National logistics working groups: A landscape analysis study

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\textbf{Abstract}

Several countries have acknowledged the contributions made by national logistics working groups (NLWG) to ensure equitable access to the expanded program on immunization’s (EPI) vaccines against preventable diseases. In order to provide key insights to the United Nations Children’s Fund (UNICEF) and the World Health Organization (WHO) supply chain hub – as well as other players, including national EPI – a landscape analysis study was conducted from September 2015 to February 2016. This is a cross-sectional survey taken by 43 countries that combines qualitative and quantitative approaches. Data was collected through a desk review, consultation, interviews, and distance questioning. References and guidance were used to determine and specify the underlying mechanisms of NLWGs. The key findings are:

- Mandate of NLWG commonly declared by countries is improving immunization logistics and supply chain.
- Of the 43 countries surveyed, 10 have formal NLWGs, 8 have informal or ad hoc NLWGs, and 25 have none.
- The immunization supply chain and logistics (iSCL) decision-making process in countries, regardless of NLWG status, mainly depends on the EPI manager.
- In countries with an NLWG, members with logistics and supply chain backgrounds are relatively common; they are mostly from EPI, UNICEF, and WHO.
- Almost all NLWGs have terms of reference and primarily operate under EPI governance; however, three NLWGs have standard operation procedures (SOP), and four use monitoring and evaluation tools.
- The coordination mechanism of these iSCL activities is mainly built into the immunization Comprehensive Multi-Year Plan (cMYP) and annual EPI plans, and organized by EPI/Immunization Coordination Committee (ICC).
- Most countries that participated in this survey expressed their technical requirement for improving the function, positioning and influence of the immunization logistics working group, and capacity building for the group’s members.

This study has provided a general overview of the status of NLWGs for immunization in various countries. Based on the key insights of the study, technical assistance needs have been identified, and immunization partners will be required to help countries create and reinforce their NLWGs.

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1. Introduction

National Immunization Programs (NIPs) in developing countries have been facing several challenges in ensuring equitable access to the expanded program on immunization (EPI) vaccines against preventable diseases. Safely storing and transporting vaccines and other immunization commodities to immunization service points is one of the biggest obstacles these countries are struggling with in general, and especially in remote and hard-to-reach areas. The Effective Vaccine Management (EVM) Initiative, launched by the World Health Organization (WHO) and United Nation Children’s Fund (UNICEF) in 2010, is a process by which countries periodically evaluate the performance of their immunization supply...
chain and logistics (iSCL) systems against best-practice benchmarks in order to enact an improvement plan accordingly.

The TechNet meeting in Bangkok (May 2015)\(^1\) acknowledged that National Logistics Working Groups (NLWGs) appear to be a promising strategy for improving supply chain management, decision-making, and accountability at the national level. Indeed, the role and successes that NLWGs have achieved in India, Indonesia, Kenya, Mozambique, and Nigeria suggested that it is a key mechanism for decision making in health supply chain. These Groups provide oversight, guidance, visibility and accountability. NLWGs can bring innovation, mobilize resources, and advocate for stakeholder involvement. The countries also highlighted the crucial role of NLWGs in coordinating with partners, taking decisions, and jointly implementing supply chain improvements.

NLWGs as “leadership groups” may take different forms and names. Gambia, for example, named its NLWG the “National EPI Logistics Committee” and Lao PDR named its NLWG the “National Immunization Logistics Working Groups – NLWG”. Whatever their names, these groups aim to improve coordination among partners to plan and implement initiatives to strengthen national immunization priorities. Establishing and operating these working groups are part of the Ministry of Health’s process of strengthening iSCL with the objective of continuous improvement in the availability of vaccines and immunization commodities, vaccine potency, and supply chain efficiency.

Recognizing the potential importance of NLWGs, WHO-UNICEF Supply Chain Hub has made it a priority to support countries in establishing or strengthening NLWGs. However, too little is known about what the NLWGs should do, how they should operate, how they should be managed, and who should be involved. In order to support the WHO and UNICEF joint statement “Achieving immunization targets with the comprehensive EVM framework”, a landscape analysis study was conducted from September 2015 to February 2016.

This research is a first step in understanding where NLWGs exist, how they are structured, and what impact they might have on decision-making, and immunization program performance. This paper, therefore, outlines the key findings of a landscape analysis study, including the current situation of NLWGs in terms of their availability, functioning and scope of work that would be important to improve health supply chains, as well as the countries’ needs for establishing or enhancing NLWGs.

### 2. Methodology

The investigator searched for data to identify which countries are operating with or without an NLWG, how existing NLWGs operate, how NLWGs are institutionalized, how they support decision-making, and what countries still need to establish or reinforce NLWGs. To collect data, the investigator developed a cross-sectional survey to provide a snapshot, in February 2016, of the situation of NLWG in 157 UNICEF-supported countries, and to document their needs for support. The study combined qualitative and quantitative assessments.

The investigator used existing references and guidance to determine and specify the functioning mechanisms of NLWGs: the WHO/UNICEF joint statement on the comprehensive EVM framework (2016)\(^2\); the WHO Immunization Practices Advisory Committee’s (IPAC) call to action for national programs and the global community by IPAC (2014)\(^3\); and People that Deliver’s framework on health supply chain competency (2015)\(^4\). Likewise, the investigator performed a systematic review of guidance documents and materials used by existing NLWGs. Table 1 presents the types of materials reviewed from consulted countries (Table A1). In addition, the performance of other working groups in the health sector was analyzed, including: the Supporting Independent Immunization and Vaccine Advisory Committees’ (SIVAC) Initiative and National Immunization Technical Advisory Group (NITAG)\(^5,6\), the Health Stakeholder Leadership Groups, Strengthening Commodity Security Committees, Contraceptive Security Committee, and the Advisory Group on acquired immune deficiency syndrome (AIDS) (Table A2).

The investigator conducted semi-structured interviews with UNICEF immunization focal points in the seven Regional Offices (Central and Eastern Europe, East Asia and the Pacific, Eastern and Southern Africa, Middle East and North Africa, West and Central Africa, South Asia) and in eight countries operating with existing NLWGs (Democratic Republic of Congo, Ethiopia, Haiti, India, Indonesia, Mozambique, Nepal, and Nigeria). However, the Latin America and Caribbean Regional Office (LACRO) did not participate in the survey because of the unavailability of informants at the regional level. The interviews were designed to collect data about informants’ perception of how iSCL issues are addressed, how is iSCL managed at the national level, what is/was the rationale for establishing an NLWG, and how do NLWGs function (e.g. Do they have a Terms of Reference or Standard Operating Procedures?). The investigator gathered opinions about best practices and the challenges of NLWGs.

The interviews and desk review identified possible functioning and performance indicators of NLWGs. These indicators were used to design a questionnaire and to analyze two possible situations in a country:

- Existing NLWGs: formal/informal NLWG, functioning, technical capacities, key barriers and challenges, and needs for improvement.
- Non-established NLWG: process for coordinating partners and assessing EVM, implementing improvement plan, conducting reviews/assessments/studies related to immunization supply chain, needs for establishing an NLWG.

UNICEF regions sent the questionnaire to 121 countries. The study population could access the questionnaire online on the SurveyMonkey® Web platform, and via an interactive Microsoft® Word questionnaire sent by regional offices. UNICEF country offices provided data in cooperation with EPI managers.

### 3. Results

Forty-three out of the 157 UNICEF supported countries participated in the study (Fig. 1) through direct interviews by Skype or phone and/or online or interactive word questionnaire. The distribution of participating countries is presented in Table 3. Of the 43 countries, 6 countries only participated in interviews, 36 countries only filled in the questionnaire, and 2 countries participated both in the interviews and questionnaire. Seventy-nine countries did not reply to the sent questionnaire, and 35 countries in Latin America and the Caribbean could not receive the questionnaire via the LACRO because of unavailability. Unlike other LACRO countries, Haiti, which participated in the interview, could receive the questionnaire.

Twenty-nine documents (Table 1) from countries and 34 documents from five other working groups (Table 2) were collected and reviewed through desk reviews.

#### 3.1. What is an NLWG?

Based on the results of interviews and questionnaires, NLWG is considered a mechanism for coordinating national immunization logistics and supply chain activities as well as supply chain investments made by government agencies and development partners.

### References

2. WHO/UNICEF joint statement on the comprehensive EVM framework.
3. IPAC call to action for national programs and the global community.
4. People that Deliver’s framework.
5. SIVAC Initiative.
6. NITAG.
The NLWG provides guidance, expertise, and technical assistance on all matters concerning supply chain operations and improvement initiatives. The NLWG engages with key stakeholders in the process to share information, evidence, and lessons learned; to identify and overcome program bottlenecks; to explore opportunities for innovation; and to make optimal use of resources. Survey respondents suggested that this working group is a key element of the national EPI strategy that will ensure the availability of effective vaccines for children and adults at all levels of the health system [40].

Perceptions of NLWG as a leadership group vary among consulted regions and countries, but the common impression is that NLWG’s mandate improves immunization logistics and the supply chain in a country.

Table 1
Types of documents collected from countries.

<table>
<thead>
<tr>
<th>Document</th>
<th>Ethiopia</th>
<th>Indonesia</th>
<th>India</th>
<th>Mozambique</th>
<th>Nepal</th>
<th>Nigeria</th>
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<td>Action tracker</td>
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<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
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<tr>
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<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
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<tr>
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<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
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<td>Minutes</td>
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<td>✔</td>
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<td>✔</td>
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<td>Recommendation note</td>
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<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
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<td>Terms of reference</td>
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<td>✔</td>
<td>✔</td>
<td>✔</td>
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<tr>
<td>Work plan</td>
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<td>✔</td>
<td>✔</td>
<td>✔</td>
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</tbody>
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Table 2
Distribution of countries participating in the consultation and/or the survey (Feb. 2016).

<table>
<thead>
<tr>
<th>Region</th>
<th>Consultation</th>
<th>Survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEE/CIS</td>
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<td>– Cambodia</td>
</tr>
<tr>
<td>– Azerbaijan</td>
<td>– Ethiopia</td>
<td>– Madagascar</td>
</tr>
<tr>
<td>– Republic of Moldova</td>
<td>– Mozambique</td>
<td>– South Sudan</td>
</tr>
<tr>
<td>– Turkmenistan</td>
<td>– Korea</td>
<td>– Djibouti</td>
</tr>
<tr>
<td>– Uzbekistan</td>
<td>– DPR</td>
<td>– Jordan</td>
</tr>
<tr>
<td>– Vietnam</td>
<td>– Lao PDR</td>
<td>– Palestine</td>
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<tr>
<td>– Mongolia</td>
<td>– Myanmar</td>
<td>– Sudan</td>
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<td>– Timor-Leste</td>
<td>– Tunisia</td>
<td>– Syria</td>
</tr>
<tr>
<td>– Democratic Republic of the Congo</td>
<td>– Yemen</td>
<td>– Tunisia</td>
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<table>
<thead>
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<th>Consultation</th>
<th>Survey</th>
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</thead>
<tbody>
<tr>
<td>ROSA</td>
<td>– India</td>
<td>– Afghanistan</td>
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<tr>
<td>– Nepal</td>
<td>– Benin</td>
<td>– Burkin Faso</td>
</tr>
<tr>
<td>– Democratic Republic of the Congo</td>
<td>– Burkina Faso</td>
<td>– Cameroon</td>
</tr>
<tr>
<td>– Mongolia</td>
<td>– South Sudan</td>
<td>– Central African Republic</td>
</tr>
<tr>
<td>– Malaysia</td>
<td>– Djibouti</td>
<td>– Congo</td>
</tr>
<tr>
<td>– Timor-Leste</td>
<td>– Jordan</td>
<td>– Cote d’Ivoire</td>
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<tr>
<td>– Vietnam</td>
<td>– Palestine</td>
<td>– Democratic Republic of the Congo</td>
</tr>
<tr>
<td>– Mozambique</td>
<td>– Sudan</td>
<td>– Gambia</td>
</tr>
<tr>
<td>– Korea</td>
<td>– Syria</td>
<td>– Guinea-Conakry</td>
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<tr>
<td>– DPR</td>
<td>– Tunisia</td>
<td>– Liberia</td>
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<tr>
<td>– Mongolia</td>
<td>– Yemen</td>
<td>– Mauritania</td>
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<tr>
<td>– Timor-Leste</td>
<td>– Timor-Leste</td>
<td>– Nigeria</td>
</tr>
<tr>
<td>– Vietnam</td>
<td>– Timor-Leste</td>
<td>– Sao Tome &amp; Principe</td>
</tr>
<tr>
<td>– Mozambique</td>
<td>– Togo</td>
<td>– Senegal</td>
</tr>
<tr>
<td>– Nepal</td>
<td>– Timor-Leste</td>
<td>– Sierra Leone</td>
</tr>
<tr>
<td>– Afghanistan</td>
<td>– Timor-Leste</td>
<td>– Togo</td>
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</tbody>
</table>

Total number of responding countries:

<table>
<thead>
<tr>
<th>Region</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEE/CIS</td>
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<tr>
<td>EAPRO</td>
<td>8</td>
</tr>
<tr>
<td>ESARO</td>
<td>4</td>
</tr>
<tr>
<td>MENARO</td>
<td>7</td>
</tr>
<tr>
<td>ROSA</td>
<td>3</td>
</tr>
<tr>
<td>WCARO</td>
<td>16</td>
</tr>
<tr>
<td>LACRO</td>
<td>1</td>
</tr>
</tbody>
</table>
The existence of many NLWGs is quite recent and the foundation dates of the working groups range from 1984 to 2015. The answered interviews and questionnaires from 43 countries systematically documented the situation of NLWGs. Three levels of country’s maturity for NLWGs (Fig. 2) were identified:

- Level 1: 10 of 43 countries have an NLWG established within a legal or administrative framework: Burkina Faso, Democratic Republic of the Congo, Ethiopia [9–12], Gambia, Haiti [16–18], India [8,13–15,19–23], Mozambique [26], Nepal, Nigeria [27–33], and Senegal.
- Level 2: 8 out of 43 countries have an informal NLWG operating without either a systematic or an organized framework: Benin, Indonesia [24,25], Lao PDR, Liberia, Timor-Leste, Togo, Tunisia, and Vietnam.
- Level 3: 25 out of 43 countries do not have an NLWG: Afghanistan, Azerbaijan, Cambodia, Cameroon, Central African Republic, Congo, Côte d’Ivoire, Djibouti, Guinea, Jordan, Korea DPR, Madagascar, Mauritania, Mongolia, Myanmar, Palestine, Republic of Moldova, Sao Tome and Principe, Sierra Leone, South Sudan, Sudan, Syria, Turkmenistan, Uzbekistan, and Yemen.

### 3.3. Who oversees iSCL decisions and activities

Eighteen out of 37 countries declared that an EPI manager is primarily responsible for iSCL and provides technical recommendations to the Ministry of Health. Only four responded that the logistics or supply chain manager is accountable for iSCL and reports to the EPI manager.

In the majority of countries, the EPI manager—a medical doctor who is neither a logistician nor a supply chain specialist—is responsible for Effective Vaccine Management Assessment (EVMA), for EVM planning (in 13 out of 16 countries), and also for the oversight and coordination of the EVMA process (in more than half of the countries). Most countries declared that UNICEF/WHO is responsible for EVMA financing, and half of them said that UNICEF/WHO is in charge of its execution and reporting.

Likewise, 16 out of 18 countries considered the EPI manager to be responsible for the EVM improvement plan implementation. However, half of the countries said a national supply chain manager should be assigned to perform this work.

### 3.4. How do NLWGs work?

#### 3.4.1. Governance structure

Countries with NLWGs report that governance of NLWGs is mainly within the EPI (11) and the Inter-agency Coordination Committee (ICC) (5). The legal framework of NLWGs could be in the form of a decree (4), decision, or circular (2). Regardless of the type of official document, countries agree that it should be signed by the Minister of Health to formally authorize and acknowledge the NLWG’s establishment and function.

The rationale for establishing an NLWG is mainly to supplement immunization activities (i.e. campaigns) and to formulate immunization and vaccine strategies related to the introduction of new vaccines, a new immunization schedule, or new technology for vaccinations and routine immunizations. Five out of 12 countries declared that the NLWG’s chairperson holds the position of logistician or logistic manager within the EPI or Ministry of Health. Seven countries indicated the EPI manager or Ministry of Health departments (i.e. Epidemiological service in Republic Central Africa, Maternal and Child Health in Togo) chair of the NLWG. Most of the time (11), NLWGs operate under EPI’s governance.
3.4.2. Terms of reference

Seventeen countries declared that their NLWGs were operating with Terms of Reference describing their roles, scopes, and functions, and 16 out of 18 countries said that NLWG's role was to provide advice to EPI/ICC on ISCL management. Likewise, 10 out of 14 countries said NLWGs focused on providing guidance on vaccine security issues, coordinating regular inventories, coordinating partners' efforts, and conducting regular supportive supervision. NLWGs work in the areas of EPI routines, EPI campaign, EVM assessment, and improvement plan.

Only three NLWGs use SOPs to guide their mode of operations, but nine NLWGs use an annual work plan (e.g., Nigeria's NLWG 2015 work plan) [33].

Ten NLWGs indicated meeting on an irregular basis, when needed and on request. In 2014 the number of meetings varied from two to 50 per year. Most of the time (14), meeting minutes are issued and circulated afterward. In general, there is no specific operational budget for NLWGs, and all expenses of the working groups are paid for via the EPI budget with support from development partners (UNICEF/WHO).

In large countries such as India [19,20] and Nigeria [27], modes of operations include working groups at national and sub-national levels. In the ISCL decision-making process, NLWGs rely on sub-national groups to report supply chain impediments at lower levels of the health system. Likewise, sub-national working groups allow large countries to implement strategies and solutions locally.

NLWG's monitoring and evaluation are rarely implemented at the country level. Only four NLWGs declared using monitoring and evaluation tools, i.e. Nigeria NPHCDA 2015. Action Plan Tracker [28].

3.4.3. Membership criteria

Members of NLWG are mainly representatives from EPI, UNICEF/WHO, pharmacy and drug departments, and other technical departments at Ministry of Health. Non-governmental organizations (NGOs) and other development partners serve as NLWG’s members in only five countries. Nine of 18 NLWGs have established a set of criteria for becoming a member. Most NLWGs did not specify or describe the duration and termination of membership. Regarding the renewing process, two countries indicated the unlimited duration of membership terms, while no country specified the process (i.e.: election, consultation).

Membership criteria, term duration, and rotation processes are by and large undefined within NLWGs. Most of the time, key governmental officials and development partners working in immunization become members because they are supporting immunizations and/or the supply chain. Likewise, half of NLWG’s chairpersons are medical doctors and not logisticians/supply chain managers.

The question of whether members and the chairperson should declare conflicts of interest – designed to ensure the objectivity of recommendations and options proposed to decision makers – has not been raised in any country surveyed. According to best practices defined by similar working groups in other health sectors, working group members should be free of conflict of interests. Discussing this issue during the consultation process was particularly tricky when members were representing the private sector.

Fig. 3 shows the positions held by NLWGs’ members. Ten countries indicated that NLWG’s members have logistics and supply chain backgrounds and mainly hold the positions of supply chain manager, immunization logistician, or store keeper. However, during interviews, issues were raised related to the shortage of available skilled specialized human resources to deal with ISCL. There are quite a few qualified and competent experts at the country level, but they are still insufficient to comprehensively address ISCL challenges.
3.5. Successes and shortcomings of NLWGs

Twelve countries expressed opinions on the greatest achievements of their respective NLWGs in recent years (Fig. 4). Vaccine management training and demand forecasting were the most frequently mentioned achievements (10 out of 12 countries answered the questions), as well as EVM assessment and preparing to introduce new vaccines.

Respondents’ perceptions of NLWG’s impact and value depended on the way the group was acknowledged as a reference working group to support EPI/ICC decisions for the most appropriate iSCL options. About half of the countries declared that NLWGs serve as a working group that sustainably provides technical advice and recommendations to decision-makers.

However, half of the countries recognize the need to improve NLWGs’ position and influence by enhancing the legal framework and governance of NLWGs. The official creation and formal structuring of the working group appear to be an asset to support its visibility.

3.6. Request for NLWG strengthening

Functioning: Countries were invited to define types of support needed to strengthen the functioning of their NLWG. The majority of countries (12 out of 14) requested support regarding revising/updating NLWG’s terms of reference. Likewise, 10 countries identified the need to improve monitoring and evaluation processes and tools, as well as developing specific SOPs.

Technical capacity: Twelve countries declared the need to enhance the technical capacity of NLWG’s members in the areas of partner coordination (8), EVMA and improvement plan implementation (7), and the issuance of evidence-based recommendations (6).

Positioning and influence: Half of the countries recognized the need to improve NLWG’s position and influence by enhancing the legal framework and governance of NLWG and technical capacities in advocacy, issuing policy recommendations, and integrating iSCL with other health commodities.

3.7. How are iSCL decisions and activities monitored in countries without NLWGs?

In countries without NLWGs, multiple partners at the country level including EPI, UNICEF, WHO, Ministry of Health (MoH) departments, donors, and NGOs are supporting immunization logistics activities. Twenty-three countries indicated that existing partners supported all iSCL activities. The three organizations mentioned most often as supporting partners are EPI/MoH, UNICEF, and WHO. In Madagascar and Azerbaijan, specific working groups are mentioned on specific topics such as cold chain management, operating as a sub-group of EPI and led by the EPI manager.

3.7.1. Process for coordinating stakeholders and partners

The coordination and partnership building mechanism [34] is mainly structured through the immunization comprehensive Multi-Year Plan (cMYP) and the EPI annual plans. EPI/ICC coordinates partners with technical assistance of UNICEF/WHO. Existing meetings such as EPI and ICC meetings are used to discuss vaccines and iSCL management topics and issues. EPI/MoH invites partners mostly on a regular basis in accordance with EPI or ICC [35] meeting frequency. In some cases, the EPI manager can arrange specific meetings depending on the country’s needs.

3.7.2. The needs for establishing an NLWG

Nineteen countries out of the 25 countries respondents without NLWG expressed a need for establishing an NLWG in order to improve the effectiveness of immunization and vaccine management [36].

3.8. What is the rationale for establishing NLWGs

According to the 19 countries that expressed a need to establish an NLWG, most perceived that strong and robust iSCL systems are important to achieve strong coverage outcomes. Feedback from the surveys suggests that the establishment of NLWGs can help to better engage multiple partners in addressing supply chain bottlenecks and identifying and bringing in relevant expertise. Cameroon indicated it needs an NLWG to support the general improvement of iSCL, as well as to coordinate the implementation of the EVM/continuous Improvement Plan (cIP). In Madagascar, the establishment of an NLWG was part of the EVM/cIP recommendation. Mongolia indicated the added value of an NLWG would be as a “specialized group for planning, monitoring, and evaluating outcomes in a structured manner”.

Likewise, in Sudan, the creation of an NLWG would give “more responsibility and power to ensure that EVM recommendations will be implemented by different parties”. Several countries suggested that the formal establishment of a working group could raise awareness among iSCL decision-makers and partners. Respondents agreed that legal and administrative frameworks are useful mechanisms for acknowledging NLWG’s role and positioning in the health system.

Nineteen countries expressed that the terms of reference should describe the NLWG’s roles in informing decision makers and practitioners about supply chain issues; planning and setting up a...
framework for supply chain-related activities; and monitoring supply chain related activities.

The survey suggested that NLWG's members should be from EPI, UNICEF, WHO, pharmacy and drug departments, and other technical departments at Ministry of Health, and other relevant stakeholders. Likewise, most of the countries acknowledged the need to define membership criteria.

Regarding the functioning of the NLWGs, 19 countries indicated that NLWG's functioning should be described in a mode of operation, i.e. SOP [28], and should operate within a workplan. NLWG's ideal frequency of meetings was quarterly (12); and 8 countries declared the need for ad-hoc meetings when needed and upon request.

Fifteen countries indicated the need for a budget allocated to NLWG's functioning, possibly funded by UNICEF (13), WHO (12), the Government (11), and Gavi, the Vaccine Alliance (11), based on the current funding environment.

Eighteen countries indicated that NLWGs should design and use monitoring and evaluation systems to measure their performance.

3.9. What do countries need to establish NLWGs

3.9.1. NLWG’s functioning

In this analysis, a majority of countries responded that they need assistance issuing the working group’s terms of reference (18), describing functioning through SOP (17), and developing a systematic approach to measure the working group’s performance (17) (Fig. 5).

3.9.2. Members’ technical capacity

Most countries willing to establish an NLWG expressed the need for assistance in gathering and analyzing evidence and issuing evidence-based recommendations, EVMA [37], and improvement plan implementation. Eleven out of 18 countries with NLWGs requested technical support related to partners’ coordination [38] (Fig. 6).

Interviews conducted at the country level revealed crucial barrier – the shortage of health logisticians and supply chain managers. The investment in equipping countries with more specialized human resources is necessary to ensure the effective performance of NLWGs. Technical assistance and capacity building will be an essential component of sustainable and well-functioning NLWGs.

3.9.3. NLWG’s position and influence

Fig. 7 describes the required technical capacity for improving the position and influence of NLWGs. Seventeen out of 18 countries declared the need to advocate for iSCL. Twelve countries acknowledged the need for technical support in establishing NLWG’s legal framework and governance.

4. Discussion

Although the research provided novel information on the current situation of NLWG, there were some limitations. First, because of the time limit, the study was conducted in a small number of countries (43 of 157 UNICEF-supported countries) so it will be difficult to consider the results representative of the large group of countries, to whom results should be generalized. The research should have involved more countries and especially in the Latin America Region. Second, it was not possible to use prior research studies to design the research questions. So the lack of literature review on NLWG was a limitation of the analysis to compare the collected data with other past researches on the same topic. Third, the research was not designed to measure the effectiveness of NLWGs in making measurable improvements to supply chains at country level or compare the NLWGs to other country-level health and development technical groups. These missing questions – arisen later in the study – might have inhibited the ability to conduct a thorough analysis of the results. Therefore, there is a need for future research, so to generate additional evidence of NLWG’s inputs to improve immunization supply chains, and ultimately health outcomes.

Despite the unanswered questions, this research is the first analysis that systematically collected data on the current situation of NLWG for EPI in countries of different regions. The survey described the heterogeneous perception of the role of logistics and supply chain leaders and managers in most of the countries. As documented in section 3 related to the decision-making process for iSCL at the country level, medical doctors and/or EPI managers make most of the supply chain related decisions. Only 5 of the 18 countries with an existing NLWG have a chairperson that holds a supply chain or logistic manager position within the EPI or Ministry of Health. Indeed, medical doctors chair the NLWG but may not have had formal training in supply chain management. Likewise, 3 out of 10 NLWGs rarely operate within a specified mode of operation – i.e. SOP.

4.1. Strong NLWGs to achieve iSCL outcomes

In this study, countries without a permanent NLWG manage iSCL within other larger groups such as the ICC and rely on partners’ support and interventions. Thus, the coordination mechanism is mainly structured through the immunization cMYP and the EPI’s annual plans.
However, these countries acknowledged the need to improve the effectiveness of iSCL. There are still critical barriers related to iSCL: inventory predictability, inadequate cold chain capacity, insufficient funding, insufficient coordination of interventions, and low interest in iSCL at the policy level. A good solution to address these impediments to life-saving vaccines is to unite national stakeholders, opinion-formers, and decision-makers to rally behind a shared vision for the country’s iSCL, in alignment with national immunization health system-strengthening priorities. Country ownership and leadership are essential to foster commitment and the collaborative atmosphere needed to enable country-led change [38]. This can happen with structured and powerful NLWGs chaired by the Ministry of Health. WHO and UNICEF are committed to supporting countries in the establishment or reinforcement of these leadership groups. NLWGs will monitor and evaluate the implementation of the improvement plan and establish a data dashboard for data-driven management and improvement.

4.2. Key challenges of NLWGs

The landscape analysis study demonstrated five key challenges to set up a structured and well-functioning NLWG.

4.2.1. Low interest in iSCL and logistics managers or officers

In some regions and countries, the investment in iSCL is insufficient, which translates at the country level into the absence of a long-term and strategic vision of immunization logistics. Indeed, in some countries, logistics issues are addressed only while implementing the national immunization strategy. Likewise, as per section 3 related to the responsibility of iSCL, in most countries, the EPI manager rather than a logistics manager/officer is responsible for immunization logistics. The concept of logistician as a profession is seldom acknowledged as instrumental to improving the iSCL, cold chain, and logistics.

4.2.2. Unclear understanding of the role and value of an NLWG

The low interest and investment in iSCL contributes to a second barrier; decision makers did not establish logistics working groups (LWG) as a permanent and key contributor to the NIP. An NLWG is not acknowledged as a leadership group that is accountable and composed of experts from various areas including equipment, supplies, cold chain, temperature monitoring, etc. At the national level, logistics working groups are often convened for ad-hoc discussions or activities and not set up as permanent entities.

4.2.3. Lack of specialized human resources and capacity at country level

The critical issue highlighted in interviews is the scarcity of skilled supply chain managers in the country immunization program. A shortage of competent staff impedes the process of establishing an NLWG. It is therefore recommended that an in-depth human resource capacity assessment is performed to estimate the need for and feasibility of establishing an NLWG. This survey
could be performed in the framework of the EVMA or existing human resources studies, i.e. Gavi HR assessment survey [39].

4.2.4. Shortage of systematic and clear mode of functioning

Most existing NLWGs operate with terms of reference. However, most of these Terms of Reference do not describe NLWG’s functioning such as SOPs. During the consultation, only 2 out of 8 countries reported using an annual or multi-year work plan. Also, in general, membership criteria are not clearly defined. All of these elements are helpful in establishing well-functioning NLWGs.

4.2.5. Size of countries and partners

The size of a country is a crucial element in the process of establishing or strengthening an NLWG. Indeed, in small countries with limited support from external partners such as within CEE/CIS, it would not be appropriate to create an NLWG without resources and expertise. By contrast, big countries such as Nigeria [28] and India [19,20] should not only have an NLWG, but should also set up a state or regional LWG to better address the iSCL needs at lower levels of the health system.

5. Conclusion

This study has produced a very general picture of the status of NLWGs for immunization at the country level. It takes three different forms: official NLWGs, unofficial NLWGs and non-existent NLWGs. Most of the NLWGs are working without SOP. Thus, they are working and meeting on an irregular basis, and dealing with ad hoc matters rather than proactively solving systematic issues.

This landscape analysis enabled countries to describe the iSCL decision-making process and the value of a dedicated NLWG in overcoming barriers and challenges to ensure that the right vaccine will be available in the right quantity and place, and with assured quality. Likewise, almost all of the countries clearly expressed their need to strengthen or establish an NLWG. The recommendations and options suggested by countries to address identified challenges of iSCL are as follows:

- Advocacy to raise awareness about iSCL issues and establish formal NLWGs
- Reinforcing capacity and knowledge in supply chain management
- Institutional integration and acknowledgement of the NLWG
- Using formal written Terms of Reference and modes of operation
- Defining basic indicators for monitoring and evaluating NLWGs
- Creating Regional Logistics Working Groups for small countries.

Survey respondents generally agreed that NLWG is a key element of the national EPI strategy that works towards ensuring the availability of effective vaccines for children and adults at all levels of the health system. The research suggests that NLWGs play or could play an important role in fostering coordination of national iSCL activities with supply chain investments from government agencies and development partners by providing systematic guidance. These groups are recommended to provide systematic guidance [39], expertise, and technical assistance on all matters concerning supply chain operations and improvement initiatives.

The study has provided insight into the specific aid or actions that are needed in order to establish and reinforce NLWGs. In order to address these needs, all immunization partners must coordinate efforts to ensure the effectiveness of the aid provided.

**Conflict of interest statement**

The authors state that they have no conflict of interest.

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- Capacity plus.
- SIVAC initiative.

for contributing to the landscape analysis study.

**Appendix A**

See Tables A1 and A2.

**Table A1**

List of documents collected from countries.

<table>
<thead>
<tr>
<th>Country</th>
<th>Document Details</th>
</tr>
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<tbody>
<tr>
<td>Ethiopia</td>
<td>1. Log terms of reference Ethiopia March 2012</td>
</tr>
<tr>
<td></td>
<td>2. TWG Meeting Minutes Feb 2</td>
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<td></td>
<td>3. TWG Meeting Minutes July 23</td>
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<td></td>
<td>4. TWG Meeting Minutes May 7</td>
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<td></td>
<td>6. Agenda-1.08.11 (Cold-chain subgroup meeting)</td>
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<tr>
<td></td>
<td>7. Agenda-13.1.11</td>
</tr>
<tr>
<td></td>
<td>8. Draft_Agenda_24-26_June</td>
</tr>
<tr>
<td></td>
<td>9. 2nd CCL Subgroup meeting Minutes (1/8/2011)</td>
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<tr>
<td></td>
<td>11. Draft Minutes of the meeting (1/8/2011)</td>
</tr>
<tr>
<td></td>
<td>12. Kolkata CCO minutes (28, 29/11/2013)</td>
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<tr>
<td></td>
<td>13. CCO Review Format</td>
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<tr>
<td></td>
<td>14. Letter to other states (LOI)</td>
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<tr>
<td></td>
<td>15. Concept Note – National CC &amp; Vaccine Management Resource Center</td>
</tr>
<tr>
<td></td>
<td>16. Country Innovation</td>
</tr>
<tr>
<td>Indonesia</td>
<td>17. Agenda Meeting 21/1/2014 (in Indonesian)</td>
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<tr>
<td></td>
<td>18. Meeting Minutes (Indonesian)</td>
</tr>
<tr>
<td>Nigeria</td>
<td>19. THE ROLE OF NATIONAL LOGISTICS WORKING GROUP: NIGERIA</td>
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<tr>
<td></td>
<td>20. Governance Structure in Nigeria</td>
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<td></td>
<td>21. Potential Governance of EPI/POL, Nigeria</td>
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<tr>
<td></td>
<td>22. NPHCDA_Final costed workplan 2015 V2</td>
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<td>23. ICC &amp; NSMWG TORs</td>
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<td>24. Terms of Reference for the State Logistics Working Group</td>
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<td>25. NLWG MEETING OF 12TH AUGUST – COPY</td>
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<td>26. NLWG MEETING OF 29TH JULY – COPY</td>
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<td>27. SLWG meeting Minutes</td>
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<tr>
<td>Mozambique</td>
<td>29. Terms of reference EPI Logs Committee (in Portuguese)</td>
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Table A2
List of documents collected from other working groups in the health sector.

Materials from 5 different groups

Advisory Group on AIDS
1. Expert Advisory Group on AIDS (EAGA)
2. Procurement and Supply Chain Working Group for malaria (PSMWG)

Contraceptive Security Committee
3. Contraceptive Security Committees: Lessons Learned
4. Contraceptive Security Committees: Their Role in Latin America and the Caribbean
5. Promoting Country Ownership Through Latin American Contraceptive Security Committees

Health Stakeholder Leadership Groups
6. Applying Stakeholder Leadership Group Guidelines in Ghana: A Case Study
7. Guidelines for Forming and Sustaining Human Resources for Health Stakeholder Leadership Groups
9. The role of leadership in HRH development in challenging public health settings

Logistics Management Units
10. Logistics Management Units: What, Why, and How of the Central Coordination of Supply Chain Management

NITAG
11. Establishment of a NITAG in Cote d’Ivoire: Process and Lessons Learned

NITAG Resource Center: http://www.nitag-resource.org/

Strengthening Commodity Security Committees
13. A few RH statistics and testimonials
14. CS Indicators and Index
15. Sample PPMR report
16. Guidance and Resources for Inclusion of RMNCH Commodities in National Commodity Supply Coordination Committees/Mechanisms
17. Leading and Managing Framework
18. Leading and Managing Results Model
19. Resources to Support Managers Who Lead
20. RH Interchange brochure
21. Sample justification for establishing a CS committee (Recommendations for Structure and Operation of Commodity Security Task Force/Committee)
22. Sample list of stakeholders to include as CS committee members
23. Sample Norms of the National Contraceptive Security Committee
24. Sample team charter
25. Sample Terms of Reference for Contraceptive Security Committees
26. Strategic Pathways to Reproductive Health Commodity Security (SPARHCS)
27. Terms of Reference for Contraceptive Security Committees
28. Terms of Reference of the Family Planning Technical Committee
29. Terms of Reference of the Family Planning Technical Working Group
30. Terms of Reference of the National Reproductive Health Core Group
31. The Procurement Planning and Monitoring Report: Reducing Contraceptive Stockouts Through Data and Partnerships
32. Virtual Leadership Development Program
33. What can the RH Interchange reveal about contraceptive security? (courtesy of the Reproductive Health Supplies Coalition)

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