



14th TechNet Conference

Immunization Supply Chain and Logistics:
Current Challenges, Innovations,
Future Prospects

**MAY 11-15, 2015
BANGKOK, THAILAND**

**Conference
Report**



IMMUNIZATION
SUPPLY CHAIN HUB



PLANNING PARTNERS



FUNDING



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Preface

On behalf of the WHO and UNICEF Immunization Supply Chain and Logistics Hub and the TechNet Planning Committee, we were delighted to welcome over 260 participants to the 14th TechNet Conference, which took place at the Conrad Hotel in Bangkok, Thailand from 11 to 15 May, 2015.



The 14th TechNet Conference took place 25 years on from the first TechNet Conference in Nicosia, Cyprus in 1990. Despite all the time that has passed, many of the topics discussed at the first conference remain relevant today. Furthermore, a continuous flow of evidence shows that immunization supply chains designed and developed over three decades ago at the start of EPI have outgrown their ability to manage this decade's priorities of introducing new vaccines, vaccinating age groups beyond infancy, and addressing the equity gaps in access to all vaccines at the last mile.

While these systems have shown extreme resilience in dealing with the growing challenges with limited funding, they have done so by resorting to ad-hoc solutions and unsustainable coping strategies. The limitations of these approaches have now been reached, to the point where in-country immunization supply chains remain crippled by inefficiencies in vaccine storage, distribution, vaccine management and stock control, and are becoming a serious bottleneck to addressing the equity gaps in vaccination and achieving future immunization goals.

Ignoring these challenges is no longer possible. Piecemeal and fragmented approaches to alleviate immediate pressures will not solve perennial problems identified 25 years ago, nor the new challenges of this decade.

Conference format

Faced with mounting concerns and the need to prioritize immunization supply chains as a pillar of immunization and health systems strengthening, WHO and UNICEF, under the umbrella of the Immunization Supply Chain and Logistics Hub, selected the theme of the 14th TechNet Conference to be: “Immunization Supply Chain and Logistics: Current Challenges, Innovations and Future Prospects”.

Based on the theme, the first three days of the conference covered current challenges and innovations through six supply chain focus topics (two were covered each day). The last day of the conference focused on the Future prospects part of the conference theme.

Table 1. Overall conference format

Day	Focus	Topics
Tuesday	Designing the supply chain	<ul style="list-style-type: none"> • Network redesign for the future and rethinking more fundamental supply chain design elements, such as integration and private sector engagement. • Ensuring that supply chain design addresses the basics in vaccine management best policies and practices.
Wednesday	Equipping the supply chain	<ul style="list-style-type: none"> • Equipping supply chains with new cold chain technologies and approaches that can extend the reach of vaccines to the last mile. • Protecting vaccine potency during storage and transport by equipping supply chains with continuous temperature monitoring systems and technologies.
Thursday	Managing the supply chain	<ul style="list-style-type: none"> • Improving supply chain management by implementing new approaches to strengthen human resources for logistics. • Managing the supply chain with improved approaches in Logistics Management Information Systems (LMIS).
Friday	Enabling the supply chain	<ul style="list-style-type: none"> • Enabling country-driven improvements to supply chains with global strategies, policies, and advocacy.

Events at the TechNet Conference were organized into the formal agenda and side events. On the formal agenda, plenary sessions occurred each morning for all participants with global updates and country-specific experience/innovations on the two daily focus topics. The morning plenary sessions were intended to provide overall updates without much in-depth discussion due to the time constraints. This was the purpose of afternoon interactive sessions organized to go into more depth on the two daily focus topics through lunchtime round table discussions, expert panel discussions, and focus-topic breakout sessions.

Long lunch and afternoon coffee breaks allowed participants to visit the various side events organized around the TechNet Conference:

- Manufacturers Marketplace, where vaccine and equipment manufacturers showcased their latest devices, products and cold chain technologies, including temperature monitoring devices, in the
- Innovations Café, where innovations in data systems, temperature monitoring technologies and modelling tools were demonstrated in the, enabling participants to learn about a particular technology innovation for the supply chain. Experts in each technology hosted an informal discussion and hands-on demonstration of the technology.
- Project Gallery, where participants were able to learn about a wide variety of immunization projects and initiatives by browsing more than 40 posters from over 20 different organizations in the. Short presentations on selected posters were also given at scheduled times.
- Video Gallery, where participants were able to watch a selection of recently released immunization-related videos and take part in Q&A sessions with the filmmakers
- Resource Library, that provided a collection of useful immunization resources submitted by conference participants.
- TechNet-21 Clinic, where technical assistance related to using the www.TechNet-21.org website and e-forum was possible.

Conference attendance

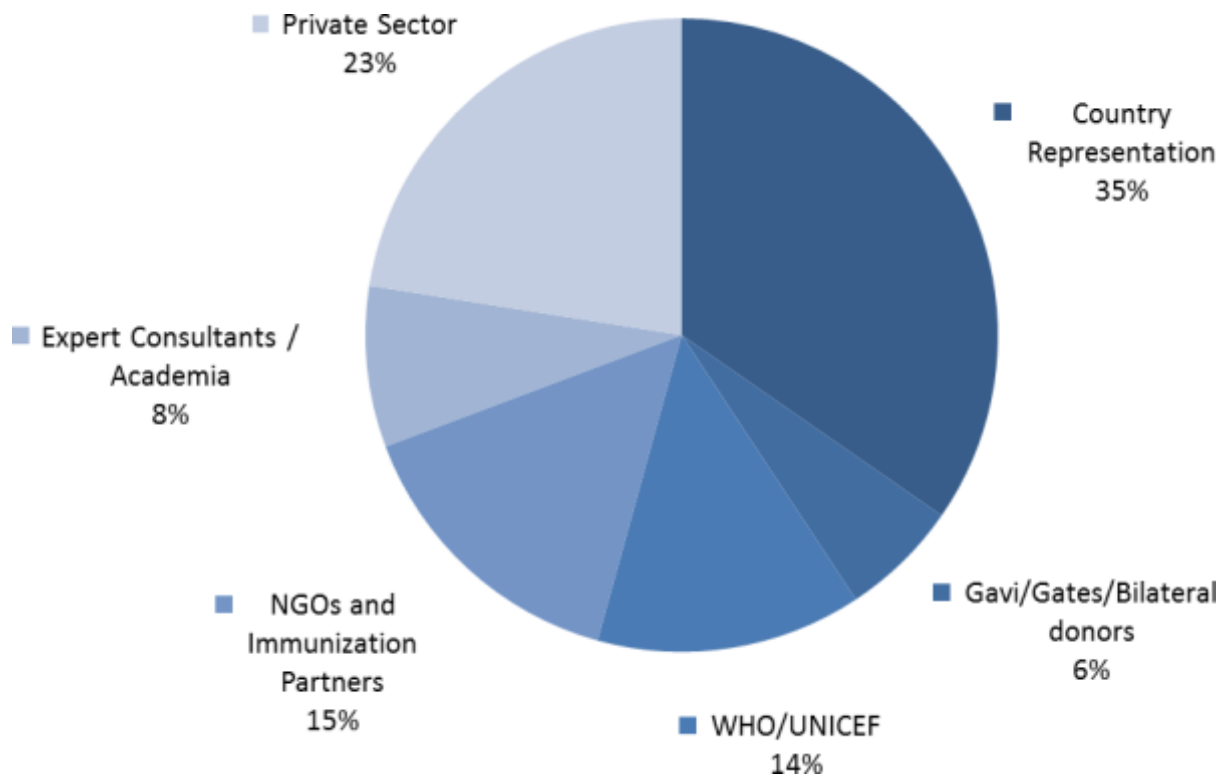
Over 370 participants expressed interest in participating in the 14th TechNet Conference. Given the size of the venue and budget constraints, we were forced to make difficult decisions on participation.

In the end, over 260 participants representing a wide spectrum of stakeholders from public and private sector joined the conference.



The figure and table below illustrates the composition of participants by main grouping and by types.

Figure 1. Profile of participants by main groupings*



* The number of participants in each group is the figure in brackets.

Immunization officials from ministries of health in 27 countries were represented. Beyond that, more than 51 countries were represented at the 14th TechNet if participants from partner agencies based in country are included.

The following countries were represented at the conference: Afghanistan, Australia, Bangladesh, Benin, Cambodia, China, Colombia, Congo Rep., Côte d'Ivoire, Denmark, DR Congo, Egypt, Ethiopia, Gabon, Hong Kong, Iceland, India, Indonesia, Iran, Iraq, Ireland, Italy, Japan, Kenya, Lao PDR, Lebanon, Luxembourg, Malaysia, Mali, Mozambique, Myanmar, Nepal, Netherlands, Nigeria, Oman, Pakistan, Philippines, Saudi Arabia, Senegal, Singapore, Somalia, South Africa, Switzerland, Tanzania, Thailand, Togo, Uganda, UK, USA, Vietnam, Zambia.

Table 2 Representation of participants by type

Type	Representatives
Ministries of health	Afghanistan, Albania, Armenia, Cambodia, DR Congo, Egypt, Ethiopia, India, Indonesia, Iran, Kenya, Lao PDR, Latvia, Malawi, Mozambique, Myanmar, Nepal, Nigeria, Senegal, Sri Lanka, Swaziland, Tanzania, Thailand, Togo, Turkey, Uganda, Vietnam
UN agencies & donors	JICA, Gates Foundation, Gavi, Luxembourg Development, UNDP, UNICEF Country Offices, UNICEF Headquarters, UNICEF Regional Office (EAPRO), UNICEF Regional Office (ESARO), UNICEF Regional Office (ROSA), UNICEF Regional Office (WCARO), UNICEF Supply Division, UNICEF Supply Division, UNOPS, US Fund for UNICEF, WHO Country Offices, WHO Headquarters, WHO Regional Office (AFRO), WHO Regional Office (AMRO), WHO Regional Office (EMRO), WHO Regional Office (EURO), WHO Regional Office (WPRO), WHO IST CA office (AFRO)
NGOs & partners	3rd Stone Design, AMP, CDC, CHAI, eHealth Africa, Global Good, HCWH, ICDDRDB, Imperial Health Sciences, Intellectual Ventures, JSI, LIGTT, Llamasoft, Logistimo, MSF, Nexleaf Analytics, PATH, People That Deliver, Public Health Foundation India, Riders for Health, Solar Electric Light Fund, USAID, Vax Trac, VillageReach
Academia	Carnegie Mellon University, KVG Medical College, MIT, University of Michigan, University of Pittsburgh, University of Washington
Expert consultants	Cold chain consultants, independent consultants, McKinsey & Company
Manufacturers	Aucma, Berlinger & Co. AG, Beyond Wireless, Bio Farma, Blowkings, BPFK, Cold & Co, Colombo Smart Plastic, Controlant, Dometic, Dulas Limited, Easy Solutions, ELPRO-BUCHS, Godrej, Haier, Janssen, Japan BCG Laboratory, Merck, Nilkamal, Polestar Cooling, Quascenta, Remonsys Ltd, Savsu Technologies, Serum Institute of India Ltd, South East Solar Co., Stevanato Group, SunDanzer, Sure Chill, Taiyo Kogyo Corporation, Temptime, UPS, Vestfrost Solutions, Zero Appliances, Zhendre

Conference planning

Organizing the 14th TechNet Conference was a multi-stakeholder effort. Although the organizational leadership was provided by the WHO-UNICEF immunization supply chain Hub, it is important to acknowledge the various people and groups that contributed to the organization of this event – even at the risk of forgetting to mention some. The following people need to be acknowledged.

Members of the TechNet Planning Committee

- Andrew Brown (People that Deliver)
- Benjamin Schreiber (UNICEF)
- Brian Taliesin (PATH)
- Chris Wright (JSI)
- Debbie Kristensen (PATH)
- Diana Chang-Blanc (WHO)
- Dmitri Davydov (UNICEF)
- Musonda Kasonde (UNICEF)
- Jeff Sanderson (JSI)
- Ousmane Dia (JSI)
- Pat Lennon (PATH)
- Ryan McWhorter (UNICEF)

Agenda organizers

- Day 1: Jeff Sanderson (JSI); Ryan McWhorter (UNICEF); Ousmane Dia (JSI); Dmitri Davydov (UNICEF) and Patrick Lydon (WHO)
- Day 2: Benjamin Schreiber (UNICEF); Pat Lennon (PATH); and Sophie Newland (PATH)
- Day 3: Andrew Brown (People that Deliver); Brian Taliesin (PATH); Chris Wright (JSI); and Musonda Kasonde (UNICEF)

Side event organizers

- Manufacturers Marketplace: Alex Pascutto (WHO Consultant)
- Innovations Café: Dan Brigden (WHO)
- Project Gallery: Denise Habimana (Gavi)
- TechNet Clinic: Padmini Menon (WHO Consultant)
- Resource Library: Dan Brigden (WHO) and Denise Habimana (Gavi)
- Video Gallery: Denise Habimana (Gavi)

- Live streaming: Alex Lee (Storytelling Media)
- Conference brochure: Dan Brigden (WHO) and Rebecca Richards-Diop (Freelance Creative Director and Designer)

Chairs and rapporteurs

- Monday: Opening Ceremony
 - Chair: Patrick Lydon, WHO
 - Rapporteur: Zainab Berry, Ministry of Health, Lebanon
- Tuesday: Designing the supply chain
 - Chair: Ousmane Dia, JSI
 - Rapporteur: Modibo Dicko, independent consultant
- Wednesday: Equipping the supply chain
 - Chair: Diana Chang-Blanc, WHO
 - Rapporteur: Ticky Raubenheimer, independent consultant
- Thursday: Managing the supply chain
 - Chair: Chris Wright, JSI
 - Rapporteur: James Cheyne, independent consultant
- Friday: Enabling the supply chain
 - Chair: Andrew Brown, People that Deliver
 - Rapporteur: Mojtaba Haghgou, independent consultant

Conference organizers

- Dawadee Charnpanichkarn - Executive Project Director KDC (Knowledge Development Centre)
- Eakkapol Chatpreechakul - Events Manager, Conrad Hotel Bangkok.

Special mentions

- Sana Kisoso, Nathalie Chenavard and Corinne Desfarges, WHO Headquarters
- Aree Moungsookjareoun, WHO Thailand Country Office
- Stephane Guichard, WHO South-East-Asia Regional Office (SEARO)

Funding

The 14th TechNet Conference would not have been possible without the generous funding from the Bill and Melinda Gates Foundation.

Conference resources

The official 14th TechNet Conference Guide contains a complete description of the formal agenda and all side events, including the full conference schedule and list of participants.



The 14th TechNet Conference Guide is available on the TechNet-21 website:

www.technet-21.org/en/resources/technet-resource-library/1193-technet-conference-2015-conference-guide

The plenary sessions were streamed live and are now available to watch online. For a full list of video recordings, as well as complete access to accompanying slides and posters, please refer to the 'TechNet Conference 2015' page on the TechNet-21 website:

www.technet-21.org/home/about/tc2015

Monday, 11 May:

Opening ceremony and keynote speeches

Rapporteur: Zainab Berry, Ministry of Public Health, Lebanon

Summary of opening remarks

The opening of the 14th TechNet Conference was made by senior officials from WHO, UNICEF and the Ministry of Health of Thailand. Following a welcome message to participants, a historical review of TechNet from its inception in 1990 to today was presented, including a special tribute to Andrew Garnett who tragically passed away on 22 February 2015 after dedicating more than 30 years working on cold chain and vaccine management strengthening.

Summary of keynote speeches

The opening ceremony then shifted to keynote speeches related to the conference theme: "Immunization Supply Chain and Logistics: Current Challenges, Innovations and Future Prospects". The first keynote was from the WHO Immunization in Practice Advisory Committee (IPAC) that called-out the inattention being paid to immunization supply chains in 2013. This committee raised the alarm bells at the highest levels within WHO through a "Call to Action" that was endorsed by WHO's Strategic Advisory Group of Experts (SAGE) in April 2014. Two other keynotes illustrated the challenges that developing countries face today. One focused on the visual evidence through photos while the other presented quantitative evidence from recent assessments in 70 countries. Finally, insights on future prospects and opportunities to improve supply chain systems were presented. Before closing the opening ceremony, a review of the conference format and agenda was summarized to participants before a group photo and an evening cocktail reception.

Formal opening of the TechNet Conference

Richard Brown (WHO) and Basil Rodriques (UNICEF)



The formal opening of the TechNet Conference began with a welcome message by Patrick Lydon (WHO) and an introduction to all the guest speakers for the opening ceremony.

Richard Brown (acting WHO Representative in Thailand) proceeded to welcome all participants to Thailand and gave a brief history about the TechNet Conference and recognizing how the number of participants has increased from 32 at the first TechNet Conference in 1990 to more than 260 participants in 2015. Richard emphasized the collaboration between the two sister agencies (WHO and UNICEF) under the immunization supply chain and logistics Hub. By benefiting from the individual strengths of each agency, collectively they can overcome some of the real challenges faced by countries.

Basil Rodriques (Regional Health Advisor for UNICEF in the Regional Office for South-East Asia) gave a regional perspective on immunization and equity improvement in the region and emphasised how immunization supply chain strengthening is part and parcel of health system strengthening and the equity goal to reach the last 20% of children who have no access to vaccination.

Recording: www.ustream.tv/recorded/62218116/highlight/627867

Opening remarks from the host country

Piyanit Tharmaphornpilas (Ministry of Public Health of Thailand)



On behalf of the Ministry of Public Health Thailand and member of the WHO Strategic Advisory Group of Experts (SAGE), Dr Piyanit Tharmaphornpilas greeted all participants to Bangkok. Dr Piyanit reflected on the SAGE meeting in November 2013 and April 2014 where specific session on immunization supply chain were organized. These sessions were milestone events where the issues of immunization supply chains were

raised at the highest levels within the immunization community and for SAGE to be aware and an advocate for improvements.

Dr Piyanit proceeded to describe how much the TechNet Conference was an important forum in response to the SAGE meeting but also from a country perspective in Thailand. Indeed, in the face of growing challenges to manage more vaccines, the Ministry of Public Health in 2010 decided to entirely redesign their in-country distribution system. This included an approach of outsourcing the end-to-end distribution of vaccines to a 3rd party private sector logistics service provider. The TechNet conference was a great opportunity to share this experience with other countries and experts in an effort to promote south-south exchange of experiences on innovative approaches to address immunization supply chain bottlenecks.

Recording: www.ustream.tv/recorded/62218116/highlight/627869

The cold chain over last four decades

John Lloyd (Independent consultant)



John Lloyd gave a historical overview of the EPI and the TechNet Conference. This evolution was divided into each decade starting from 1976 when EPI was launched by the World Health Assembly.

The first decade (1976-1985) was coined the “Developmental” decade of EPI where equipments were installed and guidance was developed – from ice-lined refrigerators and cold boxes/vaccine

carriers, to logistics training materials and modules. At the time, the cold chain and logistics guidance developed in WHO through the EPI department were for primary health care and at the time, included the notion of supply chain integration. During this decade however, there was no possibility to scale up logistics systems in countries with only hardware and/or guidance. Implementation remained weak due to lack of human resources for vaccine logistics.

During the second decade (1986-1995), UNICEF decided to step-up implementation efforts as part of the Universal Childhood Immunization (UCI). It was during this “Implementation” decade that the first TechNet Conference was held despite the narrow base of partners working on immunization supply chains – mainly UNICEF, WHO, CDC and USAID. Thanks to the UCI efforts, the immunization supply chain systems in countries had been build-up and performed well. Unfortunately, these systems were subsequently taken for granted and few resources were made available for their upkeep.

During the third decade (1996-2005) efforts were diverted away from routine immunization and concentrated on eradicating polio and improving the quality of services, especially with safe injection and the use of auto-disable syringes. With the launch of Gavi in 2000 and the ambitious agenda to accelerate the introduction of HepB and Hib vaccines in the poorest countries, UNICEF realized that national central stores were not up to standard for introducing the pentavalent vaccine. In response to this, the EVSM was developed in 2004 by the WHO as a way to strengthen national vaccines stores.

The fourth decade (2006-2015) witnessed a complete transformation from a purely cold chain focus toward the vaccine supply system with the ever increasing challenges driven by new bulky vaccines (ex: first generation of rotavirus vaccine), the increasing need for cold chain storage capacity at all levels, and the need for distribution system efficacy. To this end, the Effective Vaccine Management (EVM) assessment tool was developed and today, drives the planning for immunization supply chain management. This fourth decade can really be coined the decade of “Collaboration” with many new partners engaging in immunization supply chain strengthening. This 14th TechNet Conference

highlights the variety of partners that have joined to help beyond the traditional partners like WHO and UNICEF.

Recording: www.ustream.tv/recorded/62218116/highlight/628319

Presentation: www.technet-21.org/images/TC2015/01_John_Lloyd.pdf

A tribute to Andrew Garnett

James Cheyne (Independent consultant)



James Cheyne made a special tribute to Andrew Garnett who tragically passed away on 22 February 2015 after dedicating more than 30 years working on cold chain and vaccine management strengthening. James shared some thoughts and memories of Andrew Garnett: “a giant with extraordinary achievements”.

Without Andrew’s work, many of the WHO guidelines on vaccine management would not have seen the day; important work on prequalification of cold chain equipment would not have happened, and the EVM tool would not have existed. Over the years, Andrew also developed the supply chain SOPs, training, software tool, and was intricately involved in many projects including “Optimize”. James read part of Andrew’s letter to his family and friends where he wrote at the end: “Keep on singing... and never, ever, give up”, and the session closed with a standing ovation from the audience to celebrate Andrew’s 30-year contribution to immunizations services.

Recording: www.ustream.tv/recorded/62218116/highlight/628320

Presentation: www.technet-21.org/images/TC2015/02_James_Cheyne.pdf

A "Call to Action" was born - Perspectives from an IPAC Member

Robert Steinglass (John Snow Inc. and member of the IPAC)



Robert Steinglass shared his perspective on the experience of a sub-group of IPAC members that decided to call out the inattention being paid to immunization supply chains and how the mounting challenges in countries were impacting on successfully implementing immunization programmes.

With support from the WHO Secretariat, a small working group of IPAC Members including Robert Steinglass developed a "Call to Action" for the global community of practice to no longer take immunization supply chain systems for granted and that these systems are no longer running smoothly and efficiently. With few exceptions, immunization supply chains in developing countries continue to face chronic difficulties in providing uninterrupted availability of potent vaccines up to service delivery levels, and many government-managed systems remain crippled by inefficiencies in vaccine storage, distribution, vaccine management and stock control.

A widening variety of new vaccines and immunization schedules, a greater diversity of service delivery strategies, an ever expanding target population to vaccinate, and increased cold chain infrastructure requirements are just a few of the new realities that immunization supply chain systems are being confronted with today, and for systems that were initially designed to manage fewer, less expensive and less bulky vaccines and related supplies. The IPAC "Call to Action" not only brings to light the evidence that immunization supply chains are stretched but it advocates for greater action by both national programmes and the global immunization community to strengthen Immunization supply chain and logistics. More specifically, the IPAC calls on national immunization programmes to measure, monitor and invest in their ISCL systems, and to plan and implement improvements and for the global community of partners to increase awareness and investment, to address supply chain issues when formulating immunization recommendations, and to identify and resolve knowledge gaps.

This Call-to-Action was approved by IPAC in October 2013 and endorsed by the WHO Strategic Advisory Group of Experts (SAGE) on Immunization in April 2014.

Recording: www.ustream.tv/recorded/62218116/highlight/628321

Presentation: www.technet-21.org/images/TC2015/03_Robert_Steinglass.pdf

Link to IPAC "Call to Action": www.who.int/immunization/documents/WHO_IVB_14.05

Key immunization supply chain challenges in developing countries - a photo safari

Benjamin Schreiber (UNICEF)



Using a photo montage Benjamin Schreiber provided visual illustration of the key immunization supply chain challenges that developing countries facing today and namely as results of the following changes in the past 10 years whereby:

(1) the availability of new life-saving vaccines has accelerated the pace of new vaccine introductions in countries.

Between 2010 and 2015, low and lower middle income countries are expected to introduce 300 new vaccine into their national immunization schedule. This represents 5 times more introductions as compared to the 5 year period 2000 to 2005;

(2) the annual value of vaccines procured by UNICEF for developing countries now exceeds one billion US\$ – a ten-fold increase from the value of vaccines procured in the year 2000. Coupled with this, the volume of vaccine to fully immunize a child has now risen by a factor of 11 in the past decade. This increased volume needs to be stored and transported in countries down to service delivery levels; and

(3) recent immunization supply chain assessments in developing countries revealed that most are under-performing and unable to achieve the objectives of ensuring uninterrupted availability of potent vaccines up to service delivery level. The so-called “photo safari” by Benjamin and the visual evidence was also a way of highlighting that there is little hard evidence on the full spectrum of issues faced by countries aside from the data collected via the EVM assessments.

Recording: www.ustream.tv/recorded/62218116/highlight/628322

Presentation: www.technet-21.org/images/TC2015/04_Benjamin_Schreiber.pdf

Key immunization supply chain challenges in developing countries - evidence from EVM assessments

Paul Colrain (WHO)



Paul Colrain provided quantitative evidence on the same key immunization supply chain challenges in countries presented by Benjamin but through the lens of the data compiled from EVM assessment in 75 countries. Key findings from these WHO and UNICEF supported assessments indicated that 26% of countries achieved adequate temperature control in the cold chain for the storage of their vaccines; 20% of

countries were operating with functional vaccine stock management systems; and 38% of countries had sufficient storage capacity for the vaccines and supplies needed for their immunization programmes.

Deeper analyses of the EVM sub-indicators were presented according to their impact on vaccine availability, cold chain quality and supply chain efficiency. One third of countries didn't meet the minimum standard on the vaccine availability score. For cold chain quality, only 18% had conducted temperature monitoring studies and only 20% the temperature mapping studies. Less than 50% of countries use continuous temperature monitoring devices and around 40% uses freeze indicators. For supply chain efficiency, more than 50% of countries had a cold chain equipment inventory and 90% had fully functional refrigerators.

The main gap however, was in the information systems where approximately 25% national stores still use paper based logistics management information systems (LMIS), and one third of the staff didn't receive any supportive supervision. Paul's presentation highlighted the magnitude of the challenge countries face in a context of increasing pressures to introduce new vaccines and achieve target coverage rates.

Until these country supply systems are improved, stock-outs, avoidable wastage, inadequate cold chain capacity, and potential administration of compromised or expired vaccines will continue to be bottlenecks to achieving targets for coverage, equity, and cost-effectiveness of national immunization programmes.

Presentation: www.technet-21.org/images/TC2015/05_Paul_Colrain.pdf

A global perspective on immunization supply chain prospects and opportunities

Raja Rao (Gates Foundation)



Raja Rao shared some thought-provoking perspectives on immunization supply chains prospects and opportunities. Raja first reflected on the trade-offs between the growing complexity of managing an immunization supply chain systems in today's world while focusing on simple solutions that don't add complexity. The quote from Albert Einstein of: "Everything should be made as simple as possible, but not simpler" was offered as

a way to approach the complexity versus simplicity question.

The role that other groups (apart from immunization) that help achieve the under 5 mortality and broader quality of life goals was highlighted before presenting insights on the economic and health impact of immunization; similar endeavours in global health/global development; and a brief review of vaccination coverage success through some data.

A look back on some of our collective achievements and remaining challenges was presented including the role of technology and innovation in the supply chain work. Raja's presentation ended with a description of the changing landscape of the constituencies working on immunization supply chains including how the Gates Foundation is contributing and new opportunities through the Gavi Supply Chain strategy. Raja concluded with a call for all these constituencies to work closely together towards the same objective.

Presentation: www.technet-21.org/images/TC2015/05_Raja_Rao.pdf



Tuesday, 12 May: Designing the supply chain

Rapporteur: Modibo Dicko, Independent Consultant, Mali

Summary of morning session

Tuesday morning sessions focused on the components to consider when designing a vaccine supply chain. These range from network design optimization to other system design elements such as private sector engagement and integration with other health commodity supply chain systems. The session began with a global update on new efforts to frame supply chain system design within an informed, evidence-based decision-making process. This process brings together agencies, industry partners, and local experts to define guidance, mechanisms, and metrics in support of activities that can improve availability, potency and efficiency of in-country distribution systems. This global update was followed by a series of presentations from Mozambique, Ethiopia, Benin and Thailand. Each country illustrated an innovative approach to supply chain design and redesign including level-jumping, informed-push distribution, optimizing transport routes, implementing a moving warehouse, and outsourcing distribution to the private sector. Irrespective of some of these supply chain design elements to consider, it's important to ensure that fundamental vaccine management best practices are adhered to and complied with. This second topic covered was on global efforts to strengthen vaccine management best practice. A overall update on this was followed by presentations from Myanmar and Uganda. Both countries illustrated existing challenges with supply chain fundamentals and how fixing some of the basics in vaccine management may have as much impact as redesigning the supply chain. The morning session was closed with a facilitated Q&A session relating to all presentations and teasers for the afternoon interactive sessions.

Summary of afternoon sessions

Tuesday afternoon sessions allowed participants to go deeper into the morning topics through interactive roundtable or panel discussions and focused-topic breakout groups. In total, seven formal interactive sessions were organized and covered topics related to the theme of the day: "designing the supply chain". In particular the seven interactive sessions focused on:

- How immunization supply chain design can drive coverage and equity improvements in countries;
- The learning from countries that have successfully integrated their vaccine supply systems with pharmaceutical supply chains;
- Available supply chain network modelling tools and their application for simulating the impact of different network designs on vaccine availability at the last mile; safeguarding vaccine potency in the cold chain; and increasing efficiencies whilst reducing the cost to

deliver a dose of vaccine from the national level to the service delivery points;

- The lessons learned from the redesign of the US vaccine supply chain and the challenges of getting buy-in from all stakeholders for the changes that were implemented;
- Debating the topic of engaging the private sector in vaccine logistics and having experts from both public and private sectors share their views on the advantages and pitfalls of outsourcing;
- Reviewing the evidence on innovative approaches to distributing vaccines at the last mile and how informed-push distribution models are an important network design solution for vaccine transport;

New approach to comprehensive effective vaccine management as promoted by the UNICEF and WHO immunization supply chain Hub.

Daily opening remarks

Ousmane Dia (JSI)



The chairman opened the first day of the TechNet by introducing the programme and reviewing the theme for the day's sessions around designing the supply chain and the design components to consider that can range from network design optimization to other design elements, such as private sector engagement and integration with other health commodity supply chain systems.

Global update on vaccine management best-practices

Diana Chang Blanc (WHO)



The aim of the presentation was to emphasise the need to fix some of the basics of vaccine management as part and parcel of any work to strengthen immunization supply chain systems in country. These systems are the foundation and backbone to any national immunization programme.

As was noted in the presentations made during the opening ceremony, the

performance of these systems is sub-standard and some of the fundamentals needs to be strengthened otherwise: "...performance on a weak foundation will be wobbly!"

The focus of the presentation was to highlight the necessity to build strong immunization supply chain system across all countries in order to sustain the performance of their national immunization programmes and a call to ensure that innovative solutions are implemented on a solid foundation of supply chain basics. In support of the need to fix and focus on some of the basics, Diana presented key resources that is being developed at the global level to help countries build some of the fundamentals.

Among the ones listed are: (i) the comprehensive approach to effective vaccine management (cEVM) for countries to enhanced countries ability to comprehensively assess, plan and implement innovative changes to their immunization supply chain; (ii) the UNICEF Cold Chain Support Package (CCSP) which provides commercial and technical information to enable an efficient and effective procurement process for Cold Chain products and services through UNICEF Supply Division; (iii) the WHO updated guidelines on Vaccine Vial Monitors (VVM), the multi-dose vial policy (MDVP), the immunization in practice book with module 2 on supply chain and logistics, the Vaccine Management Handbook and revised manuals and various e-learning materials.

In closing, Diana emphasised the growing complexity of immunization supply chain and that concerted efforts from all partners to standardize guidance to is necessary in order to help countries consolidate the fundamentals of an immunization supply chain management system.

Recording: www.ustream.tv/recorded/80684897/highlight/675780

Presentation: www.technet-21.org/images/TC2015/01_Global_Updates_Diana_Chang-Blanc.pdf

Global update on network design and optimization

Ryan McWhorter (UNICEF)



The aim of the presentation was to emphasise that new approaches exist to help countries model changes to their vaccine distribution network and simulate the impact of various scenarios on improving vaccine availability, safeguarding vaccine potency and increasing supply chain efficiency.

Health supply chain system is both the vehicle to supply health commodities and the bottleneck that hinders availability of medicines, and it can present both characteristics at the same time. The Gavi Supply Chain Strategy and the WHO-UNICEF Supply Chain Hub are leading new efforts to frame supply chain network design within an informed, evidence-based decision-

making process by bringing together agencies, industry partners, and local experts to define guidance, mechanisms, and metrics in support of activities that can improve availability, potency, and efficiency of in-country distribution systems.

Ryan highlighted the necessity for immunization supply chain management to adapt continuously to change because every day brings up new technologies, results of new research, etc. This adaptation will result from a strategic informed forward-looking continuous process.

Recording: www.ustream.tv/recorded/80684897/highlight/675781

Mozambique – Network optimization modelling for new vaccine introduction

Ruth Bechtel (Village-Reach, Mozambique)



The aim of the presentation was to illustrate the case study in Mozambique where network optimization modelling was conducted in a context of understanding new options for distribution network design to support new vaccine introduction. In Mozambique, frequent vaccine stockouts was the cause of low and stagnating vaccine coverage in certain provinces of the country. In an attempt to solve this problem, the

Ministry of Health with the support of Village-Reach decided to review the vaccine supply chain network design and ways to optimize it by modelling the supply chain network in 2 provinces using the HERMES tool developed the University of Pittsburgh.

The HERMES model was used to compare different supply chain network designs. In addition to that, other criteria were taken into account when assessing the various scenarios. The results enabled to proceed with an evidence-based decision-making about network design. The decision to scale up the new network design in 2 provinces was taken based on the compelling evidence that was produced by the HERMES model taking into account the need to introduce new vaccines. Private sector involvement was also considered in the modelling exercise.

One of the conclusions of the modelling exercise was the highlight of the necessity to develop an in-country HERMES team in order to be able to include changes in the model at country level and not be obliged to always call upon the developers of the tool from the University of Pittsburgh.

Recording: www.ustream.tv/recorded/80684897/highlight/675782

Presentation: www.technet-21.org/images/TC2015/03_Country_Innovations_Mozambique_Ruth_Bechteler.pdf

Ethiopia - Network design for improving transport of health commodities

Henok Benti (JSI Ethiopia)

The aim of the presentation was to illustrate the case study in Ethiopia where network optimization modelling was conducted to understand the best network for transportation within a context of health supply chain integration. Pharmaceutical logistics systems are integrated in Ethiopia, but vaccine supply chain was an exception that remained vertical with steps following the 5 levels of the health system pyramid.

However, in 2013 the decision was made to move vaccines under the management of the Pharmaceutical Fund and Supply Agency (PFSA). In 2014, the transition started following a phased approach. During the first phase, studies were undertaken to highlight the following key questions: storage infrastructure, transport capacity, frequency of deliveries, and other constraints. Sensitivity analyses were also conducted about stoppage, speed and volumes. Additional analyses concerned vaccination campaigns. The findings led to the adoption of monthly deliveries and to the definition of route maps.

Recording: www.ustream.tv/recorded/80684897/highlight/675783

Presentation: www.technet-21.org/images/TC2015/04_Country_Innovations_Ethiopia_Henok_Benti.pdf

Benin – Implementing the redesign of the vaccine supply chain

Philippe Jaillard (AMP Benin)

The aim of the presentation was to show evidence from Benin of the benefits of redesigning the vaccine supply chain. The presentation started with a video show on the benefits of supply chain streamlining through the use of a moving warehouse. Philippe indicated that the incentives to proceed with supply chain redesign were provided by: (i) the recently conducted EVM assessment which highlighted numerous weaknesses in vaccine supply chain management, and (ii) the availability of financial support from the Gates Foundation for the redesign effort. Philippe indicated that supply chain redesign through modelling and the use of the moving warehouse to distribute vaccines and consumable to health facilities led to a great improvement in vaccine management. That said, he warned that it took more than two years to implement the new system and required a great deal of sensitization of decision-makers as well as technical assistance at all levels. In order to keep the system up to date, there is a need to develop in-country capacity to tailor the system to different situations and areas.

Recording: www.ustream.tv/recorded/80684897/highlight/675784

Presentation: www.technet-21.org/images/TC2015/05_Country_Innovations_Benin_Philippe_Jaillard.pdf

Thailand – The experience of streamlining the network design by outsourcing

Netnapis Suchonwanich (Ministry of Health Thailand)

The aim of the presentation was to show evidence of engaging the private sector in the redesign of the vaccine supply chain through outsourcing the logistics to a 3rd party service provider. Prior to outsourcing, Netnapis described the former vaccine distribution network and its shortcomings – too many tiers in the system and several unnecessary and redundant steps. The new systems allowed to streamline the network design and have less steps in the supply chain by implementing a Vendor Managed Inventory (VMI) system outsourced to the private sector. The results of the new systems allowed to reduce the overall costs by no longer needing as much idle buffer stock in the system, reducing closed vial wastage, reducing the cost to deliver a dose of vaccines by having less tiers in the supply chain and improving the timely availability of vaccines at service delivery levels.

Recording: www.ustream.tv/recorded/62173382/highlight/626195

Presentation: www.technet-21.org/images/TC2015/06_Thailand_Netnapis_Suchonwanich.pdf

Myanmar – Immunization supply chain challenges in a resource-constrained country

Dr. Kyaw Kan Kaung (Ministry of Health Myanmar)

The aim of the presentation was to illustrate some of the challenges with immunization supply chain fundamental like conducting a mass vaccination campaign. Dr. Kaung presented the physical barriers to supplying and distributing vaccines and supplies in Myanmar during a mass campaign for Measles and Rubella linked to geography, topography and to the weakness of basic infrastructure (in some areas, vaccines had to be distributed by helicopter). Such fundamental challenges were compounded by the insufficiency of human resources, cumbersome custom procedures, inadequate cold chain capacity, and weak information systems. The case of Myanmar exemplifies how fixing some of the basics in vaccine management may have as much impact as introducing innovative approach and technologies to improve the supply chain.

Recording: www.ustream.tv/recorded/62173382/highlight/626196

Presentation: www.technet-21.org/images/TC2015/07_Country_Innovations_Myanmar.pdf

Uganda - Lessons learned from supply chain integration and improving vaccine management

William Musubire (Ministry of Health Uganda)

The aim of the presentation was to provide an example of how the redesign of the Ugandan vaccine supply chain by integrating it with that of other health commodity supply chains has led to improvements in vaccine management performance. In other words, this is an country example of how redesigning the vaccine supply chain and fixing basic vaccine management performance can go hand in hand and are not incompatible objectives. William described the country context and the performance of supply chain management through the results of the EVM assessments conducted in 2011 (before supply chain integration); then proceeded to explain the various phases of the supply

chain integration effort in 2012 and 2013. By 2014, the National Medical Stores (NMS) of Uganda began storing, handling and distributing vaccines on behalf of EPI. An EVM assessment was conducted after the integration of vaccines with other health commodities in the NMS system. The EVM performance was significantly increased as compared to the 2011 performance results suggesting that basic vaccine management best practise was improved following integration.

Recording: www.ustream.tv/recorded/62173382/highlight/626197

Presentation: www.technet-21.org/images/TC2015/08_Country_Innovations_Uganda_William_Musubire.pdf

Somalia - Immunization supply chain challenges in a fragile state and lessons learned

Douglas Mukwaya (UNICEF Somalia)

The aim of the presentation was to provide insights on managing an immunization supply chain in a fragile state under civil unrest and where the country is divided into various inaccessible zones that make for a complex vaccine supply chain network design. Somalia is a complex country divided into 3 zones each having a President; area not under government control; and 9 decentralized cold chain Hubs in each region for receiving and distributing vaccines. For some hubs, vaccines are received directly from the international level (Kenya) rather than passing through the national level. This is known as Model A where for the most part, vaccines are flown from Nairobi to subnational levels in Somalia. In rare instances where air flight is not possible, vaccines are transported by road sub-nationally from Kenya. Model B is the one where vaccines are transported from the national level to other regional hubs. In this model, ways of grouping health commodities to share freight costs are leveraged. This allows to reduce the cost of air travel for each of the individual health programmes. Douglas concludes that managing a complex network design for distributing vaccines like in Somalia requires very close collaboration between the Ministry of Health and all international partners like UNICEF and WHO.

Recording: www.ustream.tv/recorded/62173382/highlight/626199

Presentation: www.technet-21.org/images/TC2015/09_Country_Innovations_Somalia_Douglas_Mukwaya.pdf

Morning session Q&A

Facilitator: Jeff Sanderson (JSI)

Recording: www.ustream.tv/recorded/62173382/highlight/626201

Lunchtime roundtable discussion: Immunization Supply Chain – driving coverage and equity improvements

Moderator: Xiaojun Wang (UNICEF)

The session focused on how immunization supply chain strengthening can drive coverage and equity improvements in countries and reflect on challenges, opportunities, innovations and potential solutions. In recent years, many national immunization programmes have been increasingly engaged in improving immunization supply chain management and improving immunization coverage and equity. However it is also observed that often two programmatic areas are planned and managed in a separation, leading to missed opportunities or reduced programme efficiency. This section aims to increase recognition on close linkages between those two areas, particularly in line with reaching the most hard-to-reach populations; and to identify synergies potentially required in order to overcome the last mile and protect the last child.

Expert panel discussion: Supply Chain Integration - the good, the bad and the ugly

Moderator: Modibo Dicko (Expert Consultant)

The session focused on learning from countries that have successfully integrated vaccine supply systems with pharmaceutical supply chains from the national level to the service delivery points. Although there has been a significant degree of integration of the supply chain for health commodities in many countries, a number of programme commodities such as immunization continue to run vertical supply chain systems. The reasons given are often due to the specificities of the specific products it manages (temperature sensitive vs. non-temperature sensitive health commodities). In addition, in immunization more than any other health programme, standards and practices should be maintained but not at the expense of compromising coverage and timeliness of immunization. Supply chain integration has been initiated in several countries but frequently the national immunization programme was not part of the process or integration was at limited scale.

Focus topic breakout session: Network modelling - what tools and approaches exist?

Moderator: Ryan McWhorter (UNICEF)

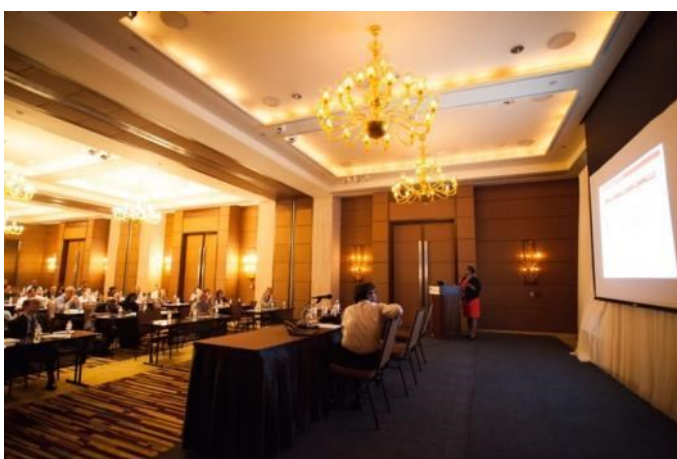


The session focused on available supply chain network modelling tools available and their application for simulating the impact of different network designs on vaccine availability at the last mile; safeguarding vaccine potency in the cold chain; and increasing efficiencies whilst reducing the cost to deliver a dose of vaccine from the national level to the service delivery points. Such tools allow to answer questions like: what is the

change in operating costs if I double transportation frequency and reduce storage capacity? Can my cold chain capacity support a new vaccine introduction? Do I need a central medical store? It is possible to use software tools to help you understand and advocate for changes in your supply chain structure. This session was chance to talk to experts about your unique challenges, hear how two tools (HERMES and Supply Chain Guru) have been used in similar contexts, and see the tools in action as an expert panel of technologists will be on-hand to answer your questions and demonstrate the applicability of their tools to modelling the immunization supply chain.

Focus topic breakout session: Setting up Network Redesign for Success

Moderator: Raja Rao (Bill and Melinda Gates Foundation)



The session focused on a specific example of how the entire redesign of the US vaccine supply chain had radical impact on ensuring uninterrupted available of vaccines at all service levels and complete visibility of vaccines through the end to end supply chain. No visibility of vaccines once they left the National Store (National Distribution Center). Reports of expired vaccines. A reliance on expensive, emergency

shipments. Inability to respond to health crises efficiently and effectively. This was the United States immunization supply chain system less than 10 years ago. The National Center for Immunization and Respiratory Diseases (NCIRD) at the United States Centers for Disease Control (CDC), has reshaped their network to deliver a stable, high-performing supply chain. Lessons learned from this experience,

in particular how to aligned stakeholders to new initiatives, and managed the network redesign implementations to success were presented.

Expert panel discussion: Outsourcing Logistics - view from both sides

Moderator: Walter Proper (JSI)

The session focused on the topic of outsourcing vaccine logistics and having experts share their views on the advantages and pitfalls of engaging the private sector when outsourcing some or all elements of a vaccine supply chain system. Outsourcing logistics is becoming more prevalent as a network design strategy, enabling the immunization programme to focus on health while positioning an expert to manage the supply chain according to their experience. While this is a clear strategy at a high level, how do country programmes decide on what segments of the supply chain to outsource? Should a logistics officer outsource by region, function (warehousing, transportation), commodity, or all? Further, what measures are there to ensure high performance by the logistics provider? This expert panel reflected on these outsourcing questions from both sides of the equation: from how a Ministry of Health makes the decision to outsource and how they manage an outsourcing contract, to the views from third-party logistics providers as having a comparative advantage and better expertise/know-how to manage vaccines and other health commodities on behalf of the government.

Focus topic breakout session: Informed-Push Distribution - the magic bullet to vaccine transportation?

Moderator: Emily Bancroft (Village-Reach)

The session focused on innovative approaches to distributing vaccines at the last mile and reviewing how informed-push distribution models are an important network design solution for transport. A number of countries have implemented new immunization supply chain designs to improve responsiveness, efficiency, and efficacy in recent years. In the panel, representatives from Mozambique, Benin, and Nigeria discussed the use of “informed push” supply chain designs and their effect on vaccine availability and potency, as well as on supply chain costs. The panel discussed their opinions on the critical components of an informed push system and the impact on immunization supply chains at the country level. The panellists provided an assessment of the benefits and challenges of implementation, and some advice for countries considering the implementation of similar system changes.

Focus topic breakout session: Effective Vaccine Management - Let's get comprehensive!

Moderator: Dmitri Davydov (UNICEF)



The session focused on the new approach to comprehensive effective vaccine management as promoted by the UNICEF and WHO immunization supply chain Hub. The session examined the continuum of EVM interventions from preparation (experience from Nepal) to assessment (experience from Somalia) to comprehensive improvement planning (experience from Myanmar) to implementation (experience from

Mozambique).

Since 2010, WHO and UNICEF have supported more than 70 developing countries in assessing their immunization supply chain bottlenecks using the Effective Vaccine Management (EVM) assessment tool developed by WHO. A recent global analysis of the data from the EVM assessments have highlighted a number of shortcomings: (a) No countries meet the basic standards for vaccine management best practice; (b) country supply chain systems are a bottleneck to new vaccine introductions and coverage improvements; (c) solutions are being tackled in a fragmented way using business as usual approaches; and (d) available solutions are not being implemented due to poor governance or lack of resources, while funding opportunities to address the bottlenecks are being missed.

In response to these shortcomings, WHO and UNICEF are spearheading the 4 step comprehensive EVM approach (or cEVM) under the joint Immunization Supply chain and Logistics Hub to prepare, assess, plan and implement change at country level while contributing to broader programmatic immunization and health systems strengthening outcomes. The implementation of the cEVM approach has been gradual and a number of countries have had experience in various aspects of this new approach.

Wednesday, 13 May: Equipping the supply chain

Rapporteur: Ticky Raubenheimer, Independent Consultant, South Africa

Summary of morning session

Wednesday morning sessions focused on equipping the supply chain with new technologies to extend the reach of the cold chain into the last mile, and innovative temperature monitoring systems to safeguard the potency of vaccines up to service levels. A first global update was given by WHO to present the latest WHO prequalified technologies in cold chain and temperature monitoring. This was followed by an update from UNICEF Supply Division on new cold chain guidance and support packages for procuring, installing and managing these new technologies.

A set of country specific presentations from Senegal and Vietnam followed and showcased how long-term passive cooling containers and solar direct drive technologies allow the possibility to have cold chain for vaccine storage in areas where cold chain infrastructure was previously impossible to have. A presentation was then made by Togo on the controlled temperature chain (CTC) and the successful implementation of this strategy during a Meningitis A campaign whereby vaccines were kept outside of the standard cold chain system in a CTC up to 4 days at ambient temperature not exceeding 40°C. Continuing with temperature monitoring, the recent experiences from Lao PDR, Mozambique and Turkey were presented. Each country shared their experience of a different approaches to control temperature in the cold chain ranging from implementing 30-day temperature recorders to sophisticated remote systems for temperature monitoring across the entire end-to-end supply chain.

The morning session was closed with a facilitated Q&A session relating to all presentations and teasers for the afternoon interactive sessions.

Summary of afternoon sessions

Wednesday afternoon sessions allowed participants to go deeper into the morning topics through interactive roundtable or panel discussions and focused-topic breakout groups. In total, seven formal interactive sessions were organized and covered topics related to the theme of the day: "equipping the supply chain". In particular the seven interactive sessions focused on:

- Sharing perspectives and views on the trade-offs for selecting a multi-dose vial of vaccine and understanding what may be the optimal dose per vial size;
- The Gavi effort to establish a Cold Chain Equipment Optimization Platform (CCEOP) as an innovative mechanism to increase countries access to more sustainable, efficient and better performing cold chain equipment used at service levels;

- Greening the immunization supply chain through using renewable energies to supply energy needs for systems rather than just for cold chain equipment;
- The need to develop a standardized approach for collecting, using and analysing data related to temperature monitoring and cold chain equipment;
- Discussing what are the next steps for the controlled temperature chain (CTC) approach and what lies ahead for this innovative approach to using vaccines outside of the standard cold chain system;
- The challenges of effective equipment management and maintenance for the cold chain and what can be done to address this issue in countries.
- The urgency to build the capacity of health workers handling vaccines to implement temperature monitoring systems given the growing threat of freezing and the value at risk in the cold chain.

Daily opening remarks

Diana Chang-Blanc (WHO)

The chair opened the second day of the TechNet by introducing the programme and reviewing the theme for the day's sessions around equipping the supply chain with the right equipment to extend the reach of the cold chain into the last mile with effective temperature monitoring systems to safeguard the potency of vaccines up to service levels.

WHO PQS prequalification of cold chain equipment, technology and devices

Denis Maire (WHO)



The aim of the presentation was to provide an update on the global process of prequalifying cold chain equipment, technology or devices through WHO and review the new products that have successfully been prequalified. The prequalification process (or PQS) is a 3 step cycle of (i) developing and maintaining performance specification and verification protocols for new technologies and innovations; (ii) the

prequalification process itself once a full dossier is received from a company and it is reviewed by an independent review committee, and (iii) the post-market monitoring of equipment in the field as a feedback loop on equipment performance after installation. More recently, the PQS has included +2

steps relating to field validation and developing target product profiles (TTPs). In terms of performance of the PQS, 264 products were prequalified in 2014 from 54 manufacturers. This represents a fivefold increase since 2008 where only 55 products were prequalified by WHO. In 2014, solar technologies accounted for 45% of the cold chain equipments prequalified. In closing, Denis shared information on other projects that the WHO PQS team is helping partners with. Namely: (i) revising the international shipping guidelines (incl. barcoding); (ii) revising the protocols on temperature studies for route validation and initiating a list of qualified suppliers of refrigerated trucks; (iii) work on freeze-free vaccine carriers and large capacity vaccine cold boxes; and (iv) developing specifications and verification protocols for remote temperature monitoring systems.

Recording: www.ustream.tv/recorded/62205057/highlight/626214

Presentation: www.technet-21.org/images/TC2015/01_Global_Updates_Denis_Maire.pdf

Latest from UNICEF SD on cold chain equipment, technologies and support package

Dereje Haile (UNICEF)



The aim of the presentation was provide an update from UNICEF Supply Division which procures WHO prequalified equipment to many countries of the world. The presentation covered the different areas of support countries can benefit from UNICEF Supply Division; highlighted the trends in procurement and how the demand for solar direct drive is increasing but indicating how absorption refrigerators and freezers are still be

requested by countries. The trends further highlight how the value of procurement for cold chain equipment (CCE) has risen from \$15 million in 2008 to over \$40 million in 2014. The presentation covered UNICEF's Cold Chain Support Package (CCSP) and recent efforts to landscape temperature monitoring devices and survey Walk-in Cold Rooms in countries to better understand post-procurement issues. The results of temperature monitoring devices landscape showed that there are many technologies available and these ought to be fast-track for prequalification. The WIC study indicated that 65% of the units were functioning properly but installation was the most problematic area of concern. The performance of the WIC could vary significantly depending on the quality of the installation. Another insight from the study is that it can take close to 18 months on average between ordering the WIC and its full installation. In closing, Dereje presented some of the key areas of work that will be prioritized in the coming years such as: fast tracking temperature monitoring devices for prequalification (based on the landscape analysis); developing field performance evaluation protocols for WIC/F and solar technologies; improving the demand forecast of cold chain equipment for 2016 – 2020; expanding the CCSP with additional modules.

Recording: www.ustream.tv/recorded/62205057/highlight/626215

Presentation: www.technet-21.org/images/TC2015/02_Global_Updates_Dereje_Haile.pdf

Temperature monitoring evidence, strategies, technologies and practices - Where do we go from here?

Benjamin Schreiber (UNICEF)



The aim of the presentation was provide an update from UNICEF Programme Division on the effort to accelerate the implementation of effective temperature monitoring systems in countries. The presentation began by examining the reasons why temperature monitoring is more critical today than in the past. For one, there is evidence that many incidents of vaccine freezing remain undetected and can result in potency loss of vaccines.

With the knowledge that 70% of the value of vaccines now being procured by UNICEF represent freeze-sensitive vaccines, more stringent temperature monitoring is required given the value at risk. But there is limited guidance to countries to help them select the right technology to use; the systems requirements for temperature monitoring; and what training is required to ensure cold chain managers understand how to operate the technology and use the information to mitigate the risks of potency loss of vaccines from temperature excursions in the cold chain. Today, there is a vast array of continuous temperature monitoring options that have the advantage of helping improve vaccine handling quality, detecting malfunctioning cold chain equipment, and mitigate damaging temperature fluctuations and freeze events even when health workers were not present. Unfortunately in many countries these technologies have not been introduced (only 40% facilities have continuous temperature recorders in all cold and freezer rooms), or have been introduced and are not used in order to move from data to action. Furthermore, as new technologies are made available to countries the choice of technology becomes more complex and requires assistance to ensure that adequate and cost-beneficial technologies are being adopted. For that tools and guidance is being developed to assist countries to make evidence based decision about temperature monitoring system relevant for their context. This is the backdrop to the work conducted by UNICEF programme division to respond to these shortcomings.

Recording: www.ustream.tv/recorded/62205057/highlight/626216

Presentation: www.technet-21.org/images/TC2015/03_Global_Updates_Benjamin_Schreiber.pdf

Senegal – Using long holdover passive storage devices at the last mile

Khadidiatou Gomis (Ministry of Health Senegal)

The aim of the presentation was to share the findings from the pilot project to test long holdover passive storage devices in Senegal. In 2013, a two phased pilot project began to first test the durability and temperature holdover time of the passive vaccine storage device (PVSD) in 6 sites over a period of 2 months. The second phase test PVSD in different locations to understand where best it can be used (fixed versus mobile vaccination posts). On holdover, the results showed that temperatures were maintained between 38 to 56 days depending on the location and ambient temperature (38 day holdover if the ambient temperature was 43oC and 56 days if the ambient temperature is 32oC on average). The results on the second phase indicated that the thermal design of the PVSD met the needs of each of the 12 locations: from cool coastal health posts to the much warmer remote inland locations on the edge of the Sahara. In addition, it was possible to use the device both in fixed site and during outreach. Feedback from users highlighted the ease of use (no defrosting or maintenance); that power cuts are no longer an issue, and that it's space efficient. On the other hand, users felt the capacity of the device is insufficient during immunization campaigns; there was no possibility to keep other temperature sensitive products and the device is too heavy to carry for outreach. That said, the PVSD provides a good solutions to ensure the continuity of the cold chain at the last mile.

Recording: www.ustream.tv/recorded/62205057/highlight/626217

Presentation: www.technet-21.org/images/TC2015/04_Country_Innovations_Senegal_Khadidiatou_Gomis.pdf

Vietnam – Using solar direct drive CCE: the needs, success and challenges

Nguyen Van Cuong (Ministry of Health Vietnam)



The aim of the presentation was provide evidence on the viability of solar direct-drive cold chain technologies for storing vaccines in different regions of Vietnam with regard to performance, cost, and available solar energy. In Vietnam, the electric grid is extensive, yet many small communities throughout the country experience frequent power outages. Also, funding for electricity at small health centers is sometimes not available, and

as a result, refrigerators are often unplugged between immunization days, which is hard on the refrigerator mechanism. Solar Direct Drive (SDD) refrigerators were pilot-tested as a solution in two district health centers (north and south of the country). The results of the pilot showed that the SDD refrigerators maintained extremely stable temperatures and rarely fluctuated outside of the range

between 4°C and 5°C. The SDD refrigerators performed extremely well over a period of more than 10 days with very cloudy weather in northern Vietnam or high ambient temperatures in the South. Users liked having a refrigerator that was independent of the electric grid as they did not have to worry about power cuts. Challenges included managing a large amount of condensation resulting from the high humidity, especially in the north of Vietnam, and electrical problems with the compressor controller. The Sure Chill Company has worked diligently to resolve these issues and has also made a number of other improvements as a result of the demonstration in Vietnam, highlighting the importance of carefully monitored field demonstrations for new technologies.

Recording: www.ustream.tv/recorded/62205057/highlight/626218

Presentation: www.technet-21.org/images/TC2015/05_Country_Innovatis_Vietnam_Nguyen_Van_Cuong.pdf

Togo – Implementing a CTC approach during a Meningitis A vaccine campaign

Dadja Essoya Landoh (WHO Togo)

The aim of the presentation was to share the experience of implementing the Controlled Temperature Chain (CTC) strategy in Togo as an innovative approach allowing certain vaccine to be kept at temperatures above of the traditional cold chain of 2-8°C. During the MenAfriVac campaign organized in Togo at the end of 2014, ten selected districts of the country that had weak cold chain and logistics systems implemented the CTC approach. The presentation covered the lessons learned from this experience, ranging from the planning of CTC for the campaign (deciding where to implement CTC and what scenario); the training on CTC (as a new approach for vaccinators and logisticians); the new monitoring tools for CTC (threshold temperature indicator); and the implementation challenges themselves. In total, 188 health facilities implemented CTC. The findings showed that performance was not affected by CTC (coverage was just as high as in non-CTC zones); wastage was minimal (only 2 vials out of 1 million were discarded having passed the 4 day limit and no vials were discarded from exposure to >40°C temperatures. Moreover, the facilities implementing CTC did not experience any more AEFI's than non-CTC facilities. While the MenAfriVac campaign was a success, Dr. Landoh did indicate the health care workers and vaccinators had an initial fear of using vaccine without the standard cold chain. Consequently, the full flexibility offered by the strategy, was not taken advantage of. While they understood the benefits, it took a few days before they embraced the approach and became enthusiastic about its implementation.

Recording: www.ustream.tv/recorded/62205057/highlight/626219

Presentation: www.technet-21.org/images/TC2015/06_Country_Innovations_Togo_Dadja_Essoya_Landoh.pdf

Morning session Q&A

Facilitator: Pat Lennon (PATH)



Recording: www.ustream.tv/recorded/62205057/highlight/626220

Lao PDR – Implementing a temperature monitoring strategy with 30-DTRs

Kongxay Phounphenghack (Ministry of Health of Lao PDR)

The aim of the presentation was to share the results from a pilot study in 20 sites of using 30 day temperature recording devices (30-DTR) as a solution to poor temperature monitoring practices in Lao PDR and mitigate undetected damaging temperature excursions. The 30 DTR pilot was part of a broader Cold Chain Information System (CCIS) including temperature alarms, the status of the fridges, fridge failure, vaccine stock levels...etc. The system relies on monthly SMS reports centralised into a cloud-based platform with a data dashboard front-end system. The overall results of the pilot were very positive and considered a success. The data helped uncover the frequency of temperature excursion in the cold chain and the causes of any temperature alarms. Most heat alarms were due to prolong power failure or refrigerator under preventive maintenance. Most freeze alarms were due to the cold chain equipment performance. This information was critical for managing the cold chain equipment and responding to issues. Some lessons learned were shared in that the selection of the right technology for Laos was not straightforward especially when the national EPI was trying to avoid setting up a parallel data system. This objectives come with its own set of difficulties particularly relating to system compatibility and integration with DHIS2. The human factor was also an important one to note in that intense training was required to ensure that the system would work. At times, this required one-on-one training.

Recording: www.ustream.tv/recorded/80687773/highlight/675796

Presentation: www.technet-21.org/images/TC2015/07_Country_Innovations_Lao_PDR_Kongxay_Phouphenhack.pdf

Mozambique – Innovations in cold chain temperature monitoring

Ruth Bechtel (Village Reach)

The aim of the presentation was to share the results of a randomized trial in Mozambique where 3 alternative temperature monitoring approaches were compared: (i) a standard stem thermometer; (ii) a 30 DTR and (iii) a remote temperature monitoring system (RTMS) with SMS alerts. The comparative study took place between August 2014 to May 2015 where the difference systems were implemented in 26-29 clinics. As a control, the RTMS was installed in all facilities where the stem thermometer and 30 DTR were used. The remote temperature monitoring, which is reported from the health worker up to supervisor and then central level, has already resulted in improved fridge up-time, fewer temperature excursions, reduced duration of excursions, quick action by all the workers and most importantly, clear recognition by the Ministry of Health and regional management of the benefits. Ruth ended her presentation with a few considerations needed for future deployment of the RTMS, namely the need to understand the economics of RTMS and to what extent the benefits justify the costs of the system to justify scaling up the system across the country.

Recording: www.ustream.tv/recorded/80687773/highlight/675798

Presentation: www.technet-21.org/images/TC2015/08_Country_Innovations_Mozambique_Ruth_Bechteler.pdf

Turkey – Innovative approach for end-to-end cold chain temperature monitoring

Tarkan Yamanoglu (Ministry of Health of Turkey)



The aim of the presentation was to share the experience of the end-to-end continuous and remote temperature monitoring systems implemented by the national immunization programme in Turkey. After describing the rationale for why temperature monitoring was important, the history of the project was presented – a history that dates back to 2010 when the first phase of implementing an vaccine LMIS using

barcoding started.

The temperature monitoring aspect was an expansion of the existing system and was operationalized in 2015. It was entirely developed nationally and centrally managed at the national vaccine warehouse in Ankara. All the temperature monitoring data from each storage point in the country is sent to a main server at national level. The data sends information on temperature, heat/freeze alarms, geo-location/mapping, and vaccine transport is tracked and communicated through dashboards and SMS messaging. In addition, a 24 hour call service is available to help respond to SMS alerts that have

been sent by the system. This temperature monitoring system is end-to-end and allows for comprehensive inventory tracking of all cold chain equipment and performance monitoring. Turkey is excited about the great success of their system and the depth of monitoring and management of vaccines possible by using the system. The system was showcased during one of the innovations café.

Recording: www.ustream.tv/recorded/80687773/highlight/675800

Presentation: www.technet-21.org/images/TC2015/09_Country_Innovations_Turkey_Tarkan_Yamanoglu.pdf

Morning session Q&A

Facilitator: Benjamin Schreiber (UNICEF)

Presentation: www.ustream.tv/recorded/62208338/highlight/626230

Lunchtime roundtable discussion: What is the optimal number of doses per vaccine vial size?

Moderator: Robert Steinglass (JSI)

The session focused on sharing perspectives and views on the trade-offs for selecting a multi-dose vial of vaccine and understanding what may be the optimal dose per vial size. Indeed, global efforts to protect all children from vaccine preventable disease have been promoting the use of multi-dose vials (MDVs) in developing countries in order to offer lower prices per dose and promote higher purchase volumes. However, the selection of the number of doses per vial involves inherent trade-offs between wastage, timely coverage, cold chain requirements, safety, efficiency, and vaccine and total system costs, particularly in lower and middle income countries where resources are limited. A group of global stakeholders is now being engaged to discuss these trade-offs, compile the evidence to inform decision making, and identify critical gaps in knowledge and tools needed to improve the availability and promote the selection of appropriate options for doses per vial. The roundtable discussion brought together stakeholders with global and field perspectives to share insights on priorities and preferences for vaccine vial sizes – including through a live interactive survey.

Expert panel discussion: Cold Chain Equipment Optimization Platform

Moderator: Lauren Franzel (Gavi)



The session focused on the Gavi effort to establish a Cold Chain Equipment Optimization Platform (CCE Platform) as an innovative mechanism to increase countries access to more sustainable, efficient and better performing cold chain equipment used at service levels. Indeed, the Gavi Supply Chain Strategy endorsed by the Gavi Board in 2014 recognises that a well-functioning cold chain is a pre-requisite to achieving the global goals of

coverage and equity improvements. Non-availability of cold chain points in remote, hard to reach geographies is a key barrier in reaching the excluded populations. Likewise, high-performing and well-maintained cold chain equipment is vital to safeguard vaccines from excessive temperatures susceptible to damage vaccines and compromise their potency to protect all children reliably, efficiently and sustainably. As such, a well-functioning cold chain system is a critical component of any national immunization supply chain. To ensure that cold chain isn't a bottleneck to introducing new vaccines and coverage/equity goals, the establishment of the CCE Platform is seen as an important contributor to success for Gavi's 2016-2020 strategy. Together with partners, Gavi is developing this innovative mechanism as a way to ensure Gavi countries have access to better performing, more reliable technologies at an affordable price, and as a means to make progress towards Gavi's strategic goals. The panel discussion brought together stakeholders with global and field perspectives to share insights and view on what is being proposed for the CCE Platform.

Focus topic breakout session: Solar cold chain equipment versus solar systems: where now?

Moderator: Steve McCamey (SELF)

The session focused on greening the immunization supply chain through using renewable energies. Thousands of health facilities in developing countries lack reliable electricity yet immunization programmes have long recognized the importance of a reliable power source for WHO prequalified cold chain equipment (CCE) to keep vaccines potent. Solar panels matched with appropriate refrigerators have been in use for over three decades. Now the second generation of solar direct drive (SDD) equipment have been improved by eliminating the need to store energy into a battery. The session probed the idea of expanding solar agenda beyond just powering cold chain equipment. Experiences exist where health centres have been solarized and where all the electrical needs of the centre are supplied by the sun including the refrigerator, air-condition, computers, lighting, heating...etc. The discussions focused on identifying the other energy needs for the immunization

supply chain that are not being provided for and the benefits or drawbacks of expanding solar power beyond simply the vaccine refrigerator. This interactive discussion brought together stakeholders with global and field perspectives to share insights on these issues.

Focus topic breakout session: Data standards for temperature monitoring and cold chain equipment inventories

Moderator: Richard Anderson (University of Washington)



The session focused on the need to develop a standardized approach for collecting, using and analysing data related to temperature monitoring and cold chain equipment. Temperature monitoring is recognized as an important tool to ensure a quality vaccine cold chain. Multiple approaches are used for tracking refrigerator temperatures including manual daily recording, electronic logging devices which record a

month's temperatures and real time devices which send regular reports of temperature to a centralized server via SMS. To allow these different approaches to collect compatible data, and to allow different types of temperature monitoring devices to be combined into unified systems, it is necessary to have data standards to support interoperability. This session provided an introduction to data standards in the context of ongoing efforts by WHO, UNICEF, and PATH to increase the use of accurate cold chain inventory and continuous temperature monitoring data to improve equipment management and planning. The interactive discussion brought together stakeholders with global and field perspectives to share insights on these issues and advance the process of developing an open data standards for immunization logistics, including standards for temperature monitoring of vaccine refrigerators and standards for cold chain equipment inventories.

Expert panel discussion: The innovation of CTC - where now?

Moderator: Anna-Lea Kahn (WHO)



The session focused on discussing what are the next steps for the controlled temperature chain (CTC) approach and what lies ahead for this innovative approach to using vaccines outside of the standard cold chain system. While it is believed that many vaccines are more heat stable than their labelling suggests, possibly allowing them to be used outside of the traditional 2 to 8°C cold chain, turning this into a safe and

effective practice continue to remain a challenge. A key component of the CTC agenda is the definition of the conditions allowing a CTC to be adopted, which includes documented thermostability and regulatory approval. To date, only one vaccine product has successfully met the criteria to be licensed and prequalified for use in a CTC. But what needs to happen for other vaccines to enter the market with a CTC label and what are the main challenges and bottlenecks to advancing the CTC agenda, both upstream (in the vaccine development and manufacturing stage) and downstream (at country-level implementation)? Experts from a variety of backgrounds and representing a cross-section of CTC stakeholders (including suppliers, users, donors, economists and policy-makers) shared their perspective on this question.

Recording: www.ustream.tv/recorded/80687851/highlight/675804

Focus topic breakout session: Cold chain equipment management and maintenance systems in countries

Moderator: Modibo Dicko (Expert Consultant)

The session focused on discussing the challenges of effective equipment management and maintenance for the cold chain and what can be done to address this issue. Effective Vaccine Management (EVM) results show that equipment maintenance, particularly at the lower levels of the vaccine supply chain, is one of the weakest areas of vaccine management systems. But effective equipment maintenance systems directly and immediately impact the availability and potency of vaccines, as well as the overall efficiency of an immunization programme. This session presented some specific country experiences and approaches to equipment maintenance systems before engaging participants to reflect on an effective strategy to ensure that essential equipment maintenance services are available where and when they are required, and how to help national immunization programmes communicate to internal and external stakeholders why maintenance systems must be prioritized and funded.

Focus topic breakout session: How can we design effective temperature monitoring systems in developing countries?

Moderator: Adama Sawadogo (UNICEF)

The session focused on the urgency for countries to build the capacity of health workers handling vaccines to monitor temperatures in the refrigerators given the growing threat of freezing and the value at risk in the cold chain. Vaccines are temperature sensitive and can get damaged by excessive exposure to heat or freezing temperature. While heat exposure can be detected through Vaccine Vial Monitors (VVMs) indicating any cumulative exposure to damaging heat; freezing remains largely undetected. Evidence has shown that up to 35% of vaccines are exposed to extended periods of freezing at one point during storage or transport. Today, different temperature monitoring devices are available for use at primary and facility levels that are WHO pre-qualified and many more technological solutions are available to countries. But a temperature monitoring technology or device is only part of the solution. The most important element and most challenging is to establish management processes that ensure the responsibility of all parties to take corrective actions in the case of temperature excursion alarms. This interactive discussion brought together stakeholders with global and field perspectives to share insights on how to design an effective temperature monitoring systems that includes both the technology but the human and management side as well.

Thursday, 14 May:

Managing the supply chain

Rapporteur: James Cheyne, Independent Consultant, Switzerland

Summary of morning session

Thursday morning sessions focused on managing the supply chain with skilled, competent and motivated supply chain workforce who have access to reliable and timely data for managing the immunization supply chain. The session first provided updates on global initiatives and efforts to strengthen human resources (HR) for supply chain management (SCM) including an introduction to resources that have been developed to support countries to plan and implement HR for SCM strengthening activities. Similarly, updates on global initiatives and efforts to strengthen data for management and logistics management information systems (LMIS) were provided. Following these global updates, representatives from national Ministries of Health presented on innovative and effective broad-based approaches to improving human resources for supply chain management, as well as those more specific to the needs of cold chain and vaccine management. The session explored implementation challenges and lessons learned, highlighting opportunities that can be leveraged from the wider array of human resources for health initiatives. On the data and LMIS side of managing the supply chain, Pakistan presented on the experience of implementing a networked vaccine logistics information system (vLMIS); Tanzania presented on the pilot to track and trace vaccines with barcodes; and Sri-Lanka presented on their Web Based Immunization Information System (WEBIIS) – a data system that includes a national immunization registry that also allows to track every vaccine encounter at the place of occurrence while maintaining real time stock balances of vaccines. The morning session was closed with a facilitated Q&A session relating to all presentations and teasers for the afternoon interactive sessions.

Summary of afternoon sessions

Thursday afternoon sessions allowed participants to go deeper into the morning topics through interactive roundtable or panel discussions and focused-topic breakout groups. In total, seven formal interactive sessions were organized and covered topics related to the theme of the day: “equipping the supply chain”. In particular the seven interactive sessions focused on:

- Sharing an innovative approach to estimating vaccine wastage using binomial statistics;
- The Gates Foundation project to develop a Visibility and Analytics Network (VAN) blueprint to leverage private-sector design approaches to improve end-to-end visibility of supply chain information;
- Exploring practical examples of supply chain leadership in Malawi, Somalia and Uganda and discussing the enablers of and barriers to effective leadership at country level;

- Understanding how logistics data is used to improve supply chain performance and for continuous improvements and decision making;
- Diving deeper into the findings and lessons learned from the innovative experience the eVIN in Uttar Pradesh, India and how the use of mobile technologies fits into the broader immunization picture;
- Discussing the role and importance of national logistics working groups in countries as a key mechanisms for decision making in health supply chains and for implementing change;
- How the EVM assessment opportunities need to be leveraged for strengthening human resources for logistics and capacity building in vaccine management.

Daily opening remarks

Chris Wright (JSI)



The chair opened the third day of the TechNet by introducing the programme and reviewing the theme for the day's sessions around managing the supply chain with skilled supply chain managers and logistics management information systems.

Global activities influencing HR for supply chain management (SCM)

Andrew Brown (People that Deliver) and Musonda Kasonde (UNICEF)



The aim of these presentations were to introduce participants to the various global initiatives to promote and build strong supply chains in countries managed by competent, recognized and supported supply chain workforce with significant technical and managerial capacity. This session presented the global activities led by the “People that Deliver” (PtD) initiative and the “People & Practice” priority working group of the

Gavi Alliance– these initiatives and activities are pushing the agenda forward on building human resources for supply chain management (SCM). Andrew began by presenting an overview of the PtD initiative – a global partnership whose mission is to build global and national capacity to implement evidence based approaches to plan, finance, develop, support and retain the national workforces needed for the effective, efficient and sustainable management of health supply chains. The PtD country focused activities in Benin, Burkina Faso, Ethiopia, the Pacific islands, South Africa, and the East African Community were also presented including the move from the current to a desired human resource paradigm.



Musonda followed with a presentation on some overall context relating specifically to immunization supply chains and the work of the P&P working group – a multi-stakeholder group of experts focusing on the Human Resources priority of the Gavi Supply Chain strategy. Both presentations included information on the latest available resources that have been developed to support countries to

plan for and implement activities related to strengthening human resources for SCM.

Recording: www.ustream.tv/recorded/80687850/highlight/675806

Presentation 1: www.technet-21.org/images/TC2015/01_Global_Update_Andrew_Brown_Musonda_Kasonde.pdf

Presentation 2: www.technet-21.org/images/TC2015/02_Global_Update_Musonda_Kasonde.pdf

Vietnam – Innovative approaches to strengthening HR supply chain management

Dorothy Leab (AMP Vietnam)



The aim of the presentation was to share insights from the innovative approaches used in Vietnam to strengthen human resources for supply chain management (SCM). With support from AMP, the Ministry of Health is establishing a competency based training programme to build national capacities in SCM and harnessing information technologies to create an online community of practice, an e-learning platform, mobile job aids

and for posting technical resources. The approach will require mapping those human resources that will require specialised training (both pre-service and in-service training) from those that will require task shifting (primarily at the last mile and community health centre levels). This new approach is anchored within Vietnam's 2020 Pharmacy Strategy and 2030 Vision for Supply Chains in disadvantaged areas. Through policy dialogue it was acknowledged that professional vaccine supply chain managers were required in Vietnam. During the 27th EPI/ICC meeting in May 2015 a multisectoral partnership was established including the Ministry of Education and various other stakeholders. This set the stage for the innovative approach to be pilot tested before wider scaling up.

Recording: www.ustream.tv/recorded/80687850/highlight/675807

Presentation: www.technet-21.org/images/TC2015/03_Country_Innovations_Vietnam_Dorothy_Leab.pdf

Myanmar – Developing leaders and HR capacity for effective supply chain management

Kyaw Kan Kaung (Ministry of Health Myanmar)



The aim of the presentation was to share insights from the various challenges and opportunities that exist at country level to develop supply chain leaders and improve the capacity of human resources for logistics in Myanmar. After presenting the immunization supply chain structure in Myanmar and describing the roles and responsibilities of the 50+ staff in the country that are managing vaccines at different levels, Dr. Kaung described to

key challenges. These are wide ranging, but center primarily on the limitation of human resource capacity at central and sub-national levels; the lack of proper logistics management training; and the fact that focal points at subnational level are multitasking when dedicated SCM staff are required. Despite the key challenges, the various opportunities that present themselves to Myanmar were listed such as: (a) the on-going health reform process initiated by the Ministry of Health, with a new procurement and supply section created which will hopefully recruit dedicated supply chain managers; (b) the current Gavi Health System Strengthening (HSS) grant going until 2020 that includes resources for strengthening human resources; (c) the potential partnerships with partners like UNICEF for SCM systems and knowledge transfer; (d) the anticipated increase in government funding allocations for human resources.

Recording: www.ustream.tv/recorded/80687850/highlight/675809

Presentation: www.technet-21.org/images/TC2015/04_Country_Innovations_Myanmar_Kyaw_Kan_Kaung.pdf

PDR Lao – Developing leaders and HR capacity for effective supply chain management

Ataur Rahman (UNICEF Lao PDR)



The aim of the presentation was to share a country level perspective from Lao PDR on the challenges and opportunities for effective broad-based approaches to improving human resources for supply chain management. The presentation first presented some of the challenges in Laos such as: the shortage of staff working in supply chain; the important turnover of staff; the limited training and skills; unclear roles and responsibilities; lack of

or outdated standard operating procedures; lack of performance incentives or supportive management. The innovative solutions in Laos were to: (i) create a separate centre in the Medical Products Service Centre (MPSC) of the Ministry of Health with designated supply chain staff that have the mandate to focus on overall supply chain policy development, implementation and monitoring of supply chain management. Together with a recent Ministerial decree, the ambition is to establish an integrated supply chain policy whereby all health commodities (including vaccines) will be managed under this new structure. (ii) Establish various technical Procurement and Supply Management working groups to plan, coordinate and develop supply chain strategies jointly across all health programmes. (iii) Strengthen training on supply chain management at all levels in the country. (iv) Include supply chain management as a specific topic in the Pharmacy Training Curriculum; and (v) Include human resources and capacity building in the new cMYP and cEVM improvement plans as well as in the national supply chain strategy. Following these innovation, in 2014 there were no vaccine stock-outs at central level and more than half of facilities reported no vaccine stock-outs. Supply chain challenges remain however, particularly that of expired vaccine. Actions currently in hand include job descriptions being prepared, dedicated staff for assigned to the central level, recognition of the importance of dedicated supply chain staff, and increasing support for the supply chain management from external partners – both technical and financial.

Recording: www.ustream.tv/recorded/80687850/highlight/675811

Presentation: www.technet-21.org/images/TC2015/05_Country_Innovations_LaosPDR_Ataur_Rahman.pdf

India – Building institutions for Health Systems Strengthening: The experience of a national cold chain and vaccine resource centre

Srihari Dutta (UNICEF India)

The aim of the presentation was to present the approach in India to strengthen human resources for logistics through the establishment of a National Cold Chain and Vaccine Management Resource Centre (NCCVMRC) in collaboration with UNICEF and a National Cold Chain Testing Centre (NCCTC). The presentation opened with a brief introduction of the scope and performance of the Indian immunization programme and the 5 tiered supply chain structure - from 4 national stores to the nation-wide 28,000 health facilities. Srihari presented some of the shortcomings and gaps in India including supply chain management; weak policies and practice; lack of human resources for logistics and weak capacity building programmes. India realized that some of the basics needed to be fixed in the supply chain to address these gaps. The response was to establish both a national training center on cold chain logistics and vaccine management. The lessons learnt to date on the centre were presented.

Recording: www.ustream.tv/recorded/80687850/highlight/675812

Presentation: www.technet-21.org/images/TC2015/06_Country_Innovations_India_Srihari_Dutta.pdf

Moderated discussion: How do we achieve country-based change to improve immunization and health supply chains?

Facilitator: Andrew Brown (People that Deliver)



ahead.

Following some Q&As from participants based on the presentations made during the session on human resources for logistics, Andrew moderated a discussion on how to achieve country based change.

The fact that human resource for supply chains are being openly discussed and a wide range of issues have been covered that we not previously discussed is progress in itself. But there is more work

Recording: www.ustream.tv/recorded/80687852/highlight/675813

Global report on the Data for Management Working Group on challenges and priorities

Gemma Orta-Martinez (UNICEF)



The aim of the presentation was to provide an updated on a recently established Data for Management (D4M) priority working group. Indeed, as part of the Gavi supply chain initiative a specific priority working group was established to support countries in the development of information systems dashboards for key supply chain indicators. Gemma presented the work of the D4M working group to improving data quality and use

of data at country level while improving the visibility of vaccines in supplies in the system in order to: (a) enable supply chain managers at all levels to make better operational and strategic decisions, enhancing the ability to protect the potency of vaccines; (b) make vaccines available at all points of use; and (c) allow countries to direct resources for performance improvement in a more targeted way, improving efficiency. An update on what the working group has done to date includes first, drafting a menu of action oriented and standardized key performance indicators per immunization supply chain level. The menu of indicators were presented one by one including illustrative examples. The menu includes: stockout rate; on-time and in-full delivery of vaccines; stock levels according to plan; forecasted demand ratio; closed vial wastage; temperature alarm rate; and the % of functional cold chain equipment. The second main output of the working group is a guidance document for countries on planning for and using indicators and dashboards. The key output of this priority working group will be on evolving online resource of technical materials and guidance. In terms of challenges, Gemma indicated that adopting the menu of primary indicators will depend on the countries' ability to collect the needed data and whether the staff concerned have the skills to understand the data to be able to use it properly. Beyond human resource capacity, Gemma concluded her presentation with a call to get in touch with UNICEF Supply Division to help and for participants to respond to the TechNet Survey.

Recording: www.ustream.tv/recorded/62246434/highlight/627913

Presentation: www.technet-21.org/images/TC2015/07_Global_Update_Gemma_Orta-Marinez.pdf

Pakistan – Networked information system for vaccine logistics: the vLMIS

Wasif Raza Mirza (USAID I DELIVER PROJECT Pakistan)



The aim of the presentation was to share the experience in Pakistan from implementing an innovative data for management system known as vLMIS. Since 2009, the USAID I DELIVER PROJECT has worked with the Government of Pakistan and other partners to improve their logistics management information systems (LMIS). Before then, there was very limited visibility of vaccine stock information

through the supply chain. The vLMIS is a web-based LMIS that now allows logistics data from different physical locations to be entered electronically and viewed through a web-based interface. The system uses a central database to bring all the logistics information together and it produces a variety of reports for different users. Reports include stock status reports, months of stock, and wastage reports.. Four main data streams are currently being reported into the vLMIS: warehouse management system data, consumption data for routine immunization, campaign reporting data, and cold chain equipment management data. While vLMIS is not yet implemented throughout Pakistan, it is being used in many locations already and has provided managers, logisticians, and donors with better visibility into the supply chain, helping them make better decisions to ensure that vaccines are available for the population. In the future, Pakistan expects to be deploying the use of 2D barcodes and this will be integrated into the vLMIS.

Recording: www.ustream.tv/recorded/62246434/highlight/627915

Presentation: www.technet-21.org/images/TC2015/09_Country_Innovations_Wasif_Raza_Mirza.pdf

India – Engaging the end user to increase mobile LMIS adoption

Bhriгу Kapuria (Ministry of Health India)



The aim of the presentation was to share the experience of designing and implementing an intelligent vaccine logistics management system for India’s Universal Immunisation Programme – the eVIN. Based on the identified root causes relating the lack of stock visibility, poor distribution planning, and improper storage conditions it was decided that a national vaccine logistic management system was required to provide visibility

of real time stock levels across all cold chain points, and enables staff to apply logistics management principles for vaccines. Confronted with this challenge, the Immunization Technical Support Unit of the Ministry of Health developed the electronic vaccine intelligence network (or eVIN) which was been pilot tested in two districts in Uttar Pradesh. Early results from the pilot indicate high levels of system adoption by cold chain staff, and high stock data quality, driven by human resources strengthening measures. Bhriгу concluded that when designing eVIN, and piloting it, it was learned that any vaccine logistics information system needs to adequately map the required workload, define measures to augment human resources, rigorously support existing staff, and define clear processes.

Recording: www.ustream.tv/recorded/62246434/highlight/627916

Presentation: www.technet-21.org/images/TC2015/10_Country_Innovations_India_Bhriгу_Kapuri.pdf

Sri Lanka – Web Based Immunization Information System (WEBIIS)

Chatura Edirisuriya (Ministry of Health Sri-Lanka)



The aim of the presentation was to share the experience of designing and implementing a web-based immunization information system known as WEBIIS as part of the eGovernment and eHealth policies of Sri-Lanka. The objective was to create a National Immunization Registry using web based technologies and move away from the shortcoming of a paper based immunization management information

system. This comprehensive system was developed locally using open source software's and includes birth registration, immunization tracking, vaccine stock management and report generations. Following the results of the EVM assessment in Sri-Lanka in 2012, the stock management module (or inventory module) of the WEBIIS was customized to respond to the relevant LMIS shortcoming identified in EVM assessment. These new customizations were pilot tested at three different levels (primary, regional vaccine store and lowest delivery level). The results of the pilot were demonstrated with screenshots, including birth registration, equipment inventory, VVM status, vaccine stock positions, monthly vaccine distribution, cold chain equipment repairs, and vaccines utilization at health centre level. Problems encountered during development included the changing requirements by users and industry, underdeveloped IT capacities in the peripheral areas, malware/virus attacks, the lack of IT equipment, and the need for continuous training to build and maintain the system. Full implementation of WEBIIS is planned for 2016.

Recording: www.ustream.tv/recorded/62246434/highlight/627921

Presentation: www.technet-21.org/images/TC2015/11_Country_Innovations_SriLanka_Chatura_Edirisuriya.pdf

Moderated Q&A: Managing the system with data

Facilitator: Jan Grevendonk (WHO)

The questions and answers to the morning session related to managing the system with data was facilitated by Jan Grevendonk.

Recording: www.ustream.tv/recorded/62205057/highlight/627922

Lunchtime roundtable discussion: Immunization session sizes are Binomial!

Moderator: Paul Colrain (WHO)

The session focused on sharing an innovative approach to estimating vaccine wastage using binomial statistics. Indeed, to accurately forecast vaccine needs requires accurate estimates of vaccine wastage in the supply chain. In the absence of reliable data on wastage, most countries resort to WHO indicative wastage rates for closed vials and opened multi-dose vials. However, these indicative rates are often different than national values and when used, distort forecasts that can potentially result in stock-outs or over-stocking. The expected opened vial wastage rate of a health facility depends on the vial size and the expected distribution of session sizes. In the absence of clear guidance, many health workers are put under pressure to keep wastage rates below acceptable levels, potentially resulting in missed opportunities and reduced coverage. Decreasing the number of immunization sessions per week will increase the mean session size and so reduce opened vial wastage. However, limiting the number of immunization opportunities may have a negative impact on coverage. It is difficult for a national or district manager to determine the optimal session frequency (or vial size) for different immunization facilities without knowing the impact his/her choices will have on the expected opened vial wastage rate. The solution – Binomial statistics.

Expert panel discussion: Country blueprints for supply chain Visibility and Analytics Networks (VAN)

Moderator: Maeve Magner (Independent Supply Chain Advisor)



The session focused on sharing the Bill & Melinda Gates Foundation project to develop a Visibility and Analytics Network (VAN) blueprint to improve product availability, gain visibility to beneficiary needs, create deeper analysis to garner insight, leading to continuous improvement of effectiveness and efficiency of public health supply chains.

Many of the key design principles involved in a VAN, adapted from the private sector “control towers”, reflect the approaches for: (i) People: Supply chain professionals in a centralized and integrated team; trained on and applying quantitative analysis of supply chain performance; (ii) Processes. Data driven, using analytical methods to plan and proactively respond to problems in the supply chain; provide recommendations of continuous improvements; (iii) Technology: Systems for data collection and aggregation that generate alerts and deliver actionable insight; (iv) Policy.

Visibility of the end-to-end supply chain encompassing all programs and tiers empowered to measure performance. During this session, country experiences of apply to VAN blueprint to improve supply chain data visibility were presented by Ethiopia, Tanzania, and Mozambique.

Focus topic breakout session: How do we strengthen supply chain leadership in countries?

Moderator: Chris Wright (JSI)



The session focused on presenting the 7 Habits of a Highly Effective Supply Chain Professionals; explored practical examples of supply chain leadership in Malawi, Somalia and Uganda, discussed enablers of and barriers to effective leadership; and proposed interventions to help find and empower capable supply chain leaders.

The public health community recognizes that functional supply chains are essential to health service delivery and achieving programme outcomes and global targets like the MDGs. An effective supply chain requires effective leaders who are able to not only manage day-to-day operations, but also to understand and embrace supply chain best practices, to collaborate with a broad array of stakeholders, and to advocate for financial and human resources.

Supply chain leadership is on the international agenda, with development partners including Gavi Alliance, UNICEF, and USAID leading a global initiative to strengthen in-country health supply chain leadership and management. These initiatives were discussed during the Focus topic breakout session.

Focus topic breakout session: How should we use immunization supply chain data for continuous improvement?

Moderator: Jan Grevendonk (WHO)

The session focused on better understanding how logistics data is collected and used to improve supply chain performance and for continuous improvements. Increasingly countries invest in Logistics Management Information Systems and Visibility (LMIS) and Analytics systems, which track vaccine stocks, consumption, orders, cold chain status, and more. But it is difficult to understand what data is generated from these systems and how the data is used to drive decisions for improvements. Discussion with countries took place on these topics and the use of the primary key performance

indicators being promoted at the global level by the Data for Management Priority Working Group of Gavi.

Expert panel discussion: Using mobile technologies to strengthen LMIS in Uttar Pradesh

Moderator: Brian Taliesin (PATH)



The session focused on diving deeper into the findings and lessons learned from the innovative experience of designing and implementing an intelligent vaccine logistics management system for India's Universal Immunisation Programme (UIP) – the eVIN. The findings from the pilot in Uttar Pradesh were presented and covered the quantitative and qualitative health impacts achieved through the eVIN

deployment and how the LMIS data generated from this system has been used to improve supply chain management. Discussion also centred on the use of mobile technologies and how they fit into the broader universal immunization programme and plans for national scale.

Focus topic breakout session: The role of national logistics and supply chain working groups

Moderator: Andrew Brown (People that Deliver)



The session focused on the role and importance of national logistics working groups in countries – a key mechanism for decision making in health supply chains and for implementing change. In this session different styles of national supply chain working groups in Kenya, Mozambique, Indonesia and Nigeria were presented and the different country experiences were shared. Participants to this session engaged in an interactive

process to determine how national supply chain working groups can be more effective and provided with tools that may aid them in country application. While engaging the correct stakeholders, taking consensus decisions and making meaningful system changes can be difficult, some key drivers to

success where raised. Namely: inclusion, strong leadership and political will, clear roles and responsibilities, clear structure, open channels of communication, and a common vision to meet the objective of the working group. It's important to be recognized within the Ministry of Health and to know who listens to the group and who is able to make decisions based on the expertise of a logistics working group.

Focus topic breakout session: EVM as a tool for human resource capacity building

Moderator: Souleymane Kone (WHO)

The session focused on how the Effective Vaccine Management (EVM) tool can be used for strengthening human resources for logistics. The session discussed where the current gaps are and how the EVM process can be strengthened to support HR capacity development. The EVM provides materials and tools needed to monitor and assess vaccine supply chains and help countries to improve their supply chain performance. As such, it is a strong tool to leverage for human resource capacity building. Discussion centred on how to incorporate a strong human resource component into the EVM assessment tool in order to ensure that human resource considerations are adequately covered within the country comprehensive immunization supply chain plans or cEVM improvement plan, and integrated into the overall continuous improvement approach in countries. This session further discussed where the current gaps are and how the EVM process can be strengthened to support HR capacity development.

Friday, 15 May: Enabling the supply chain

Rapporteur: Mojtaba Haghrou, Independent Consultant, Iran

Summary of morning session

Friday morning sessions focused on five new global strategies, initiatives and enablers for supply chain strengthening. The first was the Vaccine Products and Packaging Advisory Group (VPPAG) – a forum for industry and public sectors to optimize vaccine presentation and packaging and improve future vaccine products so that they flow better through supply chains, and have inherent features that ease logistics in the field.

The second session was on the recently endorsed Gavi Immunization Supply Chain Strategy – a Vaccine Alliance-wide strategy to leverage resources and prioritize transformational actions on five supply chain fundamentals in developing countries.

The third session was on the WHO and UNICEF Immunization Supply Chain Hub as a key mechanism to support countries assess, plan and implement innovative changes.

The fourth session was on the recent initiative by PATH to raise political will for stronger supply chains and to help raise visibility and increase political will among country-level decision-makers for the adoption of emerging strategies and solutions to strengthen immunization supply chains.

A final presentation covered initiatives within the much broader health supply chain community. It covered the key developments within the global partnership known as the Inter-agency Supply chain Group (ISG). Since agreeing to a joint vision and workplan at the end of 2014, partners of the ISG have taken forward several important activities towards greater convergence of investments and technical support with the overall aim of strengthening in-country health supply-chain systems.

The morning session closed with an open discussion with participants on their perspective and views relating to these global strategies, initiatives and enablers for supply chain strengthening.

Daily opening remarks

Andrew Brown (People that Deliver)



The chair opened the fourth and last day of the TechNet by introducing the programme and reviewing the theme for the day's sessions around enabling the supply chain.

The main global enablers focused on global efforts both upstream and downstream that will impact on strengthening national immunization supply chain systems.

Update from the Vaccine Products and Packaging Advisory Group (VPPAG)

Debra Kristensen (PATH)

The aim of the presentation was to introduce participants to the work, priorities and achievements of the Vaccine Presentation and Packaging Advisory Group (VPPAG) – a working group of public and private sector experts working together to improve future vaccine products so that they flow better through supply chains, and have inherent features that ease logistics in the field. The first part of the presentation described the various strands of work of the VPPAG and its current mandate including: (a) efforts to advance specific topics such as labelling, visual cues and barcoding; (b) to develop consensus on future vaccine products characteristics through generic Preferred Product Profile (gPPP); (c) holding bilateral consultations with vaccine manufacturers or developers to engage on specific product presentation issues; and (d) serving as a WHO Immunization Practices Advisory Committee (IPAC) subcommittee. The second part of the presentation provided examples of where VPPAG

recommendations have made an impact including the adoption of the WHO Programmatic Suitability of Vaccine Candidates for Prequalification (PSPQ) requirements. The presentation ended with a call to further engage TechNet members and encourage those who work in countries to share any vaccine packaging and presentation issues that VPPAG could help address in the future.

Recording: www.ustream.tv/recorded/62280736/highlight/627928

Presentation: www.technet-21.org/images/TC2015/01_Debra_Kristensen.pdf

Update on the Gavi Immunization Supply Chain Strategy

Alan Brooks (Gavi)

The aim of the presentation was to announce and describe the recently approved Gavi Supply Chain strategy – a new and prioritized focus area for Gavi between 2016-2020. Approved by the Board in June 2014 with new resources, the supply chain strategy is establishing a powerful enabling environment for end-to-end supply chain improvement in Gavi eligible countries. The strategy sets a 2020 vision for immunisation supply chains around three objectives of ensuring adequate availability of vaccines, safeguarding vaccine potency, and improving supply chain efficiency. The strategy itself is will focus on resourcing the implementation of supply chain solutions according to five fundamentals: (1) system design so that the next generation of supply chains are designed to optimize efficiency; (2) human resources for logistics so that future supply chains are led by competent, professionally trained supply chain managers; (3) vision and strategy for the supply chain to put countries on a trajectory of continuous improvement aligned with national priorities; (4) strong data systems so that supply chains are managed with good data; and (5) scaling up innovative cold chain technologies that allow vaccines to be protected from damaging temperature excursions. In addition, the Gavi supply chain strategy will benefit from new technology and approaches, including adoption of private sector management practices. The presenter depicted on urgency of being focussed on game-changing solutions and concentrate efforts on the most needy and challenging countries which leads to implementation plan aligning Alliance partners and resources towards shared 2020 outcomes.

Recording: www.ustream.tv/recorded/62280736/highlight/627931

Presentation: www.technet-21.org/images/TC2015/02_Alan_Brooks.pdf

Update on the joint WHO & UNICEF Immunization Supply Chain Hub

Benjamin Schreiber (UNICEF)

The aim of the presentation was to inform participants of the establishment of the WHO/UNICEF immunization supply chain and logistics (iSCL) Hub. Although WHO and UNICEF have had a tradition of working together, both agencies united and joined forces under the umbrella of the Immunization Supply Chain Hub – a collaborative platform between WHO Headquarters, UNICEF New York and UNICEF Supply Division in Copenhagen as way to leverage the comparative advantages of both

organizations and to catalyse evidence based change in countries. In 2015, the Hub finalized its 2020 strategy according to three pillars of activities. The first is the expanded mandate on the Effective Vaccine Management (EVM) initiative launched in 2010 to help countries assess the strengths of their immunization supply chains against global standards and benchmarks. The availability of new resources to WHO/UNICEF allows both agencies to support countries develop and implement supply chain improvement plans in order to respond to the vaccine management shortcoming identified during an EVM assessment, but also as a way of putting countries on a trajectory of continuous improvements, supply chain optimization and innovation. To achieve this, WHO/UNICEF developed a 4 step comprehensive EVM framework (or cEVM). The second pillar of the Hub is to support countries to scale-up and adopt Hub prioritized supply chain solutions in the areas of cold chain equipment and management, system design, and continuous temperature monitoring. The third pillar of the Hub is to continue to build and strengthen a global community of practice, and establishing a cadre of skilled consultants to support immunization supply chain improvements, innovations and country level change management processes.

Recording: www.ustream.tv/recorded/62280736/highlight/627934

Presentation: www.technet-21.org/images/TC2015/03_Benjamin_Schreiber.pdf

Global update on the PATH Immunization Supply Chain Advocacy Project

Heidi Lasher (PATH)

The aim of the presentation was to inform participants of the recent initiative by PATH to raise political will for stronger supply chains and to help raise visibility and increase political will among country-level decision-makers for the adoption of emerging strategies and solutions to strengthen immunization supply chains. The initiative is working at both the global level and the regional level—particularly in Africa—to create an enabling environment for countries to prioritize and address immunization supply chain and logistics issues. At country level, Uganda and Senegal were selected for the project to ensure supply chain improvement strategies are reflected in appropriate country plans and policies. The PATH initiative is closely aligned with Gavi, the Vaccine Alliance's Immunization Supply Chain Strategy and the WHO/UNICEF Hub for Immunization Supply Chains. As part of this initiative, PATH has convened an advocacy advisory group to help identify the key policy changes to achieve at global and country levels. Through the advisory group, PATH is developing a global advocacy framework and messaging platform to share so we can amplify messages and speak from the same page. As indicated by the presenter, the ambition of the project is to work with partners to raise global visibility and country political commitment for the adoption of emerging technical, managerial, and equipment solutions for strengthening vaccine supply chain and logistics within national health systems.

Recording: www.ustream.tv/recorded/62280736/highlight/627936

Presentation: www.technet-21.org/images/TC2015/04_Heidi_Lasher.pdf

Global update on the Inter-Agency Supply Chain Group (ISG)

Lisa Hedman (WHO)

The aim of the presentations was to provide a brief update on key developments within the global partnership known as the Inter-agency Supply chain Group (ISG). Since agreeing to a joint vision and workplan at the end of 2014, partners of the ISG have taken forward several important activities towards greater convergence of investments and technical support with the overall aim of strengthening in-country health supply-chain systems. The key updates that were showcased in the presentation related to the: (1) Align in-country joint investments by multiple stakeholders (RMNCH, World Bank, BMGF, UNFPA, USAID, Global Fund, Gavi...etc). Examples include: Senegal/Togo to implement an informed-push delivery system; in Kenya/Ethiopia to strengthen the use of global information standards (GS1) and the use of bar code technology for greater end-to-end visibility of commodities as they move through the supply chain; in DR Congo/Myanmar/Zambia to support a national process to develop a comprehensive di-siloed supply-chain strategy around which various partners and investors can align; and in Nigeria with national partners on integrating storage and distribution for HIV, Malaria and TB includes establishment of a national Logistics Management Coordinating Unit. (2) Harmonize Key Performance Indicators. The ISG is recommending the use of a common set of 15 supply chain indicators by international donors and countries to measure impact of their investments on the performance of in-country supply-chains. Harmonizing KPIs and their definitions will reduce the reporting burden for stakeholders and allow for the very important ability to consolidate and analyse data across agencies and countries. (3) Leverage synergies for supply chain country assessments. Both USAID and WHO/UNICEF have developed robust country supply-chain assessment tools and it has now been agreed by all agencies to better leverage the two tools, which are already very complementary. (4) Interoperable Systems. The ISG is working towards coordinating investment planning for management information systems and system interoperability. The ISG will leverage existing forums for industry and public sector dialogue to adopt global information standards for pharmaceuticals, vaccines & medical devices. Agencies will also work toward coordination and alignment of investments for LMIS.

Recording: www.ustream.tv/recorded/62280736/highlight/627937

Presentation: www.technet-21.org/images/TC2015/05_Lisa_Hedman.pdf

Moderated discussion: What are global enablers for supply chain strengthening and how to achieve country-driven change?

Facilitator: Andrew Brown (People that Deliver)



Following some Q&As from participants based on the presentations made during the morning session, Andrew moderated a discussion intended to converge the ideas presented during the three days of the conference, such as:

Components for designing an appropriate supply chain and when and how to modify existing supply chains, outsourcing (pros and cons), push versus

pull systems, network modelling and supply chain integration;

Supply chain equipment and issues related to maintenance, innovative measures, optimal sizes of vaccine vials, solar systems and sun driven equipment, temperature monitoring and controlled temperature chain;

Managing the supply chain and issues related to human resources in relation to logistics strengthening human resources, data collection and analysis, optimal immunization size, leadership and effective vaccine management (EVM).

Finally, the last discussion reflected on other global enablers needed to strengthen immunization and health supply chains and how to achieve impact at country level.

Recording: www.ustream.tv/recorded/80696084/highlight/675821

Roundtable discussion: Generating political will for supply chain improvements

Moderator: Heidi Lasher (PATH)

The session focused on how to secure critical policymaker support to strengthen supply chain and logistics systems in countries. During this lunchtime roundtable session, discussion were held on the challenges that regional and country-level participants face when trying to achieve political commitments for supply chain improvements. Ideas and experiences used to overcome those challenges were shared, including: mapping decision-makers, identifying champions, establishing appropriate supply chain oversight bodies, and using Effective Vaccine Management (EVM) findings to generate a compelling case for investment.

A Tribute to the Supply Chain Architects

Alan Brooks (Gavi)



In closing the 14th TechNet Conference, a special tribute was given to the 4 architects of immunization supply chains – four friends that studies architecture together in the UK and were all drawn to designing the immunization systems in the world. In the 1980s, Andrew Garnett, Anthony Battersby, James Cheyne and John Lloyd all decided to apply their skills in architecture and face up to the challenge of creating a vaccine supply

chain in countries where none really existed before, and step up to the challenge of how do you keep vaccines cold in some of the most challenging environments of the world.

Given the theme of the 14th TechNet Conference on Immunization Supply Chains, Alan Brooks and close friends of the 4 architects wanted to take the opportunity to recognize their contributions over the past 30 years, offer them Awards for their achievement on behalf of TechNet and the Gavi Secretariat, and to hear from their views of the next 3 decades ahead. Key individuals that know them well and worked with them closely, each said a few words.

Debbie Kristensen preferred to call them the Fabulous 4 or Fab 4 as she shared memories of each of them and key achievements made by each: John was an embracer and champion of innovation and worked through all the hurdles to get VVM on vaccine. VVMs would not be around if it weren't for John's relentless efforts. James was instrumental for introducing Hepatitis B in India. Andrew incredible contributions on VPPAG and Vaccine management, and Anthony wrote a document that help save thimerosal in vaccines at a time when this was at risk. This pivotal document that allowed to build in exceptions that allowed to continue having multi-dose vials of vaccines and continue the open-vial policy.

Modibo Dicko choose to call them the 4 brothers and used key words to describe them: Patience, Dedication, Extreme professionalism, Bright, Going straight to the point, Consistency and Visionary. "These guys, if they are your friends you will go far and have great support. But if they are also temporarily your adversary, you will be strengthened because they will point fingers to your weaknesses in your thinking. And if you can solve those weaknesses, you will come out stronger. So You are always winning by knowing them". In terms of Visionary, Modibo read the proceeding of the 1999 TechNet that John Lloyd has summarized at the time. These are still relevant and aligned with what was discussed at the 14th TechNet Conference.

Diana Chang-Blanc called them the 4 giants and reflected on the dedication and passion for their worked despite being entirely different characters. For Diana, each evokes a quality of spirit that can be summarized into key words. For Antony it's "Tenacity" as a person that expresses what they

believe in and stand by it. For Andrew it's "Precision" and "Humility". Andrew worked relentlessly to make things as perfect as possible but never sought credit for his work, but simply took pride in knowing that his work would be helpful and meaningful. For John it's "Vision" and "Boldness". For James it's "Pragmatism" and "Positivism" no matter how difficult a situation may be.

Robert Steinglass, when reflecting on his days in the field working for WHO, always felt they were "gods and wise men". John was the "visionary thought leader". James was "methodical creating great learning materials" and always very methodological and professional and understood how to motivate people and give them learning materials they needed to do a good job. Anthony was the "analytical and intrepid one". "Anthony is fearless, makes the points that are sometimes very uncomfortable with energy and commitment and integrity. Andrew was "meticulous".



Joanie Robertson ended the tribute and was speaking on behalf of the award selection committee for the 4 supply chain architects. Joanie described the choice of the award which was a Buddha status. She explained the parallels between the teachings of Buddha and Antony, Andrew, James and John. Buddha was a teacher and everyone that came in contact with the 4 architects would have been impacted by their teachings and knowledge. Buddha practiced kindness and humility which were key attributes of the 4 architects.



The closing ceremony of the 14th TechNet Conference was also dedicated to Andrew Garnett – one of the four immunization supply chain architects who sadly passed away on 22 February 2015 at the age of 71. Although Andrew was trained as an Architect (like Antony, John and James) he was first exposed to the world of vaccines after attending an Expanded Programme on Immunization (EPI) training course run by WHO in Geneva in 1985. This quickly led to WHO asking him to develop a test protocol for standby power for cold chain equipment. This assignment marked the beginning of his association with EPI and WHO.

Andrew's work with WHO continued over many decades, namely on the development of technical documentation for the Vaccine Management Training Network; the development of the PQS (Performance, Quality and Safety); the development of the Effective Vaccine Store Management (EVSM) and Vaccine Management Assessment (VMA) tools and associated user guide, and the design the Effective Vaccine Management (EVM) tool that merged the best of both the EVMS and VMA. Lastly, Andrew was the author of numerous WHO technical documents and guidelines the most recent being the model guidance for storage and transport of time and temperature-sensitive pharmaceutical products

Diana Chang-Blanc spoke for everyone that had the pleasure to work with Andrew when she said: "Andrew leaves behind a huge gap. Not only will he be missed for his brilliant and clear mind, but also his good and gentle spirit". Debbie Kristensen complemented this by saying "There is no one like Andrew - such an amazing analytical and creative mind coupled with a kind and humble spirit. He had such patience for detailed work and great passion for getting things right to improve global health".

Modibo Dicko summed up the feelings of so many when he quoted the Malian saying: "A great baobab has fallen down! What will happen to the birds?" The truth is that the birds will continue to sing and their voices will resonate for the children of the world. That is a testament to Andrew's contribution to making the world a better place. Andrew was a true force for good. A real gentleman. He will be sorely missed.

In turn, Antony (represented by his wife Rachel Fielden), James and John reminisced on their careers, shared some anecdotes and stories, and conveyed messages for the new generation to move forward in the next 30 years and continue the legacy of the work of the 4 architects.

Recording: www.ustream.tv/recorded/80696087/highlight/675818

Manufacturers Marketplace



The main side event organized alongside the TechNet Conference is the Manufacturers Marketplace. This area resembled a trade fair or expo where private sector companies and vaccine or equipment manufacturers showcased and demonstrated their latest products and technologies which allowed participants to spend time discovering and seeing new cold chain technologies.

A total of 34 companies were represented at the manufacturers market place. While most companies were cold chain equipment manufacturers (60%), there was good representation from companies developing temperature monitoring devices, cold boxes, vaccines carriers, and injection devices.

The complete list of companies represented are as follows: Aucma, Berlinger & Co. AG, Beyond Wireless, Bio Farma, Blowkings, BPFK, Cold & Co, Colombo Smart Plastic, Controlant, Dometic, Dulas Ltd, Easy Solutions, ELPRO-BUCHS, Godrej, Haier, Janssen, Japan BCG Laboratory, Merck, Nilkamal, Polestar Cooling, Quascenta, Remonsys Ltd, Savsu Technologies, Serum Institute of India Ltd, South East Solar Co., Stevanato Group, SunDanzer, Sure Chill, Taiyo Kogyo Corporation, Temptime, UPS, Vestfrost Solutions, Zero Appliances, and Zhendre.



Innovations Café



The second side event organized was known as the Innovations Café. This area was designed for non-commercial innovations to be showcased, or innovations developed by countries to improve logistics management information systems (LMIS), temperature monitoring of the cold chain and supply chain modelling tools. Experts in each technology hosted informal discussion and hands-on demonstration of their technology, enabling participants to learn about a particular home-grown innovation for the strengthening immunization supply chains.

The main innovations represented were the following: Fulcrum smart phone/tablet application for cold chain equipment management; Android EVM assessment using android smart phone application; Llamasoft Supply Chain Guru modelling software for network optimization; Logistimo cloud-based mobile LMIS; Hermes supply chain modelling tool; AsiNet temperature monitoring system; ColdTrace NexLeaf temperature monitoring system; GS1 Barcoding system; VaxTrac tracking vaccine vials up to the child.



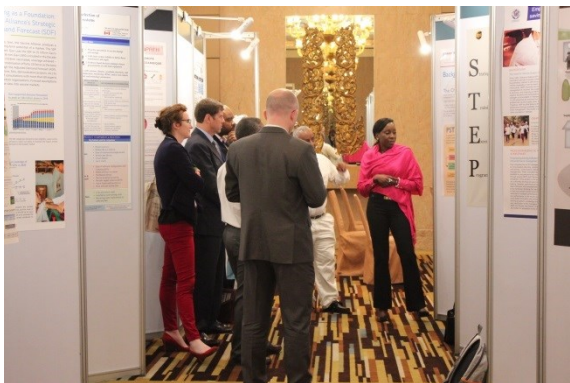
Project Gallery, Video Gallery, and Resource Library



The third, fourth and fifth side events were the Project Gallery, Video Gallery and Resource Library. These areas were designed in part to respond to the inability to include in the formal agenda all the interesting activities, projects, research or demonstration projects being conducted and implemented by immunization supply chain partners. Instead, a dedicated room was made available for posters, video presentations and resources on innovative supply chain projects in developing countries. A total of 40 posters from approximately 20 partners were presented, while 12 videos were presented in the Video Gallery on a continuous loop.

The complete list of posters and videos can be found in the TechNet Conference Guide:

www.technet-21.org/images/TC2015/TC2015_Conference_Guide.pdf



TechNet Clinic



The fifth and last side event was the TechNet-21 Clinic, which assisted various people with technical problems they encountered with the website, and was able to sign up a significant number of new members to the website. By the end of the conference, it was estimated that 85% of all participants had TechNet accounts.

Live streaming



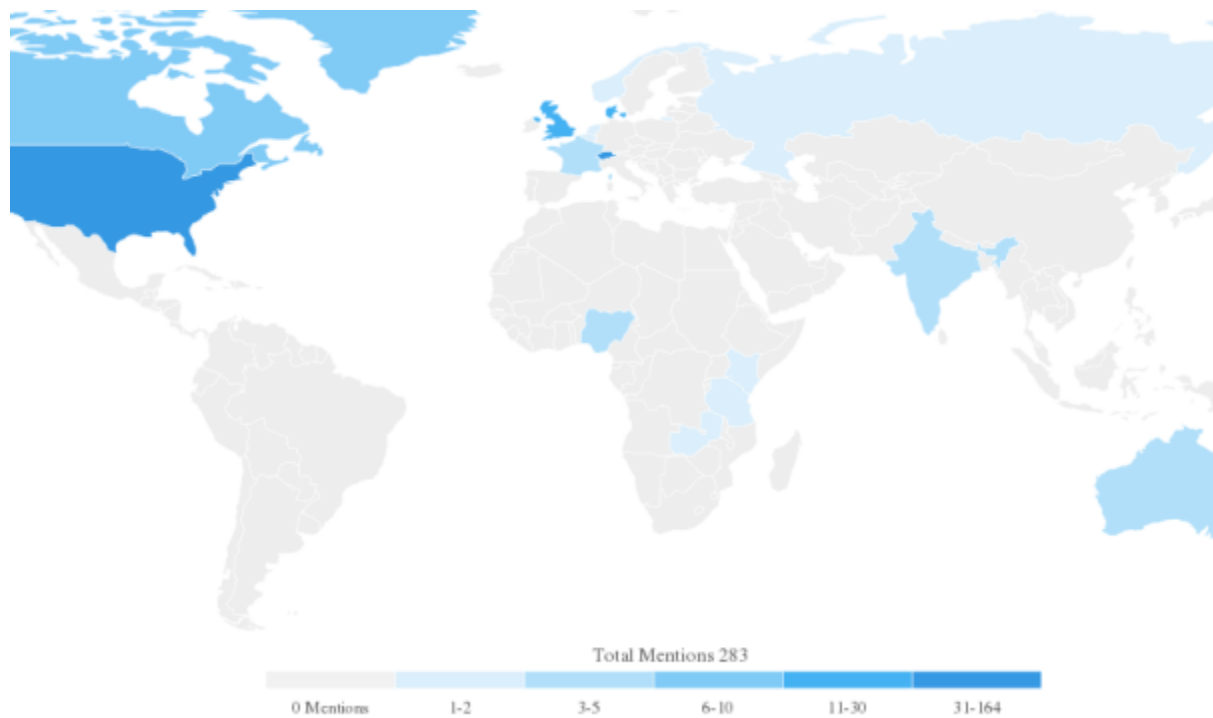
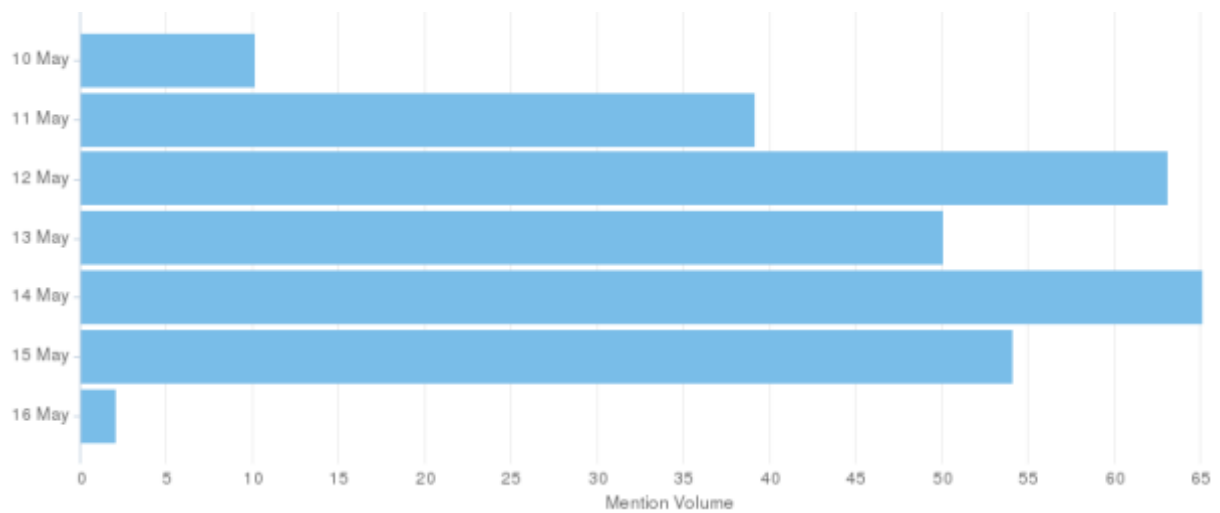
In light of the overwhelming interest in participating in the TechNet Conference and the inability to accommodate for the physical participation of all 370 expressions of interest, all morning plenary sessions were recorded and streamed live over the internet. The videos were then posted on Ustream for remote viewing at a later stage for participants located in time zones that complicated streaming live. Throughout the week, a total of 350+ views were registered on Ustream with a maximum of 10 people streaming at any given time during the morning plenary sessions. The most popular day for live streaming was on 13 May 2015 (Equipping the Supply Chain).

All recorded sessions are available on the TechNet-21.Org website:

www.technet-21.org/home/about/tc2015

Social media

Throughout the week of the 14th TechNet Conference, updates were being posted on social media sites. Over the four full days of the conference, a total of 282 tweets were tagged with the official TechNet Conference hashtag (#TechNetConference).



The geographical locations of people who tweeted about #TechNetConference were as follows.

Conference survey

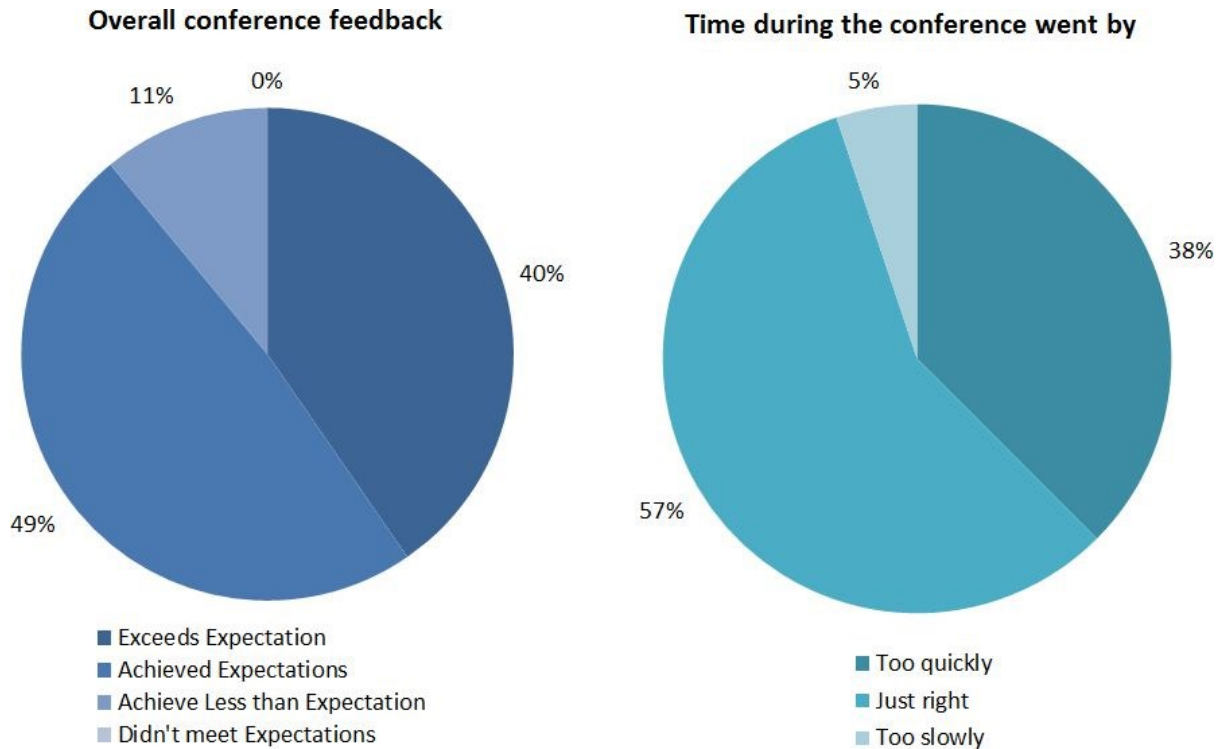


At the end of the 14th TechNet Conference, an interactive meeting survey was conducted with participants in order to evaluate the effectiveness of the Conference. Using electronic voting clickers, participants were asked a series of questions that they had to rate according to a range of choices. Most questions used a 5 choice Likert scale (awful, not good, good, very good, excellent) and touched on a variety of areas measuring participants impressions of the Conference.

The results are presented below and based on the responses from 150 participants (we had 150 voting machines available).

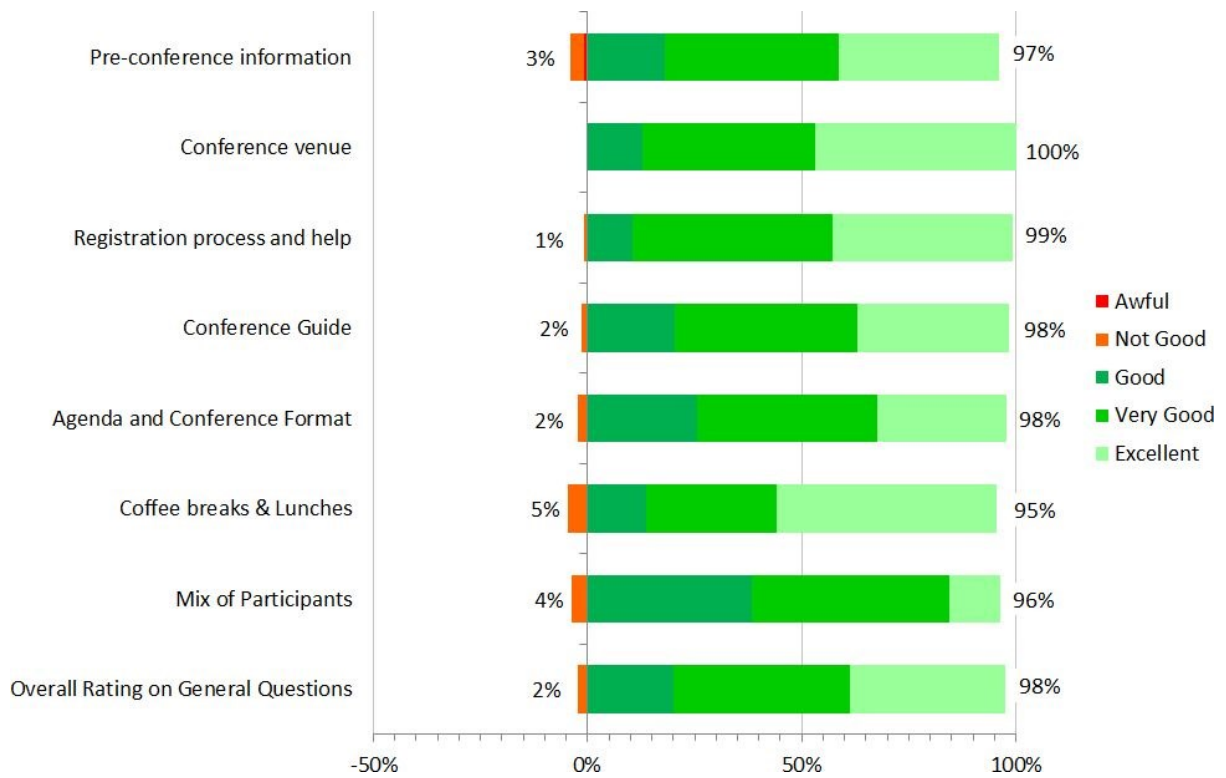
Overall conference impressions by participants

The overall feedback indicated that conference exceeded expectations for 40% of participants and achieved expectations for 49%. In terms of the duration, 38% of participants felt the conference went by too quickly whereas the majority (57%) felt the time was just right.



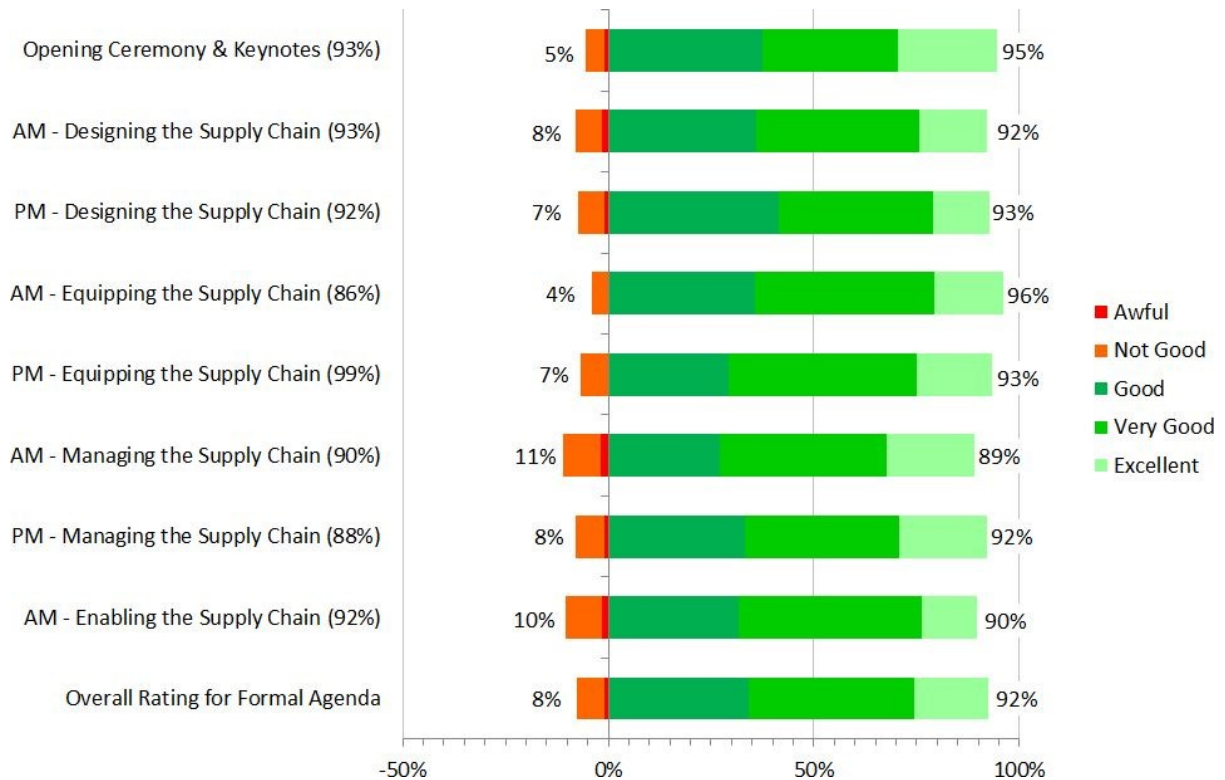
For 11% of participants, they felt the conference did not meet their expectations and 5% felt the conference pace was too slow.

The majority of participants voted "Very Good" to "Excellent" when asked questions relating the pre-conference information; the conference venue; the registration process and helpdesk; the conference guide; the agenda and conference format; and the mix of participants attending.



Feedback on the formal agenda

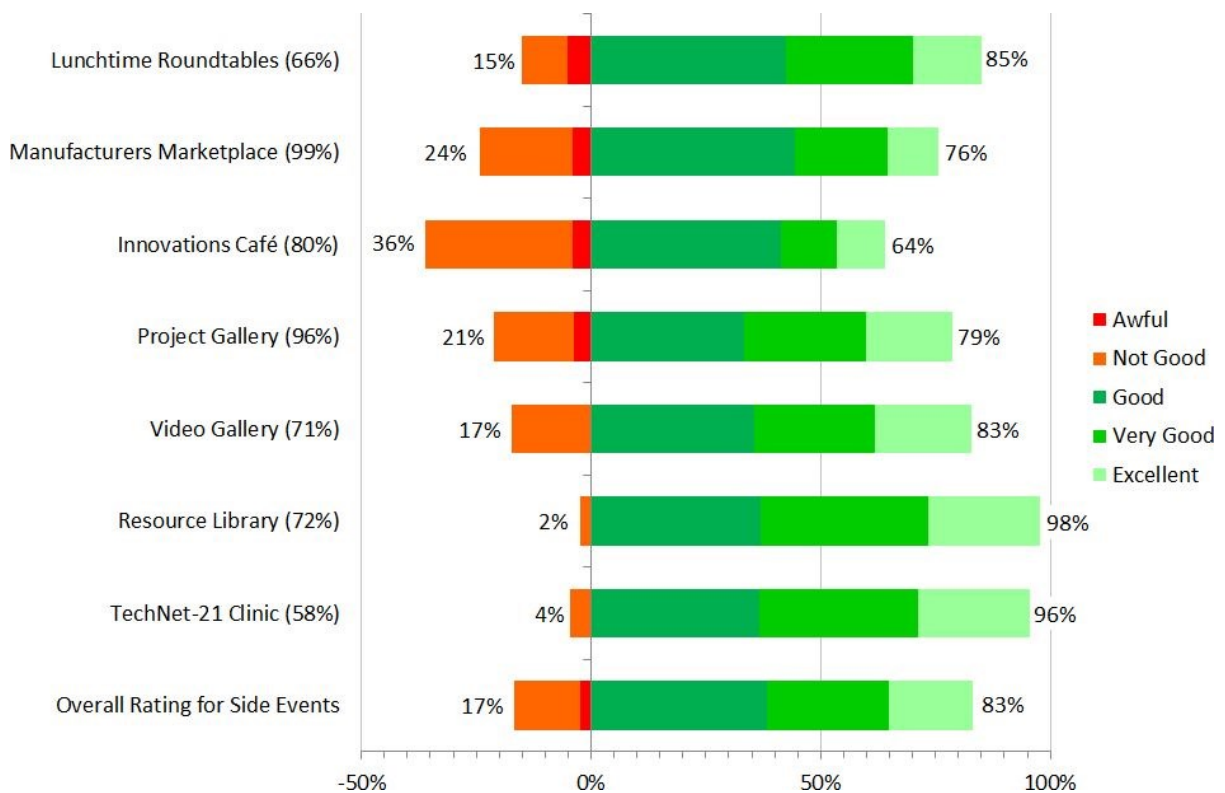
The feedback provided on the formal agenda was quite positive and most participants found the structure to be a good one. Of interest is that the 95% of participants enjoyed the Opening Ceremony & Keynote speeches (a new feature of the 14th TechNet Conference). In addition, the format of formal morning sessions and afternoon interactive sessions seemed to be one that participants appreciated.



* Percentages in brackets indicate the proportions of the 150 participants that votes on that particular question

Feedback on conference side events

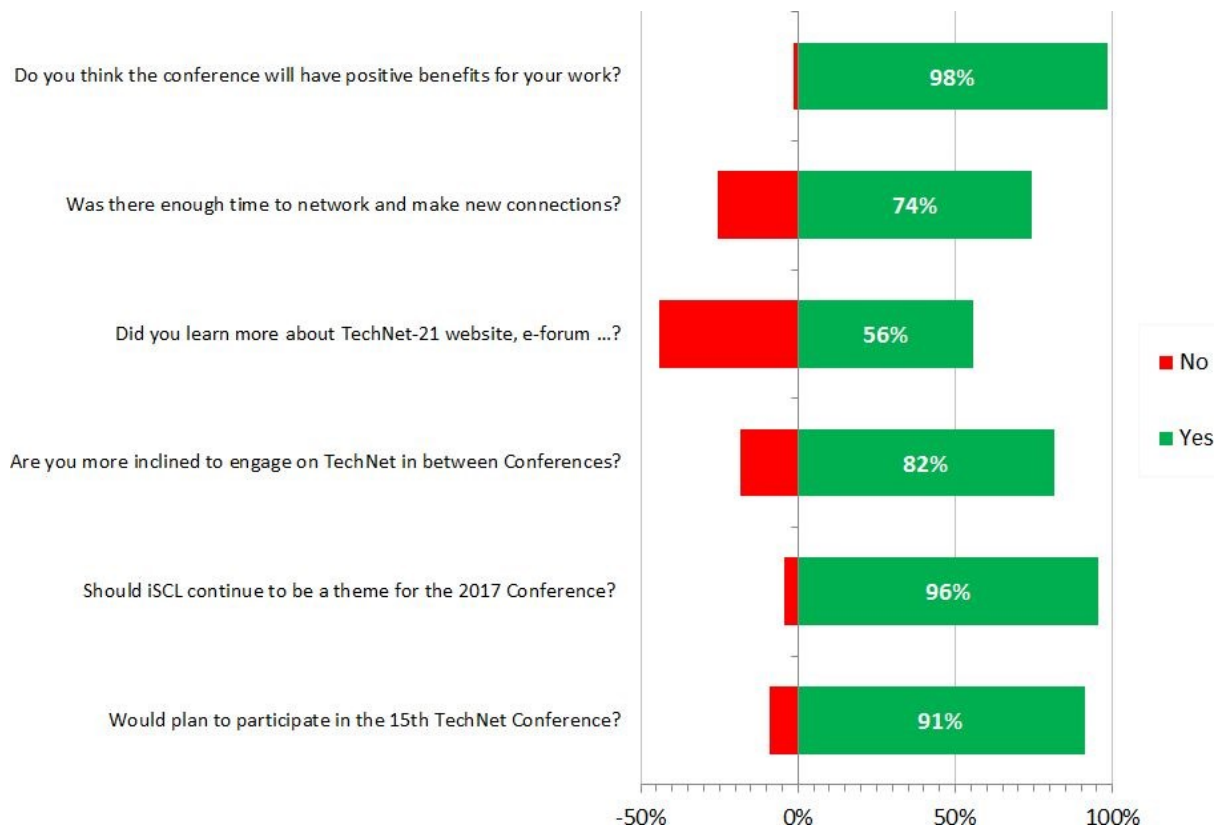
Participants views on the side events proposed during the conference indicate that these were appreciated and overall successful. Interestingly enough, the Innovations Café and Manufacturers Corners had a fair number of participants indicating not finding these side events very good. These findings aren't altogether surprising since both of these side events had a strong focus on cold chain and temperature monitoring technologies. Participants not interested in these innovations would not get much out of these two main side events proposed. For the Innovations Café, a further reason that might explains why 36% of participants did not find this side event very good is potentially linked to the format and how these were scheduled in the agenda. Whereas the Manufacturers Corners was happening at all times throughout the 4 days of the conference, each innovation had a 1 hour scheduled slot on one of the 4 days. In other words, it was quite easy to miss an innovations café and perhaps this was cause for frustration by participants voting "not good".



* Percentages in brackets indicate the proportions of the 150 participants that votes on that particular question

Feedback on the usefulness of the conference

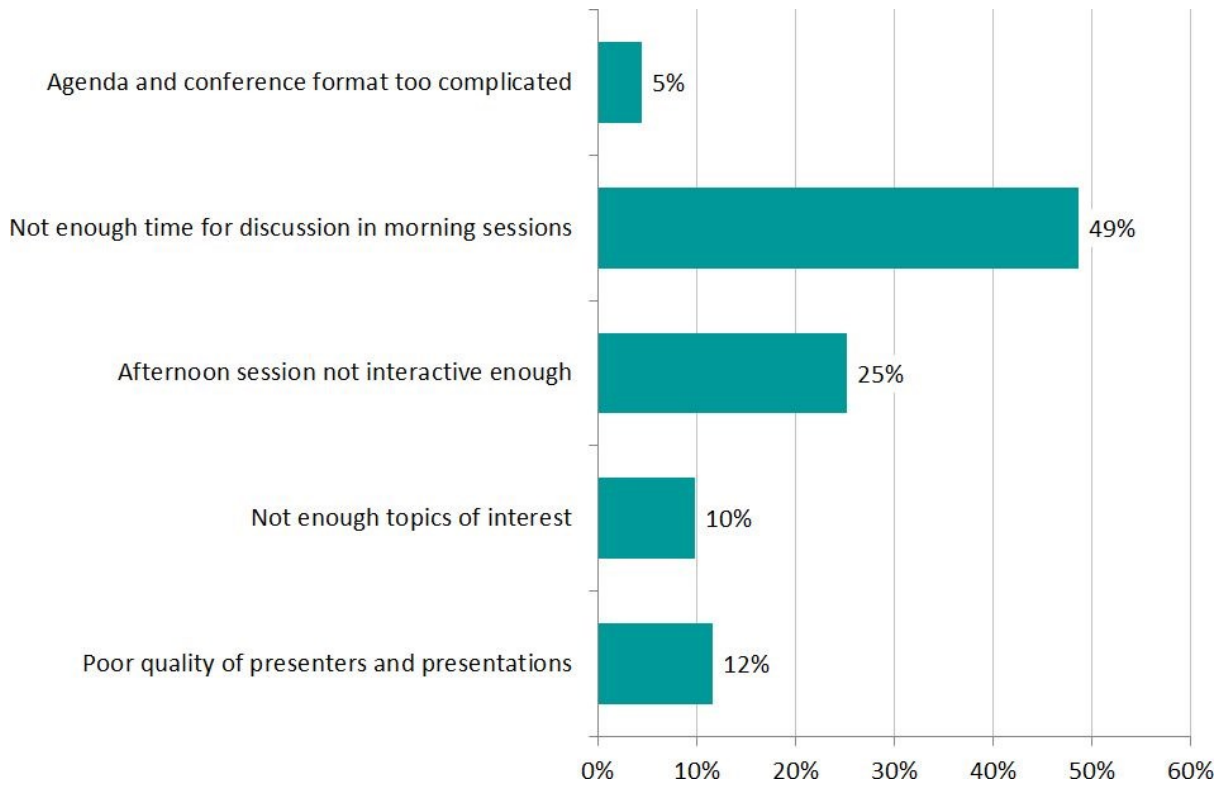
Participant views on the usefulness and effectiveness of the conference were very positive. Almost all respondents indicated that the conference will have positive benefits on their work, and 9 out of 10 participants would participate in the next one. When asked if the theme of immunization supply chain and logistics (iSCL) should continue at the next conference, 96% of respondents said “yes”.



In between conferences 82% of participants felt more inclined to engage on the TechNet website and e-forum.

Constructive criticisms

While the agenda and conference format was good, the conference covered enough topics of interest and the quality of presentations and presenters was good, participants did feel that there was not enough time available for discussions during the morning sessions and that afternoon interactive sessions were not always interactive enough.



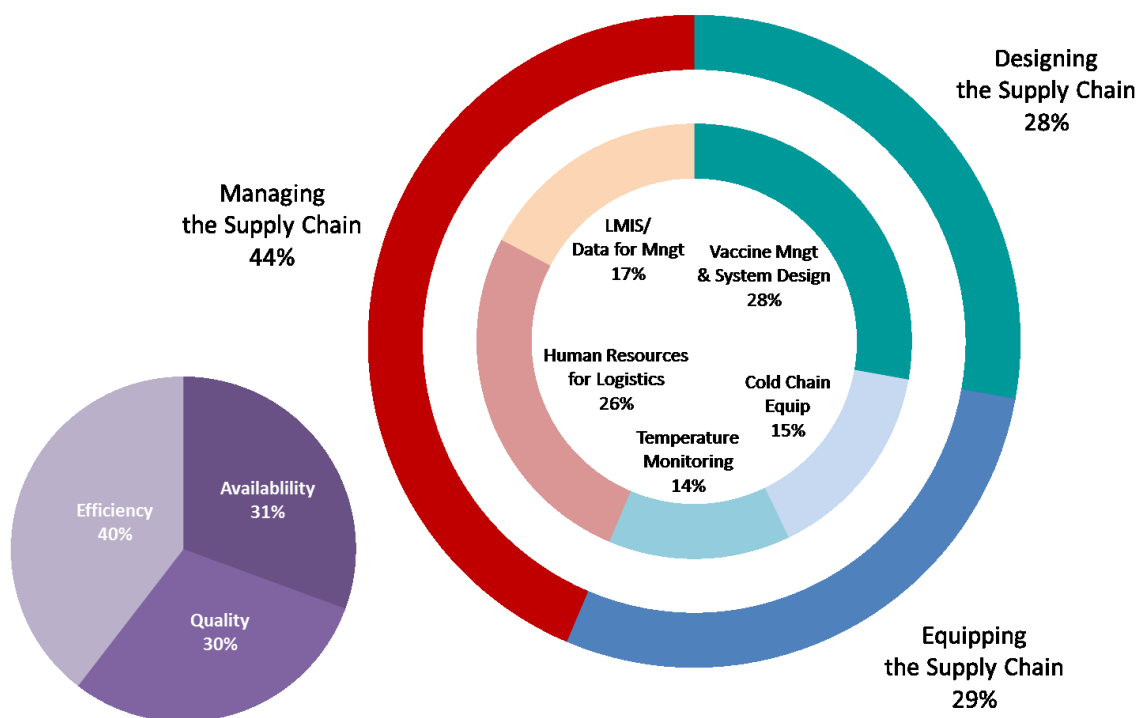
Closing remarks



On behalf of WHO and UNICEF under the auspices of the Immunization Supply Chain and Logistics Hub and with generous funding from the Bill & Melinda Gates Foundation, we would like to extend our warm thanks to all participants that made it to the 14th TechNet Conference.

Welcoming more than 260 participants for the 14th edition of the TechNet is a real testimony to the growing network of professionals and practitioners that make up the TechNet Community. As WHO and UNICEF implement its strategy, the expansion of the TechNet will be ongoing as a way of continuing to build the community of practice for immunization supply chains.

Digging deeper into participants views on the topics covered in the agenda, the Conference survey uncovered the following prioritization of immunization supply chain areas of work for the global community to focus on in the future.



Given the importance and breadth of these topics, and the feedback provided during the survey, the 15th TechNet Conference in 2017 will continue to cover the theme of immunization supply chain and logistics. The next region to host the TechNet is the WHO European Regional Office (EURO). While the exact location has yet to be decided on, a country in EURO will be hosting the next conference. Until then, please continue to be active on the www.TechNet-21.org website and e-forum.

Recording: www.ustream.tv/recorded/80696087/highlight/675819

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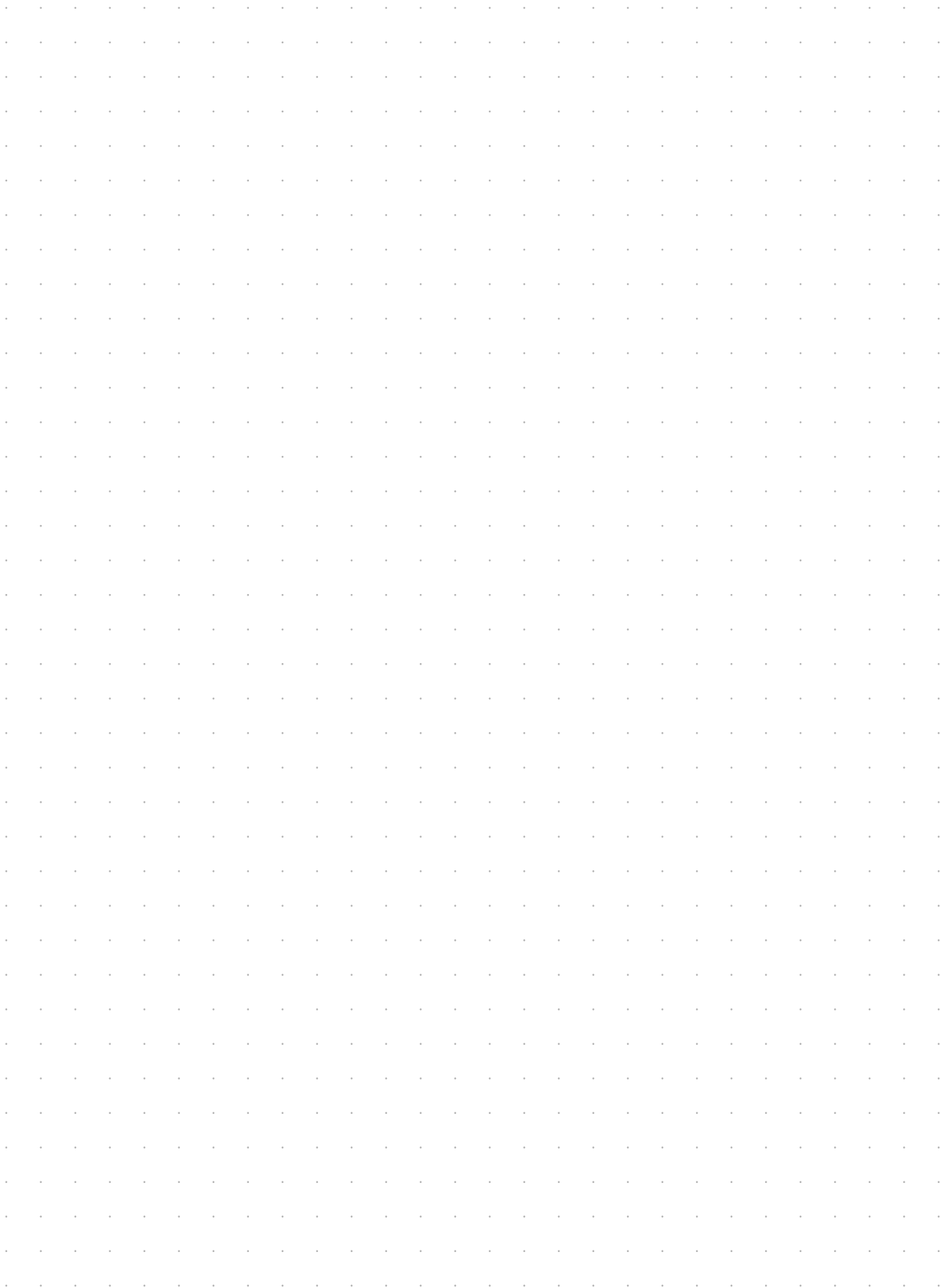
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Notes

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