Adverse Reaction Following Immunization (AEFI)

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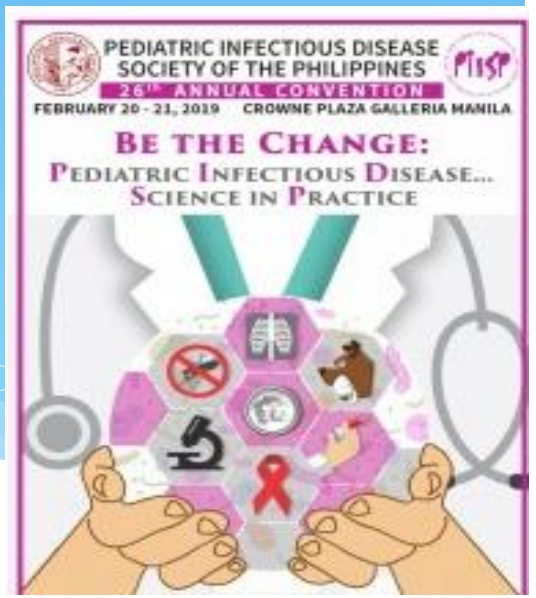

Outline

* Definition of Adverse Event Following Immunization (AEFI)
* Classification of AEFI's
* Reporting of AEFI's
* Prevention of AEFI's

What Is an Adverse Event Following Immunisation (AEFI)?

A medical incident that takes place after an immunization, causes concern, and is believed to be caused by immunization.

- **Vaccine reaction** caused by vaccine's inherent properties and individual response of vaccinee
- **Programme error** caused by error in vaccine preparation, handling, or administration
- **Coincidental** happens after immunization but **not** caused by it - chance occurrence or due to underlying illness
- **Injection reaction** anxiety or pain of injection not vaccine, e.g. syncope (vasovagal reaction) or fainting, hyperventilation
- **Unknown** cause cannot be determined

WHO Immunization safety surveillance. 1999 WPRO/EPI/99.01

Post hoc ergo propter hoc

"After this therefore because of this"

* Temporal association does not prove causation
* Just because one event follows another does not mean that the first caused the second

CDC Pink Book Webinar Series Vaccine Safety 2017

Elements Needed to Assess Correlation of Vaccine Adverse Events

	Disease	No disease
Vaccine	a	b
No vaccine	c	d

$$\frac{\text{Rate in "vaccine" group}}{\text{Rate in "no vaccine" group}} = \frac{a/a+b}{c/c+d}$$

If the rate in "vaccine" group is higher than the rate in the "no vaccine" group, then vaccines may be the cause

Risk of Autism Spectrum Disorder (ASD) Among Children in Denmark, 1991-1998

	ASD	No ASD
Vaccine	345	440,310
No vaccine	77	96,571

$$\frac{\text{Risk in "vaccine" group}}{\text{Risk in "no vaccine" group}} = \frac{7.83/10{,}000}{7.96/10{,}000}$$

Relative Risk = 0.98

Madsen et al. *N Eng J Med* 2002;347:1477-82

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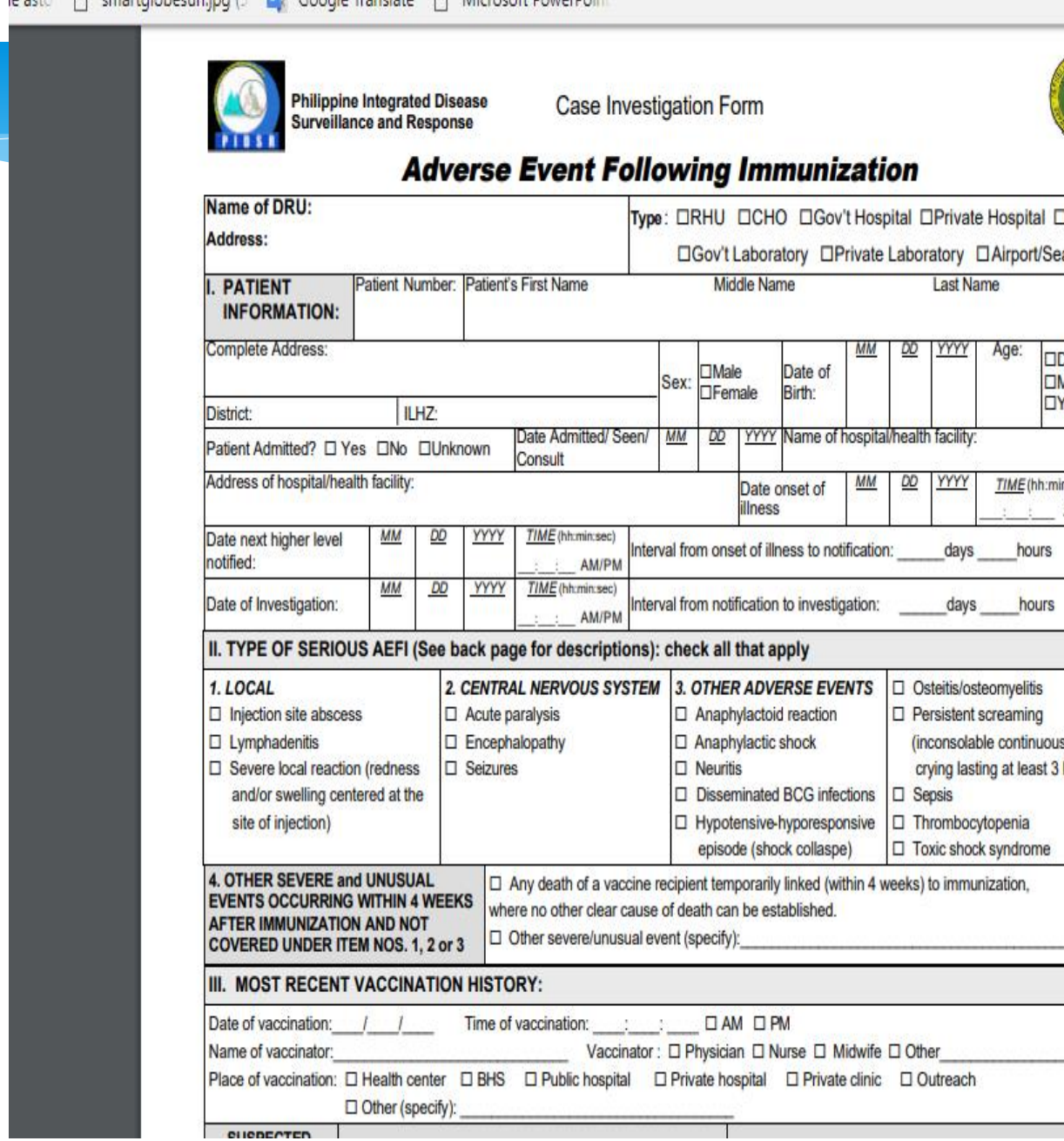
I have a case of AEFI – how do I report this and to whom?

- Infection Control Nurse of Hospitals
- PIDSR
- Pharmacovigilance of Pharmaceutical Company
- AEFI c/o DOH Reporting System



Philippine Integrated Disease Surveillance and Response

Case Investigation Form

Adverse Event Following Immunization

Name of DRU:

Address:

Type: ☐RHU ☐CHO ☐Gov't Hospital ☐Private Hospital ☐
☐Gov't Laboratory ☐Private Laboratory ☐Airport/Se

I. PATIENT INFORMATION: Patient Number: | Patient's First Name | Middle Name | Last Name

Complete Address: | Sex: ☐Male ☐Female | Date of Birth: MM DD YYYY | Age:

District: | ILHZ:

Patient Admitted? ☐ Yes ☐No ☐Unknown | Date Admitted/ Seen/ Consult MM DD YYYY | Name of hospital/health facility:

Address of hospital/health facility: | Date onset of illness MM DD YYYY TIME (hh:mi

Date next higher level notified: MM DD YYYY TIME (hh:min:sec) __:__:__ AM/PM | Interval from onset of illness to notification: _____days ____hours

Date of Investigation: MM DD YYYY TIME (hh:min:sec) __:__:__ AM/PM | Interval from notification to investigation: _____days ____hours

II. TYPE OF SERIOUS AEFI (See back page for descriptions): check all that apply

1. LOCAL	*2. CENTRAL NERVOUS SYSTEM*	*3. OTHER ADVERSE EVENTS*	
☐ Injection site abscess	☐ Acute paralysis	☐ Anaphylactoid reaction	☐ Osteitis/osteomyelitis
☐ Lymphadenitis	☐ Encephalopathy	☐ Anaphylactic shock	☐ Persistent screaming (inconsolable continuous crying lasting at least 3
☐ Severe local reaction (redness and/or swelling centered at the site of injection)	☐ Seizures	☐ Neuritis	☐ Sepsis
		☐ Disseminated BCG infections	☐ Thrombocytopenia
		☐ Hypotensive-hyporesponsive episode (shock collaspe)	☐ Toxic shock syndrome

4. OTHER SEVERE and UNUSUAL EVENTS OCCURRING WITHIN 4 WEEKS AFTER IMMUNIZATION AND NOT COVERED UNDER ITEM NOS. 1, 2 or 3

☐ Any death of a vaccine recipient temporarily linked (within 4 weeks) to immunization, where no other clear cause of death can be established.

☐ Other severe/unusual event (specify):_____

III. MOST RECENT VACCINATION HISTORY:

Date of vaccination:___/___/___ Time of vaccination: ___:___:___ ☐ AM ☐ PM

Name of vaccinator:_____ Vaccinator : ☐ Physician ☐ Nurse ☐ Midwife ☐ Other_____

Place of vaccination: ☐ Health center ☐ BHS ☐ Public hospital ☐ Private hospital ☐ Private clinic ☐ Outreach

☐ Other (specify): _____

SUSPECTED

III. MOST RECENT VACCINATION HISTORY:

Date of vaccination:____/____/____ Time of vaccination: ____:____:____ ☐ AM ☐ PM

Name of vaccinator:_____ Vaccinator : ☐ Physician ☐ Nurse ☐ Midwife ☐ Other_____

Place of vaccination: ☐ Health center ☐ BHS ☐ Public hospital ☐ Private hospital ☐ Private clinic ☐ Outreach

☐ Other (specify): _____

SUSPECTED VACCINE/S	DETAILS OF VACCINE				DETAILS OF DILUENT IF USED		
(BCG, DPT, OPV, Measles, HBV, others)	Dose Number/vial	Lot/Batch number	Manufacturer	Expiry date	Dose Number/vial	Lot/Batch number	Manufacturer

Did the patient receive any vaccination within 4 weeks prior to this adverse event? ☐ Y ☐ N ☐ U (If YES, complete the informati

VACCINE/S	DETAILS OF VACCINE			
(BCG, DPT, OPV, Measles, HBV, others)	Dose number (single/multiple)	Lot/Batch number	Manufacturer	Expiry date

IV. MEDICAL HISTORY:

Did the patient take other medications at the time of vaccination?

☐ Y ☐ N ☐ U If YES, what were these medications?

_____

Does the patient had history of similar reaction? ☐ Y ☐ N ☐ U

Does the patient had history of allergy? ☐ Y ☐ N ☐ U

If YES, what are these allergies?_____

Birth defects: ☐ Y ☐ N ☐ U

Family history of similar event? ☐ Y ☐ N ☐ U

Is the patient suffering from other medical condition

☐ Y ☐ N ☐ U

If YES, what are these conditions? _____

_____

Case Investigation Form

Adverse Event Following Immunization

V. CAUSALITY ASSESSMENT AND FINAL DIAGNOSIS: (TO BE FILLED UP AFTER CLASSIFICATION BY THE BOARD)

What is the cause of AEFI?

☐ Program-related ☐ Vaccine-related

☐ Coincidental ☐ Unknown

☐ Injection Reaction

Final diagnosis:_____

If program-related, was it due to

☐ non-sterile injection ☐ vaccine prepared incorrectly

☐ wrong administration technique

☐ improper vaccine transport or storage

☐ Other, specify_____

VI. OUTCOME:

Outcome: ☐ Alive Patient sustained disability? ☐ Yes ☐No ☐Unknown

If YES, specify type of disability:_____

☐ Died Date died: ____/____/____

☐ Unknown

Definition of Terms:

- An ***adverse*** event following immunization (AEFI) is defined as a medical incident that takes place after an immunization, causes conce and is believed to be caused by immunization.
- A cluster of AEFI is defined as two or more cases of the same adverse event related in time, place or vaccine administered.
- Serious medical condition is defined as those that are life-threatening and those that result in hospitalization (or prolonged hospitalizatio disability (or have the potential to result in disability) or death.

LOCAL ADVERSE EVENTS:

- ***Injection-Site Abscess:*** Occurrence of a fluctuant or draining fluid-filled lesion at the site of injection with or without fever.
- ***Lymphadenitis (includes suppurative lymphadenitis):*** Occurrence of either: at least one lymph node, 1.5 cm in size (one adult finge width) or larger; or a draining sinus over a lymph node. Almost exclusively caused by BCG and then occurring within 2 to 6 months afte receipt of BCG vaccine, on the same side as inoculation (mostly axillary).
- ***Severe local reaction:*** Redness and/or swelling centered at the site of injection and one or more of the following: swelling beyond the

CENTRAL NERVOUS SYSTEM ADVERSE EVENTS:

- ***Acute Paralysis***
  - Acute onset of flaccid paralysis within 4 to 30 days of receipt of oral polio-virus vaccine (OPV), or within 4 -75 da a vaccine recipient, with neurological deficits remaining 60 days after onset, or death.
  - Guillain-Barré Syndrome (GBS): Acute onset of rapidly progressive, ascending, symmetrical flaccid paralysis, wit paralysis and with sensory loss. Cases are diagnosed by cerebrospinal fluid (CSF) investigation showing dissocia count and protein content. GBS occurring within 30 days after immunization should be reported.
- ***Encephalopathy:*** Encephalopathy is an acute onset of major illness temporally linked with immunization and characte the following three conditions: Seizures; Severe alteration in level of consciousness lasting for one day or more; and Di havior lasting one day or more. Cases occurring within 72 hours after vaccination should be reported.
- ***Encephalitis:*** Encephalitis is characterized by encephalopathy and signs of cerebral inflammation and, in many cases, and/or virus isolation. Any encephalitis occurring within 1 to 4 weeks following immunization should be reported.
- ***Meningitis:*** Acute onset of major illness with fever, neck stiffness/positive meningeal signs (Kernig, Brudzinski). Sympt similar to those of encephalitis. CSF examination is the most important diagnostic measure: CSF pleocytosis and/or de ganism (Gram stain or isolation).
- ***Seizures:*** Seizures lasting from several minutes to more than 15 minutes and not accompanied by focal neurological s Febrile Seizures or Afebrile Seizures. Onset is usually 0 to 2 days.

OTHER ADVERSE EVENTS:

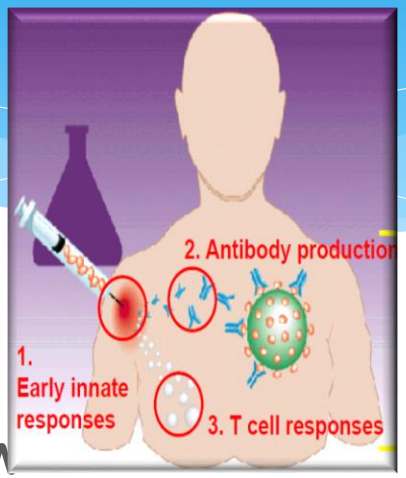
- ***Anaphylactoid Reaction (acute hypersensitivity reaction):*** Exaggerated acute reaction, occurring within 2 hours aft characterized by one or more of the following: (1) wheezing and shortness of breath due to bronchospasm; (2) laryngos edema; (3) one or more skin manifestations, e.g. hives, facial edema, or generalized edema.
- ***Anaphylactic Shock:*** Circulatory failure (e.g. alteration of the level of consciousness, low arterial blood pressure, wea peripheral pulses, cold extremities secondary to reduced peripheral circulation, flushed face and increased perspiration bronchospasm and/or laryngospasm/laryngeal edema leading to respiratory distress occurring immediately (0 to1 hr) af
- ***Neuritis:*** Dysfunction of nerves supplying the arm/shoulder/gluteal area without other involvement of nervous system. severe aching pain in the shoulder and upper arm or gluteal area followed in days or weakness by weakness and wasti gluteal muscles. Sensory loss may be present, but is less prominent. May present on the same or the opposite side to t sometimes affects both arms or gluteal area. Onset is usually 2 to 28 days.
- ***Disseminated BCG infection:*** Disseminated infection occurring within 1 to 12 months after BCG vaccination and conf Mycobacterium bovis BCG strain.
- ***Hypotensive-Hyporesponsive Episode (shock collapse):*** Sudden onset of paleness, decreased level or loss of resp creased level or loss of muscle tone (occurring within 24 hours of vaccination). The episode is transient and self-limiting
- ***Osteitis/Osteomyelitis:*** Inflammation of the bone either due to BCG immunization (occurring within 8 to 16 months af caused by other bacterial infection.
- ***Persistent Screaming:*** Inconsolable continuous crying lasting at least 3 hours accompanied by high-pitched screamin
- ***Sepsis:*** Acute onset of severe generalized illness due to bacterial infection and confirmed by positive blood culture.
- ***Thrombocytopenia:*** Platelet count of 100,000 cells or less per mm3. Onset is 15 to 35 days.
- ***Toxic-Shock Syndrome:*** Abrupt onset of fever, vomiting and watery diarrhea within a few hours of immunization, often within 24-48 hours.

Adverse Event ≠ Adverse Reaction

- Adverse event
  - Any medical event following vaccination
  - May be true adverse reaction
  - May be only coincidental
- Adverse reaction
  - Unintended effect caused by vaccine
  - "side effect"

Vaccine reactions

- Common, minor reactions
  - Vaccines stimulate immune system
  - Usually self-limiting
  - Local and/or systemic
  - Warn parents and advise how to manage (e.g. paracetamol, cool cloths, sponging, give extra fluids)
- Rare, more serious reactions
  - anaphylaxis



Remember: risk minimized by screening

es 2017 ; WHO Immunization safety surveillance. 1999 WPRO/EPI/99.01

Anaphylaxis

* is a very rare allergic reaction, unexpected, and can be fatal if not dealt with adequately.
* These reactions can be local or systemic

Distinguishing anaphylaxis from a fainting (vasovagal reaction)

	Fainting	Anaphylaxis
Onset	Usually at the time or soon after injection	Usually some delay between 5–30 minutes after injection
	Symptoms	
Skin	Pale, sweaty, cold and clammy	Red, raised, and itchy rash; swollen eyes, face; generalized rash
Respiratory	Normal to deep breaths	Noisy breathing from airways obstruction (wheeze or stridor
Cardiovascular	Bradycardia	Tachycardia
	Transient hypotension	Hypotension
Gastrointestinal	Nausea/Vomiting	Abdominal cramps
Neurological	Transient loss of consciousness, good response once prone	Loss of consciousness, little response once prone

Time Scale of Anaphylaxis

Time Scale	Signs and symptoms of Anaphylaxis	Severity
Early Warning Signs	Dizziness, perineal burning, warmth, pruritus	*Mild*
↓	Flushing, urticaria, nasal congestion, sneezing, lacrimation, angioedema	*Mild to Moderate*
Occurs within a few minutes	Hoarseness, abdominal cramps, substernal pressure	*Moderate to severe*
↓	Laryngeal edema, dyspnea, abdominal pain	*Moderate to severe*
Late, life-threatening Symptoms	Bronchospasm, stridor, collapse, hypotension, dysrhythmias	*Severe*

WHO Immunization safety surveillance. 1999 WPRO/EPI/99.01

Management of Anaphylaxis

Age (in years)	Dose of Epinephrine (1:1000)*
Less than 1 year old	0.05 ml
1 year old	0.1 ml
2 years old	0.2 ml
3 – 4 years old	0.3 ml
5 years old	0.4 ml

***Epinephrine (1:1000) 0.01ml/kg up to max 0.5ml deep IM. May repeat tevery 10–20 minutes up to 3 doses**

CDC. MMWR 2006;55(No. RR-15):1–48;
WHO Immunization safety surveillance. 1999 WPRO/EPI/99.01

TABLE 7.2 — Effect of Vaccine Adverse Events on Recommendations

Vaccine	Adverse Event	Estimated Attributable Risk	Effect on Recommendations
Any	Anaphylaxis	1 in 1,000,000[a]	Subsequent doses of vaccine contraindicated
MMR	Immune thrombocytopenia (ITP)	1 in 40,000[b]	History of ITP is a precaution for MMR
RRV-TV	Intussusception (IS)	1 in 10,000[c]	Product withdrawn in 1999
MMRV	Febrile seizures	1 in 2300[d]	Preference for combination vaccine retracted
RV1	IS	1 in 19,000[e]	History of IS added as a contraindication
RV5	IS	1 in 67,000[f]	History of IS added as a contraindication

[a] Bohlke K, et al. *Pediatrics*. 2003;112:815-820.
[b] Mantadakis E, et al. *J Pediatr*. 2010;156:623-628.
[c] Peter G, et al. *Pediatrics*. 2002;110:e67.
[d] Klein N, et al. *Pediatrics*. 2010;126:e1-e8.
[e] Weintraub ES, et al. *N Engl J Med*. 2014;370:513-519.
[f] Yih WK, et al. *N Engl J Med*. 2014;370:503-512.

Marshall, GS. The Vaccine Handbook: A Practical Guide for Clinicians. 6th edition. Immunization Action Coalition; 2017.

Tips on Vaccine Safety

Prior to Vaccination: Screen patients for contraindications and precautions prior to each vaccine dose; provide information on vaccine to be administered

During Vaccination: Do NOT deviate from recommended route, site and dosage of vaccine

After Vaccination: Observe necessary precautions, be prepared for emergency care of anaphylactic reaction; provide information and advice on vaccine side effects

Centers for Disease Control and Prevention. Epidemiology and Prevention of Vaccine Preventable Diseases. Atkinson W, Wolfe S. Hamborsky J eds. 12th ed. Washington DC: Public Health Foundation, 2011

Role of Immunization Provider

- Timing and spacing of vaccine doses
- Proper vaccine storage and administration
- Screening vaccine precautions and contraindications
- Educate patients and parents about vaccine benefits and risks
- Manage vaccine side effects
- Report suspected side effects

CDC. Epidemiology and Prevention of Vaccine-Preventable Diseases. Atkinson W et al, eds. 11th ed. Washington DC: Public Health Foundation, 2009

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BAKUNA ang PANLABAN!

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