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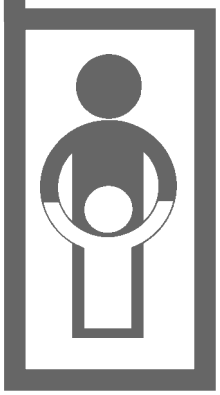
Making surveillance work

Module 1: Rapid assessment of surveillance for vaccine-preventable diseases



DEPARTMENT OF VACCINES AND BIOLOGICALS

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Module 1: Rapid assessment of surveillance for vaccine-preventable diseases (WHO/V&B/00.08)

Module 2: Planning and budgeting (WHO/V&B/00.09) in progress

Module 3: Logistics management (WHO/V&B/00.10)

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Abbreviations

AFP	acute flaccid paralysis
CDS	Communicable Diseases Cluster (WHO)
DTP	diphtheria–tetanus–pertussis (vaccine)
DTP3	third dose of diphtheria–tetanus–pertussis vaccine
IgG	immunoglobulin G
IgM	immunoglobulin M
MOH	Ministry of Health
NGOs	nongovernmental organizations
NT	neonatal tetanus
OPV3	third dose of oral polio vaccine
TT2+	second and subsequent doses of tetanus toxoid
VPD	vaccine-preventable disease
YF	yellow fever

Part 1. Background

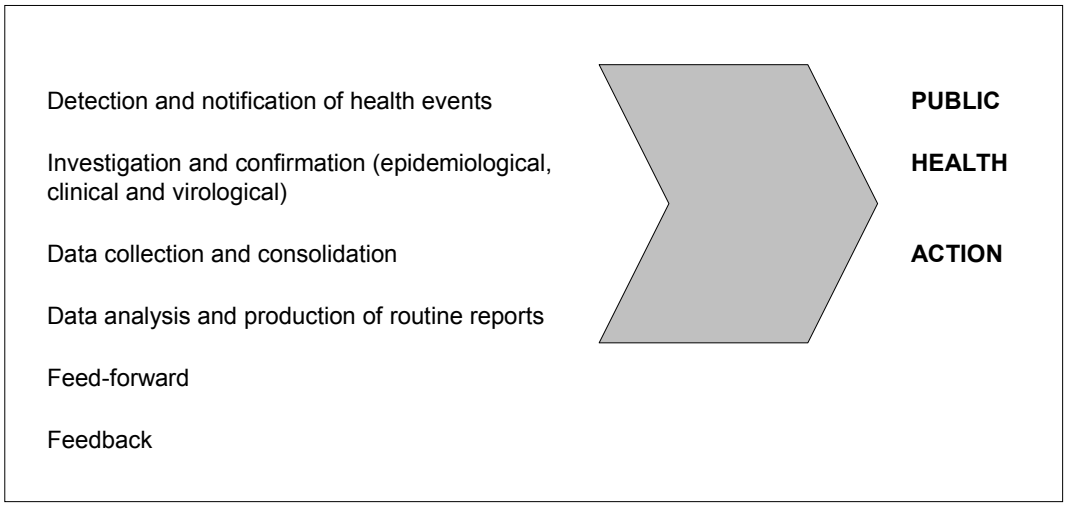
Disease surveillance and the monitoring of immunization coverage are essential components of the control of communicable diseases in general and the immunization system in particular.

Surveillance has been defined as:

> "the ongoing systematic collection, analysis and interpretation of data and the dissemination of information to those who need to know in order that action be taken. The objective of surveillance is to provide timely information to guide the planning, implementation and evaluation of public health interventions and systems."

In other words, surveillance is **information for public health action**.

There are six universal functions of surveillance:



A number of attributes of a surveillance system impact on its capacity to monitor health events efficiently. They include sensitivity, specificity, representativeness, timeliness, simplicity, flexibility, acceptability and, resulting from the previous attributes, usefulness.

1.1 Surveillance of vaccine-preventable diseases

From the very early stages, surveillance for vaccine-preventable disease (VPDs) was promoted as an important element of immunization systems. *Effective surveillance identifies high-risk populations and areas where additional interventions may be required in order to achieve disease control objectives.* Equally, effective surveillance reveals trends over time which help to demonstrate the impact of immunization services.

In many countries the development of surveillance for VPDs has been less successful than that of vaccine delivery. Weak surveillance may result in delayed disease control interventions, complacency and inappropriate immunization strategies. One reason for weak surveillance is insufficient monitoring of surveillance performance through standard performance indicators. These indicators help to identify where surveillance is weak so that efforts to strengthen surveillance can be targeted. The provision of objective information on surveillance performance to staff at peripheral levels helps them to monitor themselves and stimulates improvements.

1.2 Monitoring immunization coverage

By 1998 it was estimated that nearly 76% of the world's children were receiving at least three doses of diphtheria–tetanus–pertussis (DTP) vaccine and polio vaccine in their first year of life. It was also estimated that 71% of all children had received at least one dose of measles-containing vaccine before their second birthday. These figures are based on national coverage data as reported by WHO Member States to the world body's headquarters through its regional offices. The accuracy and relevance of these estimates are influenced not only by the accuracy of the reported data but also by missing data.

Of course, these global values hide large variations between countries. Thus in 1998 the range of reported values for DTP3 was 18% to 100%. Likewise, national aggregated estimates can mask a great deal of disparity within countries. Effective monitoring of immunization coverage identifies the areas where there are gaps in system implementation and leads to actions focusing on these areas in order to increase coverage.

It should be noted that global immunization coverage increased steadily until the early 1990s but that it has been somewhat stagnant over the last few years. In view of stagnating coverage levels and more complex disease control measures in the context of the control or elimination of VPDs, it is even more crucial to assess and strengthen the methods of monitoring immunization coverage and VPD surveillance.

1.3 Purpose of the protocol

This protocol is intended to provide a *framework* for the assessment of surveillance of VPDs and the monitoring of immunization coverage within countries. It is intended to be a practical reference document focusing particularly on surveillance for VPDs. It can be used at various levels in the health system and by all countries. The protocol may need some adaptation to meet the specific requirements of each situation and should be adjusted in accordance with the level of development of the immunization and surveillance systems.

This protocol can also be used to assess specific immunization monitoring issues, such as immunization safety monitoring. The assessment process can also provide an opportunity to check on other disease control initiatives or immunization system issues in countries, such as the cold chain and vitamin A distribution. Such opportunities should be seized if feasible. Persons involved in assessment should therefore begin by discussing the best way to use the protocol.

Part 2.
The assessment

2.1 Purpose of the assessment

The purpose of assessing surveillance systems for VPDs, and/or immunization coverage monitoring, is to identify ways of *improving* the respective systems. It should be possible to document what is working and why, and conversely what is not working and why not.

The main approach of the assessment involves an audit of practices and records of the surveillance system. The main intention is to present appropriate and realistic recommendations for improving the system. The major challenge is to ensure that the assessment is useful to the country concerned and that the recommendations are implemented.

In summary, a well-focused assessment can result in:

- documentation of the surveillance system and/or immunization coverage monitoring;
- identification of the weaknesses and strengths of the systems;
- recommendations for the improvement of the performance of the surveillance system;
- suggestions on specific activities that the country concerned should introduce for improved surveillance of VPDs.

These recommendations should help to define staff training requirements and should include a justification for the allocation of resources to surveillance.

It is important to clearly distinguish between assessing the surveillance/monitoring system and assessing the immunization system or disease control initiative. Although part of the assessment may involve a limited search for cases of a specific disease, this is not the main purpose if one is to assess the system. More typically, the assessment concludes whether the surveillance system meets the specific disease control objectives for each disease under surveillance.

2.2 Specific objectives of the assessment

By the end of an assessment that aims at identifying weaknesses and strengths of the system it should be possible to answer a number of questions, some of them overlapping. The following list of questions is intended to aid the development of specific objectives and is in no way exhaustive. The assessment team should clearly develop the objectives in the country and programme contexts, together with the Ministry of Health (MOH).

Disease surveillance system

- Are the objectives for surveillance of each disease clearly defined?
- Is the system meeting these objectives efficiently?
- Are surveillance policies, strategies and procedures clearly defined and implemented in a standardized manner?
- Are the human and financial resources for surveillance sufficient in terms of capital and recurrent costs?
- Are the logistical elements of surveillance in place and well managed?
- Is there adequate coordination between all sectors of the surveillance system, including the private sector?
- Are the data generated by the system useful and are they being used, i.e. do the data influence policy, strategies and activities under way?
- Is the system sufficiently nimble and timely to allow for prompt investigation and response? Is it flexible enough to meet evolving needs?
- Is the system sustainable? Is there appropriate integration of various surveillance activities so that the use of resources can be rationalized?
- How can the system be strengthened to achieve its maximum potential?
- Are the data generated from the system directly linked to specific public health actions?

Monitoring immunization coverage

- Are there written guidelines as to how immunization coverage estimates should be recorded and reported at each level?
- Are the methods for monitoring immunization coverage at national and various administrative levels well documented?
- How are doses administered (i.e. the numerator) recorded and reported at each level?
- What is the source of data for estimating the target population at each level?
- What factors influence the accuracy of reported coverage estimates? Is there a tendency to overestimate or underestimate immunization coverage?
- How can methods and practices for monitoring coverage be improved?

- Are coverage data being used effectively to guide improvements in the immunization system (e.g. are data being analysed by subnational unit to show disparities in system performance and where more focused efforts and resources are needed)?

2.3 Method of assessment

An assessment can normally be completed in 8–14 days. At least 50% of this time should be devoted to fieldwork, the remainder being used for the planning of activities, reviewing data, preparing a report and presenting the findings. Ideally, the identification of sites to be visited and, particularly, the collation of background data, should be completed during the planning stage before the assessment begins.

The process of assessment of surveillance involves the following key steps.

Step 1 – Agreement on terms of reference, composition and role of assessment team.
Step 2 – Collection, presentation and clarification of background data.
Step 3 – Identification of sites to be visited.
Step 4 – Conduct of assessment at each site.
Step 5 – Preparation of assessment summary and recommendations.
Step 6 – Presentation of findings and recommendations.
Step 7 – Follow-up and implementation of recommendations.

The activities involved in each step are detailed below.

Step 1. Agreement on terms of reference, composition and role of assessment team

Terms of reference

It is preferable that the assessment be initiated and planned by the country concerned. The terms of reference should clearly state the objectives, which dictate the scale and outcome of the assessment. External reviewers, such as representatives of WHO, together with the persons responsible in the MOH, should agree on the terms of reference well in advance of the assessment.

The MOH should endorse the timing of the review and avoid dates that would preclude full involvement of key national staff. All officials concerned should be informed beforehand of the objectives of the evaluation and of what is expected of them. During the assessment the team has to visit different geographical areas of the country as well as ministries, institutions and various health units, including the private sector. The team has to review records and interview key personnel. The MOH must ensure that the correct administrative processes are undertaken prior to the assessment in order to facilitate it.

The MOH should hold a briefing with the assessment team at the beginning of the assessment and a debriefing at the end of the visit. The persons responsible for implementing the recommendations should be invited to attend both the briefing and the debriefing. It may be advantageous to hold a workshop with key professionals at the end of the assessment to help with planning the implementation of the recommendations.

Composition and role of the assessment team

Since the assessment of surveillance is more frequently qualitative than quantitative and often involves subjective judgement, it is important that the team be led by an experienced epidemiologist and that it comprise persons with skills appropriate to the technical areas being assessed. For example, persons with expertise in the specific diseases covered by the review would be suitable, as would someone familiar with laboratory issues. Persons familiar with the operations of the surveillance system should be in the team, including, where appropriate, peripheral level personnel.

The team may include representatives from bilateral agencies and nongovernmental organizations (NGOs) with interests in supporting immunization and/or surveillance activities within the country, and there should be both national and international members. It may also be useful to have participants from neighbouring countries. The number of team members should reflect the geographical size and the population of the country and should be large enough to allow the formation of subgroups for field visits.

Prior to the assessment the team leader should ensure that all members are briefed on its terms of reference and objectives, their roles in the team, the country plan of action for surveillance, and WHO recommendations on the subject. Explanatory documents should be distributed several weeks before the assessment begins. A list of relevant background documents is appended.

It is important to ensure that team members are provided with or travel with the necessary tools and resources (e.g. computers, printers) for the preparation of reports, presentation of findings and facilitation of the workshop at the end of the assessment.

Key points for successful preparation

- National initiative and ownership of the assessment
- Clear objectives prepared in advance
- Mixed team – national and international
- Appropriate team skills, based on objectives
- Adequate preparation of team members:
  - familiar with country context and WHO recommendations
  - provided with necessary resources
- Team free to review all data, interview key people at all levels

Step 2. Collection, presentation and clarification of background data

The responsible officials within the country should, in advance of the assessment period, prepare background documentation relating to surveillance and the specifics of the diseases under investigation. Where relevant, there should be a coordinating group made up of officials from the MOH working closely with the WHO country office. It can be most useful for the team to meet with high-level officials at the beginning of the assessment in order to achieve common understandings and a good reception for the outcome of the review.

The initial briefing should include a summary of pertinent policies, objectives, targets, strategies, action plans and directives related to both the immunization and surveillance system for vaccine-preventable diseases.

The data provided to the team should include the following.

Country profile

- Country map, detailing all administrative levels.
- Demographic profile covering census data, urbanization and population movements, including internally displaced and refugee populations.

Health care system

- List of health facilities, indicating type and average patient load.
- Description of access to health care and identification of high-risk areas.
- Level of privatization of health care.
- Involvement of NGOs and church establishments in health care system.

Immunization system

- Description of immunization system, including immunization schedules.
- Summary of existing policies on immunization and disease control, including targets, plans of action, field guides and directives for health staff.
- Description of how immunization coverage is recorded, reported and calculated at each level.
- Coverage data for each administrative unit.
- Supplementary immunization activities.

Surveillance system

Structure

- Description of surveillance system, including the reporting network and its integration with the overall surveillance/information systems.
- Description of data collection methods, data flow and reporting procedures.
- Designated personnel for surveillance at each level.

- Overview of laboratory support and policies (related to disease surveillance).
- Data management and analysis procedures and outputs.
- Response and follow-up mechanisms.
- Feedback and feed-forward mechanisms.
- Supervisory and training activities conducted for surveillance.
- Resources available for surveillance.

Output

Routine reports from the surveillance system should be presented, including analyses by subregion. These analyses should highlight high-risk and/or low-performing areas, as well as surveillance performance. The briefing should include some information on the epidemiology of the various VPDs but should focus in particular on the performance of the monitoring/surveillance system.

Performance

This information relates to the use of the following surveillance performance indicators.

- Completeness of reporting, i.e. the number of expected reports received divided by the number of reports expected.
- Timeliness of reporting, i.e. the number of expected reports received on time, as defined by national authorities, divided by the number of reports expected.
- The proportion of reported outbreaks that were investigated.

Disease-specific surveillance performance indicators for selected VPDs are shown in Table 1.

Other related information/documents

- Results of previous assessments focusing on surveillance or data quality evaluation.
- Review of special studies, e.g. community-based surveys that include VPDs, serological studies, vaccine coverage and vaccine efficacy studies.

After studying the terms of reference and the background presentation, the members of the assessment team should seek specific clarifications. The team is expected to identify apparent strengths and weaknesses, hear and understand concerns of national staff, and identify those parts of the system which merit practical investigation or verification. The team should not be negatively critical of existing practices and progress in the country but should rather provide constructive feedback and comments.

Table 1: Examples of data required at national level, including surveillance performance indicators

Measles	Neonatal tetanus	Poliomyelitis/acute flaccid paralysis (AFP) surveillance	Yellow fever
• Incidence rate by month, year and geographical area. • % measles vaccine coverage by year and geographical area. • Age-specific incidence rate. • Proportion of cases by age group and immunization status. • Completeness/ timeliness of monthly reporting. • Proportion of known outbreaks confirmed by the laboratory. *NB: if the surveillance of measles is in the elimination phase, case-based data are required and performance indicators are more specific than the above (see 'WHO recommended surveillance indicators').*	• % coverage with two or more doses of tetanus toxoid (TT2+) among pregnant women nationally and by district. • % protection at birth if this method is implemented , nationally and by district. • Incidence rate per 1000 live births nationally and by district. • Clean delivery rate nationally and by district. • % antenatal care by district • Completeness/timeliness of monthly reporting national-ly and by district. • % cases investigated nationally and by district. • Implementation of active surveillance and register reviews in hospitals to find unreported NT cases • DTP1 and DTP3 coverage	• Number of polio cases. • Non-polio AFP rate per 100 000 children under 15 years of age, nationally and by province. • % of AFP cases investigated within 48 hours. • % of AFP cases with two adequate stool specimens taken. • % of results reported from the national laboratory within 28 days of receipt of specimen. • Completeness/timeliness of monthly reporting.	• Number of cases reported (man-datory under International Health Regulations). • Number and % of districts affected. • Number of deaths and case-fatality ratio. • Confirmed cases by age group, immunization status, geo-graphical area, travel history two weeks prior to onset, month, year. • Number and % of suspected cases with sample submitted for laboratory testing (target >50%). • If IgM test is done: % of laboratory results sent within 3 days of receipt of acute blood specimen (target = 80%). • If virus isolation is done: results sent within 21 days of receipt of acute blood specimen (target = 80%). • If IgG test is done: results sent within 3 days of receipt of convalescent blood specimen (target =80%).

NB: The above table shows only examples of data required; for a full description of data elements and surveillance performance indicators, refer to *WHO recommended surveillance standards*.

Step 3. Identification of sites to be visited

The number of sites to be visited is constrained by the time available, the number of team members, distances, ease of travel, the ability to obtain security clearance in difficult areas, and the availability of vehicles, drivers and accommodation. It may be opportune to document limitations to field visits, since similar factors may also be constraints on the surveillance system. The depth of investigation is influenced by the national stage of achievement in the development of surveillance.

Many sites likely to benefit from investigation are located in the capital city or other major urban areas. They include the central surveillance unit, statistical departments, major hospitals, including infectious diseases and neurological wards and paediatric rehabilitation centres (the latter two specifically for AFP surveillance), diagnostic and research laboratories, and academic centres for epidemiology, surveys and research. It may also be beneficial to visit specific sites or regions where relevant surveillance or research projects are being conducted.

Traditionally, the sites to be visited include health centres and community health posts or health centres. Other sites may include public hospitals, private practices and hospitals, traditional healers, rehabilitation centres and schools, and day care centres. It may also be worth holding discussions with community leaders and pharmacists. It is often useful to meet representatives of professional organizations as well as international organizations and NGOs supporting the immunization programme. Each team should visit all levels (central, intermediate and local), and each visit should include an official from a more central level. The team should be split into subgroups to make the various site visits. Depending on the sites to be visited, some subgroups may need specific expertise (e.g. for laboratory visits).

Since a complete assessment of surveillance would require visiting a large number of sites, a choice of sites to be visited must be made. The two approaches to site selection are described below.

Representative selection

This approach is based on the assumption that the selection of sites should be representative of the entire system if the recommendations are to be relevant to the whole system. In a national surveillance review, therefore, the system would be examined at all administrative levels and in a variety of provinces/districts/subdistricts. The selection of sites would be fairly distributed between geographical areas, population densities and types of data-collecting unit.

Most countries can benefit from an assessment that is representative of the whole surveillance system, with selection of a broad range of sites to be visited. This approach is the most frequently recommended for the assessment of surveillance systems.

High-risk selection

This alternative method may be preferred by some countries that wish to examine "the worst case scenario" within their country. The high-risk approach identifies those areas where disease is most likely to occur and where disease surveillance is likely to be weakest. While these sites are not representative of the whole system, their assessment is more likely to pinpoint inequities and weaknesses. This approach would be particularly relevant as part of a disease-free certification stage and for countries close to disease elimination. In the high-risk approach, sites can be selected in cooperation with national staff, who are aware of areas of low coverage, high disease incidence, high proportions of minority groups, and poor surveillance.

The following table shows how high-risk areas might be selected for some selected vaccine-preventable diseases (Table 2).

Table 2: Characteristics of high-risk areas for selected vaccine-preventable diseases

Measles	Neonatal tetanus	Polio	Yellow fever
• Less than 90% coverage **OR** less than the national target. • Areas where cases cluster. • Densely populated areas. • Sites where there are refugees or displaced persons.	• Areas with a high NT incidence rate (>1/1000 live births). • Areas with unknown or low coverage with TT2 and/or DTP3. • Areas with the following risk factors: • Rural • Persons live close to livestock • Poor access to health care, particularly clean delivery • Risky practices related to cord care	• Areas with any confirmed or compatible polio cases in the last three years. • Areas of low coverage with 0PV3. • Areas at risk of sustaining wild polio virus transmission (i.e. dense population, poor hygiene and population movements from areas of endemicity). • Areas that do not report cases.	• Areas with a history of YF cases, especially those reporting YF in the past 15 years. • Areas where YF vaccine coverage is low (desired coverage is >80%). • Areas with vegetation characterized as moist savannah (YF emergence zones).

Step 4. Conduct of assessment at each site

In the field the assessment is made by interviewing health care professionals about their knowledge of surveillance objectives, standards and operating procedures. The data being collected, including surveillance performance indicators, should be reviewed, as should the performance of standard operating procedures related to data-recording, consolidation, forwarding to more central levels, routine analyses and feedback. Queries should be made regarding supportive functions such as the date of last training, supervisory visit and feedback received, and the resources available for surveillance and their management. Staff at each level should be asked how they are using data to guide disease control strategies. They should also be asked to provide concrete examples of situations where they used data to influence decisions about the most appropriate disease control strategy.

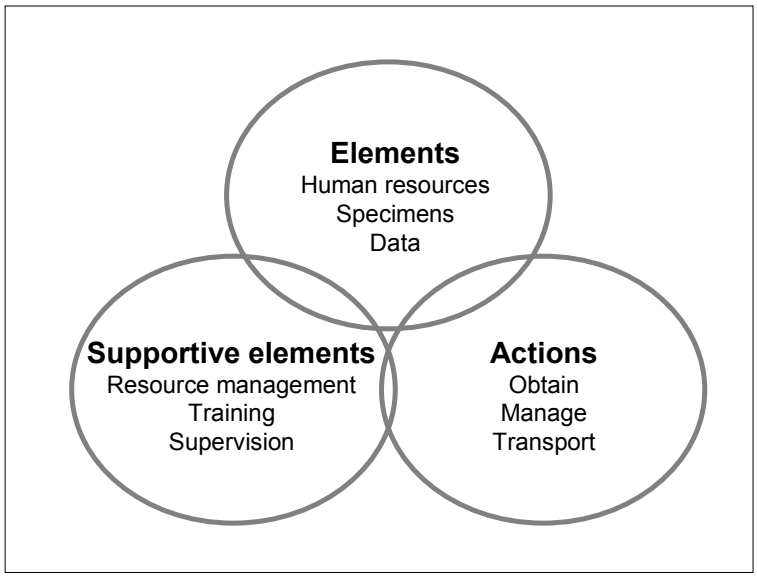
Assessments should, as far as possible, be quantitative. While qualitative assessments, impressions and anecdotes may give important insights and should be reported where appropriate, they should not replace quantitative information. The use of objective indicators limits observer bias and allows for comparisons within countries, between countries and over time. Even if the main terms of reference are focused on specific diseases, assessments should also cover broader aspects of the system, including integration or linkages with other diseases/systems.

It may be appropriate to develop a checklist so that similar objective information can be collected during all field visits. A sample checklist is provided in Appendix 1. This checklist should be adapted to local circumstances but should generally cover the following points.

- Objectives of the system.
- Population under surveillance (topography, demography, mobility, provision of health care, accessibility).
- Events under surveillance.
- How and where events are detected (including active surveillance activities).
- Notification procedures.
- Data collection and consolidation procedures.
- Specimen collection and dispatch procedures.
- A diagram of how data and specimens should flow through the system.
- Data analyses at each level.
- Decision-making and action taken on the basis of data.
- Feedback practices.
- Mechanisms for feeding forward to more central levels.
- Resources available to the system (human, financial, infrastructural).
- Overall logistics and efficiency of the system.

The logistics for surveillance involve personnel, specimens and data and how to obtain, manage and transport them. Good logistics are supported by training, supervision and good resource management (Fig. 1). For further information on logistics related to surveillance and monitoring, see *Making surveillance work. Module 3. Logistics management* (WHO/V&B/01.10).

Fig. 1. The logistical elements, actions and supportive functions for surveillance



The assessment should determine whether the surveillance system is meeting the needs of specific disease control objectives. For instance, the type of surveillance needed for measles control is different and less intense than that needed for measles elimination. For more detail on the different types of surveillance see *WHO-recommended standards for surveillance of selected vaccine-preventable diseases* (WHO/V&B/03.01).

Following an initial meeting to introduce the objectives of assessment and ask relevant questions, the assessment team should discuss with local staff at each level their impressions on how well the system functions, their responsibilities, the information being generated (e.g. disease incidence, trends, completeness and quality of data reported) and its usefulness. The assessment team should obtain copies of forms and ascertain how they are to be used.

The team should review with each level the problems and weaknesses identified. In general the field activities should include assessment of the following matters.

Indicators of surveillance performance and vaccine coverage

Performance indicators should always include completeness and timeliness of reporting, and may also include surveillance performance related to specific diseases. If surveillance performance indicators are being used the team should assess their accuracy, whether they are being correctly calculated, and whether they are being used to correct defects in the system. The capability to manage the data should be examined (this may include computer capabilities). Examples of surveillance indicators for selected diseases as recommended by WHO are presented in Table 1.

Routine surveillance policies/practices

The team should assess whether national surveillance policies, if they exist, are being correctly implemented at all levels.

The WHO-recommended principles of surveillance for VPDs are as follows.

- Establishment of clear objectives for surveillance directly linked to disease control objectives.
- Use of standard case definitions for reporting.
- Monthly or weekly reporting of cases, and in selected circumstances, immediate notification.
- Zero reporting where no cases have been detected.
- Efficient and standardized data collection/consolidation procedures.
- Data analysis and creation of routine reports (including graphical display of data).
- Clinical, epidemiological and laboratory investigation of cases/outbreaks where appropriate (depending on the disease control initiative).
- Standardized classification of cases (which may include laboratory confirmation).
- Regular feedback to reporting staff at all levels.
- Involvement of private sector.
- Good collaboration/regular communication among surveillance, laboratory, immunization and clinical staff.
- Interpretation and use of data for public health decisions.

Additional activities for intensified surveillance may be needed for some VPDs, particularly for diseases in the elimination/eradication phase. Reference should be made to specific documents, including some of the documents listed at the end of this module. Some of these activities are:

- case-based surveillance;
- immediate reporting;
- active surveillance.

The country plan or policy for the surveillance system should include minimum standards at each administrative level, as indicated below.

Central (national)

The existence of policies, case definitions, designated responsible officials with appropriate status, clearly established reporting channels, monitoring of performance indicators (e.g. completeness and timeliness of reporting), availability of trained staff, good data management including routine data analysis, reports and feedback, and evidence that surveillance data are used dynamically to guide policy/strategy development.

Intermediate (provinces, regions, districts)

Presence of guidelines, availability of trained staff, monitoring of performance indicators from more peripheral units, good data management (either on paper or by computer), analysis, useful display of data (line lists, tables, graphs, maps), and evidence that data are used for monitoring performance and taking action.

Peripheral (service delivery)

Awareness of surveillance and reporting requirements, national case definitions, designation of responsible persons for reporting, established mechanisms for efficient recording and reporting, availability of trained staff, availability of reporting forms, copies of completed forms in an easily accessible filing system.

Analysis and use of data

Some important checks to perform and questions to ask relate to:

- the analysis of cases by age groups and immunization status (if age and immunization status are being collected on cases);
- shifts in age-specific incidence rates over time (if age data are being collected);
- temporal patterns of disease, such as periodicity and/or seasonality;
- geographical patterns of disease (clustering in specific population groups or areas);
- the coherence of surveillance data with coverage data (are incidence rates high where coverage rates are low, and vice versa?);
- the proportion of cases immunized suggesting a problem in the cold chain (i.e. is the vaccination status of cases similar to that of the general population?);
- denominator data being used to calculate immunization coverage and disease incidence rates at each level (are the same sources of data used at each level?);
- the way in which immunization coverage is calculated at each level;
- whether the private sector is involved in reporting vaccine doses administered and cases detected;
- whether the completeness and timeliness of reporting are monitored;
- whether data are being analysed and used at various levels;
- whether feedback information is being provided to each level.

Case investigation and outbreak response

Case/outbreak investigation (including investigation into the origin of cases and searching for additional cases) and outbreak response are fundamental components of disease reduction strategies. The team should assess whether they are taking place and whether they are being carried out correctly, thoroughly and consistently. The team should review records of recent outbreak investigations and match them to national policies and standard operating procedures.

Clinical or case discharge records

In reviewing these records the team should look for records of recent cases and identify whether such cases have been reported, adequately investigated (if this is the policy) and followed up according to surveillance guidelines. It may prove useful in some settings to review both inpatient and outpatient charts.

Special studies

The team should review any special studies that have recently been conducted in the country, including community-based morbidity/mortality surveys, serosurveys and coverage surveys. The quality and the results identified should be assessed to identify their consistency with other reports for the same period.

Active case search

Whether active case searches are conducted during the review depends on its purpose. If they are to be done the team should concentrate on high-risk areas and focus first on regular and reliable record reviews and discussion with staff in hospitals, health centres and rehabilitation units rather than on the community. It should be borne in mind that active searches may be time-consuming, particularly if the disease in question is rare. They should not, therefore, be undertaken during the review unless clearly indicated as an objective.

Integrated surveillance and overlap between systems

The level of coordination/integration should be assessed in terms of the core elements and supportive functions (Fig. 1). Any possible synergies should be identified and highlighted during the assessment. For example, measles and NT surveillance may benefit if linked to ongoing AFP surveillance activities in health facilities or to any ongoing community-based surveillance activities (e.g. on dracunculiasis).

Laboratories

The support of laboratory facilities is vital in a surveillance system and they should therefore be visited in order to evaluate:

- accreditation status (if applicable);
- latest proficiency test results;
- laboratory-based performance indicators, including the nature of tests being performed;
- field-based performance indicators affecting laboratory performance (e.g. proper specimen handling);
- quality of samples received;
- types of tests performed, validation procedures and level of quality assurance;
- workload, staffing levels and turnaround time;
- adequacy of space, infrastructure, equipment and supplies;
- communication links with other colleagues in the same laboratory network;

- communications between laboratory, surveillance, and immunization staff;
- collection of standard core data as defined nationally;
- laboratory and staff safety procedures;
- availability of standard operating procedures.

Example of problems frequently identified in surveillance systems and in the monitoring of immunization coverage:

- use of wrong denominator data;
- inconsistency in use of numerator/denominator;
- inappropriate case definitions or lack of case definitions;
- poor advocacy among clinicians resulting in poor understanding of case definitions and policies/mechanisms for reporting;
- lack of clear policies on surveillance;
- staff are not adequately trained;
- zero reporting not implemented;
- delay in reporting;
- poor data analysis, interpretation and use;
- poor data management;
- conflicting priorities (e.g. too many forms);
- ignoring of other information sources ignored;
- insufficient coordination, which subsequently impededing effectiveness, efficiency and sustainability;
- poor logistics to support surveillance activities (e.g. insufficient transport mechanisms, specimen kits/carriers, communications);
- absence of feedback;
- lack of evaluation.

Some major problems often identified in connection with polio/AFP surveillance are insufficient private sector involvement, lack of reporting of AFP cases that have already received a final diagnosis other than polio (e.g. Guillain-Barré syndrome).

Step 5. Preparation of assessment summary and recommendations

On reconvening at the end of the data collection phase the team should discuss and review its findings. This may lead to an awareness of a need to collect additional data or seek further explanations from national staff.

The team leader should ensure that all team members' opinions are solicited and considered. It is important to identify both strengths and weaknesses in the system. The cause of any weakness should be identified. The team leader should guide the team in defining the major issues to be highlighted.

The team should prioritize the recommendations and consider discarding minor recommendations, since it is usually more effective to provide a short list of key recommendations than a long, exhaustive list. The team should also consider the cost and feasibility of implementing the recommendations. So as to ensure the feasibility and maximal usefulness of the recommendations it is important that they be developed in full consultation with national counterparts. The recommendations should specify who should do what by when. The report should include a follow-up on previous assessments, if any, and consider the level of implementation of previous recommendations.

Step 6. Presentation of findings and recommendations

At the end of the assessment, the team presents its findings and recommendations to the appropriate authorities, emphasizing what is most important or urgent and suggesting persons/parties who should be responsible for follow-up action, as well as a timetable of corresponding activities. At this stage it is critical for the team leader to facilitate a process of consensus on the recommendations together with the national authorities.

In presenting its findings the team should review the terms of reference, explain the methodology used, summarize observations (supplemented by supportive objective information), provide recommendations, and acknowledge the contributions of all persons who have helped to make the review a success. Any visual aids used during the presentation should be shared with national authorities for use during future meetings/training sessions.

If the assessment was conducted by an international team that was responsible for writing the report, a draft report and executive summary of key findings and recommendations should be provided to national officials and participating agencies before the team leaves the country.

Conducting a participatory workshop immediately following the review is usually very effective in promoting national ownership of the recommendations and in stimulating actions to strengthen the system, provided that the appropriate national and international staff attend and participate. In general, participants should include ministry staff, among them the persons responsible for the immunization system, the surveillance system and laboratory support, as well as clinicians, research staff from appropriate institutions, academic staff from medical colleges and partners such as other UN agencies. The workshop can be aimed at training key people who in turn can provide training at more peripheral levels.

It can be most constructive for the assessment team to summarize the review process. There should be frank discussion on the appropriateness of team composition, and task distribution as well as reflections on general limitations encountered during the process. The recommendations may help improve future assessments.

Step 7. Follow-up and implementation of recommendations

Proper follow-up of the implementation of recommendations is extremely important. In the first place it is necessary to make sure that the final report is received by all interested parties. The MOH may need support to implement certain recommendations, and these should be discussed during the assessment and, if necessary, facilitated by the WHO country office. A time frame for the next assessment may be provisionally agreed in order to support continuous development of the system.

References and recommended reading

1) *Protocol for the assessment of national communicable disease surveillance and response systems. Guidelines for assessment teams.* WHO/CDS/CSR/ISR/2001/2/EN.

2) *WHO-recommended standard for surveillance of selected vaccine-preventable diseases*. WHO/V&B/03.01.

3) *Guidelines for evaluating surveillance systems.* Centers for Disease Control and Prevention. MMWR 1988; 37(Suppl no S-5, pp1-18).

4) *WHO vaccine- preventable diseases: monitoring system 2004 global summary.*WHO/IVB/2004.

5) *WHO materials and methods of surveillance, monitoring and assessment*. WHO/V&B/CD/02.01

6) *V&B catalogue 2003.* Vaccines and Biologicals, World Health Organization WHO/V&B/02.06

Appendix: Sample checklist for surveillance assessment

Part 1

Surveillance assessment checklist		Date: _____/_____/_____	
Level (e.g. central, provincial, district):		**Catchment population size:**	
Component	**Yes**	**No**	**Comments**
Disease control objectives			
Clear priorities and disease control objectives known at this level?			
Clear strategies identified for achieving objectives?			
Types of data analyses (outputs) defined at this level?			
Standardization			
List of reportable diseases available?			
Case definitions available (at this level)?			
Staff know designated feed-forward sites? (how many, where)			
Using standard identification codes (case-based data only)			
Using standard forms for monthly feed-forward			
Using standard forms for case investigations			
Implementing standard feed-forward procedures			
Implementing standard investigation procedures			
Conducting 60-day follow-up examinations of AFP cases			
Conducting standard response procedures			
Hierarchical flow of data (in a standard way)			
Consistency of data (compared to more central levels)			
Inpatient and outpatient registers list "disease"			
Most recent census data available			
Sending zero reports			
Receiving zero reports			
Human resource capacity			
Clearly designated who reports and how			
Persons designated, trained and mobilized for investigations			
Persons designated, trained and mobilized for specimen collection			
Persons designated, trained and mobilized for data analysis			
Evidence of good teamwork between surveillance partners			
Date last training received on surveillance			

Part 2

Surveillance assessment checklist			Date: _____/_____/_____
Component	**Yes**	**No**	**Comments**
Evidence of a good reverse cold chain			
Specimen kits available (if appropriate level)			
Specimen carriers available (if appropriate level)			
Frozen ice packs or ice available			
Means of dispatching specimens (e.g. transport) available			
Health professionals informed of feed-forward procedures			
Active surveillance conducted (if appropriate level)			
Evidence of unreported cases when visiting health facilities			
Analysing/using data at this level			
Producing standard outputs (graphs, maps, tables)			
Line listing for any priority diseases			
Maps drawn for any priority diseases			
Local analysis of data performed			
High-risk areas for neonatal tetanus identified			
High-risk areas for other priority diseases identified			
Example of using data for action at this level			
Completeness of feed-forward monitored? Specify			
Timeliness of feed-forward monitored? Specify			
Other performance indicators monitored? Specify			
Comparing data with those of other units/levels for consistency			
Are data at this level consistent with data from central level?			
Follow-up/supervision			
Regular supervisory visits conducted from this level			
Supervisory checklist used from this level			
Late or incomplete reports followed up from this level			
Date last supervisory visit received			
Feedback and communication of data			
Feedback information received from more central level			
Feedback information sent to more peripheral level			
Infrastructure			
Means of communicating with more peripheral level			
Means of communicating with more central level			
Adequate computer equipment/supplies at this level			
Adequate transport for surveillance at this level			