

Adverse Events Following Immunization (AEFI)



पूर्ण खोप, सुरक्षित भविष्य
gkfn

GUIDELINE



Child Health Division
Department of Health Services
Ministry of Health

Table of Content

Chapter	Page Number
A. Introduction	1-1
B. Purpose of the filed guide on AEFI	1-11
1. What is an AEFI?	2
2. What are the type of AEFI?	2
2.1 Vaccine Reaction	2
2.2 Programme Errors	3
2.3 Coincidental Events	3
2.4 Injection Reaction	4
2.5 Unknown	4
3. Surveillance of AEFI	4
3.1 Detection and reporting of all AEFIs	5
3.1.1 What to report?	5
3.1.2 When to report (timelines for reporting)	5
3.1.3 To whom to report	6
3.1.4 Encouraging reporting	7
3.1.5 Providing Feedback	7
3.2 Investigation of Trigger Events	7
3.2.1 Purpose of an investigation	7
3.2.2 What should be investigated and when?	8
3.2.3 Who should investigate?	8
3.2.4 Steps in an AEFI investigation	8-9
3.3 Communication of Actions to Parent and Health Care Providers	9
3.4 Collection and recording of data	10
3.5 Analysis of AEFI data and taking action for remedy	10
3.5.1 Assessing the cause of the AEFI	10
3.5.2 Taking Action	11
C. Annexes:	12-20
AEFI Report Form	12
AEFI Case Investigation Form	13-14
AEFI Compilation Form for Districts / PHC / HP	15
Known vaccine reactions and their expected rates of occurrence	16
Program Errors leading to adverse events	17
Case Definitions	18-19

Abbreviations

AEFI	Adverse Events Following Immunization
EWARS	Early Warning Reporting System
EPI	Expanded Program on Immunization
MoH	Ministry of Health
DoHS	Department of Health Services
CHD	Child Health Division
PEN	Polio Eradication Nepal
VHWs	Village Health Workers
MCHWs	Maternal & Child Health Workers
FCHV	Female Community Health Volunteers
DPT	Diphtheria Pertutis Tetanus
OPV	Oral Polio Vaccine
MO	Medical Officer
DHO	Districts Health Office
DHOs/PHOs	Districts Health Officers / Public Health Officers
EDCD	Epidemiology Disease Control Division
PHC	Primary Health Care Centre
HP	Health Post
SHP	Sub-Health Post
SMO	Surveillance Medical Officer
HA	Health Assistant
AHW	Assistant (Auxiliary) Health Workers
SAHW	Senior Auxiliary Health Workers
VDC	Village Development Committee
TSS	Toxic Shock Syndromes

A. Introduction

The Expanded Programme on Immunization (EPI) in Nepal expands throughout the kingdom with access to more than 90% of the target population. Together with health staff, the EPI program shares the responsibility to ensure that EPI program is safe and that children and women are not exposed to unnecessary harm as a result of the immunization. To date, the EPI program has concentrated on expanding the service. This has been achieved with the help of the large number of EPI-related health personnel (>6,000 VHW, MCHW and other staff) who ensure that the large number of EPI sessions (>15,306) are carried out monthly. The geographical difficulties and lack of trained manpower has remained a challenge to deliver and maintain quality service of immunization. Despite the access of immunization in more than 90% of target population, completion of successive doses of immunizing antigens remains very low (about 65%). The reason for such a high rate of drop-out remains unanswered, although personnel and logistic management issues have probably contributed to this trend. However, the contribution of the immunization recipient's experiences during and after immunization and their perspective on immunization has not been considered when determining the reasons for the high drop-out.

International experience shows that when vaccine preventable disease declines; people become increasingly intolerant to the risk of vaccine associated reactions. As vaccine use increases, particularly during national immunization days, the number of immunization errors may increase. In addition, new vaccines are being introduced into the EPI programme thereby increasing the need for training of health staff. In order to minimize the risk of errors occurring during immunization, the EPI program has made a commitment through its strategic multi-year plan of action to develop a surveillance system together with a field guide on adverse events following immunization.

B. Purpose of the field guide on AEFI

- Providing information on:
 - What is an AEFI?
 - What are the types of AEFI?
 - What are the known vaccine reactions and their expected rates of occurrence?
 - How to prevent, detect, investigate, report and respond to AEFIs. (Surveillance on AEFI)

This field guide will enable the health worker to utilize the information at the field level to minimize adverse events following immunization by identification of the problem of AEFI and management through efficient manner to gain trust of the people.

1. What is an Adverse Events Following Immunization (AEFI)?

An adverse event following immunization (AEFI) is defined as a medical incident that takes place after an immunization, causes concern, and is believed to be caused by immunization.

2. What are the types of AEFI?

AEFI can be classified into 5 types, depending on the suspected cause of the reaction.

2.1. Vaccine Reactions

2.2. Programme Error

2.3. Coincidental

2.4. Injection Reaction

2.5. Unknown

Definition and examples of classified AEFI:

Type of AEFI	Definition	Example
Vaccine reaction	An event caused or precipitated by the vaccine when given correctly. This is due to the inherent properties of the vaccine.	Anaphylaxis due to measles vaccine
Programme Error	An event caused by an error in vaccine preparation, handling or administration.	Bacterial Abscess due to unsterile injection
Coincidental	An event that occurs after immunization but is not caused by the vaccine. This is due to a chance association	Pneumonia 4 days Oral Polio Vaccine administered
Injection Reaction	Event from anxiety about, or pain from the injection itself rather than the vaccine	Fainting spell in a teenager after immunization
Unknown	Event's cause cannot be determined	

2.1. Vaccine Reactions

Vaccine reactions can be classified into **common, minor reactions** and **rare, more serious reactions** (See ANNEX-IV)

Common, minor reactions are caused by the vaccine recipient's immune system's response to the vaccine. Some of the vaccine components can lead to reactions as well (e.g. aluminium adjuvants, stabilizers and preservatives). Local reactions including pain, swelling and/redness at the injection site can be expected in about 10% of vaccines. This is even more common with DPT injection.

These reactions usually last a few days at the most and can be treated symptomatically with paracetamol.

BCG causes a specific local reaction that starts as a papule (lump) 2 or more weeks after immunization and then becomes ulcerated after several months leaving a scar. A keloid may develop after BCG vaccination in Asian populations.

While mild fever is a common reaction, high to extreme fevers need to be investigated to rule out the possibility of a programme error. Other symptoms such as irritability, malaise and loss of appetite are also frequently reported with DTP vaccine and usually resolve naturally. Measles vaccine may cause mild symptoms such as rash or conjunctivitis, which are typically seen in a measles infection. However such symptoms are usually mild, but can be quite serious in severely immunocompromised children.

These common reactions appear one or two days after the administration of the vaccine, except for the fever and general symptoms produced by measles/MMR vaccine 5 to 12 days after vaccination. These common minor reactions usually resolve without any serious consequences. Therefore there **is no need to report these reactions** as AEFI on a routine basis. However, if there is a change in the nature, severity or the frequency with which these reactions occur, health staff should report this to their supervisor.

Rare vaccine reactions: Case definitions for these reactions are in ANNEX-VI. Some of the rare and more serious vaccine reactions (e.g., seizures, hypotonic hyporesponsive episodes) do not lead to long-term problems. Anaphylaxis, while potentially fatal, is treatable without leaving any long-term effects. Although encephalopathy is included as a rare reaction to measles or DTP vaccine, it is not certain that these vaccines in fact cause encephalopathy (brain damage).

An increase in the expected frequency of rare, serious reactions may indicate either a problem with a specific vaccine batch or a programme error. Therefore certain serious vaccine reactions have been included in the list of reportable AEFI (**See 3.1.1**)

It is important to remember that not all Serious AEFI are actually **caused** by the vaccines themselves. Many may be due to programme errors or underlying medical problems in the patient. To determine the exact cause of serious AEFI, all serious suspected vaccine reactions should be reported and investigated. In the case of programme errors, these can be corrected by the immunization programme once the cause has been determined.

2.2. Programme Errors

Programmatic errors are probably the most commonly reported adverse events. These occur as a result of inappropriate storage, handling, preparation and administration of vaccines. It is extremely important that these AEFI are reported and investigated, as these events are likely to require some kind of corrective action. ANNEX-V provides a list of programme errors and the types of AEFI that are likely to arise from these.

A program operation error may lead to a cluster of events, especially if a vaccinator does not follow what he was taught during training. Improper vaccination practices can give rise to abscesses or other blood-borne infections. The most serious result is toxic shock caused by improper handling of the vaccine vial after reconstitution or infections such as HIV, Hepatitis B and Hepatitis C. Several infants vaccinated from the same vial could die shortly after injection.

2.3. Coincidental Events

Children are usually given vaccines at an age when they are susceptible to many diseases. Therefore, situations may arise when an adverse medical event is falsely attributed to the vaccine. In other words, because an event occurred *after* immunization, it is automatically believed that the event occurred *because* of the immunization. These events occur frequently during mass immunization campaigns when there are large numbers of individuals who are vaccinated. Death of child due to pneumonia after immunization may blame the program.

2.4. Injection Reaction

Vaccinated children or adults can react in anticipation to and as a result of an injection of any kind.

This reaction is unrelated to the content of the vaccine. Examples of injection reactions include fainting, light-headedness, dizziness, tingling around the mouth and in the hands, breath holding in younger children which in some cases can lead to unconsciousness.

In a group situation, mass hysteria is possible, especially if a vaccine is seen to faint or have some other reaction. It is important to provide the parents and community with clear explanations about the immunization in a calm and confident manner. This is likely to reduce the likelihood of such an event occurring. In addition, where possible, parents should be allowed to accompany the child being vaccinated to reassure the child and to feel reassured about the vaccination process. In outreach sessions overcrowded clinics and waiting rooms are likely to cause confusion and frustration among parents, children and health workers. This could increase the risk of injection reactions as well as possible programme errors. Therefore, overcrowding should be minimized by proper planning of the immunization sessions and informing parents in advance about the time they should arrive for vaccinations. This is likely to reduce the likelihood of such an event occurring.

It is important that basic health staffs are trained to recognize the difference between fainting and anaphylaxis.

2.5. Unknown

In some situations the cause of the event cannot be determined. A reaction should only be considered to have an unknown cause once the case has been properly investigated and all possible causes carefully considered.

3. Surveillance of AEFI

AEFI surveillance is an effective means of monitoring immunization safety and contributes to the credibility and quality of the national immunization program. It allows for proper management of these events and avoids responses to reports of AEFI that can cause concerns within the community about immunization.

It is important to note at the outset, that an AEFI surveillance system is not meant to apportion blame to field staff, but rather to assist and further support staff in providing excellent immunization services to all communities.

The objectives of the AEFI surveillance are:

1. To detect, correct and prevent program errors
2. To identify unusual high rates of AEFI with specific vaccine lots and brands
3. To ensure that coincidental events are not falsely blamed on immunization
4. To maintain confidence in the immunization program and properly responding to parents/community concerns about immunization safety while increasing awareness (public and professional) about vaccine risks.
5. To estimate AEFI rates in the population compared with international data.

Components of AEFI surveillance are:

3.1. Detection and reporting of all AEFIs

3.2. Investigation of Tigger Events

3.3 Communication with Parents and Health Care Providers

3.4 Collection and recording of data

3.1. Detection and reporting of all AEFIs

3.1.1. What to report?

*The following AEFI are **REPORTABLE/ TRIGGER** events:*

1. Severe local reaction
2. Injection site abscesses
3. BCG lymphadenitis
4. Other severe or unusual health events that the health worker or community thinks was caused by the vaccine, **including, but not limited to:**
 - 4.1. High or Extreme fever (>102°F) within 48 hours
 - 4.2. Seizures (occurs rarely with DPT) within 3 days
 - 4.3. Loss of consciousness / shock-like state
 - 4.4. Acute flaccid paralysis (occurs extremely rarely with OPV)
 - 4.5. Anaphylaxis within 24 hours
 - 4.6. Encephalitis/ encephalopathy within 14 days
5. Hospitalisation believed to be related to vaccination
6. Death believed to be related to vaccination

The above 6 types of events are called **REPORTABLE/trigger events** because they stimulate or trigger a response, such as an investigation. If the AEFI does not occur within the time frame specified, but there is a suspicion that the event may be related to the vaccine, these reports are also considered trigger events and should be investigated. If the trigger event occurs outside of this time frame, the event is less likely to be due to the vaccination. Case definitions for these and other vaccine reactions are reflected in ANNEX-VI.

Common minor reactions usually resolve without any serious consequences. Therefore there is no need to report these reactions as AEFI on a routine basis. However, if there is a change in the nature, severity or the frequency with which these reactions occur, health staff should report this to their supervisor.

3.1.2. When to report (timelines for reporting):

Once an AEFI is identified, which is a trigger event, and is considered to be serious by the village health worker (VHW), it should be reported immediately but always **within 24 hours** to the nearest Health Post or Primary Health Centre (PHC). **The AEFI Report Form** (ANNEX I) should be filled in as completely as possible and the vaccinator should ensure that the patient is referred to the health post or PHC. In the case of deaths or events causing community concern, the AEFI can be communicated telephonically (where possible) in order to prevent a delay in the investigation and response to the AEFI. Health staff should be

encouraged to report AEFI even if they are not certain that the event was caused by the vaccine.

In the case of serious AEFI (death, hospitalization, clusters, systemic/ CNS reactions), these require a district level investigation, the AEFI should be reported immediately (within 24 hours of the PHC MO being notified) to the District Health Officer (DHO) or to the District Public Health Officer (DPHO) so that an investigation can commence as soon as possible.

3.1.3. To whom to report:

The **VHW//MCHW/FCHV** should report any trigger AEFI that they detect to the health staff member in charge of PHC / HP/SHP immediately. (no later than 24 hours after detecting the AEFI). These AEFI should be reported using the AEFI report form (Annex: I) and submitted, within 24 hours to the PHC/HP/SHP.

The **PHC /HP/SHP** should report these AEFI to the DHO/DPHO within 24 hours in the case of serious systemic events (e.g. death, hospitalisation, high fever, seizures, encephalopathy, AFP after immunization). All AEFIs detected at the PHC/Health post SHP level should be reported in a listing format on a monthly basis (See Annex: IV)

In the case of **serious** AEFI (e.g. Death, Cluster of trigger events, AEFIs that cause community concern), the PHC MO or HA should immediately inform the District Health Officer, RHD & CHD and will initiate an investigation within 2 days of being notified.

The **DHO/DPHO** through EPI supervisor should submit all AEFIs report per month in the prescribed line-listing format. A copy of this line listing should be sent to the CHD/EPI Section.

A copy of the initial AEFI report forms and completed AEFI Case investigation Forms should be attached to the monthly line listing and sent to DHO in the case of Serious AEFI. . This data should be submitted to EPI Section CHD by the DHO/DPHO **by 15th of each month.**

In urgency case, the DHO/DPHO can directly inform the EPI Section CHD of any serious AEFIs or clusters of AEFI that require review and action at a national level, feedback of the event should be given to DHO/DPHO within 24 hours.

If the AEFI is identified and treated at health facilities, SMO can coordinate in investigating AEFI and report to DHO/DPHO, at District Level Hospital or Central Level Hospital, the event should be reported to the District Health Office. This can be facilitated by the SMO in sentinel surveillance hospitals for AFP surveillance.

The RRT led by DHO, EPI Supervisors will investigate and act for the management, reporting and media handling in these situations.

In certain surveillance sites, an Early Warning Reporting System (EWARS) plays an important roll for the information. In these cases, the EWARS focal person can facilitate and report the information from hospital level to EDCD/CHD level.

The EWARS officer should inform the EPI programme officer and DHO/DPHO concurrently so that proper investigation and corrective actions can commence.

If the AEFI has been detected within the private sector, the medical doctor taking care of the patient should inform it to District Health Office.

3.1.4. Encouraging reporting

Health workers may not report AEFI for several reasons, in order to encourage reporting system the PHC MO, HA, SAHW and SMO should:

- Increase awareness of health staff on the importance of reporting
- Train staff on how to recognize AEFI and report them (making it easy to report)
- Ensure that AEFI forms are provided to health staff and made freely available
- Emphasize that investigations are about finding problems with the system NOT blaming individuals.
- Give positive feedback for reporting

The support of field staff is crucial to the success of any surveillance programme. Health staff must be encouraged to **report** the adverse events **without fear of penalty**. The aim is to minimize AEFI **improve systems, provide further training and not to blame individuals**.

3.1.5. Providing Feedback

It is essential that VHWs, MCHWs, AHW, HA, SAHWs and the medical officers taking care of the patient are given **feedback** about the results of investigations and actions taken. This includes positive feedback such as a “thank you” for the report, even if the report is incomplete. The feedback should also include future management of the child especially concerning the need for additional doses of the vaccine(s) and the outcome of the report.

The EPI section should inform the relevant districts of the findings of the AEFI expert review committee or findings of any AEFI investigations carried out at national level. This should be communicated to the District Health Officer/ District Public Health Officer or the Provincial Health Officer (DHO/DPHO).

EPI Supervisors and hospital managers should ensure that there is an ample supply of reporting and investigation forms available in their institutions for better reporting.

3.2 Investigation of Trigger Events

3.2.1. Purpose of an investigation

An investigation is carried out to determine the cause of an AEFI or cluster of AEFIs. If the cause is determined to be a programme error, the problem can be corrected in time rapidly. If an AEFI is found to be coincidental, then the community can be reassured about the safety of the vaccine and the immunization programme. Investigating activity of AEFIs increases the community’s confidence towards the health care system particularly the routine immunization programme.

3.2.2. What should be investigated and when?

The following AEFI must be investigated:

- All deaths attributed to the vaccine
- AEFI that may have been caused by programme error (e.g. bacterial abscess, severe local reaction, high fever or sepsis, BCG lymphadenitis)
- AEFI in the list of reportable/ trigger events
- AEFI that is a serious event of unexplained cause
- AEFI is causing significant parental or community concern
- Clustering of serious adverse events

A **Cluster** is defined as two or more cases of the same or similar event which has occurred within the same month, within the same district or city corporation, and/or associated with the same vaccine administered.

All the above AEFI should start being **investigated immediately but no later than 2 days** of knowledge of the event by the mid-level investigating officer (i.e. PHC MO or DHO/DPHO). The longer the delay in the investigation, the less likely to find out the cause of events.

3.2.3. Who should investigate?

All local reactions such as severe local reactions, e.g. lymphadenitis and injections site abscesses (without any systemic signs suggestive of sepsis) should be investigated by the RRT or designated health workers who is appropriately trained and SMO will coordinate them.

In the case of deaths, hospitalisations, cluster events and events causing community concern:

- the DHO
- the PHC MO/ HA/SAHW of the particular VDC facility
- the SMO/ EWARS officer
- a paediatrician/ physician from the nearest district/central hospital where possible

If any members of the team are available, he/she should conduct the investigation provided they have been appropriately trained and authorized.

3.2.4. Steps in an AEFI investigation

- Confirm information reports
- Investigate and collect data about patients, events, suspected vaccines and people.
- Assess the service by asking about vaccine storage and observe the service in action as refrigerator procedures and open vial situation
- Formulate a working hypothesis
- Test working hypothesis
- conclude investigation

An AEFI should be reported within 24 hours. Start case investigation immediately if possible but no later than within 2 days of the initial report. Steps in an investigation are as follows:

Steps in an AEFI investigation

Step	Actions
1) Confirm information in report	<ul style="list-style-type: none"> • Check details about patient and event from medical file and document information. • Verify information on report form and obtain any details missing from AEFI Report Form. • Identify any other cases that need to be included in the investigation.
2) Investigate and collect data: About the patient :	<ul style="list-style-type: none"> • Check Immunization history • Obtain previous medical history, current illnesses or concomitant medication, prior history of similar reaction or other allergies • Family history of similar events.
About the event :	<ul style="list-style-type: none"> • Clinical description of event, any relevant laboratory results about the AEFI and diagnosis of the event • Treatment of the event, whether hospitalized, and outcome (e.g. recovered, ongoing problems, died etc).
About the suspected vaccine(s) :	<ul style="list-style-type: none"> • Present storage condition, state of vaccine vial monitor, and temperature record of refrigerator. • Storage of vaccine before it arrived at health facility, where it has come from higher up the cold chain, vaccine monitor card.
About other people :	<ul style="list-style-type: none"> • Whether others received the same vaccine and developed illness • Whether others had similar illness (may need case definition); if so exposure of cases to suspect vaccine(s) • Investigate the local immunization service
3) Assess the service by: asking about:	<ul style="list-style-type: none"> • Vaccine storage (including open vials), distribution, and disposal • Diluent storage and distribution • Reconstitution (process and time kept) • Use and sterilization process of syringes and needles • Details of training in immunization practice, supervision and vaccinator(s) • Number of immunizations greater than normal?
Observing the service in action:	<ul style="list-style-type: none"> • Refrigerator – what else is stored (note if similar containers stored next to vaccine vials which could be confused); which vaccines/diluents stored with other drugs; whether any vials have lost their label • Immunization procedures (reconstitution, drawing up vaccine, injection technique, safety of needles and syringes; disposal of opened vials) • Do any open vials look contaminated?
4) Formulate a working hypothesis:	<ul style="list-style-type: none"> • On the likely/possible cause(s) of the event.
5) Test working hypothesis	<ul style="list-style-type: none"> • Does case distribution match working hypothesis? • Occasionally, laboratory tests may help.
6) Conclude investigation	<ul style="list-style-type: none"> • Reach a conclusion on the cause. • Complete AEFI Investigation Form • Take corrective action, and recommend further action

The AEFI Case Investigation Form (ANNEX II) should be completed once the AEFI has been investigated.

3.3. Communication of Actions to Parent and Health Care Providers

It is crucial, that, actions taken as a result of an AEFI are communicated to an appropriate individuals in an appropriate manner. Parents and the concerned immunization staff need to be kept informed about the results of the investigation and what actions are going to be taken. In addition the wider community, and perhaps the entire country may need to be informed about the results of investigation and action taken as a result of the event. It is essential to communicate the information regarding the risk and the benefits caused by immunization in such situation.

Below are a few key points to consider when communicating with parents during and after an AEFI has occurred.

- Listen sympathetically to parents and their concerns
- Reassure and support the parents or patients but do not make false promises with them.
- Assist the parents caregivers by taking the patients to PHC/hospital facility in case of an AEFI
- Keep the parent/ guardian routinely informed of the progress of the patient

It is also important to reassure the field workers vaccinators and keep them informed about the results of investigations. Usually the field workers are members of the community Where AEFI has taken place. Therefore, they need to be supported and provided with appropriate information for the response of community concerns.

3.4. Collection and recording of data

The initial AEFI Report Form (ANNEX-I) serves as a notification to the PHC MO/ DHO/DPHO that an AEFI has occurred and may require an investigation. All data collected during an investigation should be recorded in the AEFI Case Investigation Form (ANNEX-II). The AEFI Compilation Form for DISTRICTS/PHCs/HPs (ANNEX-III) are the list of all patients who have experienced an AEFI and that has been reported and investigated during a monthly period.

3.5. Analysis of AEFI data and taking action for remedy:

3.5.1. Assessing the Cause of the AEFI

Causality assessment involves deciding on the cause of the event (i.e. vaccine reaction, programme error, coincidental event or injection reaction) and the level of certainty of the cause based on what is known. It is important that a thorough investigation is conducted to obtain as much information as possible about the facts and circumstances around the AEFI. In particular, information needs to be sought to rule out other possible causes of the event and to establish whether a programme error could have contributed to or caused the event. Please refer to Appendix 3 on how to conduct an investigation.

It is not always easy to decide whether an adverse event is actually caused by the vaccine. Vaccines are often administered to children at an age when many underlying diseases become evident. The fact that the vaccine was administered within a reasonable time period of that disease occurring does not immediately suggest that the vaccine *caused or contributed to* the disease. A systematic assessment of the case/s is necessary before such conclusions can be reached.

If the event is suspected to be *due to the vaccine itself*, the following criteria should be considered:

- Is this a known reaction to the vaccine?
- How frequent is the occurrence for this event (common/rare/not previously reported)?
- Are similar events known to occur with other diseases?
- Is there a plausible mechanism for this event taking into account the biological properties of the vaccine?
- Did the event within a plausible time frame from the vaccine administration?

- Has the patient had similar symptoms in the past? Did these occur after vaccination or independently of vaccination?
- Was the patient on any concomitant or preceding drug therapy?
- Did the patient have any concomitant or preceding medical condition that could explain the event?
- Were there any other contributing factors?
- It is important to note that assessing the causality will not prove or disprove an association between an event and the immunization. It is meant to assist in determining the level of certainty of such an association. It is seldom that a definite causal association or lack of association is established for an individual event.

3.5.2. Taking Action

When the investigation is finished and the results obtained, they should be reported to the interested parties. The remedy for the adverse event will depend on the cause, and whether it was identified. Programme errors will need to be corrected, and there should be a checking mechanism to ensure that they don't happen again.

The following table provides a summary of actions that are usually taken when the different AEFI occur.

Actions to be taken upon completion of the investigation

Vaccine reaction:	If a higher reaction rate than expected from a specific vaccine or lot then obtain information from the manufacturer and consult with WHO to consider: <ul style="list-style-type: none"> • withdrawing that lot • changing manufacturing specifications or quality control • obtaining vaccine from a different manufacturer.
Programme error:	Correcting the cause of the error. This may mean one or more of the following: <ul style="list-style-type: none"> • change in logistics for supplying vaccine • change in procedures at the health facility • training of field workers • intensified supervision. Whatever action is taken, it is important to review at a later date to check that the programme errors have been corrected.
Coincidental:	Main task is communication to ensure that the community is persuaded that the link is just coincidental.
Unknown:	Depending on the nature of the event, its extent and whether it is ongoing, a further investigation by an expert may be needed. However, it must be accepted that in some cases the relationship to immunization is not clear. In addition to reporting the findings of the investigation to the interested parties, the reason that no conclusion was drawn should be indicated, along with whatever progress was made.

AEFI Report Form

(TO BE COMPLETED AND SUBMITTED WITHIN 24 HOURS IF AEFI CASE REPORTED, EVEN IF THERE IS NO AEFI CASE PLEASE COMPLETE IT AND SUBMIT AT THE END OF THE MONTH)

AEFI Case: Yes / No

Patient's Name:	Mother's Name:	Date of birth (dd/mm/yy): / /	Case ID Number:
Address:			Sex: M / F
Village:	VDC:	District:	
Health facility:		Reported by:	

Vaccine(s) given*	Route/ Site	Date of vial opened	Lot number	Manufacturer	Expiry date

*name and dose number e.g. DPT-2, OPV-2. And also mention diluent if reconstituted

Date immunized	Date AEFI started	Onset interval	Date of report

Tick box(es) that describe the event:

Localised Events		Systemic Events	
<input type="checkbox"/>	Severe local reaction (swelling extended more than 5cm from injection site or redness and swelling for more than 3 days)	<input type="checkbox"/>	All cases of hospitalisation (thought to be related to AEFI)
<input type="checkbox"/>	BCG lymphadenitis(>1.5cm or draining sinus)	<input type="checkbox"/>	Anaphylaxis within 24 hours
<input type="checkbox"/>	Injection Site Abscess	<input type="checkbox"/>	High Fever (more than 102°F) within 48 hours
Central Nervous System Events		<input type="checkbox"/>	All deaths (thought to be related to AEFI)
<input type="checkbox"/>	Seizures within 14 days	<input type="checkbox"/>	Other (specify):
<input type="checkbox"/>	Acute Flaccid Paralysis		
<input type="checkbox"/>	Loss of consciousness/ shock-like state		
<input type="checkbox"/>	Encephalitis/Encephalopathy within 14 days		

Recovered?	Yes / No	Hospitalized?	Yes / No	Died?	Yes / No
Health facility where patient was referred: _____					

Responsible Health Officer to complete:

Date report received:	/ /	Report Checked by:	
Investigation needed?:	Yes / No	If yes, date started:	
Investigator:		AEFI investigation ID:	
Suspected Cause:		Certainty:	Possible / Probable / Likely

In all of the above cases of AEFI refer the patient to the nearest health centre or hospital.

AEFI CASE INVESTIGATION FORM

An AEFI should be reported within 24 hours of the event.. Start case investigation within 2 days of the initial report. Attach the initial AEFI report form to the AEFI Case Investigation Form. Send a copy of these forms to the District Health Office as soon as investigation is completed. Use additional paper if needed and attach to this form. Thank you for your prompt response!

Patient's Name:	Mother's Name:	Date of birth (dd/mm/yy): / /	Case ID Number:
Address:			Sex: M / F
Village/Ward No.:	VDC:	District:	
Health facility:		Reported By:	

Vaccine(s) given*	Route/Site	Date of vial opened	Lot number	Manufacturer	Expiry date

*name and dose number e.g. DPT-2, OPV-2. Also mention diluent if reconstituted

Date immunized	Date AEFI started	Onset interval	Date of initial report

Additional information about the patient (past/present illnesses, allergies, other medication, family history etc.)

Has this child had any previous reaction after immunization? Yes / No / Unknown

Does the child have any other allergies? Yes / No / Unknown

Outcome of the patient: _____ Recovered _____ Residual Problem _____ Died (date)_____

Describe residual problem or cause of death: _____

Describe the adverse event in detail:

Diagnosis of event/ Case definition:

Describe Treatment of the Event:

Laboratory Investigation carried out (e.g. blood stool culture lumbar puncture etc.) ? Yes / No If yes key findings

Community investigation carried out? Yes/No

If yes, number of cases immunized with suspect vaccine in same session:

Cases of adverse events reported in immunized: _____ cases of adverse events reported in non-immunized: _____

Clinic / outreach site investigation carried out? Yes / No If yes, key finding(s) (e.g. storage, handling etc.):

At which stage was child immunized (i.e. first/last few doses of the vial? First/last few vaccinations of clinic session?)

Type of syringe used: reusable (plastic/glass) Disposable AD Syringe Other: _____

If reusable syringes used: Asses sterilization process: satisfactory unsatisfactory not observed

If unsatisfactory, describe: _____

Vaccination technique of health worker: satisfactory unsatisfactory not observed

If unsatisfactory, describe: _____

Maintenance of cold chain from storage up to point of use: satisfactory unsatisfactory not observed

If unsatisfactory, describe: _____

Was the health status of the child assessed before immunization? Yes / No / Unknown

Was a history of any allergy in the child obtained? Yes / No / Unknown

Any other AEFI reported from this health facility in the last 30 days? Yes / No / Don't Know

If Yes, how many? _____

Assessment

Conclusion about cause of AEFI (tick categories, rank if more than one cause)

Programme error	Vaccine reaction	Coincidental	Unknown
<input type="checkbox"/> Non-sterile injection <input type="checkbox"/> Vaccine prepared incorrectly <input type="checkbox"/> Use of wrong diluent <input type="checkbox"/> Administration technique/site <input type="checkbox"/> Vaccine transportation/ storage <input type="checkbox"/> Other:	<input type="checkbox"/> Vaccine lot problem <input type="checkbox"/> Known vaccine reaction at expected rate <input type="checkbox"/> Other:	<input type="checkbox"/> Similar event in unimmunized <input type="checkbox"/> Other:	

Confidence about conclusion on main cause of AEFI: certain probable possible

Reason(s) for conclusion:

Corrective action taken?: Yes / No If yes, specify

Further actions recommended?: Yes / No If yes, specify

Investigator Details

Investigator: _____ Designation _____ Signature: _____

Facility Name: _____ VDC: _____ District: _____

Date Investigation Started: ____/____/____ Date Investigation Completed: ____/____/____

AEFI Compilation Form for DISTRICTS/PHC/HP

District/PHC/HP: _____ Month/Year: _____ Date sent from District: _____

No. of VDCs in District: _____ No. VDCs submitting: _____

No.	Patient's Name	Sex (M/F)	Date of Birth	Address	Vaccine Used	Batch/ Lot #	Expiry date	Date of onset	Date vaccine given	Vaccine given by*:	Type of AEFI**	Outcome***	Investigated? (if Yes, date of investigation)	Comment

* Fill in the appropriate number: 1.Village Health Worker, 2.Maternal & Child Health Worker, 3. Assistant Health Worker 4.Health Assistant, 5.Nurse, 6.Doctor, 7.Other (describe)

** Fill in the appropriate number (if hospitalised for AEFI – include both numbers (e.g. hospitalised for seizures – record as follows: 5,7)
 1.Severe local Reaction, 2.BCG lymphadenitis, 3. Abscess, 4.Seizures, 5. Acute Flaccid Paralysis, 6.Hospitalization, 7.High fever 8. Anaphylaxis
 9. Death; 10. Other (describe)_____

*** Write any of the following: 1.Recovered, 2. Died, 3. Residual problem (describe)_____

Reported by: _____
 Designation: _____

Signature: _____
 Date: _____

***EPI Section, Child Health Division to receive from District Health Office no later than the second week of the following month
 WRITE “NO AEFI CASES” IF NONE REPORTED DURING PREVIOUS MONTH***

Known vaccine reactions and their expected rates of occurrence:

Common minor reactions				Severe reactions		
Vaccine	Local reaction (pain swelling redness)	Fever	Irritability, malaise and non-specific symptoms	Reaction	Onset interval	Number of events per million doses
BCG1	Common	-	-	Suppurative lymphadenitis BCG osteitis Disseminated BCG infection	2-6 months 1-12 months 1-12 months	100-1000 1-700 2
Hepatitis B	Adults up to 30% Children up to 5%	1-6%	-	Anaphylaxis Guillain-Barre Syndrome (plasma derived)	0-1 Hour 1-6 weeks	1-2 5
Measles2	Up to 10%	Up to 5%	Up to 5%	Febrile seizures Thrombocytopaenia (low platelets) Anaphylaxis	5-12 days 15-35 days 0-1hours	333 33 1-50
OPV	None	Less than 1%	Less than 1% 5	Vaccine-associated paralytic polio (VAPP)	4-30 days	1.4-3.4
Tetanus	Up to 10% ²	Up to 10% ⁴	Up to 25%	Brachial neuritis Anaphylaxis Sterile abscess	2-28 days 0-1 hours 0-2 1-6 weeks	5-10 1-6 6-10
DTP3	Up to 50%	Up to 50%	Up to 60%	Persistent (>3hours) inconsolable screaming Seizures ⁷ Hypotonic, hyporesponsive episode (HHE) Anaphylaxis/shock Encephalopathy	0-24 hours 0-3 days 0-24 hours 0-1 hour 0-2 0-3 days	1,000-60,000 570c 570 20 0-1

¹Local reactogenicity varies from one vaccine to another, depending on the strain and the number of viable bacilli.

² Approximately 90% of those receiving a second dose are already immune. Reactions do not occur if the child/woman is already immune. This is not the case for anaphylaxis, where this type of reaction is more likely on the second or subsequent doses.

³ With whole cell pertussis vaccine. Acellular pertussis vaccines rate are lower.

⁴ Rate of local reactions likely to increase with booster doses, up to 50 to 85%

⁵ Diarrhoea, Headache, and/or muscle pains

⁶ The risk of VAPP is higher after the first dose (1.4 - 3.4 per million doses) compared with the second and third doses (0.17 per million doses).

⁷ Seizures are most likely febrile in origin, and rate depends on past history, family history and age, with much lower risk in children under the age of 4 months.

Programme Errors leading to adverse events:

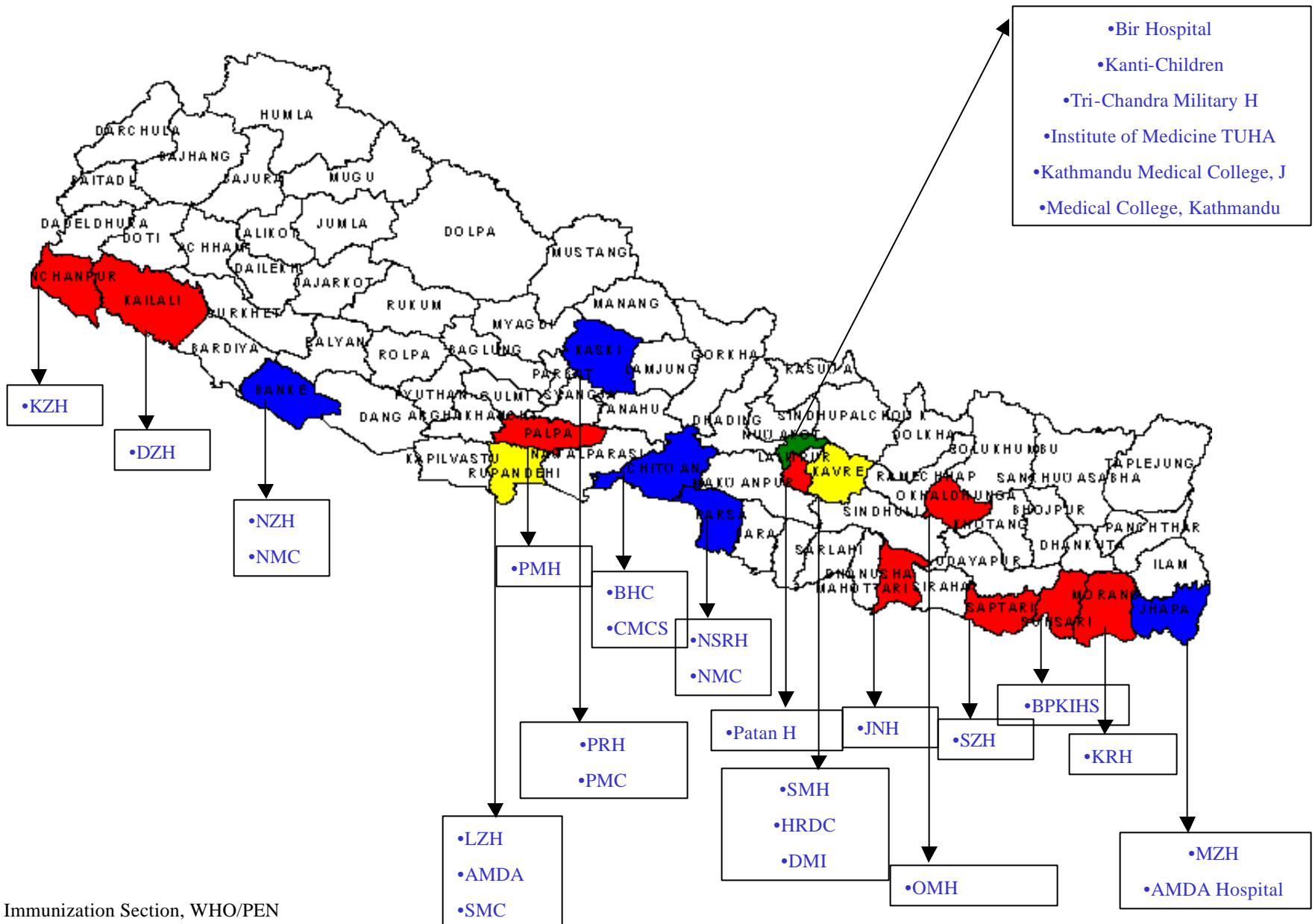
Programme Errors	Adverse Event
Non-sterile injection: <ul style="list-style-type: none"> • reuse of disposable syringe or needle • improperly sterilized syringe or needle • contaminated vaccine or diluents • reuse of <i>reconstituted</i> vaccine at next immunization session 	Infection (e.g. local suppuration at injection site, abscess, cellulitis, systemic infection, sepsis, toxic shock syndrome, transmission of blood borne virus (HIV, hepatitis B or hepatitis C)).
Vaccine prepared incorrectly: <ul style="list-style-type: none"> • vaccine reconstituted with incorrect diluent 	Local reaction or abscess from inadequate shaking
<ul style="list-style-type: none"> • drugs substituted for vaccine or diluent. 	Effect of drug (e.g. hypoglycaemia with insulin)
Immunization injected in wrong site: <ul style="list-style-type: none"> • subcutaneous instead of intradermal for BCG • too superficial for toxoid vaccine (DPT, DT, TT) 	Local reaction or injection site abscess.
<ul style="list-style-type: none"> • incorrect administration in the buttocks. 	Sciatic nerve damage
Vaccine transported/stored incorrectly.	Increased local reaction from frozen vaccine (and ineffective vaccine).
Contraindications ignored.	Avoidable severe vaccine reaction.

Case definitions

Adverse event	Case definition
Acute flaccid paralysis (Vaccine associated paralytic poliomyelitis)	Acute onset of flaccid paralysis within 4 to 30 days of receipt of oral poliovirus vaccine (OPV), or within 4 to 75 days after contact with a vaccine recipient and neurological deficits remaining 60 days after onset, or death.
Anaphylactoid reaction (acute hypersensitivity reaction)	Exaggerated acute allergic reaction, occurring within 2 hours after immunization, characterized by one or more of the following: <ul style="list-style-type: none"> • wheezing and shortness of breath due to bronchospasm • laryngospasm/laryngeal oedema • one or more skin manifestations, e.g. hives, facial oedema, or generalized oedema. Less severe allergic reactions do not need to be reported.
Anaphylaxis	Severe immediate (within 1 hour) allergic reaction leading to circulatory failure with or without bronchospasm and/or laryngospasm/laryngeal oedema.
Disseminated BCG infections	Widespread infection occurring within 1 to 12 months after BCG vaccination and confirmed by isolation of <i>Mycobacterium bovis</i> BCG strain. Usually in immunocompromised individuals.
Encephalopathy	Acute onset of major illness characterized by any two of the following three conditions: <ul style="list-style-type: none"> • seizures • severe alteration in level of consciousness lasting for one day or more • distinct change in behaviour lasting one day or more. Needs to occur within 48 hours of DTP vaccine or from 7 to 12 days after measles vaccine, to be related to immunization.
Fever	The fever can be classified (based on rectal temperature) as Mild fever: 100.4 OF to 102 OF (38 to 38.9oC), High fever: 102 OF to 104.7 OF (39 to 40.4oC) and Extreme fever: 104.7 OF or higher (≥40.5oC). Only High and Extreme fever should be reported.
Hypotonic, hyporesponsive episode (HHE or shock-collapse)	Event of sudden onset occurring within 48 [usually less than 12] hours of vaccination and lasting from one minute to several hours, in children younger than 10 years of age. All of the following must be present: <ul style="list-style-type: none"> • limpness (hypotonic) • reduced responsiveness (hyporesponsive) • pallor or cyanosis – or failure to observe/ recall
Injection site abscess	Fluctuant or draining fluid-filled lesion at the site of injection. Bacterial if evidence of infection (e.g. purulent, inflammatory signs, fever, including bacteria), Sterile abscess if no evidence of bacterial infection on culture. Sterile abscesses are usually due to the inherent properties of the vaccine.
Lymphadenitis (includes suppurative lymphadenitis)	Either at least one lymph nodes enlarged to >1.5 cm in size (one adult finger width) or a draining sinus over a lymph node. Almost exclusively caused by BCG and then occurring within 2 to 6 months after receipt of BCG vaccine, on the same side as inoculation (mostly axillary).
Osteitis/ Osteomyelitis	Inflammation of the bone with isolation of <i>Mycobacterium bovis</i> BCG strain.
Persistent inconsolable screaming	Inconsolable continuous crying lasting 3 hours or longer accompanied by high-pitched screaming.
Seizures	Occurrence of generalized convulsions that are not accompanied by focal neurological signs or symptoms. Febrile seizures: if temperature elevated >100.4 OF (rectal) Afebrile seizures: if temperature is normal
Sepsis	Acute onset of severe generalized illness due to bacterial infection and confirmed (if possible) by positive blood culture. Needs to be reported as possible indicator of programme error.

Adverse event	Case definition
Severe local reaction	<p>Redness and/or swelling centred at the site of injection and one or more of the following:</p> <ul style="list-style-type: none"> • swelling beyond the nearest joint • pain, redness, and swelling of more than 3 days duration • requires hospitalization. <p>Local reactions of lesser intensity occur commonly and are trivial and do not need to be reported.</p>
Toxic shock syndrome (TSS)	<p>Abrupt onset of fever, vomiting and watery diarrhoea within a few hours of immunization. Often leading to death within 24 to 48 hours. Needs to be reported as possible indicator of programme error.</p>

AEFI Surveillance Sites in Nepal, 2004



Source: Immunization Section, WHO/PEN