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Foreword

Today, we share a collective vision to have the South-East Asia Region free of vaccine-preventable diseases, where all countries provide equitable access to high-quality, safe, affordable vaccines and immunization services throughout the life-course.

Overwhelming evidence demonstrates the benefits of immunization as one of the most successful and cost-effective health interventions ever known. Over the past several decades, immunization has achieved many milestones, including the eradication of smallpox, an accomplishment that has been called one of humanity’s greatest triumphs. Vaccines have saved countless lives, lowered the global incidence of polio by 99% and reduced illness, disability and death from diphtheria, tetanus, whooping cough, measles, Haemophilus influenzae type b disease and epidemic meningococcal A meningitis. We have been able to make the Region free of polio for the last 6 years and eliminate maternal and neonatal tetanus.

We have vaccines against more than 25 diseases in the present day world, and this has increased the need for better surveillance against these diseases to control or eliminate them. As the essence of this subject matter, I would like to highlight that high vaccination coverage may not necessarily indicate the case-load or disease burden in a population. We need to look into the surveillance performance as the key indicators to measure progress towards disease control and/ or elimination.
A functional vaccine-preventable disease surveillance system is a key part of public health decision-making in all countries. Thus, there is an urgent need to build on the current efforts to strengthen vaccine-preventable disease surveillance with the latest state-of-the-art technologies at subnational and national levels. This will require a substantial and long-term commitment of human and material resources, usually beginning with a systematic assessment of the national vaccine preventable diseases (VPD) surveillance system by working closely in partnership with all related partners and stakeholders.

I hope that this vaccine-preventable diseases surveillance guide will be well translated into respective national programmes and add to the efforts to have a high-quality surveillance system for priority vaccine-preventable diseases and help accelerate progress towards strengthening vaccine-preventable disease surveillance in our Region.

Finally, every individual in our Region deserves our best work. We all agree that every family, no matter where residing, has the right to all immunization and health services that are provided by the respective government, in the spirit of universal health coverage contributing towards Sustainable Development Goals, especially Goal 3 on health.

Dr Poonam Khetrapal Singh

Regional Director, WHO South-East Asia Region
# LIST OF ABBREVIATIONS

| ACS  | active case search          |
|ANC  | antenatal care              |
|CBAW | child bearing age women     |
|CFR  | case fatality rate          |
|CHW  | community health worker     |
|CI   | confidence interval         |
|CIF  | case investigation form     |
|CRF  | case report form            |
|DPT  | diphtheria pertussis tetanus vaccine |
|DT/dT/Td | diphtheria tetanus       |
|DTP3 | third dose of diphtheria pertussis tetanus vaccine |
|EPI  | Expanded Programme on Immunization |
|IM   | intramuscular               |

| MNCH | maternal, newborn and child health |
|MNT  | maternal and neonatal tetanus |
|MNTE | maternal and neonatal tetanus elimination |
|NT   | neonatal tetanus               |
|PAB  | protection at birth            |
|SEAR | South-East Asia Region (WHO)   |
|SIA  | supplementary immunization activities |
|Tdap | tetanus diphtheria and acellular pertussis |
|TT   | tetanus toxoid                 |
|UNICEF | United Nations Children’s Fund |
|VD   | vaccine preventable disease    |
|WHO  | World Health Organization      |
Neonatal tetanus surveillance

1. Introduction

All countries of the WHO-South East Asia Region have achieved the status of elimination of maternal and neonatal tetanus (MNT) in May 2016. Once any country has been validated for MNT elimination, NT cases, though rare, can still be found. A sensitive and reliable NT surveillance system is required to detect every case and implement corrective measures to prevent further cases. Thus, NT surveillance should become an integral part of vaccine-preventable diseases (VPD) surveillance.

Maintaining MNT elimination: Complete eradication of tetanus is not possible because tetanus spores are found throughout the world in soil and animal faeces; so exposure to Clostridium tetani cannot be completely prevented. However, every case of NT can be prevented.

Countries that have succeeded in eliminating NT must sustain NT elimination status by:

1. Achieving and sustaining high tetanus toxoid (TT) coverage
   - Ensuring that all pregnant women are adequately immunized against tetanus (acceptable coverage >80%)
   - Ensuring high coverage with tetanus toxoid-containing vaccines in infancy (such as DTP/Pentavalent) and the WHO-recommended booster doses for both sexes in childhood, adolescence and early adulthood, where included as part of the national immunization schedule. School-based immunization can be an efficient and effective strategy to deliver booster doses of TT or dT.

2. Achieving high levels of clean delivery and clean cord care
   - Maximizing institutional delivery, with skilled attendants
   - Ensuring access to and use of clean/safe delivery practices for every delivery.

3. Achieving sensitive surveillance for NT.

Because some neonatal deaths occur at home, NT surveillance can be quite challenging. It is estimated that less than 10% of NT cases and deaths are actually reported.[1] NT surveillance requires every case of NT to be reported, and every report followed up with investigation as to why NT occurred, including mother’s TT immunization status and any break in safe delivery practice as well as a review of maternal immunization coverage in the community. A system of vaccine-preventable diseases surveillance that includes NT surveillance should be able to capture such information. Such sensitive NT surveillance is a key component of sustaining NT elimination and serves as a valuable indicator of

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the programme efficiency of maternal and child health (MCH) services in the community. NT surveillance will help identify areas where NT is still occurring. Good NT surveillance permits effective targeting of interventions where needed.

2. Case selection and reporting

Case definition

**Suspected case:** any neonatal death between 3 and 28 days of age in which the cause of death is unknown, or any neonate reported as having suffered from neonatal tetanus between 3 and 28 days of age and not investigated.

**Confirmed case:** Any neonate with normal ability to suck and cry during the first 2 days of life and who, between 3 and 28 days of age cannot suck normally and becomes stiff and/or has spasms (i.e. jerking of the muscles).

**Discarded case:** A suspected NT case, which has been investigated and does not satisfy the clinical criteria for confirmation.

**Explanation of case definition**

**Stiff and/or spasm:** Initially increased tone of facial muscles (lockjaw, grimace) is seen. Inability to suck, stiffness in the neck, shoulder and back muscles appear concurrently. Subsequent involvement of other muscles produces rigid abdomen and stiff proximal limb muscle. Muscles may go into spasms repetitively – spontaneously or when provoked by even the slightest stimuli.

**Date of onset:** The date of onset of NT should be considered as date of onset of inability to suck.

3. Case reporting

- **Reporting:** All health facilities should report suspected NT cases in surveillance routine reports.
- **Accountability:** VPD surveillance officers at all levels should ensure compliance with the “zero reports”, monitor timeliness and completeness of reporting sites, review hospital registers in search of suspected NT cases jointly with acute flaccid paralysis (AFP) and measles, investigate NT suspected cases and respond to all confirmed cases. All VPD surveillance instruments and activities need to include a section on NT surveillance.
- **Community involvement in surveillance:** Populations in areas affected by NT usually have limited access to health facilities and NT cases die at home and do not come to the attention of the health facilities. Involving communities in surveillance will allow detection of rare occurring NT cases but will require an
extensive network of trained community health workers (CHW) with clear tasks and job aids and working in close collaboration with health facility workers. It is recommended to integrate community NT surveillance with vital events surveillance, such as the registration of every pregnant woman, every newborn and every maternal and neonatal death. Neonatal deaths reported should be investigated and causes of deaths categorized.

4. Case investigation

All reported suspected NT cases should be investigated by the VPD surveillance officer and confirmed. The NT investigation forms, should include the date and place of birth, date and age of death, gestational age, birth weight, skilled or unskilled assisted delivery, the immunization status of the mother, cord care and any local application and should also provide the history of symptoms as described by the caregiver, to allow that supervisors and surveillance personnel at all levels have a full understanding of the history and symptoms of the case to double check the classification.

To facilitate the adequate response to the NT case, it is useful to determine the cause of non-protection; e.g. is the mother living in the area for at least 1 year; how many immunization sessions were provided in the village in the last 12 months; how many ANC visits were provided in the last 12 months; any other reasons for non-protection?

It is recommended to do a rapid community assessment, starting from the house where the NT case occurred, moving from house to house, to interview 7 (or more) other mothers of the community who delivered in the last 2 years, to know their immunization status, place of last delivery, use of traditional substances on the umbilical cord and the immunization status of their last born child.

5. Public health response

All confirmed cases should be followed by a case response. Case investigations should be used as opportunities to provide health education to the family and community around NT prevention and reporting of NT cases. In case the mother was not immunized, immediately immunize the mother with one dose of Td vaccine and provide a second dose 1 month later. Inform the mother about proper cord care. If 90% of the mothers from the rapid community assessment are protected (clean delivery or/and TT2+), the response will be limited to the immunization of the mother of the NT case alone and promotion of hygienic cord care practices. If less than 90% of the mothers are protected, and/or if less than 90% of the children are completely immunized, determine and address the cause of non-protection and assure that this community is included in the RED/REC planning and implementation as well as TT vaccination as an integral component of upcoming Periodic Intensification of Routine Immunization (PIRI) or Child Health Days. Also provide information to the community and birth attendants about proper cord care. If a source
of unclean deliveries is identified, training and education may be provided to the birth attendant to prevent further NT cases.

6. Data management

Data analysis: Recommended data analyses, presentations, reports

Aggregated data through routine weekly reporting:

- Number of cases and incidence rates by month, year and geographical area.
- District-specific, sex-specific, incidence rates per 1000 live births by year.
- TT2+ coverage (or protection at birth [PAB]) by year and geographical area among pregnant women

(In the 106 countries where tetanus is recommended for girls and women, coverage is usually reported as “TT2+”, i.e. the proportion of (pregnant) women who have received their second or superior TT dose in a given year. However, WHO and UNICEF estimate the proportion of births in a given year that can be considered as having been protected against tetanus - “Protection at Birth (PAB)”. Unlike TT2+ coverage, PAB accounts for women who have previously received protective doses, women who received one dose without documentation and women who received doses in TT (or Td) supplemental immunization activities (SIA). In addition, girls who have received DTP in their childhood and are entering childbearing age may be protected with TT booster doses.).

- If TT doses are being administered to all women of childbearing age, TT2+ coverage among child bearing age women (CBAWs).
- For SIAs, TT1, TT2, and TT3 coverage among child-bearing women targeted.
- Completeness/timeliness of weekly zero reporting.

Case-based data from case investigations:

- Number and rate of confirmed NT cases by sex, geographical location of birth, month and year. Percentage of confirmed NT cases by place of birth (health facility or home delivery), protection status at birth, type of birth assistance, type of cord-cutting tools used, type of umbilical stump dressing used, age group of mother and parity of mother; percentage of confirmed NT cases whose mother received antenatal care.
- Case-fatality ratio among confirmed NT cases.
- Percentage of confirmed NT cases whose mother received a protective TT dose(s) subsequent to the onset of tetanus in the baby.
7. Monitoring indicators

Countries that achieved MNTE should review the performance of each district annually. This annual review exercise should be a joint exercise by the Expanded Programme on Immunisation (EPI), MNCH, and Surveillance managers of different levels, together with partner representatives. The objectives of the review are (i) to identify and classify districts that could potentially revert back to at risk for MNT, (ii) to select and tailor relevant corrective strategies and interventions to sustain MNTE in the short, and longer term, and (iii) to use this review as an opportunity to improve EPI and MNCH programmes with particular attention to optimizing the Antenatal care (ANC) and immunization platform. The review of district performance aims at classifying districts into: “low risk” and “at risk” for MNT followed by a further sub-classification of the “at risk” districts into the subcategories “high risk” and “medium risk” to enable a more adequate tailoring of corrective strategies.

The detail guidelines for such review are available in the Guidelines for Achieving and Sustaining MNTE at http://www.who.int/immunization/diseases/MNTEStrategicPlan_E.pdf.

It is recommended to regularly evaluate the quality of the NT surveillance. The following indicators may be used.

1. **Proportion of cases with timely notification:** Date of onset in suspected neonatal tetanus cases should be considered as day of onset of inability to suck. The disease progression in neonates is very rapid with high case fatality rate early in the course of illness therefore, cases reported within 7 days of disease onset should be considered as timely notified.

   \[
   \frac{\text{Total number of suspected neonatal tetanus cases reported within 48 hours of onset}}{\text{Total number of suspected neonatal tetanus cases}} \times 100
   \]

   Target of at least 80% timely notification should be achieved.
2. **Proportion of cases with timely investigation**: It is expected that the designated surveillance/medical officer should be able to investigate all notified cases within 48 hours of notification. It is calculated as:

\[
\text{Proportion} = \frac{\text{Total number of cases investigated within 48 hours of notification}}{\text{Total number of reported cases}} \times 100
\]

Efforts should be made to achieve target of at least 90% for timely investigation.

3. **Proportion of timely case response in community**: This indicator will help to monitor the preparedness of the government health system to build up a community response. It is calculated as:

\[
\text{Proportion} = \frac{\text{Total number of case response conducted within 7 days of case investigation}}{\text{Total number of neonatal tetanus cases}} \times 100
\]

Target of at least 80% should be achieved for this indicator. However, all cases should be followed by case response.

4. **Timeliness of weekly reporting**: This indicator determines the proportion of reporting units whose weekly reports are received on time at the district. It is calculated as:

\[
\text{Timeliness} = \frac{\text{Number of weekly reports received on time}}{\text{Total number of reporting units}} \times 100
\]

Target of at least 80% timeliness of weekly reporting should be achieved.

5. **Completeness of weekly reporting**: This indicator determines the proportion of reporting units whose weekly reports have been received at the district. It is calculated as:

\[
\text{Completeness} = \frac{\text{Number of weekly reports received}}{\text{Total number of reporting units}} \times 100
\]

The numerator includes all weekly reports received at the district before next week irrespective of their timeliness. Target of at least 90% completeness of weekly reporting should be achieved.
8. Feedback mechanism

Surveillance data should be presented in the form of bulletins, presentations and charts to all stakeholders, including the reporting network. Principal use of data for decision-making:

- Monitor progress towards achieving and sustaining high routine TT2+ (or PAB) coverage in all geographical areas. Monitor progress towards maternal and neonatal tetanus elimination in every geographical area (progress towards neonatal tetanus elimination is a proxy for maternal tetanus elimination).
- Investigate suspect NT cases in areas not considered at risk for NT to identify risk factors.
- Identify high-risk geographical areas and conduct supplemental immunization activities.
- Identify missed opportunities for tetanus toxoid immunization through antenatal care. Monitor whether corrective actions were taken in those areas considered to be at high risk. Periodically verify the sensitivity of NT reporting by comparing the number of reported cases with cases identified through active surveillance, hospital record reviews, and active searches.
- Periodically profile risk factors for NT (e.g. place of birth, assistance during delivery, cord care, immunization status, age and parity of mother) to target messages and actions appropriately. Monitor risk levels in areas considered at HIGH risk and take corrective action accordingly. Monitor COMPLETENESS and specificity of reporting through analysis of age of death, risk factors.
ANNEX 01- Tetanus disease

Aetiology

Tetanus is an infectious bacterial disease caused by Clostridium tetani. C. tetani is a gram-positive, strictly anaerobic bacillus that may develop a terminal spore giving it a drumstick appearance. Bacterium itself can survive only in strict anaerobic conditions but its spores are much more resistant and survive normal disinfection and heating. If a wound is contaminated with tetanus spores, they are able to germinate allowing bacterial multiplication.

Pathogenesis

The bacilli may produce tetanospasmin, an extremely potent neurotoxin. This toxin blocks inhibitory neurotransmitters in the central nervous system and causes the muscular stiffness and spasms typical of generalized tetanus.

Transmission

Maternal tetanus is a consequence of unclean delivery or abortion practices, and neonatal tetanus occurs when unclean instruments are used to cut the umbilical cord or when contaminated material is used to cover the umbilical stump in susceptible babies.

The incubation period of tetanus usually varies between 3 to 21 days (median 7 days, range 0—>60 days). In most cases, neonatal tetanus starts 3–14 days after birth.

Reservoir

Spores are prevalent in the environment, particularly in the soil of warm and moist areas, and may be carried in the intestinal tracts of humans and animals.

Occurrence

Majority of tetanus cases occur in developing countries and are birth-associated, occurring among newborn babies or in mothers following unclean deliveries and poor post-natal hygiene. Tetanus in children and adults following injuries may also constitute a considerable public health problem.

In countries with effective immunization programmes and good standard of hygiene, maternal and neonatal tetanus has been largely eliminated (<1 case per 1000 live births at the district level). On rare occasions, tetanus may affect inadequately immunized people, primarily among the elderly.
Clinical features and complications

In most cases, tetanus presents as a generalized spastic disease. Characteristic features are early spasms of the facial muscles (trismus or “lock-jaw” and “risus sardonicus”) followed by spasm of the back muscles (opisthotonos) and sudden, generalized tonic seizures (tetaspasms). Spasm of the glottis may cause sudden death. In neonatal tetanus, generalized spasms are commonly preceded by inability to suck or feed and excessive crying.

Prognosis

Neonatal tetanus is associated with a high mortality rate, despite intensive care. It can be prevented by immunization of expectant mothers and by good hygiene and asepsis during delivery. A short incubation period and low birth weight are associated with a high mortality rate and are poor prognostic factors. The case fatality rate ranges from 40% in developed countries to 80% in the poorest developing countries.

The overall tetanus case-fatality rate varies between 10% and 70%, depending on treatment, age and general health of the patient. Without hospitalization and intensive care, fatality is almost 100% among the oldest and the youngest patients. In settings with optimal care, it may be reduced to 10–20%.
Laboratory diagnosis

There is no diagnostic laboratory test for tetanus; the diagnosis is entirely clinical. C. tetani is recovered from wounds in only about 30% of cases, and the organism is sometimes isolated from patients who do not have tetanus.

Immunization

Tetanus toxoid: A modified neurotoxin that induces protective antitoxin. Conventional production includes growth of toxigenic strains of C. tetani in a liquid medium that favours toxin production, toxin harvest by filtration, detoxification by formaldehyde followed by several steps of purification and sterilization. To increase immunogenicity, the toxoid is adsorbed to aluminum or calcium salts. According to WHO requirement the potency of tetanus toxoid should be at least 40 IU per dose (0.5 ml).

When pregnant women receive a booster dose of TT at least 2 weeks before delivery both mother and child are protected against birth-associated tetanus because maternal tetanus antitoxin passes via the placenta to the fetus.

Monitoring TT Immunization Coverage/TT protection: The WHO recommendation to calculate routine TT2+ coverage among pregnant women (the total number of protective doses (TT2+TT3+TT4+TT5) given to pregnant women over the last calendar year/estimated number of pregnant women in the district) is still valid, but systematically underestimates the true level of TT protection when compared with coverage surveys and serological data with reasons detailed in the document.

WHO recommends monitoring Protection at Birth (PAB) against tetanus at the DTP/Penta-1 contact. An infant is protected at birth if the mother received: (i) two TT doses while pregnant with the child OR (ii) one TT dose while pregnant with the child and one or more doses at any time before that pregnancy OR (iii) no dose while pregnant with the child and three or more doses at any time before that pregnancy. The Percentage of infants protected at birth will be the total number of infants protected at birth (as per criteria above) over the expected number of live births.
## ANNEX 02- Core reporting variables for Neonatal Tetanus

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Readings


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