BID Learning Network Discussion Meeting

Lusaka, Zambia | September 19–22, 2017

Contents

Abbreviations

ADI	Addis Declaration on Immunization
BID	Better Immunization Data
BLN	BID Learning Network
CDC	Centers for Disease Control and Prevention
DHA	Digital Health Atlas
DHIT	Digital Health Implementation Toolkit
DIAL	Digital Impact Alliance
DVDMT	District Vaccination Data Management Tool
EIR	Electronic Immunization Registry
EMR	Electronic Medical Record
EPI	Expanded Program on Immunization
Gavi	Global Alliance on Vaccines and Immunization
HMIS	Health Management Information System
ICT	Information and Communication Technology
MOH	Ministry of Health
RNI	Registro Nacional de Immunizaciones
SMS	Short Message Service
TImR	Tanzania Immunization Registry
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
VIMS	Vaccine Information Management System
WHO	World Health Organization
ZEIR	Zambia Electronic Immunization Registry

Executive Summary

Background

The BID Initiative, a program at PATH funded by the Bill & Melinda Gates Foundation, has a vision to empower countries to enhance immunization and overall health service delivery through improved data collection, quality, and use. The BID Initiative has partnered with countries in Africa through the BID Learning Network (BLN) to design information system products and introduce new practices that can be tested in a few countries and deployed at scale in many. Through this network, the BID Initiative promotes learning among peers and provides opportunities for creative collective thinking and innovation between countries that share common problems with their data quality and use of data in decision-making. To this end, the BLN hosted a discussion meeting in Lusaka, Zambia, from September 19 to 22, 2017, with the view to:

1. Disseminate progress, challenges, opportunities, and next steps for BID Initiative demonstration countries.
2. Receive updates on health information systems from design countries.
3. Address the sustainability and evolution of the BID/BLN, being cognizant of lessons learned, current opportunities, and possibility of public-private partnerships.
4. Receive feedback on BID packaging/toolkits and further develop the dissemination strategy.
5. Recognize and share performance, excellence, and innovation of BLN country participants.

The meeting was attended by 109 participants comprising development partners and Ministry of Health (MOH) officials drawn from 15 African countries.

Highlights of the meeting

The four-day meeting, held from September 19 to 22, was very interactive and was characterized by presentations, plenary discussions, group work, brainstorming sessions, and a field visit (refer to full agenda in Annex 1).

- Pre-meeting workshops, “Pretesting of the Principles for Digital Development (PDD) Toolkit” and “Enterprise Architecture,” for design countries were held on September 18, 2017.
- The main meeting started on September 19, 2017, and was officiated by the Zambia MOH and goodwill messages were delivered by the United Nations Children’s Fund (UNICEF) Zambia Country Office, the Bill & Melinda Gates Foundation, and PATH. On the last day the closing remarks were given by the Zambia MOH and PATH.
- Topical discussions included the following:
    - Updates from the demonstration countries (Tanzania and Zambia) on the implementation of the electronic immunization register (EIR).
    - Updates from design countries, namely The Gambia, Uganda, and Cameroon, on progress made on the various health data management systems through presentations.

  - Ivory Coast, Zimbabwe, Nigeria, Mali, Senegal, and Mozambique gave updates through poster representation sessions.
  - Participants also had an opportunity to undertake a field visit to health facilities in Mazabuka where the BID Initiative EIRs have been deployed.
- Key lessons learned from the meeting were:
  - For sustainability, health information systems should be interoperable.
  - Sustained political commitment and ownership of health information systems by the African governments are essential for the success of initiatives.
  - Stakeholder involvement is key in implementation of health solutions.
  - Design of systems should take scaling up into account.
  - Planning for change management is an essential component of information systems deployment.

Resolutions

After four days of deliberations, the participants came up with the following resolutions:

1. Advocate for leveraging of resources toward the sustainability and institutionalization of the BLN.
2. Advocate for leadership from various governments and allocation of resources toward the BLN
3. Create a BLN Secretariat with governance structure and funding
4. Identify focal point persons in each country.
5. A technical working group on maternal, newborn, and child health data management systems should be established.
6. Engage major stakeholders, including other funding partners and the private sector in BLN activities
7. Ensure synergies and interoperability between and among systems

This report therefore, is a synopsis of the deliberations of the discussion meeting which took place at the Taj Pamodzi Hotel in Lusaka, Zambia, from September 19 to 22, 2017.

Introduction

The BID Initiative, a program at PATH funded by the Bill & Melinda Gates Foundation, has a vision to empower countries to enhance immunization and overall health service delivery through improved data collection, quality, and use. The BID Initiative has partnered with countries in Africa through the BID Learning Network (BLN) to design information system products and introduce new practices that can be tested in a few countries and deployed at scale in many. Through this network, the BID Initiative promotes learning among peers and provides opportunities for creative collective thinking and innovation between countries that share common problems with their data quality and use of data in decision-making. To this end, the BLN hosted a discussion meeting in Lusaka, Zambia, from September 19 to 22, 2017.

This report, which is a record of the proceedings of the meeting that took place in Lusaka, highlights the discussions around strategies and approaches to improving data, quality, and use among participating countries and includes highlights around the progress made in BID demonstration countries (Tanzania and Zambia), the successes and challenges they have had, and the way forward. The meeting also brainstormed and made recommendations on the continuity and sustainability of the BLN after its first round of support from the Gates Foundation.

Photo: PATH/Reuben Mwanza. BID Initiative staff and BLN delegates pose for a group photo at the 2017 discussion meeting.

Meeting participants

The meeting brought together 109 participants representing e-health and immunization program personnel from 15 sub-Saharan African countries and international development partner organizations, which included the United States Agency for International Development (USAID), the Gates Foundation, Mott MacDonald, Centers for Disease Control and Prevention (CDC), John Snow Inc., the World Health Organization (WHO), United Nations Children's Fund (UNICEF), and the Global Alliance for Vaccines and Immunization (Gavi) (refer to full list of participants in Appendix 2).

Meeting objectives

Meeting objectives were to:

1. Disseminate progress, challenges, opportunities, and next steps for BID Initiative demonstration countries.
2. Receive updates on health information systems from design countries.
3. Address the sustainability and evolution of the BID/BLN, being cognizant of lessons learned, current opportunities, and possibility of public-private partnerships.
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5. Recognize and share performance, excellence, and innovation of BLN country participants.

Sessions

Pre-meeting workshops

Prior to the main meeting, two workshops for BLN countries were held on September 18, 2017. The first, "Principles for Digital Development (PDD)," focused on pretesting and soliciting user feedback on the principles for digital development resources and the web version of the Digital Health Implementation Toolkit. The second workshop, "Enterprise Architecture," illustrated how governments in many parts of the world are now taking advantage of information and communication technologies (ICTs) to improve productivity in administrative services and satisfy health care service clients through a networked environment.

Opening ceremony

The main business of the discussion meeting began on September 19, 2017, with remarks by the BID Initiative global director, Ms. Laurie Werner, who on behalf of PATH, welcomed the

participants representing more than 20 countries, including partners such as the Gates Foundation, UNICEF, WHO, CDC, and Gavi. She thanked the Zambia MOH for hosting the meeting. Ms. Werner stated the meeting objectives and expected outcomes, gave a brief overview of the BID Initiative and its learning network and the successes scored since 2013, and highlighted the opportunities to share experiences between the peers from the participating countries.

Mr. Chris Wolff from the Gates Foundation also thanked the Zambia MOH for agreeing to host the meeting in Lusaka, which he called the "land of God." He stressed the importance of data in decision-making and its contribution to the universal access to immunization by reaching out to children who need to be vaccinated.

The deputy representative of UNICEF Zambia, Mr. Shadrach Omol, delivered a message of good will in which he emphasized the importance of immunization to child health. He said the availability of good data makes it possible to reach that fifth child who has not been vaccinated yet, and it also makes it possible to identify the underserved localities in order to take care of the children in those areas. He welcomed the collaboration between partners and national systems in ensuring that every child is reached through immunization and resource development by identifying high-quality vaccines and human resources.

In the keynote address, Dr. Andrew Silumesii who represented the Zambia MOH, welcomed the meeting participants to Zambia, a country of "smiles and safaris." He reiterated the importance of immunization for child health and noted the collaborative efforts among the BLN member countries and developmental partners to alleviate the problems related to immunization data. He applauded the Gates Foundation for its commitment to improving immunization data and the collaboration of PATH in strengthening the immunization program in Zambia and beyond. Participants were challenged to explore sustainability and funding mechanisms to ensure continuity of the BLN and, in so doing, to consider engaging civil society and the private sector to find specific and lasting solutions for Africa.

Session 1: BID Initiative—Progress, Challenges, and Next Steps

This session provided a platform for the two BID Initiative demonstration countries Zambia and Tanzania to share progress, challenges, lessons learned, and perceived next steps.

BID Initiative in Zambia

Dr. Francis Mwansa, Zambia National Expanded Program on Immunization (EPI) manager, gave an overview of the immunization situation in Zambia, showing the trends in coverage. He highlighted the challenges, which included, denominator issues, local data use, and supply chain concerns. The presentation underscored the collaborative efforts between the MOH and the BID Initiative, whose priority areas are solutions to address the aforementioned challenges. Various interventions in place include data use guides and coaching, WhatsApp groups, data-

user groups, micro-training videos, cross-site visits, and change management. The Zambia Electronic Immunization Registry (ZEIR) has been developed for registration of children, updating their immunization status, monitoring their growth, and tracking vaccine stock. This system has been rolled out to most of the districts in Southern Province, which is representative of rural, peri-urban, and urban populations. Future considerations for the ZEIR will focus on ensuring that the ZEIR is aligned to the national EIR standards and interoperability with other systems such as the SmartCare and the UNICEF-led mVAC, a short message service (SMS)–based immunization information platform. There are plans for the inclusion of an operability layer in the health ICT infrastructure in alignment to the DHIS2. Partnerships have been established with other governmental and nongovernmental organizations where each partner is expected to contribute toward the achievement of this goal and until recently, the private sector has been engaged on various forums to discuss EPI issues.

BID Initiative in Tanzania

Dr. Dafrossa Lyimo from the Tanzania MOH provided an overview of the Tanzania Immunization Registry (TImR), which was in three segments: (1) introduction to immunization services and the BID Initiative in Tanzania, (2) the electronic immunization registry (TImR), and (3) the vaccine information management system (VIMS). The TImR is used not only for tracking number of children vaccinated but also for monitoring prevention of mother-to-child transmission and tetanus toxoid. The system uses bar codes as a safeguard measure for reduction of errors and is able to validate data. Currently the TImR has been rolled out to 600 health facilities in Tanga and Arusha Regions of Tanzania with plans to scale up to 588 more by end of October 2017 in Kilimanjaro and Dodoma Regions. In the roll-out strategy, district mentors who were trained in providing support to the health facilities were utilized to reach 90 percent coverage. The TImR is integrated into the VIMS at district level with an open electronic logistics management information system, both of which were deployed countrywide in 2017 and 2015, respectively. Tanzania used the BID "fast" approach, which subscribes to "Learn fast, Fail fast, and Share fast." The country foresees the introduction of other digitalization interventions through the implementation of its e-Health Strategy under the MOH with the objective of harmonizing systems across programs. Tanzania will go paperless only after a reliable backup system is put in place.

Key lessons from deployment of the TImR:

- Design and test for scale and use any lessons learned in relation to systems design and testing processes.
- The right mix between health professionals and end users is key to achieving a usable health system.
- User-centered design and development flexibility is required.
- Support and implementation of parallel systems should be planned for in advance and be prepared to continue doing so before switching to an electronic information system, which requires political will.
- The roll-out approach should consider one-time and continuous support to community health workers, which should be cost-effective and foster a sense of ownership.

Panel discussion

Panelists from the Ministries of Health in Tanzania and Zambia presented their perspectives on the BID Initiative and discussed what they saw as accomplishments, challenges, and prospects. EPI managers from Nigeria, Zimbabwe, and Uganda joined the panel to share experiences on using electronic health information systems. Participants heard that Nigeria undertook a pilot of the logistics management information system in one of its states for one year and used the lessons learned before scaling to other states. Zimbabwe is using electronic platforms for reporting and reminding potential immunization defaulters, while Uganda has developed several e-health systems in line with its e-Health Strategy. Challenges noted by all panelists included poor internet connectivity, which calls for systems that should be able to operate in both online and offline mode as well as use of mobile technology. Major lessons deduced were the importance of a feedback loop to avoid reporting discrepancies, the importance of stakeholder/partner involvement and strong political will for successful implementation of e-health solutions, and learning from mistakes.

Change management brainstorming

This was a brainstorming exercise that covered lessons learned so far from the ZEIR. In introducing the session, Masaina Bwakya, BID change management officer, asked the following question: “If we wanted to design a new digital health information system today, what are the key areas that must change to enable health facility staff to use it effectively in spite of already existing systems at national, provincial, district, and health facility level?” While there was a general consensus that accountability should be ensured at all levels, participants proposed the following changes for the different levels:

National level	Provincial level	District level	Facility level
• Policy adjustments • Stakeholder involvement from the start so that they appreciate the new systems • Redesigning of data collection tools and availability of the same • Make sure the new system is more user-friendly • Align reporting system to capture the new adjustment	• People at the provincial level have to be well versed in policy guidelines • Ability to provide technical support to lower structures • Resource allocation • Give timely feedback to lower structures on how they are performing • Make system to be part of the process • Cost-effectiveness • Action-oriented points/space • Data verification mechanism • Hold training workshops • In-house sensitizations and departments • Address inadequacies at hand • Backup strategies (e.g., electricity) • Monitor and evaluate progress of new system	• Clarify vision and look at the national policy vision • Meeting on a regular basis to address issues • Have clear pathway of implementing and provide feedback for implementers • Articulate the advantage of the change to users • Supervision and technical assistance • Sensitization and orientation • Maintenance plans for the new systems • Updated standard operating procedures • Advocacy and marketing	• Develop an high impact assessment plan • Sending feedback across all levels of reporting • Human resources (align) • Infrastructure • Attitude and mindset • Capacity and skills • Communication and feedback

Photo: PATH/Reuben Mwanza. BLN participants also took part in field visits to Mazabuka. This gave participants the opportunity to see ZEIR demonstrated.

Session 2: Field Visit and Report Back

Participants were taken on a field visit to eight BID Initiative sites, namely Nakambala Urban Health Centre, Nega Nega Rural Health Centre, Kaleya Smallholders Company Limited (KASCOL) Clinic, Veterinary Research Health Centre, Nkabika Health Post, Musangu Rural Health Centre, Nanga PLC Clinic, and Mainza Health Post. These are both public (five) and private (three) health facilities located in Mazabuka, Zambia. The primary aim of the field visit was to determine:

1. If the ZEIR meets the needs of the immunization program in Zambia.
2. What the health workers using the system perceive as the advantages and disadvantages of the system.
3. If there are any operational challenges.
4. The sustainability and scalability of the ZEIR (i.e., what needs to happen if this system is considered for nationwide coverage).

During the recap of the field visit, participants expressed the following observations.

ZEIR's ability to meet the needs of the immunization program in Zambia:

- The system allows for update of new vaccines and that on average it takes about six minutes to record one child at new registration. Maybe have separate people entering data from those and providing vaccinations though this might not be possible for facilities that are manned by one staff.
- The data flow should be assessed to see if it is the best.
- It was noted that time spent by the visiting team in observation for this visit was not sufficient to determine whether the system meets the needs of the immunization program in Zambia.

Advantages and disadvantages of the ZEIR as perceived by the health worker:

- **Advantages**—The system is user-friendly, and it is able to tell you the Z-score of the child; easy to track children; information generated is used for decision-making and user-friendliness of the system; caregivers are generally excited by the system in that it kept a complete record of their children, including pictures; it captures all the antigens a child needs and the main fields in the child register.
- **Disadvantages**—It takes a lot of time to complete data entry in the initial stages and the mothers become impatient due to the long waiting time. It was also noted that some fields in the ZEIR cannot be edited because they are locked.

Operational challenges:

- Internet connectivity is sometimes a challenge and affects service delivery.
- Frequent power outages, but staff have appreciated the availability of backup power provided by the solar systems installed, which is also good for cold chain maintenance and the ZEIR. However, monitoring the temperature is a challenge, particularly during weekends and holidays, hence the need for a fridge monitoring tab to be included.
- One tablet is inadequate for facilities that conduct outreach services.
- Self-data quality assessment at the facility is not done regularly.
- There is a data backlog, which was resulting in long waiting times; also delays caregivers, with some of them spending the whole day at the health facility.

Recommendations:

On the basis of the field visit, participants made the following recommendations:

1. District-based staff who are well trained in the use of EIR should provide regular supportive supervision to health workers in health facilities mainly during the initial implementation phase.
2. Health facility staff should be adequately trained in the use of the EIR and all health workers at the health facility should be involved in the training.
3. Technical support should be provided immediately to a health facility when a technical issue on use of EIR is reported.

Session 3: Health Information Systems in Design Countries

This session was aimed at receiving updates on what has been accomplished among BLN countries in the African region and discussing reported challenges as well as offering recommendations. Experiences from The Gambia, Cameroon, and Uganda shared progress and lessons learned on the deployment of their respective health information systems as highlighted below.

Initiating immunization registries: The Gambia experience

Mr. Mbye Njie reported that The Gambia has piloted the electronic immunization registry (EIR). He provided an insight into the application used and the specific requirements as well as challenges of introducing an EIR in a developing country. Key lessons drawn from The Gambia is the importance of high-level stakeholder involvement, creation of ownership among service providers, and constant supervisory support for the success of initiating the EIR. Further, effective change management is achieved through prompt reaction to technical issues. Interactions with the BLN were cited as a key motivational factor in that The Gambia was a beneficiary of the BLN small grants for innovations in immunization information systems. Next steps will entail an assessment of systems, review of strategy, and nationwide roll-out of the EIR.

Electronic information systems: Lessons from Uganda

Professor Josephine Nyabukenya reported that there are five main electronic health systems in Uganda, namely the mTrac, SMS platform, DHIS2, electronic medical record (EMR) and the Human Resources for Health Information System (HRHIS). The mTrac is for tracking surveillance of community diseases through empowering communities to report while the MOH tracks in real time. The SMS platform is used for Option B+ reporting on elimination of mother-to-child transmission and takes into account the stock status of anti-retroviral drugs and HIV test kits, which has resulted in reduced stock outs of these commodities from 45 to 15 percent. The DHIS2 is the national reporting platform for aggregated reports from all health facilities while the Uganda EMR is a facility-based patient-level open medical records system (OpenMRS) used to store and track HIV and tuberculosis data. The fifth system, the HRHIS, is built on the iHRIS platform is used for managing data on human resources for health. Major challenges common to all systems were identified as low ICT skill levels among staff and inadequate equipment. Uganda has developed an e-Health Strategy that identifies health system goals, beneficiaries, and desired health systems outcomes. However, there are a number of problems that need to be solved, including duplication of effort, lack of an integrated e-health system, security of health data, and low usage of data at the health service delivery point. Notwithstanding the challenges, Uganda anticipates enjoying benefits of e-health systems through reduced varieties and cost savings and avoiding duplication in service delivery.

Moving toward an ICT-based information system: Update from Cameroon

Mr. Calvin Tonga presented Cameroon's experience with ICT in which he stated that the main data quality issues specific to Cameroon are internal and external inconsistencies, failure to triangulate data, and poor documentation. The introduction of an electronic information system helped reduce immunization issues arising from mobility and made it easier to track the children but resulted in fragmented health information subsystems, a multiplicity of data collection tools in the field, increased workload for already insufficient staff, disparities in the processing of data from different programs, inadequate quality of health information, and upscaling of data with low feedback. To redress this situation, a national strategic plan for health information systems strengthening was developed, which culminated into the development of an integrated platform of data management through the DHIS2. To date, ten regions and 189 health districts of the country are now equipped with computers and internet modems and their staff trained in the use of this platform; the national health map, which includes geolocation, has been updated and health facilities provide information on the paper-based monthly activity report. In relation to EPI data, ICT was included in the 2016 version of the District Vaccination Data Management Tool (DVDMT) and deployed in all of the regional units and 85 percent of the health districts with data capture exclusively done at district level. There has been a development of a semi-automated system for transferring data from the region's DVDMTs to the medical database. As a learning point, ICTs have a strong potential for improving the health management information system (HMIS) that Cameroon can explore with the DHIS2 data management platform. Further, the EPI contributes to development and deployment of DHIS2, hence the migration from DVDMT/RIM to DHIS2. Lastly, EIRs can help solve some critical immunization data quality issues and the BLN presents an opportunity for the digitization process.

Packaging session

This session was jointly facilitated by Digital Impact Alliance (DIAL), WHO, and PATH, where the focus areas for the presentation were the Digital Health Implementation Toolkit (DHIT), packaging overview and update, and the BID briefs on the DHIT. The first segment was on the DHIT in which participants were guided on steps for planning for a digital toolkit. Participants learned that it is critical to map resource requirements for implementing the toolkit as well as formulate an implementation strategy, inventory and management. However, the resource continuum requires identification of what you already have/know and uses resources where they are required. The second segment was on BID packaging, which highlighted how to develop a digital toolkit that is user-friendly and customized to the needs of the particular service provider. WHO and PATH are currently in the process of developing a print and electronic toolkit that is connected to the first-ever WHO guidelines on digital interventions. The presenter gave a brief history of the toolkit development process from the December 2015 Arusha meeting to date.

The presentation also touched on the WHO Classification of Digital Health Interventions. The digital implementation system is available online at www.digitalhealthatlas.com. The Digital Health Atlas (DHA) is a global web platform to curate digital health intervention supporting governments, donors, technologists, and other stakeholders. However, the atlas, as in most digital innovations, has problems of uncoordinated investment, development, and reinvention of tools; poor understanding of existing goals, functionality, and maturity of existing digital systems;

inability to compare digital systems in a standardized way; and inadequate registry mechanisms that offer value to all stakeholders. The presenter went on to elaborate on the DHA inventory approach, which supports government-led mechanisms, unique identification and categorization of specific investments, data files, and said that customization will be added in by end of 2017. This was followed by a demonstration on the portal.

Panel discussion: Change management for health information system improvement

The objectives of this session were to share lessons from the Southern Province and to gain insights into how partnering in change management between the BID Initiative and the MOH has impacted the health systems in the Southern Province. There was a panel discussion featuring health facility staff and BID implementers sharing what they learned during the two years they have been carrying out change management activities for the development of a data use culture to support improved health service delivery. To moderate the discussion, questions focused on the panelists' experiences with change management interventions and how they have impacted the health information system, what lessons have been learned, what challenges exist, what solutions have been identified, and what recommendations would be made.

Change management interventions and how they have impacted the health information systems:

The panelists noted that there is always resistance to change, but the approach taken matters. Initially, the introduction of the EIR system seemed like a lot of work, but with time, the users came to appreciate the advantages of the system, such as information is readily available and the health staff are now able to track defaulters easily. The system is only cumbersome when populating the initial entries and backlog; however, the involvement of volunteers has helped. Generally, the panel reported that the system has more benefits in health service delivery and they hope that it will bring positive change to the way business is done. The mothers have also come to appreciate the new system, knowing that their children will be tracked and followed up more closely and that improved workflows makes work much easier.

Existing challenges:

The panelists reported that the ZEIR does not allow for backdating entries of child weights. It was further noted there are problems encountered by facilities that do not have internet access, though fortunately the system works in offline mode and an inclusive approach would be used where infrastructure development would be key in going forward. The panel also stressed that because of the offline functionality, laptops or tablets would be used during community outreach sessions.

Lessons learned:

1. Change management always encounters various challenges, ranging from resistance to not sharing the same vision.

2. Human resource is a key element in achieving desired change management objectives, hence the need to engage with and support health workers when managing change.
3. When approaching change management, not everything must be changed but rather areas which need to be changed must be identified.

Recommendations:

1. Health facilities with more than 22 staff should be provided with at least one extra tablet.
2. To reduce data entry gaps, facilities that provide outreach services should also be availed more than one tablet.
3. Consideration should be made to allow for weights to be backdated.
4. PATH should make frequent backstopping visits to the facility for on-site orientation to tackle challenges, especially in the initial stages.

Poster presentations

There were poster presentations from Cameroon, Mali, Côte d'Ivoire, Burkina Faso, Zimbabwe, Senegal, and Mozambique. Each country highlighted its respective project background, funding source(s), the approach used, status of implementation to date, further impact, lessons learned, challenges and the way forward.

Each country explained the contents of its poster, summarized as follows:

- Burkina Faso—"*Improving Vaccination Data Recording, Approaches to Improve Vaccination Data*." The approach was a field research in ten health districts and the key lesson was that vaccine coverage varies with primary data source.
- Cameroon—"*e-Health Implementation and Progress in Cameroun*," where health facilities are reporting directly in the national electronic system. Key lessons learned were that successful integrated data management requires commitment from health system authorities, stakeholder involvement, multiple partnerships, and support of help personnel.
- Côte d'Ivoire—"*Integration of an Early Warning System into the DHIS2 in Côte d'Ivoire.*" The highlights of this presentation were the use of local language in epidemiology and how community health workers are using their own mobile phone SMS alerts transmitted on the DHIS2 platform.
- Mozambique—"*Improving the Quality of Immunisation Data.*" The presentation covered the Nampula Province of Mozambique and touched on the problems associated with data quality.
- Mali—"*Integrated Digital Information System (SNISI).*" Aimed at improving the availability, quality, dissemination, and use of health-related data in Mali. The SNISI helped improve overall data quality in the National Health Information System.
- Senegal—"*Data Integration of DVDMT and DHIS2 Tools.*" Immunization data has been collected using the DVDMT, while the District Health Information Software (DHIS) was introduced in 2014 as a single data warehouse for the management of the National Health Information System. Until recently, the EPI and Health Information System Division has integrated both tools for greater efficiency in data completeness and promptness.

- Zimbabwe—"*Strategies for Improving Immunization Coverage and Reporting in Zimbabwe*." Previously, immunization data were captured manually at district level but it is now done using electronic platforms.

Demonstrations

The Zambia Electronic Immunization Registry

Paul Nindi, BID systems project manager, gave a demonstration of the Zambia Electronic Immunization Registry (ZEIR) after which it was open to the floor for discussion. The discussions were centered on data management for mobile children, end user motivation, vaccine batch numbers versus vaccine adverse reactions, supply chain management, system generation identification numbers and data validation.

Logistics Management Information System in Zambia: Logistimo

To supplement the ZEIR demonstration, Mr. Guissimon Phiri, chief logistician, EPI for the Zambia MOH, gave a demonstration of the Logistimo, a web-based logistics management information system. He informed the participants that Zambia realized there was need for an electronic logistics management information system to address visibility of inventory and based on assessments. The country participated at the TechNet Thailand in 2015 and that marked the beginning of the process. With support from WHO, the team went to India for a learning visit and scale-up with support from UNICEF. The training of service providers that commenced in 2015 has culminated into 18 out of 103 districts in Zambia being trained to date. By 2017, the system has included temperature monitoring and it also enables day-to-day monitoring of vaccine movements. Mr. Phiri cited the major challenges as high staff turnover, poor internet connectivity, and absence of equipment. The system is still not available at facility level. The way forward entails advocating for more support to enable capacity-building and focusing on the key enablers of the system.

Session 4: Future Perspectives on BID/BLN

The objective of this session was to receive input on the BID/BLN scale-up, sustainability, lessons learned and recommendations as well as to recognize performance of the BLN members. Brainstorming sessions were conducted through a knowledge café. The session also included receiving a report on the BLN study visit to Chile and a demonstration of the SmartCare system while there were facilitated interactions between partners and country delegates.

Analytical paper on lessons learned, challenges, and opportunities for the sustainability of BID/BLN

Ms. Seymour and Ms. Werner from the BID Initiative centered on sharing of lessons that emerged across the initiative's work in Tanzania and Zambia. They highlighted the primary lessons as a way to help other countries have more efficient and smoother experiences with

similar initiatives, particularly as they address challenges. The two countries embarked on the same project but used different approaches. Tanzania focused on data use mentors, identifying intervention use and electronic information systems such as the TImR and VIMS, and on-site training and use of hybrid tools. Zambia concentrated on change management and strengthening of data analysis skills. Implementation strategy in Tanzania was based on on-site training and hybrid tools while Zambia used hybrid training (both on-site and classroom style) and an all-electronic approach. Key lessons learned from the two demonstration countries were that it is important to identify what type of interventions to use and also to strengthen the data analysis skills of the users. It was emphasized that the device (e.g., tablet) in use for the EIR is a tool and not a fix-all magic wand.

This was followed by group discussions on which lessons resonated with the participants, how they applied these lessons, and what other learnings or information would be helpful to them. There were questions around the sustainability of the BLN to which the response was that discussions were in progress with potential funding partners and it also depends on how many countries will commit to ownership of the network.

SmartCare Zambia

There was presentation on the SmartCare project, an electronic health records system that supports clinical care and continuity of care by providing confidential portable health records to clients on a “smart card.” This system is aimed at improving continuity of care where existing paper systems are insufficient to provide this service and is a joint activity between the Zambia MOH and CDC, together with other cooperating partners. The SmartCare system is used at the health facility level and is also currently being used in Ethiopia and South Africa. The system was designed for use in regions with unreliable power and limited telecommunication infrastructure. Another SmartCare strength is that migrant patients no longer need to be held accountable for remembering their own health records. The smart card they carry in their wallets, which hooks up to the SmartCare network, will inform any clinician of their medical histories.

Lessons from Chile

Dr. Sydney Shampile, Zambia National e-Health coordinator, shared the outcomes of the BLN study visit to Chile’s Registro Nacional de Immunizaciones (RNI), comprising a team of six health information specialists from Zambia and Ghana. The study visit was conducted in collaboration with the Pan American Health Organization, which supported the participation of EPI specialists from Bolivia, Colombia, Costa Rica, and Honduras. Dr. Shampile gave a brief overview of the visit, highlighting the objectives, which primarily were to learn from the RNI whose implementation is at 100 percent coverage and includes the private hospitals who are all reporting immunization data into the national system. Some of the RNI challenges alluded to were around change management issues in which the users were skeptical about the system and weary of the dual reporting (paper and electronic). In a contrastive analysis between the ZEIR and the RNI, he pointed out that the former is also a good system in that it supports both online and offline functionality, it is simple to navigate and easy for new users to familiarize

themselves with, is scalable, and new functions can be added to it. However, given the knowledge gained in Chile, the potential areas for improvement on the ZEIR include the need to strengthen the unique identification number, linking to civil registration systems, and the ability to show batch numbers and expiry dates of all vaccines.

Major lessons learned from the visit were that implementation of a successful EIR:

1. Sometimes requires a standalone system.
2. Requires a strong political will and supportive legal framework.
3. Must ensure that clear standards, guidelines, and protocols are in place.
4. System should be applicable to both private and public health facilities.
5. Interoperability should be possible with other systems in other relevant department births and deaths.
6. Need for a robust change management framework and committed workforce.
7. It should also have a module for stock management of vaccines and kits.

The African and Latin American participants agreed on continued collaboration through information and experience sharing on virtual platforms such as Google Groups, webinars, and blogs. However, the presentation underscored the fact that “electronic platforms are here to stay!”

Knowledge café on the sustainability and evolution of BID/BLN: Synthesis

This session allowed participants to brainstorm around creative solutions in moving the BLN forward and was conducted to answer a predefined set of questions. It was followed by a plenary discussion on the key recommendations from the brainstorming on the evolution and sustainability for the BLN:

1. **What strategies can be used to better engage stakeholders to ensure alignment, scale, and sustainability of e-registries?**

Participants acknowledged that the success of an EIR could be accelerated through (multi) stakeholder collaboration and that there should be representation of key stakeholders aligned around a common framework, vision, and goals. The roles and responsibilities of each stakeholder should be clearly articulated while leveraging on their respective comparative advantage. Further, there is need to strengthen the BLN and create a community technical working group.

2. **As we adopt ICT-based solutions, how can the security of data be assured in African countries?**

To mitigate against cyber security risks, participants noted the need to formulate national data security policies that govern and provide oversight and accountability mechanisms to address privacy, security, confidentiality, and operability standards, regulation, and policies. They also noted the need for local hosting of EIRs at a national data center for data storage, management, and protection.

3. **What strategies should be adopted to create country ownership of ICT-based information systems, including the registries we have been discussing?**

Country ownership should be user-centric from inception to iterative development and implementation of systems. There should be comprehensive ICT programs integrated within the school curriculum and strong national ownership, planning, and sponsorship through respective national e-health strategies and ICT policies. Participants also noted that stakeholder involvement from inception is cardinal.

4. **What are the critical capacity-building needs required to ensure scale and sustenance of ICT-based immunization information systems in the African context?**

Health systems strengthening is the key driver to improvements in health service delivery. It was proposed that the development of legislative frameworks will address ICT capacity-building needs for infrastructure, human capital, and training standards. Further, there is need for deliberate efforts to leverage existing capacity while ensuring sustainability. These include standardized data collection tools and supportive supervision.

5. **Improving immunization data quality is one of the issues addressed in the Addis Declaration on Immunization (ADI) road map to attain country coverage and equity goals. What can BLN countries do to position themselves to effectively implement the ADI road map and specifically on data quality under strategy three?** (Reference: *http://immunizationinafrica2016.org/ministerial-declaration-english/*.)

In the context of the ADI roadmap, participants proposed that the BLN countries should invest in robust data management systems to track progress on data collection, quality and use. In this regard, there is need to ensure enabling ICTs and availability of skilled human resources. The countries should also prioritize the development of universal data collection tools, data quality plans which should include periodic data audits.

6. **If we were to continue with BLN, what would you like it to look like in terms of scope and the governance structure? What business models can be considered to ensure sustainability of the peer-learning network and ensure its transformation into an effective African-led community of practice?**

    a. *Governance Structure*—The BLN should be institutionalized with its administrative and technical activities coordinated by a Secretariat. The member governments should consider having the BLN adopted under a regional body such as the African Union (particularly as it relates to the ADI). There should be internalization of BLN activities in all the member countries such that it is included in the planning cycles and each country shall appoint a focal point person from the EPI or HMIS units to deal with the affairs of the network. There should be accountability at all levels with standardized reporting tools in place. The scope of the BLN should be broadened beyond immunization to include but not be limited to maternal, newborn, and child health; HIV; and malaria. Technically, the network should advocate for interoperability among the health information systems

as this would be a cost-effective mechanism for sharing data and ensuring data quality improvements.

b. *Sustainability*—This largely depends on stakeholder involvement and thus should consider a multi-sectoral approach inclusive of civil society and private sector. The network should not be confined to the African countries but should bring on board developed countries in order to learn from them. Additionally, the network should be able to sustain itself through cost sharing among countries by way of allocating finances from the national health budgets. Resource mobilization can also be attained by pooling financial resources from among the countries through the African Union.

c. *Business Models*—These should consider advocacy for funding and maintaining the network and forge partnerships, particularly from the private sector.

Partner Market Place

The Partner Market Place gave the partners and BLN country delegates an opportunity to interact and highlight priority areas as well as respond to specific inquiries. Major partners in this session included the Gates Foundation, CDC, and the Centre for Infectious Disease Research in Zambia, the Catholic Medical Mission Board, UNICEF, USAID, and WHO.

Photo: PATH/Reuben Mwanza. BID Global Director Laurie Werner awards Dr. Boris Bleou from Cote d'Ivoire with an award for the best poster presentation.

Awards for Outstanding Contributions to the BID Initiative

The awards session was aimed at recognizing those who had made notable contributions to improving data collection, quality, and use through active participation in advancing the goals and objectives of the BID Initiative and the learning network. The awards were in four categories:

1. **Individual Awards**

Sister Georgina Muunga from Linda Health Facility, Livingstone Zambia; and Nadeiti Binta from Faith Dispensary, Tanzania, were recognized for being the most consistent users of the ZEIR and TImR, respectively.

2. **Health Facility Award**

In Tanzania, the award went to Wasso Hospital, Arusha in Ngoro Ngoro District for being the best-performing health facility in relation to data collection, management, and use following the implementation of the TImR. In Zambia, the Nkabika Health Post was awarded for being the best adopter of the ZEIR.

3. **BLN Director's Award**

Ghana Health Service was presented with the BLN Director's Award for outstanding commitment to information sharing and peer learning.

4. **Best Poster Award**

Côte d'Ivoire received the Best Poster Award on the basis of scoring the highest marks on usefulness and relevance of information in relation to timely availability of data and its quality and use/contribution to design and scale of immunization registries/contribution to strengthening health information systems in Africa.

Evaluation

The participants were given the opportunity to provide feedback on their experience at the conference using meeting evaluation forms. The feedback survey also served as a mechanism to determine areas of interest for future iterations of the learning network. The evaluation questionnaire was built around feedback on the meeting objectives, technical content, logistical arrangements, facilitation, key lessons learned, importance of the lessons, and action plans. A paper-based form and an online BLN analysis form were sent out to all non-PATH participants. Summaries of the observations are highlighted below:

- **Overall rating of meeting:** Over 72 percent of the participants rated the meeting as being "excellent" in relation to the quality, facilitation, and technical content and interpretation services.
- **Most valuable aspects of the meeting:** Field visits, exchange of information, a rich mix of sessions, and the Partner Market Place.
- **Least-liked aspect of meeting:** There was a general observation that the meeting was too saturated and there was very little time to discern the contents or take some social time off to visit tourist attractions (e.g., the Victoria Falls).
- **Proposed improvements:** Consideration of distance, timing, and transportation for site visits. It was also noted that more partners should be invited to meetings for the Partner Market Place to be meaningful.
- **Peer-to-peer learning:** An overwhelming majority of participants reported that the meeting provided peer-to-peer learning opportunities.
- **Key lessons learned:**
    - "Deployment of e-technology does not mean that data quality issues will be resolved."
    - "Community engagement is essential for success of program."
    - "Innovation and human capital are important for improved data quality."
    - "There is need to pilot initiatives before deploying to scale."
- **Importance of lessons learned:** "Guides the choice of applications, increases political will, financial commitment, and stakeholder involvement."
- **Some proposed names for future iteration of BLN:**
    - Maternal and Child Health Learning Network (MCHLN)

  - Network for Improved Data Quality (NIDQ)
  - African Learning Network for Better Health Data (ALNBHD)
  - Better Health Data Network (BHDN)
- **Action plans:** Most participants were looking forward to sharing what they learned at the meeting with EPI/HMIS colleagues on their return back home, and they did not require technical support from BLN to undertake the follow-on activities. The estimated time frame for follow-up of action plans by BLN was within six months.

Way forward

Dr. Chilunga Puta thanked all individuals and organizations who made the BLN discussion meeting a success. Drawing on the issues, deliberations and calls to action that were discussed during the four days of the meeting, she said the way forward for the BLN lay in sourcing funding to ensure its continuity. She acknowledged that the governments of Tanzania and Zambia were actively pursuing financing options for scaling while PATH is considering key learnings and steps forward for collaborating with the governments of other countries. Recommendations are summarized as follows:

1. Advocate for leveraging of resources toward the sustainability and institutionalization of the BLN.
2. Advocate for leadership from various governments and allocation of resources toward the BLN.
3. Create a BLN Secretariat with a defined governance structure and funding.
4. Identify focal point persons in each country to manage BLN activities.
5. Form a technical working group on maternal, neonatal, and child health data management systems.
6. Engage major stakeholders, including other funding partners, civil society, and the private sector, in BLN activities.
7. Ensure synergies and interoperability between and among systems.

Closure

Dr. Francis Mwansa closed the meeting on behalf of the Zambia MOH. In his closing statement, Dr. Mwansa thanked all the delegates for actively taking part in the deliberations that resulted in the meeting being a huge success. The number of participants from the different countries already demonstrated the commitment by various governments represented. He wished all the participants safe journeys back to their respective homes.

To access presentations from the BLN Discussion Meeting, please visit the BID website.

Appendix 1. Agenda

Sunday September 17, 2017	**Arrival of Country Delegates**
All Day	**Arrival of Country Delegates**
Evening	**Dinner (own arrangement)**
Monday September 18, 2017	**Pre-Meeting Event**
08:30–15:30	BID-PATH/WHO and DIAL User Testing Workshop (Ms. Hallie Goertz) • Digital Health Implementation Toolkit • Principles for Digital Development Toolkit
15:30–17:30	Enterprise Architecture Workshop (Prof. Jennifer Nyabukenya)
Evening	**Dinner (own arrangements)**
Tuesday September 19, 2017	**Session 1: BID Initiative—progress, challenges, and next steps** **Chair: Zambia** **Rapporteurs: Senegal and Malawi** **Sub-objectives:** • **Receive update on what has been accomplished in the two BID demonstration countries** • **Conduct field visit in host country** • **Discuss reported challenges and offer recommendations**
08:00–09:00	**Opening Ceremony** **Facilitator:** Zambia Ministry of Health/BID Zambia **Description:** The Permanent Secretary will officially open the workshop and it is anticipated that key development and collaborating partners (WHO, UNICEF, USAID, and World Bank) will give short speeches to the participants.

09:00–11:00	**The BID Initiative in Zambia**—What have you done for me lately? **Facilitators:** Ms. Mandy Dube and Zambia MOH Team **Description:** With just over seven months left before we bid the BID Initiative farewell in its current form, shape, and scope, what do we have to show for our work? What are the life lessons and the crown jewels that we will leave the world? Have we set out a path soon to be well worn, or will our journey remain the road less traveled? This session will present key achievements, remaining hurdles, and prospects for a future iteration of BID in the context of the lessons that have been learned.
11:00–11:30	**Tea/Coffee Break**
11:30–13:00	**The BID Initiative in Tanzania**—Progress, Challenges, and Future Perspectives **Facilitators:** Dr. Lyimo, Mr. Mtenga, and Mr. Luoga **Description:** This session will provide the participants with Tanzania's experience in addressing immunization coverage and inequity though implementation of electronic data systems and data use interventions across all levels of the health system, that is, implementation of an electronic immunization registry integrated with a vaccine supply chain information system. The session will provide participants with challenges, lessons learned, and success stories emerging from implementation.
13:00–14:00	**Lunch**
14:00–15:30	**Panel Discussion:** Country Perspective of the BID Initiative **Facilitators:** Ms. Dube and Mr. Mtenga **Description:** Four panelists from the ministries of health of Tanzania and Zambia will present their perspective on the BID Initiative and discuss what they see as accomplishments, challenges, and prospects for the initiative.
15:30–16:00	**Tea/Coffee Break**
16:00–17:00	Change Management Brainstorming
17:00	**End of Day**
17:30–19:30	**Welcome Cocktail**
Wednesday September 20, 2017	**Session 2: Site Visit**

07:30–17:30	**Site Visit to Mazabuka BID Initiative Sites** **Facilitators:** Mr. Njobvu and Ms. Dube **Description:** Meeting participants will be driven to Mazabuka District in the Southern Province of Zambia to visits sites where the BID solutions have been implemented. Eight facilities will be visited and each group will be expected to have a rapporteur who will be responsible for summarizing the group's observations and reporting back to all the participants in plenary the following morning. The facilitators will provide detailed guidance for the participants.
Thursday September 21, 2017	**Session 3: Health Information Systems in Design Countries** **Chair: Mali** **Rapporteurs: Zimbabwe and Burkina Faso** **Sub-objectives:** • **Receive update on what has been accomplished among BLN countries in the African region** • **Discuss reported challenges and offer recommendations**
08:00–09:00	**RECAP:** Feedback from the field visit **Facilitator:** Mr. Njobvu and MOH **Description:** The rapporteur from each group will give a five-minute presentation on the team's observations and recommendations. There will be time for questions and comments from the meeting participants.
09:00–10:00	**Initiating Immunization Registries: The Gambia Experience** **Facilitator:** Mr. Mbye Njie **Description:** The Gambia will share their experience in initiating an immunization registry in Gambia. They will describe both preparatory and implementation activities and relate the challenges and successes that they have had. The session will highlight opportunities and lessons learned. This will be opportune for all those thinking about initiating immunization registries in the African context.
10:00–10:30	Tea/Coffee Break

10:30–11:30	**Electronic Information Systems: Lessons From Uganda** **Facilitator:** Prof. Jennifer Nyabukenya **Description:** The immunization registry or immunization information system is a confidential, population-based, computerized information system that attempts to collect vaccination data about all persons within a geographic area. It consolidates the immunization records from multiple sources for each person living in its jurisdiction. This session will describe an Immunization Registry or Immunization Information System in Uganda that collects vaccination data and consolidates the immunization records from multiple sources for each person living in its jurisdiction. Uganda's vision for the future of immunization information management is that "Real time, consolidated immunization data and services for all ages are available for authorized clinical, administrative, and public health users and consumers, anytime and anywhere." This session will share Uganda's experience as they have been working on their electronic registry.
11:30–13:00	**Packaging Session**—Key responsible: Ms. Hallie Goertz **Facilitators:** DIAL, WHO, PATH **Description:** The team will share information on upcoming publications, tools, and resources relevant to the BLN community.
13:00–14:00	**Lunch**
14:00–15:00	**Moving toward an ICT-based Information System: Update from Cameroon** **Facilitator:** Mr. Calvin Tonga Session: This session will describe electronic immunization registry implementation milestones in Cameroon. This will cover an overview, situation analysis, processes, successes, and gaps.
15:00–16:00	**Panel Discussion: Change Management for Health Information System Improvement** **Facilitators:** Ms. Bwakya and MOH Staff **Description:** During this session health facility staff and BID implementers will share what they have learned during the two years they have been implementing change management activities to enable the development of a data use culture to support improved service delivery through availability of high-quality data and its effective use in decision-making for better programming.
16:00–16:30	**Tea/Coffee Break**

16:30–17:30	**Country Poster Session/Demos** **Facilitator:** Ms. Kambandu **Description:** BLN countries will present their posters during this time and a panel of judges will go around each poster and mark it against set criteria. The top two posters will be awarded BLN prizes.
17:30	**End of Day**
Friday **September 22, 2017**	**Session 4: Future Perspectives on BID/BLN** **Chair: Uganda** **Rapporteurs: Cameroon and Ghana** **Sub-objectives:** • **Interaction between partners and country delegates** • **Receive input on scale, sustainability, and new face of BID** • **Receive lessons learned and receive recommendations** • **Recognize performance**
08:30–09:30	**Analytical paper on lessons learned, challenges, and opportunities for the sustainability of BID/BLN** **Facilitators:** Ms. Werner and Ms. Seymour **Description:** This session will focus on a high-level sharing of lessons that emerged across the BID Initiative work, particularly in Tanzania and Zambia. The primary lessons of the initiative will be shared as a way to help other countries have more efficient and smoother experiences with similar initiatives as they address their data challenges. The larger group will then discuss which of these lessons resonate most with them, how they may apply those lessons, and what other learnings or information would be helpful to them in the work they are doing.
09:30–10:00	**Lessons from Chile—Dr. Sydney Shampile**
10:00–11:15	**Knowledge Café: Sustainability and Evolution of BID/BLN** **Facilitators:** Dr. Puta and Ms. Muyawala **Description:** This will be a brainstorming session conducted in the form of a knowledge café. Participants will be divided into six groups and will in rotation answer six questions placed at one each of six tables. Each group will discuss the question at hand and record their discussion on a flip chart until all six groups have answered all six questions.
11:15–11:30	**Tea/Coffee Break**

11:30–12:30	**Synthesis of Outcomes of Knowledge Café** **Facilitators:** Ms. Mutesa and Ms. Kambandu **Description:** This will be a plenary session during which the facilitators will summarize the key recommendations from the brainstorming under the key themes based on the questions addressed. Key recommendations on evolution and sustainability for the BLN will be drawn from this discussion.
12:30–13:30	**Partner Market Place** **Facilitators:** Ms. Dawn Seymour, Ms. Muyawala, and Ms. Kambandu **Description:** This session will give opportunity for country and partner delegates to interact. The partners will be allocated roundtables where they can highlight their priority areas and respond to country delegate inquiries/questions.
13:30–14:30	**Lunch**
14:30–15:00	**Award Ceremony** **Facilitators:** Dr. Puta and Ms. Werner **Description:** In this session individuals and facilities will be recognized for their notable contribution to improving data availability, quality, and use through their active participation in advancing the goals and objectives of the BID Initiative.
15:00–15:45	**Evaluation and Next Steps** **Facilitator:** Dr. Puta **Description:** Participants will complete meeting evaluation forms and a network analysis questionnaire online. There will then be a discussion of next steps.
15:45–16:00	**Closure –** Dr. Mwansa Francis – Zambia Ministry of Health
16:00	**END OF MEETING**

Appendix 2. List of Participants

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