external sources for the purchase of tetanus toxoid, supplies and equipment, and planning and operational costs. Countries with low gross national product (GNP) and poor health infrastructure may need additional support in infrastructure development.

Total estimated financial needs as of January 2000 for elimination of MNT (in US$ millions)

Country *(for country classification, see page 7)*	**2000**	**2001**	**2002**	**2003**	**2004**	**2005***	**Total**
Afghanistan (c)		0.3	0.7	0.7	0.8		2.5
Angola (c)		0.4	0.4	3.2			4
Bangladesh (b)	2.2	0.5	0.5	0.5			3.7
Benin (a)	0.1	0.1					0.2
Burkina Faso (c)	0.2	0.4	0.2				0.8
Burundi (b)		0.2	0.2				0.4
Cambodia (b)	0.3	0.4	0.3				1
Cameroon (c)		0.2	0.3	0.5			1
Central African Rep. (a)		0.2	0.2				0.4
Chad (c)	0.2	0.3	0.2				0.7
China (b)	1.5	1.5	2.5				5.5
Comoros (a)		0.1	0.1				0.2
Congo (b)		0.1	0.1				0.2
Côte d'Ivoire (b)	0.5	0.6	0.6				1.7
Congo, Dem. Rep. (c)		2	2.5	2			6.5
Egypt (a)	0.9	0.1					1
Equatorial Guinea (a)		0.1					0.1
Eritrea (c)		0.2	0.1	0.1			0.4
Ethiopia (c)	1.25	2.25	3	4	4		14.5
Gabon (a)		0.1					0.1
Ghana (b)	0.5	0.5	0.5				1.5
Guinea (a)	0.2	0.3	0.2				0.7
Guinea-Bissau (b)		0.1	0.1	0.1			0.3
Haiti (a)		0.2					0.2
India (b)	2	7	8	2			19
Indonesia (a)	2	1.2					3.2
Iraq (a)		0.2	0.3				0.5
Kenya (b)		0.4	0.6	0.6			1.6
Lao PDR (b)		0.3	0.5	0.3			1.1
Liberia (c)		0.2	0.2	0.3	0.3		1

Country *(for country classification, see page 7)*	**2000**	**2001**	**2002**	**2003**	**2004**	**2005***	**Total**
Madagascar (b)		0.3	0.5				0.8
Malawi (a)		0.2	0.2	0.1			0.5
Mali (c)	0.6	0.7	0.6	0.2			2.1
Mauritania (c)		0.1	0.2	0.3			0.6
Mozambique (c)		0.3	0.3	0.4			1
Myanmar (a)	0.6	0.5	0.3				1.4
Namibia (a)		0.1					0.1
Nepal (b)	1.5	1	0.5				3
Niger (c)		0.2	0.5	0.5	0.3		1.5
Nigeria (c)		3.5	4	4	2		13.5
Pakistan (c)	3.1	2.7	2.6				8.4
Papua New Guinea (b)		0.3	0.3	0.2			0.8
Philippines (a)		0.6	0.6	0.3			1.5
Rwanda (a)		0.2	0.1	0.1			0.4
Senegal (b)		0.3	0.3	0.2			0.8
Sierra Leone (b)			0.2	0.6	0.3		1.1
Somalia (c)		0.6	0.5	0.4	0.4		1.9
South Africa (a)		0.5					0.5
Sudan (b)		0.6	0.6	0.7			1.9
Tanzania (a)		0.2	0.1				0.3
Togo (a)		0.2	0.1				0.3
Turkey (a)		0.1	0.1				0.2
Uganda (a)		0.2	0.3				0.5
Viet Nam (a)	0.7	0.8					1.5
Yemen (c)	0.2	0.4	0.3				0.9
Zambia (b)		0.1	0.2				0.3
Zimbabwe (a)		0.2					0.2
Country total	**18.55**	**35.35**	**35.7**	**22.3**	**8.1**		**120**
Staff/infrastructure	**2**	**2**	**2**	**2**	**2**		**10**
PROGRAMME TOTAL	**20.55**	**37.35**	**37.7**	**24.3**	**10.1**		**130**

* Some activities may continue into 2005.

Global responsibilities

The needs and responsibilities of all of the countries and agencies involved in the global elimination effort are described in this section.

Coordination

Coordination at the global, regional, national and district levels among government agencies, multilateral agencies, bilateral donors, non-governmental organizations (NGOs) and the private sector is the only way to ensure that the goal of maternal and neonatal tetanus elimination will be met.

Planning of elimination activities should include others involved in immunization initiatives, such as polio eradication, measles control and elimination, and the introduction of new vaccines. Many of the 57 countries on which WHO, UNICEF and UNFPA are focusing their maternal and neonatal tetanus elimination efforts are also struggling with polio, measles and other vaccine-preventable diseases. Supplementary activities for maternal and neonatal tetanus elimination should be coordinated with the supplementary efforts for other diseases.

MNT elimination should also facilitate effective introduction of new vaccines, such as hepatitis B or *Haemophilus influenza,* through the improvement of routine immunization systems and services in high-risk districts. MNT elimination efforts specifically target countries with low routine immunization coverage and low-performing districts within countries. Many of the countries affected by MNT have not met the eligibility criteria to receive assistance through the Global Alliance for Vaccines and Immunization (GAVI) for the introduction of new vaccines. These countries will benefit from the technical assistance and resources provided by MNT elimination efforts and GAVI to improve and strengthen routine immunization services in low-performing districts. Effective and sustained outreach services are critical to maintain MNT elimination and improve access to and quality of routine immunization services for women and children.

Coordination within the health sector, both public and private, and again at every level is necessary to optimize existing resources and strengthen district managerial capacity. Maternal and neonatal tetanus elimination activities should be addressed in both national and district plans for the health sector.

Monitoring

Countries that are attempting to eliminate maternal and neonatal tetanus should routinely monitor their own progress. On a global scale, the three UN agencies will monitor progress and evaluate impact, using the indicators listed below.

To monitor progress toward elimination:

- ∑ Total number of districts estimated at high risk after countrywide assessments
- ∑ Total estimated number of women of childbearing age at high risk
- ∑ Proportion of women of childbearing age protected by a minimum of two doses of tetanus toxoid in high risk districts
- ∑ Number and incidence rate of neonatal tetanus cases reported
- ∑ In countries with high DPT1 coverage (above 80 per cent), use of the 'protection at birth (PAB)' methodology (the PAB method provides more accurate estimates of the level of TT2 protection than the traditional tetanus toxoid coverage method).

To monitor the maintenance of elimination:

- DPT1 coverage
- DPT3 coverage
- ANC coverage (one visit)
- TT2+ coverage in pregnant women
- Proportion of women delivering with a health professional
- Reported cases and incidence rate of neonatal tetanus.

Research and development

Research and development on products and procedures that will facilitate tetanus elimination continue in the following areas:

- **Injection technologies.** Equipment such as prefilled monodose devices (for example, Uniject™) and jet injectors can facilitate the expansion of routine immunization services through outreach in high-risk areas. Such devices will be especially effective in small, scattered and nomadic situations and areas in conflict.

- **Vaccine vial monitor indicators (VVMs).** This equipment, soon to be available on all vaccine vials, including those for tetanus, will enable health workers to provide immunization services outside of the cold chain and more accurately monitor vaccine potency.

- **Serological test.** A rapid, simple and cheap serological test to assess sero-protection level against tetanus will soon be field tested. Such a test will enable district health programme managers to monitor the sero-protection level of individuals and communities against tetanus more accurately.

- **Tetanus toxoid.** A slow-release micro-encapsulated tetanus toxoid vaccine is currently in the clinical trial phase. One dose of this vaccine will provide the same duration of protection conferred by at least two doses of the current vaccine.

Annex C

MNT countries in order of estimated NT deaths (1999 WHO estimates)

	Country	Estimated NT cases	Estimated NT deaths	Estimated NT mortality rate (per 1,000 live births)
1	India	65,291	48,578	1.99
2	Nigeria	46,064	34,583	6.77
3	Pakistan	28,882	21,619	4.08
4	Ethiopia	17,875	13,406	4.47
5	Bangladesh	13,575	10,386	3.09
6	Congo, Dem. Rep.	13,359	10,019	4.56
7	Somalia	11,204	8,791	16.49
8	China	12,439	8,627	0.43
9	Afghanistan	5,408	4,213	3.37
10	Indonesia	6,075	4,090	0.86
11	Niger	4,639	3,614	7.11
12	Mozambique	4,024	3,018	3.82
13	Nepal	3,917	2,935	3.52
14	Angola	3,654	2,741	4.83
15	Chad	3,226	2,517	8.83
16	Uganda	3,433	2,403	2.2
17	Mali	3,187	2,390	4.29
18	Yemen	3,012	2,339	2.9
19	Senegal	3,021	2,281	6.18
20	Sudan	2,880	2,209	2.3
21	Ghana	2,576	1,932	2.69
22	Burkina Faso	2,205	1,606	3.0
23	Cameroon	1,958	1,475	2.62
24	Cambodia	1,963	1,472	4.11
25	Madagascar	1,761	1,336	1.99
26	Guinea	1,677	1,258	3.4
27	Myanmar	1,754	1,205	0.93

	Country	Estimated NT cases	Estimated NT deaths	Estimated NT mortality rate (per 1,000 live births)
28	Côte d'Ivoire	1,513	1,135	2.09
29	Philippines	1,420	1,082	0.53
30	Kenya	1,432	1,074	1
31	Tanzania	1,364	933	0.7
32	Malawi	1,136	852	1.73
33	Sierra Leone	1,057	793	3.76
34	Burundi	973	730	2.63
35	Liberia	830	638	4.94
36	Egypt	1,570	628	0.37
37	Eritrea	790	592	4.23
38	Viet Nam	887	532	0.28
39	Iraq	870	522	0.66
40	Lao PDR	556	417	1.76
41	Papua New Guinea	522	396	2.68
42	Togo	370	278	1.5
43	Mauritania	315	236	2.51
44	Zambia	307	218	0.59
45	Zimbabwe	294	206	0.47
46	Central African Rep.	268	201	1.56
47	Rwanda	189	141	0.51
48	Turkey	231	139	0.1
49	Guinea-Bissau	162	129	2.82
50	Benin	136	99	0.4
51	Haiti	187	75	-
52	Namibia	82	62	1.05
53	Congo	66	48	0.4
54	Comoros	67	47	1.73
55	Equatorial Guinea	42	29	1.72
56	South Africa	20	12	0.01
57	Gabon	-	-	0