Considerations for countries on targeting Gavi investments to achieve immunisation outcomes

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<tr>
<th>Focus area</th>
<th>Data</th>
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</table>

Why invest in data?
Data is cross-cutting and essential for planning, programme management and understanding and documenting of results. Improving routine immunisation, vaccine-preventable disease (VPD), and vaccine safety data availability, quality and use are essential for:

- Planning and monitoring immunisation programmes;
- Understanding which interventions and efforts are working to increase coverage and equity;
- Appropriately and efficiently targeting interventions based on data of sufficient quality at all levels (health facility, district, provincial, and central);
- Identifying and responding to outbreaks, low coverage and performance areas, vaccine safety problems, and vaccine stock-outs or wastage in a timely manner.

What are the key considerations when planning investments in data?
Countries must ensure that:

- They have recently conducted an in-depth assessment of their data systems (considering data collection, reporting and use) and identified key bottlenecks and areas for improvement;
- They have developed a strategic data improvement plan, based on recent assessments and evidence that helps identify key priority areas to be addressed, clarifying responsibilities, needed and available resources, timelines and key milestones;
- There is a clear sense for how the data generated from the investments will be used, and, conversely, that the data systems will answer the key questions that need to be addressed to guide the programme’s actions;
- Appropriate consultations have taken place. Data systems extend beyond the immunisation programme and as such, consultations with broader teams, Ministries and other donors or partners supporting work in this area are likely warranted;
- Sufficient human and financial resources are available to implement the plan;
- The programme can monitor and evaluate the progress and results of these investments in data, and accordingly make adjustments and course corrections to the immunisation programme and, if necessary, the data investments themselves.
- Non-traditional data have been seen as instrumental in driving coverage and equity changes in some countries (e.g. Pakistan). As such, some of the proposed investments may be directed towards strengthening systems for collecting operational data (e.g. health facility related data, etc.)

What are the key investment elements for this strategic focus area?
Depending on the challenges that you are facing, there are a range of investment areas for consideration across assessments / improvement planning, governance, people, tools and evidence towards improving data availability, quality and use. Examples include:

Data availability:

- Implement continuous improvements of immunisation and surveillance data, information collection and management systems, based on the results of recent assessments and a sufficiently funded data improvement plan that all relevant partners agree to support collaboratively;
- Implement national representative coverage surveys (conducted at least every five years);
- Co-finance surveys and assessments that measure survey availability and readiness.
• Establish or enhance **electronic and paper data reporting systems** for health care providers at service delivery points to report immunisation and stock data, adverse events following immunisation (AEFIs) and suspected VPD cases;
• Conduct **training for health care providers** on reporting immunisation and stock data, AEFIs and suspected VPD cases.

**Data quality:**
• Identify mechanisms to **increase the accuracy of denominators** for use by immunisation programmes and disease surveillance systems, such as use of spatial demography;
• Implement **annual data desk review, both of data quality and immunisation performance, including triangulation analyses** using data from different sources such as administrative, vaccine stock, surveillance, and survey data;
• Implement **in-depth data assessments** of the routine reporting system, VPD surveillance and AEFI reporting systems (conducted at least every five years);
• Establish or enhance access to reliable international or national **laboratory capacity** that can meet diagnostic and confirmatory laboratory testing requirements for suspected VPD cases.

**Data use:**
• Enhance the skills and knowledge of health workers at all levels in the **continuous collection, analysis, use, and communication of immunisation, vaccine stocks, surveillance, and vaccine safety data**, following training needs assessment;
• Identify **priority research topics** related to improving immunisation and surveillance data as well as use of such data, and support in-country research on those topics;
• Conduct and use relevant analyses to inform investments, targeting and tailoring for routine immunisation services, SIA plans etc.;
• Establish or enhance **AEFI causality reviews by AEFI committee**.

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**What are example measurement metrics related to data investments?**

| Outcome indicators | Coverage / drop-out / equity metrics – compare across different sources  
|                    | Percent point difference between administrative data and survey data for Penta3 coverage |
| Examples of potential intermediate results indicators | Percentage discrepancy between UNPD and country-reported population denominators;  
|                                                    | Percentage districts reporting administrative coverage of DTP3 / Penta3 >100%;  
|                                                    | Percentage districts with a negative drop-out rate;  
|                                                    | Percentage health management information systems (HMIS) / logistics management information system (LMIS) / surveillance data reports received from (insert level) that are submitted to (insert level) on-time and complete;  
|                                                    | Percentage of suspected VPD cases with at least one specimen collected for laboratory testing;  
|                                                    | Percentage of districts reporting VPD surveillance data, even in absence of cases;  
|                                                    | Percentage of all suspected VPD cases that have had an investigation initiated within two days of notification;  
|                                                    | Number of AEFI cases reported per 100,000 surviving infants;  
|                                                    | Percentage of reported serious AEFI cases assessed by an adverse event review committee. |
1 Targeting investments for Gavi’s HSIS support

1.1 Brief description of the focus area

The availability, quality and use of data are essential for a well-functioning EPI programme as well as the achievement of Gavi’s 2016-2020 strategy.

Gavi wishes to ensure that its support is fully and strategically leveraged to support countries to address their specific bottlenecks related to the availability, quality and use of data; immunisation coverage and equity; and the robust monitoring and evaluation of Gavi support. Investments in data should be focused towards strengthening programme management; evidence-based decision-making; and mitigation of risks to programmatic sustainability.

As per the recent “Framework on Immunisation Data” developed as a companion to the Global Vaccine Action Plan, there are five fundamentals that are core to the theory of change of how proposed data improvements and actions will lead to improvements in immunisation/health outcomes, all of which rely on the allocation of sufficient resources for implementation:

<table>
<thead>
<tr>
<th>If actions to improve these building blocks are implemented ....</th>
<th>then data will be: and used for decision-making and improvements in programme:</th>
<th>... resulting in better programme outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Assessment &amp; improvement planning:</strong> Establish a continuous cycle of assessment and improvement of immunization and surveillance data and systems</td>
<td>Available</td>
<td>Coverage and equity, Efficiency</td>
</tr>
<tr>
<td><strong>Governance:</strong> Establish clearly defined policies, processes and responsibilities for the collection and use of data and design of information systems</td>
<td>In the right place at the right time to allow for timely actions</td>
<td>Planning</td>
</tr>
<tr>
<td><strong>People:</strong> Empower health personnel to use immunization and surveillance data for better decision-making</td>
<td>Fit-for-purpose</td>
<td>Implementation</td>
</tr>
<tr>
<td><strong>Tools:</strong> Invest in user-centred and sustainable tools and information systems</td>
<td>Complete, timely, representative and precise enough for the intended use</td>
<td>Monitoring</td>
</tr>
<tr>
<td><strong>Evidence:</strong> Document, evaluate and share knowledge on ways to improve immunization and surveillance data and their use</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Gavi is keen to support efforts across all these fundamentals in countries and to work with countries and partners to prioritise investments where most needed and relevant.

1.2 Relevant Gavi strategy level indicator/s

Strengthening M & E, including the availability, quality and use of data, are critical cross-cutting enablers of the Gavi 2016-2020 strategy and essential to all Gavi 2016-2020 strategy level indicators as well as other parts of the Alliance Accountability Framework (e.g., Partnership Engagement Framework and Country Performance Management).

Strategy indicator 2.2 measuring the “percentage of countries with survey in the last five years and <10 percentage point difference between national administrative coverage and point estimate from survey” seeks to act as a proxy measure data quality and consistency across countries, and over time can indicate improvements in data quality, during the strategy period.

A country is strongly encouraged to include tailored indicators as part of its grant performance framework (GPF) to compliment / contextualise progress achieved vis-à-vis the aforementioned strategy indicator. Guidance on GPFs and performance metrics is available here: https://www.gavi.org/our-support/grant-performance-frameworks
1.3 Challenges / bottlenecks to overcome in the focus area

Challenges are manifold and are situated in the following areas:

- Issues with measuring target populations and numbers of children immunised;
- Institutional capacities: lack of staff, limited capacity for data collection and use, insufficient training and supervision, lack of technical capacity for specialized activities such as laboratory testing;
- Tools and data systems: may be unavailable, duplicative, outdated, poorly designed, not user-centred, not maintained or updated, not interoperable;
- Processes and governance: lack of clear roles and responsibilities, standard operating procedures, mechanisms for review and analysis, limited feedback, lack of alignment of immunisation and other national reporting, lack of team / persons in charge of data quality;
- Missing holistic view of health information systems: need to harmonise on similar investments being made by partners and donors to reduce inefficiencies, increase financial efficiencies;
- Political environment: sensitivities around data (e.g., official population estimates), lack of engagement or leadership for data, challenges related to transparency and sharing of data;
- Plans: lack of plans and agreed action points to improve the quality of data;
- Implementation: lack of effective implementation of plans to ensure timely use of quality data for targeting and tailoring of interventions and developing programmatic strategies;
- Insufficient funding.

Core questions to ask:

Routine data:

- What evidence/data/analyses are currently available and routinely used by the EPI programme management / broader teams, including findings from recent surveys, surveillance and studies?
- Does the country conduct annual data quality desk reviews? If so, what do the data analysis results suggest in terms of key data issues?
- Has the country conducted a recent in-depth assessment of their routine administrative reporting system? What are the key findings from this and other relevant assessments?
- What are the short- and medium-term plans / priorities for improvements in the health information system? Is there a strategy in place?
- Based on data available, which sub-national areas (e.g., districts) need more attention and focus? Which population sub-groups require more attention and focus?
- Does the country compare routine / administrative data with other data useful for immunisation programme management, including VPD surveillance data and vaccine stock data, when assessing programme performance?

VPD surveillance:

- Does the country ask health care providers to report VPDs to health authorities and provide a clear mechanism for them to do so?
- Does the country have staff clearly designated as responsible for investigating VPD reports and analysing, assessing, and reporting VPD surveillance data?
- Do at least 80% of a country’s districts report VPD surveillance data regularly, including reporting zero cases when there are no suspected VPD cases?
- Does the country have access to reliable international or national laboratory capacity that can meet diagnostic and confirmatory laboratory testing requirements for VPDs, especially:
  - Yellow fever (in countries at risk for yellow fever)
  - Meningococcal meningitis (in countries at risk for meningococcal meningitis outbreaks)
  - Cholera (in countries at risk for cholera outbreaks)
  - Measles and rubella (in countries with ≥80% with 1st dose of measles containing vaccine)
  - Diphtheria
• If a country has reported coverage >80%, does it conduct case-based surveillance for any VPDs, particularly measles or diphtheria?

Vaccine safety:
• Does the country annually report to WHO at least 10 adverse events following immunisation cases per 100,000 surviving infants?
• Does the country distinguish between serious and non-serious AEFIs?
• Does the country have a functioning AEFI causality committee? How often does the committee meet?

1.4 Data/evidence sources to inform investments in this area

There are a variety of assessments and evidence that can help inform investments in the data space. Key are the data quality and survey requirements for Gavi support, namely:

- **Annual desk review** (tracking progress on indicators of data quality summary measures and routine analyses);
- **In-depth data assessment** of the routine administrative reporting system and ideally VPD surveillance and AEFI surveillance systems (conducted at minimum every five years);
- **Data improvement plan** that includes recommendations from previous reviews and assessments prioritised and an action plan, with specific operational steps, timelines and responsibilities clarified (developed then reviewed / updated on an annual basis);
- **Nationally representative coverage surveys** (conducted at minimum every five years).

Countries that have the above should be able to prioritise investments based on evidence. The improvement plan should be the key document to help steer investments to be made (with short-term gains and longer-term efforts / investments clearly identified and articulated).

In addition to the above, there are other documents and evidence that can be used to generate discussions on potential investments. These should ideally form part of the annual desk review, in-depth assessment or data improvement plan (or updates of these as and when new evidence becomes available). For example, noting the below is not an exhaustive list:

- Recent surveys (DHS, MICS, coverage evaluation surveys, post-campaign surveys, sub-national coverage surveys focusing on targeted populations / districts etc.);
- Relevant analyses and reports, such as equity analyses and / or coverage and equity assessments;
- WHO/UNICEF estimates of national immunisation coverage (commentary and grade of confidence) and country immunisation profiles;
- Relevant assessments or reports that consider immunisation, VPD or polio surveillance data, such as reports of latest EPI or VPD surveillance review, Data Quality Reviews and any recent health facility assessments;
- Relevant plans and strategies such as National Health Development plan section on HMIS, National HIS strategic plan, EPI annual plan, eHealth strategy;
- Population data.

1.5 Investment options for consideration

Data investments should support countries to assess and improve data availability, quality and use. Examples of such investments include but are not limited to:

<table>
<thead>
<tr>
<th>Data investments to consider</th>
<th>Data investments to consider supporting if proposed</th>
<th>Data investments to discourage</th>
</tr>
</thead>
</table>
- Completion of annual desk reviews, in-depth data assessments, data improvement plans;
- Implementation and monitoring of agreed data improvement plans;
- Improving estimates of target population;
- Performing triangulation/further analyses to improve immunisation coverage estimates or inform programme management;
- Robust M&E of immunisation related activities, interventions and strategies;
- Strengthening / standardising registries, facility information systems, or data management systems for VPD surveillance or vaccine safety;
- Mapping donor investments in health or immunisation system data;
- Data visualisation tools or systems;
- Training for VPD and vaccine safety surveillance staff on conducting investigations of reported cases, including through field epidemiology training programmes;
- Investigation of suspected VPD cases and serious AEFIs;
- Sentinel surveillance for specific vaccine preventable diseases, including:
  - Typhoid
  - Pneumococcus
  - *Haemophilus influenzae* type b
  - Meningococcus
  - *Japanese encephalitis*
  - Congenital rubella syndrome
  - Pertussis
  - Hepatitis B

| • Any data related investments without a data use plan or set of relevant recommendations; | • Investments that do not fit into a broader strategic plan for data collection and analyses; | • Investments in digital health (e.g., electronic immunisation registries or e-LMIS) if not aligned a clear national digital health plan; |
| • Investments that both: | • Investments at high risk for fraud, embezzlement, or other misuse; | • Investments that are deemed duplicative of other existing investments (domestically or externally funded); |
| 1. Are not time limited | 2. Do not have a sustainability plan | • Surveillance for human papillomavirus. |

*All investments should be tied to a clear plan, based on evidence and data, and have a robust grant performance framework. While in some cases Gavi’s support will only represent a contribution to much wider efforts (being led by the Ministry and perhaps supported by several other donors), it is still important to be able to demonstrate at least some results from such collaborative investments.*

**Country Examples**

**Pakistan** – supporting eVaccs

In Pakistan, Gavi is supporting the roll-out of eVaccs, a mobile-based technology developed for EPI Punjab to allow real-time monitoring of resources on the ground, provide timely data for decision-making and measurement of geographical coverage. eVaccs has evolved over-time to incorporate child level data and digital vaccination cards. Since it was launched in June 2014, eVaccs has been used to inform staffing and resource decisions as well as a source of vital data for triangulation purposes to better understand quality of data.

**Myanmar** – DHIS2 and eLMIS interoperability
Myanmar recently developed an ambitious roll-out plan related to DHIS2. As part of this, and in line with their overall data improvement plan, Gavi is supporting efforts towards the integration and further adaptation of immunisation in DHIS2 and interoperability with eLMIS. Similar to other countries, Myanmar is looking towards DHIS2 to help data use through visualisation and dashboards and sees interoperability with eLMIS as essential to ensure routine analysis, triangulation and use of both routine immunisation data and stock-related data.

Ghana – Use of GIS to improve microplanning

Analysis of denominator estimates revealed an important (>25%) discrepancy between data sources. This served as the impetus for dialogue with country core and expanded partners to identify solutions. The result was to create a sub-district shape file for the whole country so that there were clear geographic areas to facilitate micro planning and accountability. With accurate shape files, application of GIS and layering of multiple data sources can provide additional data for decision making.

1.6 Investment links with Gavi’s grant performance framework

There are many indicators that could be relevant for inclusion in Gavi’s grant performance framework. Selected indicators must reflect the priorities identified and activities that will be funded by Gavi. Some examples include:

- District-level reporting completeness: Number of district reports that were received, divided over the expected number of reports over the same period (such as last calendar year or last month);
- Facility-level reporting completeness: Number of facility reports that were received divided by the reports that were expected;
- Percentage discrepancy between administrative and survey DTP3 coverage estimates;
- Percentage of districts reporting DTP3 coverage >100%;
- Percentage of districts reporting VPD surveillance data even in the absence of suspected cases;
- Percentage of reported serious AEFI cases assessed by an adverse event review committee;
- Percentage of health facilities with immunisation cards in stock;
- Number of health workers completed training on new integrated health data platform;
- Number of facilities with new integrated health data platform introduced;
- Completeness and timeliness of reporting through integrated health data platform;
- Number of agreed action items identified in data improvement plan fully implemented;
- Percentage of agreement between data in sampled facility records and national records for the same facilities.

Targets for these should be derived on a country-by-country basis, informed by the baseline and relevant agreed workplans / improvement plans.

1.7 Information repositories (if relevant)

There are a great deal of resources available that provide technical guidance on aspects related to improving the quality of and using immunisation data. These include, but are not limited to many resources currently available from WHO (http://www.who.int/immunization/documents/en/; http://www.who.int/vaccine_safety/en/ and http://www.who.int/healthinfo/tools_data_analysis/en/):

- WHO EPI systems and data assessment guidance
- WHO Data Quality Review toolkit
- WHO Data Quality Self-assessment tool
- WHO Vaccination coverage cluster survey reference manual
- WHO EPI and VPD surveillance review guidance (currently being updated)
- WHO guidance on Assessing and Improving the Accuracy of Target Population Estimates for Immunization Coverage
- WHO’s collecting, assessing and using immunisation data reference guide (in final preparations)
- WHO Health Equity Assessment Toolkit
- WHO indicators for monitoring districts and national performance
- WHO Immunisation in practice: Monitoring and using your data
WHO Vaccine Preventable Disease Surveillance Guidelines
Global Vaccine Safety Blueprint
Resources on logistics data and information systems (www.technet-21.org)

2 Guidance on country dialogue

2.1 Stakeholders to be included in the country dialogue workshop

In addition to the EPI team, key partners from WHO and UNICEF, the following stakeholders should be considered specifically for data-related discussions:

- Teams: Disease surveillance, HMIS, National Statistics Office, National logistics, polio, NRA / pharmacovigilance;
- Relevant working groups such as data quality or HIS working groups;
- National public health laboratory;
- CDC, WB, universities, NGOs, other donors/stakeholders active in the areas of data, ICT;
- Representatives from Ministry of planning / finance (as relevant);
- Country public health institutes, or organisations conducting MICS, DHS or other relevant surveys.

Efforts to improve data systems are often supported by multiple donors in countries. A mapping exercise can help identify key players and the areas they are focused on supporting. These donors should ideally also be included in the workshop.

2.2 Essential data/evidence/documents to be reviewed prior to the country dialogue

Annual desk reviews, most recent in-depth data assessment and any data improvement plan (or sections from relevant documents such as HIS strategic plan or cMYP). Please refer to the data and evidence suggested in section 1.4 above.

2.3 Key discussion points which should be addressed during the country dialogue

- Discuss findings of recent desk reviews, surveys and in-depth assessment and the implementation of agreed action points / lesson learned or lack thereof;
- If data improvement plan is available: discuss how it came about, who was involved, how it was integrated into country planning and budgeting cycles, monitoring of agreed actions and progress made against action plan;
- If no data improvement plan is available, discuss the need for one, reasons for lack of development to date, technical assistance required (if any) to support development;
- Identify any relevant examples of how Ministry and stakeholders have used data previously to help target / tailor interventions;
- Discuss utilisation of surveillance data to inform immunisation programmes and identify what needs the country has in this area;
- Discuss extent of other donors supporting data improvements in country;
- Discuss health systems barriers to better data (HR, financial, otherwise) and initial ideas on potential areas that could be supported by Gavi.

Discuss comprehensive data improvement activities and encouraging data use at each level, starting from community level, through health facility, district, intermediate level and national level.

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Annex: Examples of investments

<table>
<thead>
<tr>
<th>Fundamentals</th>
<th>Examples of investments with high potential to improve data availability, quality and use</th>
<th>Country examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessment and improvement planning</td>
<td>1. Develop, implement and monitor holistic data improvement plan</td>
<td>Cross-regions (note this is a Gavi requirement)</td>
</tr>
<tr>
<td></td>
<td>2. Conduct periodic (at minimum once every 5 years) nationally representative coverage surveys</td>
<td>Cross-regions (note this is a Gavi requirement)</td>
</tr>
<tr>
<td>Governance</td>
<td>1. Develop / endorse / roll-out agreed standards related to data collection</td>
<td>Afghanistan, Bolivia, Tanzania</td>
</tr>
<tr>
<td></td>
<td>2. Establishing and maintaining AEFI causality review committee</td>
<td>Georgia, Kenya, Lao PDR</td>
</tr>
<tr>
<td></td>
<td>2. Updating norms and guidance related to routine data and surveillance data collection and use</td>
<td>Bolivia, Lao PDR, Eritrea</td>
</tr>
<tr>
<td></td>
<td>3. Support routine data review and analyses at national and subnational levels</td>
<td>Mozambique, Cote d’Ivoire, Mauritania, Zambia, Comoros</td>
</tr>
<tr>
<td>People</td>
<td>1. Capacity building efforts, such as training, related to data availability, quality and use at all levels, particularly health facilities</td>
<td>Cross-regions</td>
</tr>
<tr>
<td></td>
<td>2. Updating and implementing supportive supervision, providing regular on-hand validation and guidance related to data collection, reporting and analysis practices</td>
<td>Mozambique, Uganda, Somalia, Gambia</td>
</tr>
<tr>
<td>Tools</td>
<td>1. Supporting scale-up of eLMIS / eHMIS in countries</td>
<td>Myanmar, Mozambique, Senegal, DRC, India, Cameroon, Cote d’Ivoire</td>
</tr>
<tr>
<td></td>
<td>2. Scale-up of innovative tools and approaches, such as SMS-based real-time monitoring tools, geospatial population mapping</td>
<td>India, DRC, Nigeria</td>
</tr>
<tr>
<td></td>
<td>3. Roll-out of electronic vaccine registries</td>
<td>Kenya, Tanzania, Zambia</td>
</tr>
<tr>
<td>Evidence</td>
<td>1. Strengthen laboratory capacity in order to generate evidence for action and decision-making</td>
<td>DPRK, Pakistan, Lao PDR, Sierra Leone, Sudan</td>
</tr>
<tr>
<td></td>
<td>2. Support evaluation and generation of case studies related to specific interventions, such as those in urban settings</td>
<td>Regional cross-learning (PAHO), Pakistan, DRC, Ghana, Kyrgyzstan, Bangladesh, Chad</td>
</tr>
<tr>
<td></td>
<td>3. Evaluation of innovative tools or delivery models</td>
<td>South Sudan, Indonesia</td>
</tr>
</tbody>
</table>
Considerations for countries on targeting investments from Gavi’s financial support to achieve immunisation outcomes

Focus area | Data – Disease Surveillance Annex

3 Uses of Disease Surveillance Data

3.1 Value of Disease Surveillance Data

Vaccine preventable disease surveillance data provides information on the occurrence of the diseases that vaccination is meant to prevent. Such data can guide health system decision making on how to decrease death and disease from vaccine preventable diseases as efficiently and effectively as possible. The value of disease surveillance data is inextricably linked to the value of the decisions that the data is used for, so surveillance activities are more important if:

- The decisions they impact involve a great deal of money or prevention of a great deal of disease
- Surveillance data are essential to making those decisions
- The proposed surveillance activity has a high likelihood of generating the needed data

Conversely, the less these things are true, the less important the surveillance activity.

- If programs are unlikely to be implemented even if surveillance data indicate they are needed, surveillance activities are less important.
- If other types of data can be good substitutes for surveillance data in decision making, surveillance activities are less important.
- If surveillance activities are unlikely to be able to collect the data needed for decision making, such activities are less important.

The link between the value of disease surveillance data and the value of the decisions it impacts allows judgements on the potential value of surveillance activities which Gavi may fund on the basis of the estimated value of the relevant decisions.

3.2 General Uses of Vaccine Preventable Disease Surveillance Data

For immunization programs, disease surveillance data has four main use cases as described in the table below.

<table>
<thead>
<tr>
<th>Surveillance use case</th>
<th>Description</th>
<th>Examples</th>
<th>Immunization Program Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outbreak detection</td>
<td>Rapid detection of outbreaks key to rapid containment</td>
<td>Yellow fever outbreak scale as a function of detection and response date</td>
<td>Reduce death, disease, and disruption caused by outbreak</td>
</tr>
<tr>
<td>Vaccine introduction and preventive campaign decisions</td>
<td>Burden of disease data helps show if vaccine needed</td>
<td>Antimicrobial resistant typhoid outbreak prompts Pakistan introduction</td>
<td>Target correct areas and groups</td>
</tr>
<tr>
<td>Routine immunization quality assurance</td>
<td>Disease cases and outbreaks can indicate program gaps</td>
<td>Measles outbreaks despite declared high vaccine coverage</td>
<td>Identify coverage and equity gaps in specific geographies and trigger action</td>
</tr>
<tr>
<td>Vaccine effectiveness monitoring</td>
<td>Monitor changes in effectiveness, e.g., shifts in disease causing serogroups</td>
<td>Meningococcal serogroup monitoring showed need to change vaccine</td>
<td>Inform vaccine formulation and schedule decisions to achieve effective protection</td>
</tr>
</tbody>
</table>
Targeting of vaccine use in routine immunization or preventive campaigns is particularly important for vaccines that are not going to be used universally in routine immunization or that are used in mass vaccination campaigns. Examples include:

- Typhoid vaccine
- Oral Cholera vaccine
- Meningococcal vaccine
- Yellow fever vaccine
- Measles vaccine
- Rubella vaccine
- Japanese encephalitis vaccine

4 Evaluation of Disease Surveillance Activities

4.1 Key Questions for Evaluating Surveillance Activity Funding Proposals

- What decisions depend on the data that may be generated by the surveillance activity? Examples:
  - What areas or age groups should be included in a campaign or RI strengthening efforts?
  - Should an outbreak response effort be launched?
  - Should a new vaccine without a universal recommendation be introduced? Where?
- How important are those decisions?
  - How much money is dependent on those decisions?
  - How much disease might be prevented due to those decisions?
- What is the likelihood that the surveillance activity will be able to generate the data needed for the decision?
- What will targeting of vaccine use look like in the absence of surveillance data? Examples:
  - Will broad campaigns or RI efforts likely cover a larger geographic area or wider age range than would be the case otherwise without added benefit for preventing disease? In other words, will vaccine and effort be wasted?
  - Will narrow or absent campaigns or RI efforts not target areas or age groups that would benefit? In other words, will people be missed or left behind?

4.2 Disease Surveillance Components

Disease surveillance involves multiple components which in turn each require a variety of inputs as summarized in the table below.

<table>
<thead>
<tr>
<th>Surveillance components</th>
<th>Key inputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surveillance system design, monitoring, and management</td>
<td>Personnel, training, transportation, and means of communication</td>
</tr>
<tr>
<td>Case recognition</td>
<td>Personnel* and training</td>
</tr>
<tr>
<td>Case reporting</td>
<td>Paper or electronic communication channels</td>
</tr>
<tr>
<td>Follow-up and investigation</td>
<td>Personnel, training, transportation</td>
</tr>
<tr>
<td>Laboratory confirmation</td>
<td>Laboratory equipment, maintenance, supplies, personnel, training, sample transportation, quality control and proficiency testing</td>
</tr>
<tr>
<td>Data management</td>
<td>Paper or electronic record keeping system**, personnel</td>
</tr>
<tr>
<td>Data analysis and reporting</td>
<td>Personnel, paper or electronic analytic tools*** and means of communication</td>
</tr>
</tbody>
</table>

* Can include health care workers, community health workers, surveillance officers, or others depending on structure of disease surveillance system.
** Can include HMIS, DHIS2, or equivalent systems, which may also contribute to other surveillance components.
*** Can include SAS, Stata, Excel, analysis features of electronic record keeping system, or other tools.

Disease surveillance activity proposals may reasonably include any of these components and inputs. Laboratory confirmation is important for the surveillance of almost all vaccine preventable diseases because the clinical symptoms of many vaccine preventable diseases resemble those of other diseases. Laboratory confirmation helps ensure that the right vaccine is used in a given outbreak response or change in immunization programme policy.
5 Country Type Considerations

5.1 Countries in Conflict or Civil Disorder

For Gavi purposes, general disease surveillance capacity should usually be prioritized most in conflict countries. Since routine immunization in conflict countries often faces great challenges, flexible approaches are important for preventing death and disease from vaccine preventable diseases. The effective and efficient targeting of campaigns is critical given difficulties in conducting campaigns in conflict areas. In addition, low population immunity means greater susceptibility to outbreaks, i.e., vaccine preventable disease outbreaks occur more frequently and are spread over greater areas, so the potential need for campaigns can increase along with the difficulty of conducting them. Detection and containment of outbreaks is also important for maintaining global health security as part of countries’ obligations under the International Health Regulations to detect, report, and respond to Public Health Emergencies of International Concern (PHEICs). For multiple vaccine preventable diseases, including polio, Ebola, cholera, yellow fever, and meningococcal disease, outbreaks constitute PHEICs.

Due to the limited resources from government and other indigenous sources as well as the difficulties in maintaining surveillance systems in conflict areas, Gavi disease surveillance support in such settings should generally focus on general capacity for case identification, reporting, and investigation as well as data analysis, which may involve funding for human resources consistent with Gavi’s policies on supporting human resources capacity. Syndromic surveillance, i.e., disease surveillance focused on identifying clusters of suspected cases of disease instead of individual laboratory-confirmed disease cases of disease, can be an important surveillance strategy in such settings. Diagnostic support should focus on simple tests, such as rapid diagnostic tests, or transporting samples to laboratories in other countries.

5.2 Stable Countries with Weak Immunization Systems

For non-conflict countries, Gavi surveillance funding should focus on providing information for specific programme decisions. Given the need to focus Gavi funding on improving immunization coverage and equity, funding for disease surveillance should generally be limited to activities providing information for the most critical programme decisions, for example, targeting of vaccination in large countries where preventive mass campaigns or subnational introductions involving a particular vaccine are under active consideration.

Laboratory testing is often key for addressing disease specific programmatic questions given the need to distinguish a given disease from others with similar symptoms. Since Gavi Targeted Country Assistance (TCA) cannot support laboratory procurement or operations, consideration should be given to including laboratory support in Health Systems Strengthening (HSS) planning. Many countries eligible for Gavi support tend to focus their disease surveillance budgets on human resources to identify, report, and investigate suspected cases of disease, so Gavi funding for laboratory capacity can help address an important element that may otherwise be overlooked.

5.3 Stable Countries with Strong Immunization Systems

In stable countries with strong immunization systems, Gavi surveillance funding can potentially support activities to provide information for a broad range of programme decisions since immunization programmes are likely already achieving substantial coverage and equity. Such programme decisions may involve all four of the use cases described in section 3.2.

If they are not already doing so, stable countries with high coverage may particularly benefit from using disease surveillance for immunization programme quality assurance and monitoring of vaccine effectiveness in addition to outbreak detection and vaccine introduction and preventive campaign targeting as described above. Surveillance for vaccine preventable diseases that usually cause relatively distinctive acute infections, such as measles and diphtheria, can contribute substantially to...
immunization programme quality assurance by identifying populations or subpopulations in which such cases occur and therefore have inadequate immunity to disease. Disease surveillance is particularly effective for such identification of nonimmune populations when triangulated with other types of data such as coverage or vaccine use data. High quality sentinel surveillance sites can provide data for assessing the effectiveness of vaccines, for example, data on the serotypes causing pneumococcal or meningococcal disease that can indicate whether changes are needed in a vaccine’s formulation to compensate for changes in the pathogens causing the disease the vaccine prevents.

5.4 Illustrative Sequencing for Developing Disease Surveillance Systems

Stage 1: General capacity for case identification, reporting, and investigation as well as data analysis. Very basic disease surveillance systems may initially focus on syndromic surveillance. Diagnostic testing focuses on simple tests or transportation of samples to laboratories in other countries for testing.

Stage 2: Diagnostic capacity is expanded to allow more sophisticated laboratory testing within the country for diseases of particular programmatic interest, e.g., diseases likely to trigger outbreak responses or under active consideration for targeted preventive campaigns or introduction of a relevant vaccine into routine immunization. Domestic sample transportation becomes more routine and elaborate. Increased emphasis on triangulation of surveillance data with other types of data, such as coverage and stock use data, to guide immunization programme decision making.

Stage 3: Diagnostic capacity expanded to cover a wider of diseases. Fully routine domestic sample transportation sending samples to national reference laboratory in smaller countries or a network of reference laboratories in larger countries. Potentially includes sophisticated laboratory testing and intensive surveillance, for example at sentinel surveillance sites, to address questions such as changes in serotypes causing disease.

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