

SAGE Working Group on Quality and Use of Immunization and Surveillance Data:

Executive Summary

Material included in the Yellow Book

1. Updated Executive Summary of the “Report of the SAGE Working Group (WG) on Quality and Use of Immunization and Surveillance Data” and table with WG recommendations with timeframe and responsibilities
2. Immunization Data: Evidence for Action (IDEA) Precis
3. India Case Study: Utilization of Immunization Data to Improve Evidence-based Decision-Making
4. Excerpt from the draft 2019 Western Pacific Region 28th Technical Advisory Group Meeting report summarizing presentations on the draft “Regional strategic framework for vaccine-preventable diseases and immunization in the Western Pacific, 2021-2030”

Supplemental material on the SAGE website

5. An updated version of the “Report of the SAGE Working Group on Quality and Use of Immunization and Surveillance Data” that was presented in the April 2019 Yellow Book, including the Executive Summary and References
6. All previously presented annexes reference in the Report: literature reviews, case studies, white papers

Purpose of session: propose recommendations for SAGE endorsement. The session will include a recap on the major findings for the work of the WG and discuss a way forward for the proposed recommendations, including a country example from India on how data has been used to improve programme performance and a presentation from the WHO Western Pacific Region on data and surveillance for their regional immunization strategy.

Specific questions for SAGE: for SAGE to discuss high-level recommendations and next steps, including:

- Endorsing WG report and recommendations
- WHO to incorporate recommendations into Immunization Agenda 2021–2030
- Regions and countries to incorporate recommendations into 2021–2030 strategies, including multi-component interventions for improving data quality and use across 5 key areas:
 - Strengthen governance of data generation, use, & information systems
 - Build capacity & capability of health workforce in data generation & use

- Align information systems & technologic innovations with local context & program needs
- Use immunization & surveillance data for continuous quality improvement
- Fill gaps in evidence around data quality & use with robust evaluation

Improving data quality & use: Focus on multi-component interventions across 5 key areas



Strengthen governance of data generation, use, & information systems



Build capacity & capability of the health workforce in data generation & use



Align information systems & technologic innovations with local context & program needs



Use immunization & surveillance data for continuous quality improvement



Fill gaps in evidence around data quality & use with robust evaluation

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Target outcomes: SAGE to consider and endorse WG report and high-level recommendations:

1. Endorsement for the WG report, framework and included recommendations
2. A call for the Immunization Agenda (IA) 2030 to take into account Data as a key enabler and the recommendations from the WG
3. A call to integrate data activities under the broader umbrella of Universal Health Coverage (UHC) and Primary Health Care (PHC)
4. A call to actions to regions and countries, through their regional immunization technical advisory groups (RITAGs) and national immunization technical advisory groups (NITAGs), to take the recommendations and implement activities aimed at improving data quality and use.

Background

Concerns about the quality and use of immunization and vaccine-preventable disease (VPD) surveillance data have been highlighted on the global agenda –including by the SAGE – for more than two decades. The demand for accurate data and their use in programme management and decision-making has only increased as countries strive to meet the ambitious vaccination coverage and disease elimination goals of the Global Vaccine Action Plan (GVAP). These agreed upon goals require new, more precise and finer types of measurements than have often been used in many low- and middle-income countries. Improved information systems and data quality will also be critical to measuring progress in achieving the Sustainable Development

Goals (SDGs) and Universal Health Coverage (UHC), such as improvements in equity of service delivery and in reaching under-served, marginalized, and migrant populations.

Recent efforts by countries and immunization partners to improve immunization-related data have resulted in successes in a number of countries. However, poor quality and under use of data remain a persistent problem in many, affecting the ability of countries and partners to monitor progress against the GVAP and other global goals as well as to support optimal changes to immunization programmes. In fact, SAGE assessment reports of GVAP implementation stated that poor data quality was impeding programme improvement, and recommended that improving data quality should be a top priority for national immunization programmes.

As a concrete measure to address this ongoing problem, the SAGE Working Group (WG) on the Quality and Use of Global Immunization and Surveillance Data was established in August 2017. Its mandate was to:

- Take stock of data availability and determine if there are unmet immunization monitoring and evaluation data needs at global and regional level, and suggest revisions for reporting processes;
- Review existing and new draft standards and guidance on immunization monitoring and vaccine-preventable disease (VPD) surveillance data to identify gaps, revisions, and areas that require updates;
- Review and assess the current 'state' of immunization and VPD-surveillance data quality and use at country, regional, and global level;
- Review evidence on:
 - factors that may cause and/or limit access to quality and use of immunization and VPD-surveillance data for decision-making at different levels;
 - effectiveness (including where possible, cost-effectiveness) of interventions for improving access to, improving quality of, or promoting the use of data at national and subnational levels;
- Review the status of information systems that collect immunization and VPD-surveillance data, the availability of modern information technologies, and their current and potential future role in supporting the collection, management, analysis and use of immunization and surveillance data;
- Identify knowledge gaps & create prioritized research agenda around data quality and use.

Methods and definitions

The WG considered data within the scope of their review as vaccine coverage, immunization programme process indicators (e.g., vaccination sessions), vaccine supply, and VPD surveillance data. A series of landscape analyses (involving key informant interviews and document

reviews), literature reviews, country case studies and data analyses (data triangulation exercises) were conducted by the WG, consultants and partners to fulfill the terms of reference of the WG and prepare the Data WG report. Detailed reports for many of these reviews and analyses can be found in the Annexes, along with full versions of the case studies.

The WG used a definition of data quality as *data that are accurate, precise, relevant, complete and timely enough for the intended purpose (or “fit-for-purpose”)*, such as to monitor programme performance, support efficient programme management or provide evidence for decision-making. The structure of the report presents the current landscape and is based on a simplified theory of change, which identifies five pillars – Governance, People, Tools, Processes for Continuous Quality Improvement, and Evidence required to produce data that are available, fit-for-purpose and used for action.

Major findings and key points

The availability, quality and use of immunization and surveillance data, data-related guidance and assessment methods

There is a considerable amount and variety of immunization and surveillance-related data available nationally, regionally, and globally, though the data are not always accessible to those that need them the most. However, when evaluated, the quality of these data is still often poor, especially in low- and middle-income countries, with inaccuracies in denominators used to calculate immunization coverage or disease incidence rates being particularly pronounced. The WHO-UNICEF Joint Reporting Form (JRF) and WHO-UNICEF estimates of national immunization coverage (WUENIC) remain key sources of immunization data available internationally. There is also increased demand for the collection of disaggregated data for immunization and VPD surveillance (e.g., subnational; individual-level) to support achieving programme objectives. The new global electronic platforms and strategies, including the WHO Immunization Information System (WIISE) (which will include an e-JRF), the WHO Immunization Data Handbook and related Immunization Monitoring Academy and the global Comprehensive VPD Surveillance Strategy, should help improve the quality and use of immunization and surveillance data.

In recent years, a plethora of global and regional guidance documents and standards have been developed to address issues related to monitoring, data quality and use. However, awareness of these tools among people working in immunization and VPD surveillance and their ability to find and access these tools needs to improve. In addition, the review found a continued lack of practical guidance and tools for a number of technical areas. Tools for countries to assess data quality – such as the Data Quality Self-assessment (DQS) and Data Quality Review (DQR) tools – have improved over the years and have had a positive impact on country ownership and interest in making data improvements in a number of countries, with some evidence of positive impact on data quality and use as well. More work is needed to define a common lexicon of

definitions around data and a standard set of indicators to measure data quality and use, as part of comprehensive programme monitoring.

The factors limiting and the effectiveness of interventions to improve access, quality and use of immunization and surveillance data

The possible sources of data quality loss or failure to share and use data are many and can occur at all levels of the health system. Data quality loss can result from failure to record properly, errors in transcribing/calculation, inaccurate denominator data, poor/missing/outdated forms, procedural gaps (e.g., not including private sector), lost/damaged records, or intentional falsification. Types of barriers to sharing data locally and internationally include technical (inadequate interoperability, standards, archiving procedures), motivational (lack of incentives, trust between data providers and users, or resources/time needed), economic (e.g., potential negative economic effects), political (bureaucratic hurdles, lack of political will), and legal and ethical barriers. Failure to use data can result from lack of confidence in the quality of available data, lack of basic/advanced data analysis and interpretation skills, or lack of understanding on how to use data to monitor and improve the immunization programme, as well as lacking a culture of information use.

Systematic reviews have found that multicomponent interventions are most prevalent and often more effective for improving health data quality and use. For example, no impact has been observed from technological interventions alone, without the related capacity building. Training combined with supervision or group problem solving or certain multifaceted strategies were found to be more effective than single strategies. Further, a health systems approach was found to be more likely to succeed and be sustained over long-term. An example of this would be implementing data review meetings, creating national guidelines and protocols on data use, and hiring data managers at all levels. For this reason, it is relevant to consider implementing multi-component interventions within and across the five key areas of Governance, People, Tools, Processes for Continuous Quality Improvement, and Evidence towards improving data quality, access and use as part of a health systems approach.

Strengthening governance of data collection, access, and use

Having strong policies and mechanisms in place that govern all key aspects of data collection, access, and use is important to develop immunization and VPD surveillance information systems that produce high-quality, credible data that are useful to monitor and improve programmes. Data can be used for programme planning, performance accountability, implementing evidence-based interventions to improve vaccine uptake, and informing policy decisions. Coordination and collaboration between different units dealing with data (e.g., immunization programme, labs, surveillance units), between partners and the government, as well as across the entire health care system is crucial to establish efficient, sustainable information systems, and to avoid systems that are fragmented and duplicative. Strong

leadership within national governments and the political will to improve data quality — even if it initially leads to lower reported performance — are also critical to ensure the sufficient resources, key policies and regulations, and development of a “data use culture” needed for improvements. Also, key is the establishment of national standards governing all stages of data generation and use and having policies and mechanisms in place for sharing data both within countries (e.g., data from the private sector and Non-Governmental Organization-NGOs/Civil Society Organizations-CSOs) and internationally, while also taking issues of privacy and confidentiality into account.

Building capacity and capability of the health workforce in data collection and use

The lack of adequate person-time equivalents and skills in data collection, analysis, interpretation and use among health workers are key factors limiting the quality and use of immunization and VPD surveillance data. This report recognizes that data quality at all levels ultimately depends on the quality of data collection at the health facility level, and thus data quality interventions, including workforce planning and capacity-building must specifically target the local level. In addition, data-related activities often compete with clinical duties for health workers’ time, thus impacting the quality, completeness and timeliness of reporting. Improving this situation requires a multi-pronged approach — including pre-service and in-service training, with regular reinforcement through supportive supervision, and feedback — as well as adequate resourcing and dedicated person-time for data-related tasks taking into consideration in workforce planning. Some countries have dealt with the issue by creating a cadre of health information personnel specifically trained and dedicated to managing and analyzing data.

The reviews found that current pre-service training programmes often do not adequately prepare health workers to carry out data-related tasks, even in high-income countries, nor has most in-service training around data had a major impact in improving the skills and practices of health workers. Governments therefore need to make a dedicated effort to provide continuous and effective competency-based training on the generation and use of health data, incorporating adult learning theory and based on the data-related responsibilities required at all levels of the health system. The WG has developed a framework that defines the roles and responsibilities of health workers in collecting, analyzing and using immunization data from the facility to the global level in order to assist countries in planning their capacity-building activities related to immunization data and information systems.

Align information systems and technological innovations with local context & programme needs

Health workers need user-friendly tools (either paper or electronic) that make their jobs easier and more efficient. Recent advances in information and communication technology (ICT) have led to a multitude of innovative tools developed with the aim of improving data quality,

availability and use. Immunization information systems are currently either immunization-specific tools or part of an integrated health management information system, such as DHIS2, and challenges with both approaches exist. Innovative “e-Health” tools used in immunization and disease surveillance programmes range from electronic immunization registries (EIRs) to decision-support tools (such as dashboards), mobile technologies to enable real-time data collection, reporting and monitoring; geospatial-based tools (e.g., GIS) and predictive analytics to improve coverage and population estimates.

While there is evidence that some of these tools improve data quality and use, many — with the exception of electronic information systems, such as DHIS2 and some EIRs — never get rolled out nationally, nor thoroughly evaluated. Some innovations have failed because they ignored country context, user requirements, and issues of interoperability with existing systems. This highlights the fact that technologic solutions are not a magic bullet for solving all data problems, but rather the successful use and scale-up of these innovations depends to a large extent on other key elements being in place, including a skilled and motivated workforce, strong governance, sustainable financing, adequate infrastructure, such as computers, connectivity, and technical support, as well as clear operating procedures and processes. Global guidance is also needed on how and when to scale up innovations to ensure a sustained, long-term benefit on data quality and use.

Using immunization and surveillance data for continuous quality improvement

There is evidence to suggest that improving the quality of immunization and VPD surveillance data on a periodic basis can only go so far, and that using a continuous quality improvement (CQI) approach has the potential for greater and longer-lasting improvements. This approach should start with an assessment of the root causes of poor data quality extending down to the lowest level of the health system. Limited evidence also indicates that increasing the use of data can improve data quality, though not necessarily the other way around. However, gaps in data use and data use capacity abound at all levels.

Solutions proposed as part of a continuous quality improvement approach include a shift from periodic data quality assessments to routine monitoring of data quality, including automated data validation checks and analyses on electronic information systems; and the better use of existing, under-utilized data, such as surveillance, rapid coverage monitoring, and vaccine supply data, to create a fuller picture of programme performance. They also include the “triangulation” of data to synthesize evidence across different data sources to address relevant questions for programme planning and decision-making (e.g., checking data quality, prioritizing areas for intervention, estimating coverage/denominator, evaluating programme impact/effectiveness). Such data triangulation analyses should be the default for public health analysis.

In line with the goals of improving equity of services across populations and geographic areas, better measures, tools and indicators need to be developed to monitor equity on a regular basis. Similarly, current methods for measuring and estimating vaccination coverage must be adjusted to accommodate the shift towards a life-course vaccination approach. Methods for improving estimates of target populations, including dealing with migration, remain among the needs that are most critically felt at the local programme level.

Filling gaps in evidence around data quality and use

This report identifies and maps out gaps in evidence and knowledge concerning key aspects affecting the quality and use of immunization and VPD surveillance data and proposes a research agenda based on these gaps, structured according to the pillars for improving data quality and use. In general, the Working Group found a need for more robust evaluation of the impact of various data quality and use interventions (e.g., tools, capacity building approaches), their cost-effectiveness, and their impact on staff time and efficiencies.

The Working Group has outlined high-level and specific recommendations for countries (national and subnational), regional and global levels with a timeline in the Table below.

Table of SAGE Immunization Data Working Group recommendations by level, WHO role and time horizon¹

Recommendation area	Specific recommendation	Countries	Regions	Global	WHO-specific unit & topic-area	Time horizon ²
1. Embed monitoring of data quality and use into global, regional and national monitoring of immunization and vaccine-preventable disease (VPD) surveillance	WHO to develop a common definition, attributes, and indicators of data quality (i.e., small panel of indicators corresponding to the different data quality attributes), using those identified in this report as a starting point			x	EPI – see previous experience with GVAP, propose for eJRF	+
	Integrate ongoing monitoring of data quality indicators alongside other routine programme performance (e.g., coverage) and impact indicators	x	x	x	EPI – Guidance, Supporting implementation	+/++
	Develop and utilize data quality assessment approaches for immunization programme data other than coverage (i.e., VPD surveillance, stock data, etc.)	x	x	x	EPI – Guidance, Supporting implementation	++
	Evaluate the impact, cost and sustainability of interventions which aim to improve data quality, management, and use to inform decisions on scale-up	x	x	x	IVB, EPI – Convening, guidance, advocacy - Collaboration with HSS	++/+++
2. Increase workforce capacity and capability for data quality & use starting at lowest level, where data collection occurs	Develop and disseminate data-related competencies guidance and capacity building tools to implement assessment of workforce at country-level	x	x	x	EPI – Guidance, advocacy (building on work on functions & competencies) - Collaboration with HSS	++/+++
	Ensure data functions (collection, analysis, and use) are accounted for & resourced in workforce management plans, e.g., devoting adequate person-time equivalents, staff recruitment, and retention	x			- Collaborate with HSS	+++
	Build data capabilities across various levels and career stages (pre-service, refresher, supportive supervision, etc.), considering new approaches (e.g., e-Learning) potential efficiencies created by coordination across programmes	x	x	x	- Collaborate with HSS	+++

¹ Acronyms: eJRF – Electronic WHO/UNICEF Joint Reporting Form on Immunization; EPI – Expanded Programme on Immunization; GVAP – Global Vaccine Action Plan 2011-2020; HSS – Health Systems Strengthening; IVB – Department of Immunization, Vaccines and Biologicals at WHO

² Time horizon represents a proxy for priority and feasibility. Code is: + short term or within two years; ++ medium term or 2-5 years; +++ long term or 5 or more years.

Recommendation area	Specific recommendation	Countries	Regions	Global	WHO-specific unit & topic-area	Time horizon ²
3. Take actions to improve the accuracy of immunization programme targets (denominators)	WHO and UNICEF to revise and finalize the draft guidance on Assessing and Improving the Accuracy of Target Population Estimates for Immunization Coverage (2015), including proposing practical and evidence-based solutions			x	IVB, EPI – Convening, guidance, advocacy - Collaborate with HSS - Beyond health sector	++
	Increase immunization programme coordination with national statistics office, birth/civil registration offices, and other relevant programmes/ organizations for improving the quality of denominators	x				++/+++
	Identify and attempt to address the technical (e.g., resident vs non-resident) and non-technical barriers (e.g., political) to accurate denominators in countries, including the use of operational denominators	x	x	x		+++
	Document best practices & country experiences about using different sources (birth cohorts, vital registries & census estimates) or methods for improving denominators	x	x	x		++
4. Enhance use of existing data for tailored action, including immunization programme planning, management and policy-change	At all levels, increase the use of data sources beyond administrative coverage for monitoring, planning and decision-making (e.g., numerators, denominators, surveys, surveillance, vaccine supply, service delivery, serosurveys)	x	x	x	EPI – Guidance, Supporting implementation	+/++
	Develop /incorporate guidance and training on data triangulation for immunization and surveillance programmes at the national and subnational level	x	x	x	EPI – Guidance, Supporting implementation	+/++
	Support the development and use of decision-support tools (e.g., monitoring charts, dashboards), as needed, for better planning and programme management	x	x	x	EPI - Guidance-Supporting implementation - Polio team - Health info systems (e.g, DHIS-2)	+/++
	Further work on defining the role of serosurveys for immunization programme management at different levels, across different diseases and different epidemiological contexts			x	IVB – Convening, guidance	++

Recommendation area	Specific recommendation	Countries	Regions	Global	WHO-specific unit & topic-area	Time horizon ²
5. Adopt a data-driven continuous quality improvement (CQI) approach as part of health system strengthening	Shift from identifying data quality issues to root cause analysis and improvement planning, as outlined in the draft <i>Handbook</i>	x	x	x	EPI - Guidance - Supporting implementation	++
	Monitor the implementation and impact of previous recommendations to improve accountability and inform new recommendations (e.g. create data-driven improvement cycles)	x	x	x	EPI - Supporting implementation - Collaborate with HSS	+ / ++
	Tailor multi-component strategies for strengthening data collection & use, which may include capacity-building activities, tools, supportive supervision, actionable feedback, staff recognition (e.g. certificates, awards) & accountability mechanisms	x	x	x	EPI - Supporting implementation - Collaborate with HSS	++
	Recognize that perverse incentives may have led to overestimation in reported coverage, and ensure that data quality improvements leading to lower coverage are not penalized (i.e., promote accurate reporting)	x	x	x	EPI - advocacy - Collaborate with HSS - Beyond health sector	+++
	Develop a vision and strategic framework for a CQI approach for EPI, including measuring relative changes alongside absolute indicator targets	x	x	x	EPI - Supporting implementation - Collaborate with HSS	++ / +++
6. Strengthen governance around piloting & implementation of new information, communication, & technology (ICT) tools for immunization & surveillance data collection & use	Design systems and tools based on needs, user requirements, and local context (e.g., sustainability)	x	x	x	EPI – convening, guidance - Collaborate with HSS - Digital health	+++
	Review existing evidence on cost, impact and effectiveness when considering pilot or scale up new tools for data collection/ management	x	x	x	EPI – convening, guidance - Collaborate with HSS - Digital health	++
	Plan for and ensure integration & interoperability of any newly introduced tools within the existing information system	x	x	x	EPI – convening, guidance - Collaborate with HSS - Digital health	+++
	Ensure new information systems include historical data, support all data management functions (archiving, security, and linkage of relevant data), and are accompanied by guidance, standards and specification	x	x	x	EPI – convening, guidance - Collaborate with HSS - Digital health	+++

Recommendation area	Specific recommendation	Countries	Regions	Global	WHO-specific unit & topic-area	Time horizon ²
7. Improve data sharing and knowledge management across areas and organizations for improved transparency and efficiency	Include best practices on data management (archiving, migration, sharing, and security) in immunization monitoring and surveillance guidance and training	x	x	x	EPI - Guidance - WHO Monitoring - Digital Health	++
	Make data, guidelines, documentation, and reports readily available and accessible to relevant users by building and maintaining user-friendly websites, mobile apps and other communication tools	x	x	x	IVB - knowledge management - WHO in general	++
	Improve routine coordination between stakeholders (epidemiologic surveillance, laboratory, and immunization units; private providers, civil society organizations, and partners) with regards to reporting/sharing of relevant data and information	x	x	x	EPI – Guidance, Supporting implementation	+++
8. WHO & UNICEF to continue strengthening global reporting and monitoring of immunization and surveillance data through a periodic needs assessment and revision process	Continue development and implementation of global (WHO Immunization Information System-WIISSE) and regional information systems, including electronic JRF		x	x	EPI - implementing	+ Ongoing
	Collect and monitor disaggregated coverage (e.g., subnational) and surveillance data (e.g., by age, vaccination, lab confirmation)	x	x	x	EPI - Guidance	+ Ongoing
	Develop approaches for data collection & routine monitoring of emerging immunization issues, e.g., coverage equity, life-course, migrants / mobile populations, qualitative data		(x)	x	EPI - Guidance	++
	Collaborate to convene new research & validate existing research for improving denominators & national/ subnational coverage (e.g., spatial modelling), including use of data sources beyond coverage (e.g., stock), to inform guidance for programme use			x	EPI – Convening, Guidance, Supporting implementation	++
9. WHO & SAGE should periodically review the implementation status of the WG recommendations, lessons learned, and the gaps to be addressed.				x	- Coordinate with SAGE	Every 2-3 yrs