Supporting LNCT countries in assessing and addressing their vaccine hesitancy:

Report of interviews with in-country stakeholders

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Background

Gavi, The Vaccine Alliance (Gavi) provides support to countries by co-financing the purchase of vaccines and health system improvements and by providing targeted technical assistance in collaboration with its partners. Countries qualify for Gavi support based on their gross national income per capita. As country income levels grow, their co-financing obligations increase slowly at first, and then more rapidly as countries cross Gavi's eligibility threshold and enter accelerated transition, until they are eventually fully self-financing their immunization programs. By 2020, half of the 73 Gavi-supported countries are projected to have transitioned, be currently transitioning, or be close to entering accelerated transition. Gavi's ultimate goal is that countries be able to independently sustain high immunization coverage and ensure equal access to vaccines post-transition.

The Learning Network for Countries in Transition's (LNCT – pronounced "linked") is a platform dedicated to supporting countries as they transition away from Gavi support to full domestic financing of their national immunization programs. Launched in early 2017, LNCT enables practitioners and policy makers in Gavi transitioning countries to access a network of peers, experts, and state-of-the-art resources for understanding and sharing the practical "how-to" of transitioning key immunization functions and maintaining high performing immunization programs. There are currently 17 LNCT member countries that are within two years of entering Gavi's accelerated transition, in accelerated transition, or within two years' of fully self-financing. Funded by the Bill & Melinda Gates Foundation and the Gavi Alliance, Results For Development Institute (R4D) coordinates LNCT with support in the European region from the Curatio International Foundation.

The Vaccine Confidence Project at the London School of Hygiene & Tropical Medicine were requested by R4D to lead a vaccine hesitancy workstream for LNCT, due to country requests for help in supporting them in assessing and addressing their vaccine hesitancy issues. Vaccine hesitancy refers to delay in acceptance or refusal of vaccines despite availability of vaccination services. Vaccine hesitancy is complex and context-specific, varying across time, place and vaccines (Larson HJ & Jarrett C, et al. 2014; SAGE working group on vaccine hesitancy 2014). It includes factors such as complacency, convenience and confidence (SAGE working group on vaccine hesitancy 2014). Extensive literature has shown that understanding reasons for and particular groups who chose not to vaccinate is critical to accurately tailor strategies to address hesitancy and increase vaccine uptake (Jarrett et al. 2015; WHO 2013).

The LNCT Network Coordinator organised a LNCT meeting in Vietnam in December 2017, where Pauline Paterson was invited to lead two vaccine hesitancy sessions. At this meeting, teams from Angola, Lao PDR, Nigeria, São Tomé and Príncipe, and Vietnam gave examples of access issues resulting in some members of the population, including hard-to-reach populations, not vaccinating. Moldova, Sri Lanka and Timor-Leste reported recent increases in vaccine refusals influenced by the rapid spread of misinformation through social media and mobile SMS. Vaccine safety concerns were raised as an issue affecting vaccine hesitancy in Lao PDR, Moldova, Nigeria, Sri Lanka, São Tomé and Príncipe, Timor-Leste, and Vietnam. Other issues affecting vaccine acceptance were porcine components in vaccines in Indonesia, lack of awareness in some population groups in Angola, and

some population groups, including health professionals, questioning the value of vaccines due to a reduction of vaccine preventable diseases.

Aim

To support LNCT countries in assessing their vaccine hesitancy issues to inform where interventions are needed to build vaccine confidence through in-depth interviews, focus group discussions, peer learning, facilitated knowledge exchange and development of strategies during a skills building workshop

Objectives

1. To capture and frame country experiences of vaccine hesitancy:
   a) Identify main reasons for vaccine hesitancy including contextual issues as well as specific vaccine concerns
   b) Understand if and how vaccine hesitancy is being monitored and measured
   c) Understand if and how vaccine hesitancy is being addressed
2. To characterize country needs including capacity and/or resource gaps to address vaccine hesitancy and identify/quantify partner services and resources to support addressing vaccine hesitancy;
3. Facilitate learning across countries and support development of materials that will aid and assist LNCT countries, etc.

Design

Study population, recruitment and sampling

The study population included immunisation experts (e.g. EPI programme, Ministry of Health, and National Immunization Technical Advisory Groups (NITAGs)), from LNCT countries who requested support to assess and address vaccine hesitancy.

The 12 countries included in the study are: Armenia, Georgia, Ghana, Indonesia, Lao PDR, Moldova, Nigeria, São Tomé e Príncipe, Sudan, Timor-Leste, Uzbekistan, and Vietnam. These countries were selected as either they registered for and attended the vaccine hesitancy exchange sessions at the LNCT meeting in Vietnam in December 2017, or they expressed interest in the vaccine hesitancy work stream post-meeting. The LNCT Network Coordinator confirmed their participation via email and phone calls.

Those who expressed interest were emailed a study information sheet (see Appendix 1). They were then contacted by phone (or Skype) by a study investigator, who went through the study information sheet in more detail giving them the opportunity to ask any questions. The investigator then asked

them if they were willing to take part in a phone (or Skype) interview. If they confirmed, an interview date and appointment time was scheduled.

Since the interviews were with a range of countries, the interviews took place over the phone (Skype or WhatsApp). Prior to the interview, the investigator again went through the study information sheet with the interviewee to ensure that they had understood the purpose of the research, were aware of how the information they shared would be used and how their confidentiality would be maintained. The investigator then asked for oral consent over the phone and made a record of the consent (See Appendix 2). Oral consent rather than signed consent was used, as the interviews were conducted via phone or Skype and the participants were unlikely to have access to scanners.

We supplemented our purposive sampling with snowball sampling, asking experts if they knew of others who could provide insights and might be interested in participating in the study. We anticipated that we would conduct 20-30 interviews in total (1-3 interviews per country).

Data collection

Study data were collected by the means of semi-structured interviews. This approach allowed us to cover predefined topics and provide the necessary flexibility for the interview to be shaped by interviewees' interests, their roles and experiences. We developed an interview topic guide (see Appendix 3). In this, we covered country experiences of vaccine hesitancy and strategies in place to address vaccine hesitancy. The topic guide was developed based on the investigators' previous knowledge and experience, the vaccine hesitancy sessions in the LNCT meeting in Vietnam in December 2017, and the SAGE immunisation manager's survey (SAGE working group on vaccine hesitancy 2014, Dube et al. 2014).

The interviews were conducted in English or in the interviewees' local language, depending on their preference.

With the permission of participants, the interviews were recorded verbatim with a digital recorder. Field notes were also kept throughout the interviews.

Data analysis

The English interviews were transcribed anonymously by Transcript Divas Limited, a registered transcription service in the United Kingdom. Interviews in a foreign language were translated and transcribed into English by Language Connect, a global language service provider, and Goga Askurava Language Center. All transcriptions were coded in NVivo, a qualitative data analysis software programme.

The approach to data analysis was thematic and involved a combination of deductive and inductive coding (Boyatizis 1998). This involved organising the data under the pre-defined topic areas from the interview guide and then exploring this data inductively to identify the key themes and associated sub-points.

Data analysis proceeded in tandem with data collection and the investigators met regularly to discuss emerging findings, fine tune interview questions accordingly, define codes and higher-level themes and categories, and then map and finalise a coding framework.

Ethical considerations

This study was reviewed and approved by the LSHTM Observational Research Ethics Committee and no research activities were commenced prior to the committee's approval on 24 January 2019 (LSHTM Ethics reference number 16197). Each country was asked if there were any additional ethics approvals which were required locally. No further ethical approvals were needed by any of the participating countries.

The study investigators obtained informed consent from participants and ensured the participants that their anonymity would be maintained.

Participants were informed that their participation was voluntary and that they were allowed to refuse to answer any question or end the interview at any time.

The interviews were audio-recorded, with the participants' consent, and transcribed. Recordings and transcripts of interviews are stored anonymously using a numerical identifier on password-protected computers. Only the investigators have access to the files that link a numerical identifier to a participant's name. The names or organisations of participants are not in the reports or publications. Anonymised quotations from participant interviews may be used in further study reports or published articles. Confidentiality has been maintained by referring to quotations using the data collection method and country (e.g. Focus group discussion participant, Country name) and extra care has been taken to ensure that participants or organisations cannot be identified through contextual information.

Results

LSHTM contacted 28 immunisation experts from the selected LNCT countries to invite them to participate in an in-depth interview, (See Figure 1). Curatio contacted 32 immunisation experts to invite them to participate in focus group discussions.

Seventeen immunisation experts responded positively to the email sent by LSHTM and 14 of the 28 invited went on to have an in-depth interview either on Skype or WhatsApp (two experts participated in one in-depth interview from Lao PDR). Curatio facilitated focus group discussions with a total of 27 of the invited 32 experts participating from Moldova (n = 7), Georgia (n = 10), Uzbekistan (n = 2), and Armenia (n = 8).

In total, of the 60 invited, 41 immunisation experts from 12 countries participated in the study (68%) in either the in-depth interviews or focus group discussions.

In total, (See Table 1).

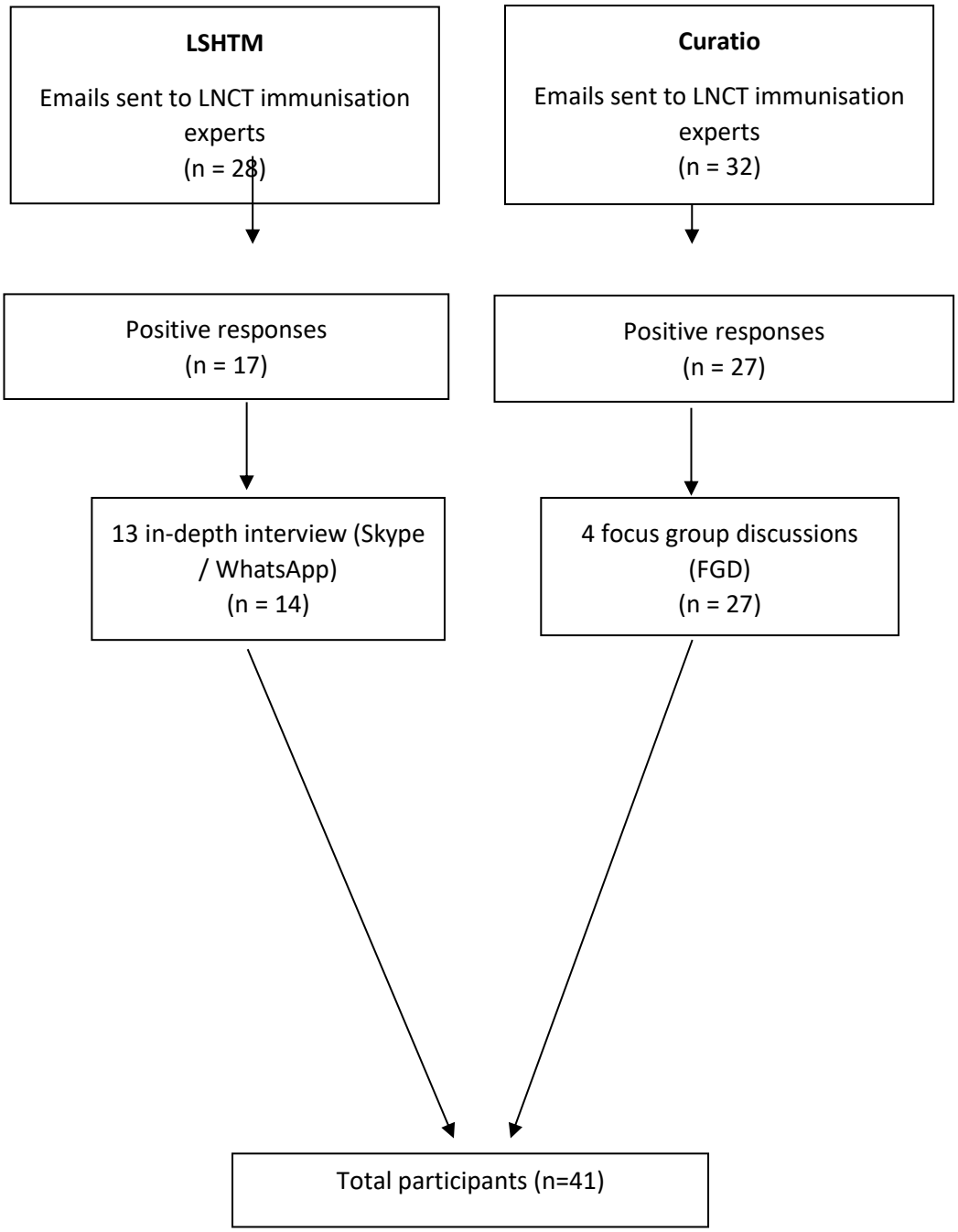
Table 1 Summary of In-depth Interviews and Focus Group Discussions

	Country	Immunisation expert-title/organisation	Data collection method	Date(s)	Total number of participants by country
1	Armenia	National Center of Disease Control; paediatrician; National Regulatory Authority; communication specialist, UNICEF; communication specialist, WHO	1 focus group discussion	24-May-2019	8
2	Georgia	EPI manager, National Center of Disease Control and Public health; general practitioner; Sabine Vaccine Institute; National immunisation technical advisory groups (NITAG) member; NITAG chair; paediatrician; public health officer; epidemiologist; head of immunisation unit at Tbilisi Municipal Public Health Centre; Health promotion and communication specialist (NCDC)	1 focus group discussion	20-May-2019	10
3	Ghana	New Vaccine and Vaccine Safety Coordinator EPI	1 in-depth interview	5-Jul-2019	1
4	Indonesia	EPI programme,	2 in-depth interviews	29-May-2019,	2

		Head of basic immunisation, Directorate General of Disease Control and Prevention MOH		3-Jun-2019	
5	Lao PDR	Department of Hygiene and Health Promotion, MOH; EPI manager	2 in-depth interviews (the first with one participant and the second with two participants)	15-May-2019, 3-Jul-2019	3
6	Moldova	Epidemiologist, Vaccine Preventable Department, National Agency for Public Health; chief department at Primary Health Care Center; family doctor; Chief of mother and child health care facility; public health officer; chief redactor for an online news platform	1 focus group discussion	17-May-2019	7
7	Nigeria	National Primary Healthcare Development Agency, Gavi Focal Desk Officer; Paediatric Association / Civil Society Initiative	2 in-depth interviews	15-May-2019, 25-May-2019	2
8	São Tomé e Príncipe	EPI Director, MOH	1 in-depth interview	24-Jun-2019	1
9	Sudan	Planning Unit, EPI	1 in-depth interview	4-Jul-2019	1
10	Timor-Leste	EPI	2 in-depth interviews	10-May-2019, 23-May-2019	2
11	Uzbekistan	EPI, MOF NOTE: *Only 2 participants agreed to the focus group discussion, but as it was conducted following the same methodology as the focus group discussions, so named as such.*	1 focus group discussion	22-May-2019	2
12	Vietnam	EPI Director, Deputy EPI Manager	2 in-depth interviews	16-Apr-2019, 14-Jun-2019	2
	TOTAL				41

Figure 1 Flow diagram of responses

(Note the positions of those interviewed or engaged in FGD is outlined in Table 1)



The immunisation experts from the countries interviewed all identified vaccine hesitancy as a concern. The results from the in-depth interviews and focus group discussions revealed a wide variation in the reported reasons for vaccine hesitancy across the 12 countries.

Participants were asked what they considered to be the main reasons for low vaccination coverage. Responses to this question have been grouped around the Complacency, Convenience and Confidence ("3Cs") model (SAGE Working Group on Vaccine Hesitancy 2014).

The "3Cs" model describes confidence, complacency and convenience in the following ways:

- **Confidence** is defined as trust in 1) the effectiveness and safety of vaccines; 2) the system that delivers them, including the reliability and competence of the health services and health professionals; and 3) the motivations of the policy-makers who decide on the needed vaccines.

- **Complacency** exists where perceived risks of vaccine-preventable diseases are low and vaccination is not deemed a necessary preventive action.

- **Convenience** is measured by the extent to which physical availability, affordability and willingness-to-pay, geographical accessibility, ability to understand (language and health literacy) and appeal of immunization services affect uptake.

1. Confidence

The most common driver of vaccine hesitancy raised racross all LNCT country participants was a lack of confidence. One focus group discussion participant from Georgia commented, *'[parents hesitate] due to different reasons, including **distrust in the medication** - its components and quality as well - and also **distrust in doctors and the process'***, highlighting the complex nature of vaccine hesitancy and the multiple influences of trust and confidence on the vaccine decision making process.

<u>Concerns around safety and side effects</u>

Many participants mentioned parental concerns about vaccine safety, side effects, and fear of adverse events following immunization (AEFIs) as reasons for delaying or refusing vaccines.

Timor-Leste, Uzbekistan and Indonesia Tall reported of parental concerns about side effects including fever, crying and pain of injection:

'*They believe the vaccine[s] cause fever so that's why they **are afraid to bring their children again**… another thing, after the injection [the child will] keep crying all night.'* (Expert interview participant, Timor-Leste)

*'They often refuse to have the DTaP vaccine … they say that it has rather **severe side effects**. A lot of cases of vaccine hesitancy have been observed with respect to this vaccine.'* (Focus group discussion participant, Uzbekistan)

'[There is] hesitancy because of fear of fever, some of the parents have the issue about fear of the fever'. (Expert interview participant, Indonesia)

There were also reports of parental concerns that children receive too many vaccines at once: *'when they bring their children for the vaccination and then they receive multiple shots at the same time, so that's one of the reasons [for non-vaccination].'* (Expert interview participant, Timor-Leste)

The impact of reported serious AEFIs was particularly highlighted by Lao PDR and Moldova.

*'The first main reason, I think, a long time ago, the children who received the vaccine may receive the adverse event resulting in death or resulting in severe impairment … so they would tell each other that, okay, my kids die because of the vaccine, **so it became a certain belief that the vaccine may cause the death**.'* (Expert interview participant, Lao PDR)

'If their family had something unpleasant with vaccines, or a brother or a sister who [had] the vaccine and something went wrong, then it is very difficult to change their mind [about accepting vaccination].' (Focus group discussion participant, Moldova)

Another concern identified by participants from Sudan and São Tomé was rumours about vaccines causing sterilisation.

'W*e have some pockets that are already known by the programme, some of them, they have their own beliefs - like in eastern parts **- believe that with the Td vaccination [causes] infertility for a woman**.'* (Expert interview participant, Sudan)

'We have more cases of hesitation regarding the HPV vaccine where people complain a lot that the vaccine causes infertility and we [health care authorities] don't want people to have kids and so on.' (Expert interview participant, São Tomé and Príncipe)

An immunisation expert from Nigeria explained how rumours that the polio vaccine causes paralysis had spread.

*'I've had a couple of parents that have a very small infant that received this house-to-house polio vaccine, and they now get some form of paralysis, and they tie it to the polio vaccine. You know? And then **one parent will talk to the other and to the other, it keeps spreading**. Now that's where the problem is.'* (Expert interview participant, Nigeria).

Negative rumours about the vaccine ingredients in Indonesia was highlighted as a challenge, including rumours that '*the vaccine can poison the community.'* (Expert interview participant, Indonesia). Although the specific means of rumor spread was not articulated in the interview, local media reports refer to social media as a key spreader of the rumors.

Confidence of healthcare workers

Healthcare professionals, including doctors and nurses, were referred to by participants as having influence on vaccination decisions. Issues with healthcare staff, including healthcare provider attitudes to vaccination and lack of education on vaccines, were particularly highlighted as influencing vaccine decisions by focus group discussion participants from Uzbekistan and Georgia..

'There are very many people who have vaccine hesitancy … they are ***afraid that vaccines might prompt development of different diseases*** *– health care workers and parents as well.* (Focus group discussion participant, Uzbekistan)

'All the surveys have shown, that what prevents doctors from talking about immunisation is their own ***lack of competence in immunisation topics****.'* (Focus group discussion participant, Georgia)

The issue of healthcare providers giving incorrect information on side effects was noted by a participant from Georgia.

'Almost 80% of the children who come to me…(when) I ask them why they did not get vaccinated, answer is that they did not get vaccinated because of ***the false side effects, which have been mentioned by the doctor****.'* (Focus group discussion participant, Georgia)

It was noted by focus group discussion participants from Georgia that physicians may not spend time communicating the importance of immunization and explaining potential side effects with patients because of competing time-demands, a lack of motivation and weak regulations. Further, they felt that physicians do not feel confident providing immunization to patients with risk factors as they are not protected by the state in the case of AEFIs.

One participant highlighted the importance of healthcare providers devoting time to provide immunisation information to patients: *'we are facing the problem of medical personnel,* ***there is lack of education, information provided or one more thing that you have mentioned that doctor does not allocate time for immunisation****, this means, that the doctor does not carry out its obligations, as this is part of doctor's obligation*.' (Focus group discussion participant, Georgia)

Lack of trust

A number of participants described more trust in private sector vaccines compared to those offered free of charge.

'Private clinics are influencing immunisation programs as well, since there is ***higher trust in the quality of vaccines for the private sector****, but prices are higher there, and some of them remain without vaccines, because the price is high, and we have them free of charge.'* (Focus group discussion participant, Moldova)

'They for example don't like a certain vaccine, but let's say they may go instead and pay 1000 Georgian Lari for the course of vaccination provided by private sector. The truth is, that they don't know the vaccine, and it does not matter what kind of vaccine do you offer, and they don't even know the characteristics of the vaccine and even if you offer them two-valent vaccine they don't know.' (Focus group discussion participant, Georgia)

In Armenia, there was perceived to be less trust in the quality of vaccines that were produced outside of Europe.

*'They believe that if a factory manufactures [a vaccine] in Korea, this is a low quality vaccine, there is such a way of thinking. For the past several years we have changed a pentavalent vaccine, until 2015 there was a French one, then the vaccine was manufactured by the Republic of South Korea. This has greatly affected the pentavalent vaccination coverage rate.' (*Focus group discussion participant, Armenia)

A fear of manipulation was identified as a challenge by one participant in the Georgia focus group discussion.

'*I think this is not the distrust to vaccination itself in case of adults, I think this is more of a fear of manipulation, and not that they fear that we will inject them measles vaccine and they will get sick. And this is not only population, dynamics show, that even medical personnel are not willing to do vaccination.*' (Focus group discussion participant, Georgia)

Religion and politics

Some participants pointed to religion playing a role in parent's refusing or delaying vaccination. In Indonesia, the main religious concern was about the Halal status of the vaccine.

'So for the new vaccine, ***many people asking regarding on the halal status of the vaccine****, whether the halal vaccine is quite difficult to achieve, which is not a simple process. So many people didn't bring their children to the vaccination post regarding on this issue.'*
(Expert interview participant, Indonesia)

Halal status comes up as an issue in multiple countries with Muslim populations. Many Islamic leaders have advised WHO that they believe vaccines are halal, as the gelatine in the vaccines is a derivative of pork, but in a different form. They have also stated that vaccines with porcine are acceptable for the health of a child when no other porcine-free alternative is available. Debate remain, though, at local levels and communities often follow the guidance of their local Imam over a global statement. Given the general agreement at a global level, although with varied local interpretations, this becomes more of a confidence issue with low trust in government increasing reliance on the local leader's interpretation.

Overall, given the government's key role in approving, recommending and sometimes mandating vaccines, those that distrust the government are more prone to distrust vaccination.

Participants from Armenia described the impact of politics on vaccine hesitancy challenges.

'I think, in our country, political environment has an impact on this, the vaccine hesitancy stems from the positive stance of our Prime Minister (towards polio), while the portion of the opposition that hates him, links this to vaccination.' (Focus group discussion participant, Armenia)

'A deliberate anti-propaganda and intervention should not be ruled out, very often these are the same people who are also engaged in political affairs, and vaccination has become one of the tools for their struggle with something, and very often, perhaps due to the fact that the Russian language is widely spoken in our country, this movement comes from Russia.'
(Focus group discussion participant, Armenia)

Influence of media

Participants suggested that the media, including social media and foreign media, play a role in whether people delay or refuse vaccines. A dominant challenge raised among study participants was the influence of the spread of misinformation on social media.

'Considering that there is information spread on vaccines causing some diseases, articles with similar content have been published and Facebook especially has dramatic influence on Georgia. I personally say that the ***number one enemy of immunisation in Georgia is 'Mothers' page on Facebook****, … and this group has huge number of followers, number is huge, like ten thousand mothers or so and this is a very big problem*.' (Focus group discussion participant, Georgia)

'The cities have a wide internet access ***and a lot of negative information can be found on the internet****, there is a very big group of bloggers, who do not praise vaccination but on the contrary, they say that a vaccine may lead to a lethal outcome. This of course****, interferes with our work very***

***much**, and probably **requires a lot of effort** to work with medial workers, with journalists etc*.' (Focus group discussion participant, Uzbekistan)

*'[**Vaccine hesitancy] is also fuelled by the media**, and not Moldovan ones, but those of developed countries. I now have in mind especially the United States, also Russia*.' (Focus group discussion participant, Moldova)

Not only are the sources of information an important influence on the public's confidence of vaccines, but also the deluge of competing information.

*'Parents are afraid to vaccinate their children due to the fact that they have a lot of information and they do not know how to balance, but **they rather do not know which information is true, and which information is false.**'* (Focus group discussion participant, Moldova)

Uzbekistan and Moldova identified the role and importance of journalists in reporting on vaccination and AEFIs as influencing vaccine perceptions

*'I can also add that the problem is not that **journalists** do not write about vaccination. They write, and many of them write correctly, **many of them make mistakes***.' (Focus group discussion participant, Moldova.)

In Uzbekistan, there were challenges after the publication of a newspaper article reporting false information about vaccines.

*'There are villages … that are subscribers of this newspaper… when nurses and doctors visited them to vaccinate children, they showed them the magazine and told them: "*we are simple people, why are you lying to us*?" … We called the editor of this magazine, asked him to apologize publicly and say that the article used the materials from the internet that were not scientifically proven. However, we are still afraid, because there are very many such journalists and magazines, newspapers, who can write everything themselves.'* (Focus group discussion participant, Uzbekistan)

<u>New vaccines</u>

With the introduction of a new vaccine or vaccine product, country participants described resistance to accepting vaccination.

*'I can say that a **distrust of new vaccines has currently emerged**. We are now making [human] papillomavirus, and parents do not know what to expect from this vaccine, and are afraid to do it, although we inform them, **we give all the information that is needed, but still there is resistance** to these vaccines.*' (Focus group discussion participant, Moldova)

2. Complacency

While some instances of complacency were mentioned, it was not a theme that emerged strongly from the in-depth interviews and focus group discussions.

However, in discussing concerns, two participants (one from Georgia and one from Lao PDR) noted that some parents did not perceive a need for vaccination, but they also expressed concerns about potential side effects. These combined reasons are not uncommon, and reinforce their hesitancy enough to rationalize refusing a vaccine.

'Yes, some parent are concerned, 'my kid is strong', but with the vaccine the kid is getting a fever.' (Expert interview participant, Lao PDR).

3. Convenience

Accessibility issues, such as living in hard to reach areas and registering at a new clinic, were reported by participants as challenges to vaccination uptake. One participant pointed to people residing in difficult-to-access or remote locations as a reason for low vaccination coverage in certain areas of Timor-Leste.

'One of the big problems is that sometimes they have to walk, for example, for one mile because the major part of our country, of Timor-Leste, is mountain, so most of them are living in rural areas, so ***the access to the health centre is one of the big problems*** *for them to bring their children.'* (Expert interview participant, Timor-Leste)

A participant from São Tomé and Príncipe noted that due to challenges getting to clinics and the fact that mobile vaccination teams were active, parents became complacent.

'We hear very often is that it was ***lack of time, problems with transportation and taking the kids with them*** *and they are a bit accommodated due to mobile vaccination teams working in the area and, therefore, some parents just wait for them to show up.'* (Expert interview participant, São Tomé and Príncipe)

A determinant of vaccine hesitancy noted by a focus group discussion participant from Georgia was related to inconvenience and regulations around where a patient is registered.

*'In a sense, **service accessibility, is not only related to the geographic problems**, it is also related to regulations as well. [A] patient may show up at a certain place and if he/she is not registered, then medical personnel may not provide the service. Patients may register at a new place, and this process prevents vaccination process.'* (Focus group discussion participant, Georgia)

4. Impact of vaccine hesitancy on the immunisation program

Participants were asked if vaccine hesitancy impacts the immunisation program, including low vaccination coverage, disease outbreaks, and suspension of the immunisation program. In addition, they were asked if there were areas of low vaccination coverage in terms of which vaccine, which region, which population group and when. Participants' perception of the consequences of vaccine hesitation on immunisation coverage varied. Some attributed low coverage rates to outbreaks of vaccine preventable diseases.

*'**Distrust of vaccines affects the immunisation programs**, it influences greatly. Even, say, we have registered measles again. We have not had measles for several years, but now it has appeared. Here, practically 2 weeks ago, there was the first case of tetanus over the past 3 years. Further, we have an increased incidence of pertussis, and all these are the direct consequences of distrust of vaccines, distrust of the quality of vaccines.'* (Focus group discussion participant, Moldova)

Other participants noted low coverage of specific vaccines, including the HPV, measles and polio vaccines.

'Individually, the lowest coverage - this is the HPV vaccine, making 65%. It is followed by the rotavirus vaccine. We introduced it in 2019, but, so far, parents manage not to vaccinate rotavirus vaccine due to the fact that some children are older than 3 and a half months old, and that is it! They can no longer be vaccinated.' (Focus group discussion participant, Moldova)

'The vaccine with the lowest rate of coverage is the second dose of rubella measles.' (Expert interview participant, São Tomé and Príncipe)

'Increasingly, especially after the MR campaign the community is more likely to refuse measles/rubella vaccine.' (Expert interview participant, Indonesia)

Hesitancy was observed with multiple rounds of mass immunisation campaigns for polio in Sudan:

'And polio, regarding the repetition of polio vaccine during the campaign, so the hesitancy occurs mainly in the campaign, not for the routine immunisation, because the routine [vaccines are] accepted by all of the people' (Expert interview participant, Sudan)

In Nigeria, a participant noted the impact of the challenges of previous mass polio campaigns:

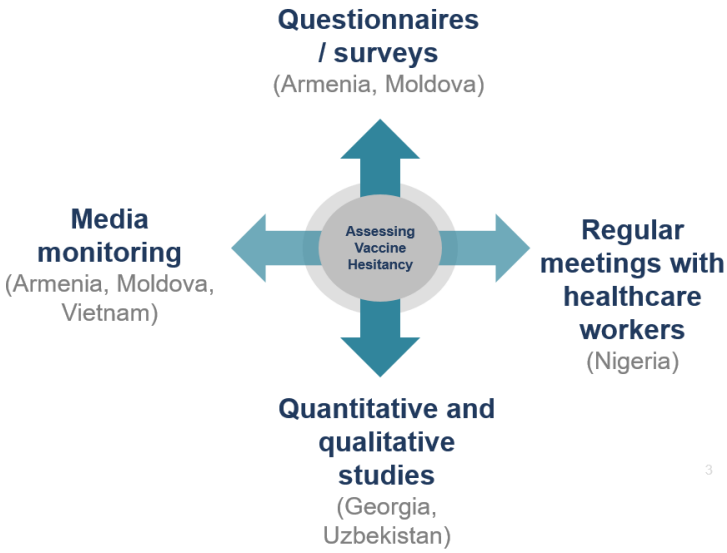
'The house-to-house thing, people are still worried about it. Someone called to ask,"Should he allow his child to get immunised. Even though the child is fully immunised… they [healthcare workers] still go around and put the drops in the mouths of under-fives. People are still worried and there have been recent… negative effects and a couple of people are tying it to the polio (vaccine). So those things are still lingering, still causing people to hesitate.' (Expert interview participant, Nigeria).

5. How countries are assessing vaccine hesitancy

Participants were also asked about activities and strategies taken to assess vaccine hesitancy. Their responses included media monitoring, surveys and questionnaires, quantitative and qualitative studies, and periodic meetings with healthcare providers. Media surveillance systems - used to analyse public concerns about vaccines – was identified as a way LNCT countries are monitoring vaccine hesitancy. For example, in Moldova, there is a 24-hour monitoring system that assesses negative vaccine sentiments on social media platforms. Reports are shared with the immunisation program manager and a specialist at the Ministry of Health who decide how to respond.

In Georgia, a mixed method study revealed public concerns about the quality and safety of vaccines and highlighted hesitancy among healthcare workers. However, there is no measurement and response system that monitors the media and responds accordingly. On the other hand, an Uzbekistan UNICEF study among healthcare workers showed high confidence in vaccines in this population. In Nigeria, periodic meetings with healthcare workers are held where their feedback on challenges and successes is requested. These sources of data can help LNCT countries to determine public and healthcare provider vaccine hesitancy and to inform appropriate interventions to address waning confidence.

Figure 2 How LNCT countries are assessing vaccine hesitancy



6. Actions LNCT country programs are taking to address vaccine hesitancy

Study participants were asked about activities and strategies taken to address vaccine hesitancy. Most LNCT country participants reported implementing interventions to address vaccine hesitancy, although a number of the interventions reported resembled standard immunization communization tactics without specific attention to addressing the hesitancy issue. In most cases rigorous evaluation of these interventions has not been done yet - some are planning on it, and others are interested in learning more about how to evaluate strategies.

<u>Use of media</u>

- In Sudan, they are addressing concerns using a radio show in the local language.
- São Tomé and Príncipe uses social media, radio and television to spread messages about vaccination.
- Indonesia's Ministry of Health uses TV advertisements to encourage the public to accept vaccination and has developed messages for social media and WhatsApp.
- Lao PDR uses a cartoon animation, translated into local languages, in health facilities and on local TV.
- Training journalists on how to report on AEFI and how to communicate the benefits of vaccines was identified as a priority for Vietnam and Moldova. However, in Moldova they report limited success to date with this intervention.
- Vietnam and Armenia engage and host training workshops with the media, including with journalists.

Social mobilisation

- Sudan engages a variety of stakeholders, including community leaders and local doctors, in a targeted social mobilisation campaign in areas where they have experienced vaccine hesitancy.
- Ghana uses a social mobilisation strategy that includes various planning committees that do media monitoring on social, traditional and international media platforms.
- Moldova has a national strategy, including a comprehensive communication plan, approved by the Ministry of Health however financing the activities has been a challenge (only a small portion comes from the national budget).
- Georgia engages in various activities to address hesitancy including focus groups, communication with doctors, communication with parents of children under 5 years old, and engaging with the education system.
- Uzbekistan has developed and use a few promotional videos, but would like to further develop this intervention and translate videos from other countries to use in Russian.

Trainings and refresher trainings for healthcare workers

- Refresher training for healthcare workers were noted to be important when it comes to building confidence in vaccines in Indonesia, Nigeria, and Sudan.
- General practitioners and midwives help identify unvaccinated children and offer the vaccine in Timor-Leste.

Engaging with religious leaders

- Indonesia and Nigeria engages with religious and community leaders, providing them with information about vaccines, to support local immunization programmes. and

7. Areas identified by participants for further support

Participants were asked if there were any specific areas which would be useful for further support, networking and learning. In addition, they were asked what learning materials would be most useful in supporting LNCT countries in assessing and addressing their vaccine hesitancy issues.

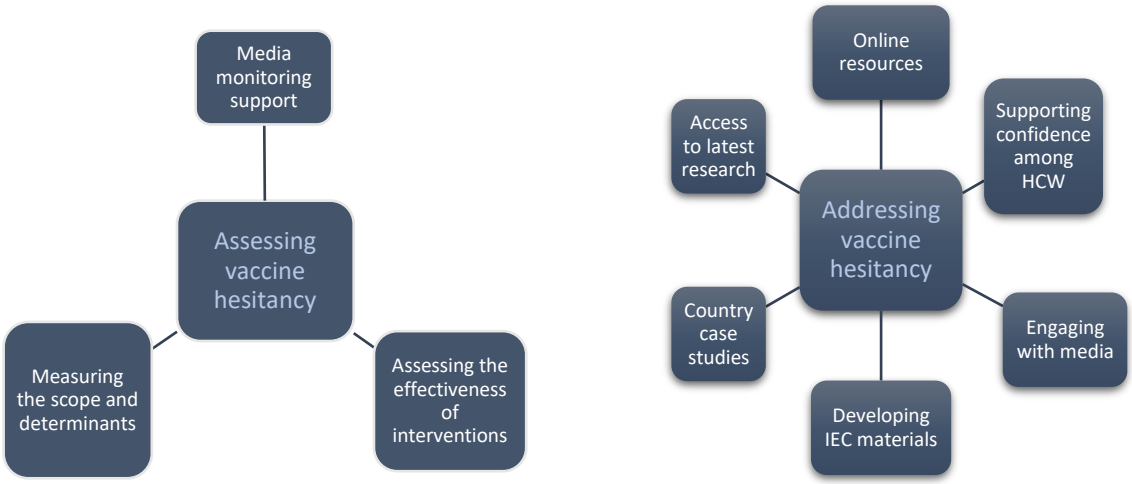
Areas for support identified by participants included:

- Support to measure the scope and determinants of vaccine hesitancy;
- Support in addressing hesitancy among healthcare providers;

- Strategies to more effectively engage with social media, and other forms of media, including how to set up media monitoring;
- Support in accessing existing research on vaccine hesitancy;
- Support for designing approaches to address vaccine hesitancy;
- Support for developing information, education and communication (IEC) materials to help increase the public's understanding of and confidence in vaccines and immunisation;

Information on how to assess the effectiveness of strategies used to address vaccine hesitancy.

Figure 3 LNCT country requests for assessing and addressing vaccine hesitancy



Specific LNCT country requests for support include the following:

- Lao PDR, Uzbekistan and Ghana have requested media monitoring support;
- Indonesia and Timor-Leste identified a need for increased access and understanding of approaches to address vaccine hesitancy;
- Most countries identified the importance of learning from other countries to gain unique perspective on how other LNCT countries are addressing vaccine hesitancy;
- Nigeria identified support to assess the nature and the impact of vaccine hesitancy as a priority.

Table 1 Summary of interview findings

	Issue						Response				
	Confidence in vaccine safety	Impact and fear of AEFI	Lack of trust in HCP/challenges with HCP	Communication & media	Impact of rumours	Hesitancy among ethnic minorities	Mass media	Social mobilization	Training of HCP	Engaging with religious leaders	Civil society and gov support
Angola		X			X						
Armenia	X						X				
Georgia	X		X	X							
Ghana				X	X			X			
Indonesia				X	X		X			X	
Lao PDR	X	X			X	X	X				
Moldova	X	X		X	X		X				
Nigeria					X				X		X
São Tomé and Príncipe	X	X		X	X		X				
Sudan	X				X		X	X	X		
Timor Leste	X								X		
Uzbekistan			X	X							
Vietnam		X	X	X	X	X	X				

Discussion

Through discussions with 41 participants (13 in-depth interviews and 4 focus group discussions), we have identified a number of the reasons for non- or under-vaccination, what countries are doing, if anything, to assess and address vaccine hesitancy, and what areas of additional support they felt they needed. A wide variety of reasons for people not accepting or delaying vaccination were reported by LNCT country participants, with some patterns of emerging across the countries.
The **most prevalent concerns among parents were regarding potential side effects of vaccines** reported in the media, by GPs, or by people they knew; trust issues around new vaccines, the halal status of vaccines, and distrust in the government.

Mistrust of new vaccines and **concerns about new products and manufacturers** were reported by multiple participants. For example, in Vietnam, there are reports that parents complain about a new pertussis vaccine that is manufactured in India as they associate it with more severe side effects, including fever. In Armenia, focus group discussion participants discussed how parents believe the pentavalent vaccines manufactured in Korea are of low quality and how this affected the pentavalent vaccination coverage rate. One immunisation expert stated the main reason for vaccine refusals in Moldova was due to parental doubt about the quality of vaccines available.

Issues of the **impact of rumours and misconceptions** were raised by participants from Indonesia, Lao PDR, Moldova, Nigeria, São Tomé and Príncipe, and Sudan. While most participants reported that mechanisms exist to investigate and respond to suspected AEFIs, they recognised that there is often failure to respond to misinformation rapidly and effectively.

Another important theme – also related to trust – was **religion and politics**. A participant in the Armenia focus group discussion highlighted the political environment, which impacts public trust in vaccines. In Indonesia, there was experiences of parents not bringing their children to be immunized because the parents were unsure of the Halal status of the vaccines. Concerns about religious compatibility of vaccines have been identified in other countries and vaccines (Paterson P, et al. 2017; Eriksson A, et al. 2013; Bashir A, et al. 2001). These findings demonstrate the importance of political, religious context in vaccine hesitancy, and highlights the need for tailored responses to concerns and interventions to increase public confidence of vaccines.

Vaccine hesitancy among healthcare providers Focus group discussion participants from Georgia and Uzbekistan reported challenges with healthcare professionals, including doctors and nurses, and the impact on parents' vaccination decisions. They point to negative attitudes, lack of self-confidence, weak regulations, and lack of knowledge and training of healthcare providers influencing parents' decision to accept vaccination. Given the influence of healthcare providers on the vaccine decision-making process, this is worrying and requires attention. Efforts to address vaccine hesitancy among healthcare providers should include information and training programs to address their concerns and knowledge gaps, training to support communication between providers and patients – including managing difficult questions, and stronger accountability mechanisms.

Many participants stressed the **issue of anti-vaccination and misinformation spread on social media**. In some cases, the information came from neighbouring countries (for example, people in Timor-Leste are influenced by Indonesian social media) or from countries far away (reports of rumours circulated in Moldova that originated in the USA or Russia). This demonstrates the trans-national spread of vaccine sentiment and the importance of media monitoring to serve as an early warning to prompt interventions to build public confidence in vaccines and immunisation.

Communication strategies were often cited by participants as an intervention for targeting hesitant populations; however, fear of side effects, concern about vaccine safety, and competing information that is accessible online will require more than filling information gaps. Efforts to build and maintain public trust are needed.

Limitations

Recruiting immunisation experts to participate in in-depth interviews was challenging. Numerous follow-up emails were sent to encourage participation however of the 28 people contacted, 14 went on to participate in a Skype or WhatsApp in-depth interview. Our findings explore vaccine hesitancy within each of the countries, how it is being assessed and how it is being addressed, based on statements from country experts. There will be gaps in this assessment, even following our attempts to cover these areas from other sources of information.

Summary of findings

In discussions with 41 participants from Armenia, Georgia, Ghana, Indonesia, Lao PDR, Moldova, Nigeria, Sao Tome and Príncipe, Sudan, Timor-Leste, Uzbekistan and Vietnam, approaches to measuring and addressing vaccine hesitancy were discussed.

Reasons for non-immunisation or delay in accepting immunisation differed across countries. However, themes emerged around confidence, complacency and convenience. The most important concern articulated across all countries was lack of confidence in vaccine safety.

LNCT countries are implementing various interventions to address vaccine hesitancy. However, in most countries rigorous evaluation of these interventions has not been done yet - some are planning on it, others are interested in learning more about how to evaluate strategies to address vaccine hesitancy.

Although there are common themes of vaccine hesitancy among the LNCT countries who participated in the study, determinants of vaccine hesitancy were shown to be context and country specific. Therefore, there is a need to address them as such. There is no one size fits all solution to addressing vaccine hesitancy. There is clear need for tailored tools and guidance to assist countries in assessing and addressing vaccine hesitancy issues.

Recommendations and Next Steps

LSHTM, in collaboration with Results for Development, Curatio, Gavi, UNICEF EURO and WHO EURO, will host a two-day vaccine hesitancy workshop in Geneva in November 2019. The overall aim of the

workshop is to build skills and strategies to assess and address vaccine hesitancy and to manage complex communication and trust-building challenges in vaccination.

The objectives of the workshop are for participants to:

1. Learn from one another's challenges and successes in addressing vaccine hesitancy;
2. To become familiar with the range of tools and resources available to measure and address vaccine hesitancy and determine which are most appropriate for their settings;
3. To draft country plans to address specific vaccine hesitancy using relevant tools and other resources.

Practical action plans to use relevant tools and other resources will be drafted at the workshop, including identification of additional resources/materials needed for implementation.

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Appendix 1: Study information sheet

Study Information Sheet

Supporting countries in assessing and addressing their vaccine hesitancy

You are being invited to take part in a research study. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and to talk to others about the study, if you wish. Ask us if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

1. What is the purpose of the study?

The purpose of this study is to support countries in assessing and addressing their vaccine hesitancy issues and in building vaccine confidence capabilities.

2. Why have I been chosen?

You have been approached about this study because your country is part of the Learning Network for Countries in Transition (LNCT). We would like to talk to you about vaccine hesitancy in your country and strategies used to address vaccine hesitancy. We will be speaking to a range of people involved in immunisation in your country. We plan to interview 20-30 participants in total (1-3 interviews per country).

3. Do I have to take part?

It is up to you to decide to join the study and take part in an interview, and the information provided in this information sheet should help you decide. If you are interested in taking part in the study please contact us by sending an email to pauline.paterson@lshtm.ac.uk or by calling Tel: +44 (0) 207 927 2830. Once you let us know that you are interested in taking part in our study a member of our research team will contact you. They will go through this information letter with you, and give you the opportunity to ask any questions you may have. If you agree to take part, we will arrange a time to have a call. Before you talk to us about vaccine hesitancy in your country, you will be asked to give oral consent to participate in this study. You are free to withdraw during the interview, or up to two weeks after the interview without giving a reason.

4. What will happen if I agree to take part?

If you agree to take part in this study a member of the research team will contact you for a phone interview. They will talk to you about country experiences of vaccine hesitancy and strategies in place to address vaccine hesitancy.

The interview will last about an hour and will be audiotaped with your permission. The audio-recordings from the interview will be transcribed into text, and anonymised so

that the people taking part in the interview cannot be identified. We will store the interview data securely in line with Research Ethics Committee guidelines and only members of the research team will have access to this. We may use quotes from the interviews in reports and academic publications but these will be anonymous.

5. Expenses

You should not incur any travel expenses from taking part in this study since we will be phoning you.

6. What are the possible disadvantages and risks of taking part?

You may feel uncomfortable about talking about country experiences of vaccine hesitancy and strategies in place to address vaccine hesitancy. The researchers, who will be interviewing you, do not work for a governmental organisation or any of the organisations who are involved in immunisation in your country. They will respect your confidentiality and any information you share with them will be anonymised, which means that your name or organisation will not appear in any research documents, reports or publications.

7. What are the possible benefits of taking part?

The information you share with us will facilitate shared learnings between countries, and help in the development of learning materials to support your country in addressing vaccine hesitancy issues and building vaccine confidence capabilities.

8. Will my taking part in the study be kept confidential?

Yes. All information collected about you during the course of the research will be kept strictly confidential. Your name or organisation will not appear in any reports or publications and we will not tell anyone about your participation in this study.

9. What will happen if I do not want to carry on with the study?

You are free to withdraw during the interview, or up to two weeks after the interview, without giving a reason. If this is during the interview we will ask you whether you are happy for us to use any of the anonymous information you shared with us during the interview so far, or whether you would like us to destroy the recording and the transcript of your interview.

10. What will happen to the results of the research study?

The results of this study will help in the development of publicly available learning materials to support LNCT countries in addressing vaccine hesitancy issues and building vaccine confidence capabilities.

The results of this study will also be written up in a report which will be shared with Results for Development, the Gavi Alliance and the Bill & Melinda Gates Foundation.

We may also publish findings from our research in academic journals and comment on these on the London School of Hygiene & Tropical Medicine website. We may be asked to comment on our research and findings by representatives of the media. You or your organisation will not be identified in any report, publication or media communications and we will send you a summary of our research findings and a copy of the main published paper.

11. Who is organising and funding the research?

This research is being funded by the Gavi Alliance and the Bill and Melinda Gates Foundation, through Results for Development. This study has been outsourced to The Vaccine Confidence Project™ at the London School of Hygiene & Tropical Medicine. The principal investigators are Dr Pauline Paterson and Prof. Heidi Larson.

12. Who has reviewed the study?

This study was given a favourable ethical opinion by the London School of Hygiene & Tropical Medicine Observational Research Ethics Committee.

13. Contact Details

If you would like to find out more or have any questions about this study please contact Pauline Paterson by sending an email to pauline.paterson@lshtm.ac.uk or on Tel: +44 (0)207 927 2830. If you phone and there is no answer, please leave a message on the answerphone, and we will get back to you as soon as possible.

If you decide to take part in the study and subsequently have any concerns relating to your participation that you would like to discuss with somebody independent you can contact ethics@lshtm.ac.uk.

You will be given a copy of the information sheet to keep.

Thank you for considering this study and for taking the time to read this study information sheet.

Appendix 2: Informed consent

INFORMED CONSENT RECORD

Study title:

Supporting countries in assessing and addressing their vaccine hesitancy

Date of call: _____

Interviewee name: _____

	Interviewer to put initials in box
1. Can you confirm that you have read and understand the participant information sheet dated ..... (version .....) for the above study, that you have had the opportunity to consider the information, ask questions and have had these answered fully.	
2. Can you confirm that you understand that your participation is voluntary and that you are free to withdraw up to two weeks after the interview, without giving any reason, without my medical care or legal rights being affected.	
3. Do you agree to this interview being recorded and transcribed?	
4. Do you agree to being quoted anonymously in publications or reports released on the study.	
5. Do you agree to take part in the above study.	

_____ _____ _____

Researcher's Name **Date** **Signature**

Appendix 3: Interview topic guide

INTERVIEW TOPIC GUIDE

Supporting countries in assessing and addressing their vaccine hesitancy

Date of call: _____

Interviewer: _____

Language of call: ☐ English

☐ Foreign language: _____

☐ Translator present

☐ Call in foreign language

Interviewee Socio-demographic characteristics

Name: _____

Occupation: _____

Organisation/Institution: _____

_____

Involvement in the Immunisation Programme:

_____

_____

_____

_____

Topic Guide

- Have you heard reports of people hesitating around whether or not to accept one or all vaccine(s) in your country? (Yes/No)
    - Do you have reports of people refusing any vaccines? (Yes/No)

- Does vaccine hesitancy impact on the immunization program? (Yes/No)

    If yes - What are the impacts? *(Probes: low vaccination coverage, disease outbreaks, immunisation programme suspended)*

    Are there areas of low vaccination coverage? (Yes/No)

    If yes - Which vaccine? Which region? Which population groups? When? (Recent or longstanding)

- Do you have an estimate of the % of un- and under-vaccinated in whom lack of confidence was a factor that influenced their decision to get immunized?

- What do you consider to be the main reasons for low vaccination coverage?

    Probes:

    - *Lack of awareness (of disease, of vaccine, of where to go)*
    - *Lack of convenience (lack of access, too expensive, too far, too long to wait)*
    - *Complacency*
        - *Lack of perceived need/value for the vaccine*
        - *Disease not seen as a threat, individual does not feel at risk*
    - *Lack of confidence/trust in vaccine or provider or manufacturer*
        - *Concerns about vaccine safety, concerns about vaccine effectiveness*
        - *Lack of confidence in vaccines, providers, policy, process, system*
    - *Prompters (new vaccine programme, mass campaign, research, programmatic issue)*
    - *Sustaining and amplifying factors (media, high profile individuals)*
    - *Contextual issues (marginalisation, religion, culture)*

- What data has been collected on vaccine hesitancy? What data are you planning to collect?

  Probes:

  - *Vaccine uptake – by region, by population group*
  - *Vaccine preventable disease surveillance – by region, by population group*
  - *Investigate reasons for non-vaccination (when was the information collected)*
    - *Survey data - from parents, implementers, vaccine deliverers*
    - *Interview and focus group data - from parents, implementers, vaccine deliverers*
    - *News media and online media*
    - *Anecdotal information*
  - *Have you looked at best practice from elsewhere / relevant and successful experiences in other countries*

- Have there been activities and strategies taken to address vaccine hesitancy? Are there any activities and strategies to address vaccine hesitancy planned in the future? – by vaccine, by population group

  Probes:

  - *Tailor immunisation programme to needs, depending on reasons for non-vaccination*
    - *Increase awareness*
    - *Increase convenience*
    - *Address concerns, build/re-build trust*
      - *Address misconceptions*
      - *Respond to serious AEFIs*
        - *Train HCWs in effectively responding to serious AEFIs (investigation, causality assessment, communication)*
        - *Effective system for monitoring safety of vaccines*
        - *Safety signals well investigated and responded to*
    - *Evidence-based multi-component and dialogue-based strategies*
      - *Social mobilization, mass media, communication tool-based training for HCWs, non-financial incentives, reminder/recall-based interventions*
  - *Specify both strategy and approach – e.g. awareness via social media or other media channels, awareness via other approaches etc. Probe for the different players in each strategy and what they are each responsible for*

- *Do you feel they are effective? Why or why not? Challenges and opportunities for more effective strategies?*

- Have you evaluated your strategies to address vaccine hesitancy for effectiveness?

  Probes:
  - *Outcome measured - Increase in vaccination uptake, increase in awareness, increase in confidence*
  - *If not evaluating strategies, why not?*

- Are there any specific areas which would be useful for further support, networking and learning?

- What learning materials do you think would be most useful in supporting LNCT countries in assessing and addressing their vaccine hesitancy issues?

Thank you very much for your collaboration.

To be completed at the end of the interview:

- Do you know anyone else who could provide insights and might be interested in participating in the study?

  Yes ☐ No ☐

- Would you be willing to pass on details to them about our study?

  Yes ☐ No ☐