A global comprehensive VPD surveillance strategy for Immunization Agenda 2030: WHO Surveillance guidelines

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Klooster van de Grauwzusters University of Antwerp (Belgium)
Immunization Agenda 2030 proposes a strategic framework informed by Immunization Programmes for Primary Health Care and Universal Health Coverage.

7 Strategic Priorities

4 Core Principles for action
WHO’s role in vaccine-preventable disease (VPD) surveillance

• To help countries generate data (for action) and monitor VPD trends globally
• To lead, coordinate, and advocate for surveillance activities with countries and partners
• To set global norms and standards for surveillance including quality assurance and control systems → VPD surveillance standards
• To support countries with technical assistance and evidence-based policy decisions
• To build on surveillance platforms and inform immunization program monitoring and policy
Our vision

All countries have sustainable, high-quality VPD surveillance systems, supported by strong laboratories, that detect and confirm cases and outbreaks and generate useful data to guide outbreak prevention and response, immunisation program management, and vaccine policy to decrease the burden of VPDs as efficiently and effectively as possible.
First dose measles coverage dropped to 81% in 2021, leaving 5 million more children unvaccinated compared to in 2019.

Coverage of the first dose of measles-containing vaccine (MCV-1) dropped to 81% in 2021, the lowest level since 2008. This leaves 25 million children vulnerable. An additional 15 million children received only a first dose, but not a needed second dose through regular public health services.

Supplemental Immunization Activities (including campaigns) continue to be required to ensure that all children receive the 2 doses that will protect them from measles.

This data is collected through the Joint Reporting Format (JRF) reported annually by MOH to WHO and UNICEF for VPD case aggregates and vaccine coverage.
Different VPD syndromes are surveilled according to end objectives of program and historical evolution of programs

SOME EXAMPLES
Global case-based surveillance on total population for regional measles elimination goals

Immunization Analysis and Insights (who.int)

MEASLES /RUBELLA SURVEILLANCE - IVB
Measles case distribution by month and WHO Region (2015–2023)

Notes: Based on data received 2023-03 – Data Source: IVB Database – This is surveillance data, hence for the last month(s), the data may be incomplete.
In the frame of tracking progress towards the goals of Immunization Agenda 2030 (IA2030), an indicator has been developed by a working group in order to represent large and disruptive measles outbreaks. This indicator is defined as an incidence equal or greater than 20 reported measles cases per million population over a period of 12 months. It is important to note that measles outbreak definitions vary between countries and regions according to local context and level of progress towards regional elimination goals. This definition of large and disruptive outbreaks aims to complement and not replace the national and regional definitions, while also providing a degree of global standardization and permitting tracking of progress against a common metric.

Notes: Based on data received 2023-03 and covering the period between 2022-02 and 2023-01 - Incidence: Number of cases / 1M population - Population Data: World population prospects, 2019 revision
Sentinel site surveillance in selected countries

ROTAVIRUS AND OTHER PEDIATRIC DIARRHEA
SURVEILLANCE - IVB
Countries reporting data to the Global Rotavirus Surveillance Network, 2021

Map production: World Health Organization, WHO, 2023. All rights reserved
Data source: Global Rotavirus Surveillance Network

Disclaimer:
This boundary and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Lines and labels on maps represent approximate geographic boundaries for which there may be no legal agreement.
Note: limited to surveillance sites with cases reported in at least 10 of 12 months and at least 80 cases reported per year (except in sites where rotavirus vaccine has been introduced)
Pathogen-specific attributable fractions of hospitalised diarrhoea in children less than 5 years of age in 2017–2018 in Global Pediatric Diarrhea Surveillance both overall and by geographic region to by rotavirus vaccination introduction status as of 2017

Figure from: https://gh.bmj.com/content/7/9/e009548
Population wide surveillance with initial validation by a sample survey (no lab component)
47/59 (80%) Countries eliminated MNT between 2000 & Dec 2022
*(Plus Punjab province of Pakistan; southern regions of Mali and southern zones of Nigeria)
Global case-based surveillance with eradication objective – mainly population <15 years old

POLIO (ACUTE FLACCID PARALYSIS) SURVEILLANCE – POLIO ERADICATION
Global WPV1 & cVDPV Cases\(^1\), Previous 12 Months\(^2\)

WPV1 cases (latest onset)
- Pakistan: 19 cases, onset 20-Feb-23
- Afghanistan: 1 case, onset 29-Aug-22
- Mozambique: 7 cases, onset 10-Aug-22

cVDPV1 cases (latest onset)
- DR Congo: 138 cases, onset 16-Feb-23
- Madagascar: 14 cases, onset 28-Jan-23
- Mozambique: 21 cases, onset 06-Jan-23
- Malawi: 4 cases, onset 01-Dec-22
- Congo: 1 case, onset 15-Oct-22

cVDPV2 cases (latest onset)
- CAR: 10 cases, onset 27-Feb-23
- Benin: 11 cases, onset 23-Feb-23
- Indonesia: 4 cases, onset 20-Feb-23
- DR Congo: 295 cases, onset 18-Feb-23
- Israel: 1 case, onset 13-Feb-23
- Chad: 44 cases, onset 13-Feb-23
- Somalia: 4 cases, onset 12-Jan-23
- Nigeria: 44 cases, onset 05-Jan-23
- Niger: 3 cases, onset 25-Dec-22
- Cameroon: 3 cases, onset 22-Dec-22
- Yemen: 2 cases, onset 14-Dec-22
- Algeria: 1 case, onset 23-Dec-22
- Burundi: 1 case, onset 24-Nov-22
- Sudan: 1 case, onset 31-Oct-22
- Mali: 3 cases, onset 26-Oct-22
- Togo: 1 case, onset 10-Sep-22
- Ghana: 1 case, onset 14-Sep-22
- USA: 1 case, onset 20-Jun-22

Data in WHO HQ as of 11 Apr. 2023

\(^1\)Excludes viruses detected from environmental surveillance; \(^2\)Onset of paralysis: 12 Apr. 2022 to 11 Apr. 2023
Health facility-based, community-based and event-based surveillance for detecting and responding to outbreaks

CHOLERA – WHO EMERGENCIES PROGRAM (WHE)
TRENDS OF OFFICIAL ANNUAL REPORTING TO WHO BY MEMBER STATES

Weekly epidemiological record
16 SEPTEMBER 2022, 97th YEAR
No 37, 2022, 97, 453–464 http://www.who.int/wer

WER9737-453-464-eng-fre.pdf (who.int)
Open WHO online courses:
https://openwho.org/courses/cholera-introduction-en
https://openwho.org/courses/cholera-eprep

GTFCC Resources:
https://www.gtfcc.org/resources/
Combination of case based and aggregate surveillance in different countries of Africa meningitis belt

MENINGITIS SURVEILLANCE – WHE (WITH SOME LAB SUPPORT FROM IVB)
MenAfriNet II 2019-2023 — 4 pillars

1. MenAfriNet Consortium
   - Framework for partner collaboration to promote surveillance best practices in the meningitis belt

2. Case Based Surveillance
   - Improved data efficiency/timeliness, >80% specimen collection, transport, confirmation testing

3. Strategic Priority Countries
   - Ensure a minimum package of surveillance & lab confirmation in priority countries at high risk for epidemics
   - MenAfriNet Toolkit of standardized surveillance and laboratory materials to guide targeted assistance

4. Research & Evaluation
   - Monitor epidemiologic trends and emerging non-A strains
   - Evaluate the effectiveness of existing bacterial meningitis vaccine programs
   - Measure the impact of future multivalent meningococcal conjugate vaccines on disease and carriage
Meningitis Enhanced surveillance and weekly Bulletin


Chetna Mishra, Undergraduate Student, School of Public Health, University of Cape Town, South Africa, and MenAfriVac, World Health Organization

Summary

An assessment of the introduction of a meningococcal conjugate vaccine in nine countries in the African meningitis belt, an enhanced meningitis surveillance network was established. The analysis included surveillance data on reported and notified cases of meningitis under study.

Method

The World Health Organization (WHO) established an enhanced meningitis surveillance system in the meningitis belt (Burkina Faso, Chad, Central African Republic, Democratic Republic of Congo, Mali, Niger, Nigeria, Senegal, and Uganda) in 2003. The incidence of meningitis and the incidence of meningococcal meningitis (Meningococcal meningitis) are calculated based on reported cases. The data are used to trigger an alert and epidemic threshold. The threshold level of meningococcal meningitis is 100 cases per 100,000 population per month.

Results

The incidence of meningitis was reduced by 64% (95% CI: 53–75%) in the vaccination compared with the non-vaccinated area. The incidence of meningococcal meningitis was reduced by 83% (95% CI: 66–93%). The incidence of meningococcal meningitis was reduced by 83% (95% CI: 66–93%).

In addition, the vaccination also reduced the incidence of meningococcal meningitis.

Conclusion

The vaccination reduced the incidence of meningitis and meningococcal meningitis.

Meningococcal Meningitis Surveillance in the African Meningitis Belt, 2004–2013

Chetna Mishra, Undergraduate Student, School of Public Health, University of Cape Town, South Africa, and MenAfriVac, World Health Organization

Background

The enhanced meningitis surveillance network was established across the meningitis belt between 2003 and 2005. The network includes 24 countries in the meningitis belt.

Methods

The data were analyzed using the IDR (Incidence Data Reporting) system. The data were analyzed using the IDR (Incidence Data Reporting) system. The data were analyzed using the IDR (Incidence Data Reporting) system. The data were analyzed using the IDR (Incidence Data Reporting) system.

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Enhanced meningitis surveillance: data for action

- 24 reporting countries
- Weekly aggregated district level data (IDSR-based)
- Incidence-based alert and epidemic thresholds
- Laboratory results
- Compiled and published in AFRO Bulletin (IST-West), since 2003

https://www.who.int/emergencies/diseases/meningitis/epidemiological/en/
Case based entire population surveillance – Eliminate Yellow Fever Epidemics (EYE)

YELLOW FEVER – WHE WITH LAB SUPPORT FROM IVB
Yellow Fever Surveillance standards

Case-based surveillance is the surveillance standard for Yellow fever disease in humans.

As yellow fever is a vector borne disease, a multi-faceted “One Health” approach is promoted. Surveillance of mosquito vector and non-human primates can provide valuable insight on yellow fever virus circulation.

Tools:
- VPD Surveillance Standards for Yellow Fever (link here)
- EYE Booklet on Managing Yellow Fever Epidemics & Outbreak Toolbox
Surveillance data outputs - examples

Yellow Fever Outbreak Timelines

YF confirmed cases (1st Jan 2021 – 13th Nov 2022), incl. late 2020 Senegal & Guinea outbreaks
Summary

1. IA 2030 envisions WHO supporting a global system of comprehensive VPD surveillance (VPDS) across Member States

2. Comprehensive VPDS encompasses different surveillance mechanisms for different end objectives of surveillance, but lays down certain minimum standards

3. Historically, VPDS for different syndromes has evolved across different departments in country systems as well as within WHO

4. There is now much stronger collaboration and information sharing (daily for outbreak flags) between WHO departments and similar guidance to countries

5. We work towards a coordinated comprehensive VPDS, to build this complex global “mosaic” of VPD surveillance

6. Ideally, disease surveillance systems in countries and supported by WHO and other partner agencies would seamlessly share and access information.
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