PROPOSAL for Adult Immunizations in Low- and Middle-Income Countries

Submitted by the Institute for Preventive Medicine and Public Health, Hanoi Medical University, Vietnam

Project title

Vaccination accessibility for child-bearing age women in low- and middle-income countries in Southeast Asia period 2015-2017

Abstract

Overall, the project aims to increase the accessibility and use of vaccines to prevent some communicable diseases such as influenza, rubella, tetanus, and hepatitis B in low- and middle-income countries in Southeast Asia period 2015-2017. The project will offer opportunities for researchers in institutions and agencies involved in improving capacity in research of adult vaccination immunization.

A multi-country, prospective and community-based study will be carried out over three years (tentatively 2015-2017). Pre- and post- evaluation design and community-based randomized control trials (RCT) will be applied in two Southeast Asian countries (Vietnam, Lao PDR).

Specifically, the outcome of the project aims to decrease health disparities by evidence-based novel interventions for accessing vaccination against influenza in Vietnam and Lao PDR. Vietnam and Lao PDR will implement health education interventions; at the same time Vietnam will implement a health service intervention in order to address barriers to vaccination access in each of their respective countries and localities. In addition, at least, two papers will be submitted to international peer-reviewed journals at the end of the project.

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Overall Goal and Objectives

Goal

The project aims to increase the accessibility and use of vaccines to prevent certain communicable diseases (influenza, rubella, tetanus, hepatitis B and Human Papillomarvirus (HPV)) in low- and middle-income countries in Southeast Asia.

The project will offer great opportunities for researchers of institutions and agencies involved in improving capacity in research of adult vaccination immunization.

General Objectives

Main Objective

To identify the constraints/difficulties in vaccination accessibility among women of child-bearing age and health providers in low and middle income countries in Southeast Asia.

Specific Objectives

Vietnam and Lao PDR

- To identify the constraints/difficulties and assess the most effective way to deliver vaccines to women of child-bearing age
- To analyze the change in knowledge and vaccination-seeking behavior before and after the intervention among women of child-bearing age
- To design and assess a pilot, novel immunization service model for adult immunization and implement the model in Hanoi that including off-clinic hours immunization services, mobile immunization delivery, post-vaccination consultation and follow up and reach out to target population via web-based social networks.
- To monitor and evaluate the model implementation in terms of the accessibility of the service, quality (immunization service and vaccine logistics), satisfaction of patients and health care providers

Background

Influenza

Influenza is one of the most common infections in humans. Annually, seasonal influenza viruses are estimated to infect 500-800 million people, resulting in 5 million severe cases and 250,000-500,000 deaths (CDC, 2013). During epidemics the overall infection rate can range from 10-20% in the community and can reach up to 50% in closed communities like schools and kindergartens (Heymann and American Public Health Association, 2008).

Influenza situation in Vietnam

In Vietnam, the clinical syndrome caused by influenza virus, typically referred to as influenza-like illness (ILI), has been one of the many reportable diseases since 1979. This routine reporting system only records the aggregated number of syndrome cases of ILI, without retaining a case-based record. Prior to 2004, influenza was a low priority for the Ministry of Health (MOH) and the research community in Vietnam, with national surveillance limited to routine monthly reporting, in which the disease was not confirmed, typed, or subtyped by PCR

or culture. After the SARS outbreak in Hanoi in 2003 and the highly pathogenic avian influenza H5N1 outbreak in 2004, a sentinel surveillance system for influenza was established. Data from 2006 to 2009 showed that influenza accounted for about 21.9% of total ILI consultation and that about 12.5% of all patients visiting the sentinel sites did so because of ILI (Nguyen et al., 2009).

High-risk groups for severe influenza-associated disease are defined by age group or by the presence of certain chronic conditions (Mertz et al., 2013; Wilschut et al., 2006). For example, women in the last trimester of pregnancy and within the first four weeks of the post-partum period are at increased risk of severe pandemic influenza A/H1N1 (Mertz et al., 2013).

Influenza situation in Lao PDR

In Lao PDR, influenza including seasonal and pandemic influenza is classified under the group of severe acute respiratory infection (SARI). It is one of 17 diseases that are on the list for the national surveillance. The influenza situation is reported weekly to the Center for Laboratory and Epidemiology. Through this center, it reaches the Department for Communicable Diseases Control (CDC) at Lao's Ministry of Health (MOH). In 2007, the first case of H5N1 avian influenza was confirmed in Vientiane Capital, and the first case of H1N1 influenza was confirmed on 16 June 2009. 663 symptom-like cases for H1N1 influenza were reported between April 2009 and June 2010. 335 of these cases (50.5%) were tested positive for pandemic influenza virus (found in 13 out of 17 provinces). The remaining cases were seasonal influenza (328 (49.5%); WHO, 2010).

Rubella

Rubella is a mild viral disease of little clinical significance in children and adult males. However, rubella infection in pregnancy is of major public health importance due to the teratogenic effects that can result from congenital rubella infection, which can lead to miscarriage, fetal death or birth of an infant with congenital rubella syndrome (CRS) (Aksakal FN et al. 2007). Numerous studies have demonstrated that postpartum rubella vaccination is safe and effective (Aksakal FN1, et al. 2007; Garcia DG, 1993; Robinson J, et al. 2004). If rubella vaccination was routinely offered to women after all pregnancies, even more CRS cases would have been prevented.

Vaccination programs have dramatically reduced the incidence of rubella in developed countries. In 2009, they were used in more than 67% of countries worldwide, but vaccination coverage differs widely. Only a few Asian countries have introduced a rubella-containing vaccine into their national immunization programs. So far, the control of rubella with vaccination has been achieved only in Japan, Taiwan and Singapore. As a result, rubella still remains poorly controlled in many countries in Asia. In particular, in the Southeast Asian countries, the vaccination coverage rate was only 4% of 2009.

Rubella situation in Vietnam

In Vietnam, vaccination against rubella has not been introduced into the national immunization program. Vietnam has been experiencing periodic rubella outbreaks and, potentially, a large burden of CRS. Adolescents and adults comprised most of the reported cases of rubella in

outbreaks, and notably, 60% of female cases were women of child bearing age in 2009 (WHO Report, 2009). Misami et al, 2013 conducted a study in Nha Trang, Vietnam and found that mothers aged 17-24 years were more likely to be susceptible to rubella than those aged 35-45 years. A substantial proportion of women of childbearing age are at risk of rubella infection during pregnancy. At present, in Vietnam, the rubella vaccine can be purchased in the market or at the Preventive Medicine Center (PMC) which contributes to a small portion of population immunization.

Rubella situation in Lao PDR

Lao PDR has already introduced a routine combination measles-rubella (MR) vaccine into the national immunization program since 2010. This vaccine has replaced the routine one dose measles vaccine for children after reaching 9 months of age. A survey found that 63.7% of children after reaching 9 months of age had received the MR vaccine (LSIS, 2012). However another survey conducted among schoolchildren in 2011 reported that 56.4% of schoolchildren were rubella seronegative and susceptible to acquiring rubella infection (Phengxay M. et al., 2011). The NIP has planned to extend the second dose MR vaccine to pre-school age children by 2015-2016. It is noted that a routine MR vaccine has not yet introduced to women of child-bearing age and pregnant women except the measles vaccine campaign was given to population aged 9 months to 20 years old in 2007 and 2011.

Tetanus

Maternal and neonatal tetanus, which can be prevented by immunization, is the most common forms of tetanus in developing countries. Worldwide, tetanus kills an estimated 180,000 neonates (about 5% of all neonatal deaths) (2002 data) and up to 30,000 women (about 5% of all maternal deaths) each year (WHO 2004). If the mother is not immunized with the correct number of doses of tetanus toxoid vaccine, neither she nor her newborn infant is protected against tetanus during delivery. The immunization of pregnant women or women of childbearing age with two doses of tetanus toxoid (TT) vaccination may reduce the neonatal tetanus mortality by 94 percent (Blecowe et al., 2010). Two doses protect for 1–3 years, although some studies indicate even longer protection (Koenig MA et al 1998). The tetanus vaccine is demonstrated to be safe to give during pregnancy (Omer et al. 2012).

Tetanus situation in Vietnam

Vietnam has achieved the World Health Organization (WHO)'s goal for elimination of neonatal tetanus at the district scale since 2005. In 2013, neonatal tetanus cases have recurred in northern regional provinces, threatening Vietnam's neonatal tetanus elimination status. Therefore, a cross-sectional study was conducted to better understand epidemiological characteristics and neonatal tetanus-related factors. Results showed that 15 neonatal tetanus cases occurred mainly in the northern mountainous provinces (such as Son La, Lao Cai, Lai Chau, Dien Bien). Attributable factors to increasing neonatal tetanus risk include unimmunized maternal status (100%), birth delivered by unskilled local attendants (93%), and inappropriate aseptic obstetric and postnatal umbilical-cord care practices (93%).

Hepatitis B

Hepatitis B is a serious and common infectious disease of the liver (WHO/CDS/CSR/LYO, 2002). More than one third of the world's population is affected with the hepatitis B virus (HBV) at some points during their lives. 75% of the estimated 360 million people chronic carriers worldwide live in Asia Pacific Region.

Hepatitis B situation in Lao PDR

Hepatitis B virus infection is endemic in Lao PDR and continues to be endemic despite the introduction of a national HepB vaccine since 2000. A current study demonstrated that 45.5% of first-time blood donors were positive for at least one of the hepatitis B virus serum markers (Jutavijittum P. et al., 2014). In addition, pregnant women from big cities like Luang Prabang and Vientiane Capital had very high prevalence of anti-BHc and HBsAg (49.5% and 8.2%, respectively), indicating high exposure and risk of onwards vertical transmission to the unborn infant.

An adult HepB vaccination was implemented across the country in 2009 and 2010. The HepB vaccine was available in provincial and district hospitals nationwide. Unfortunately, not all target populations received the vaccine due to insufficient stock. HepB vaccine can also found in private clinics, though patients have to pay out-of-pocket for it.

Human PapillomaVirus

HPV (human papillomavirus) is a sexually transmitted virus. It is passed on through genital contact (such as vaginal and anal sex) and also by skin-to-skin contact. Studies worldwide have shown that adult as well as adolescent women have limited understanding of HPV. In United Kingdom, only 30% of women participants have ever heard of HPV and in a Canada study only 13% of adolescents had heard of HPV. HPV vaccination was rated as the most important attribute of an acceptable sexually transmitted infection vaccine (Zimet et al., 2005)

Human Papilloma Virus situation in Vietnam

High-risk HPV types are detected in 99% of cervical cancer. In Vietnam, cervical cancer is the most common cause of mortality due to cancer. The prevalence of HPV cervical infection in five big cities in Vietnam ranged from 6.1% to 10.2% and the prevalence of high risk HPV infection was from 5.6% to 9.3%, in which most of HPV positive cases were infected with HPV type 16 or 18. The 5 most common HPV vaccines are not available on a routine use in Vietnam but women can order and pay for it at some preventive health care centers with quite high price. However, about only 31.2% knew about HPV vaccine (Lan TH Vu et al., 2013).

Human Papilloma Virus and Cervical cancer in Lao PDR

There are no cancer registries in Laos, so the incidence of cervical cancer can only be a crude estimation extrapolated from the incidence of the disease in neighboring countries. The World Health Organization estimated that in 2007, there were 1.77 million women in Laos who were potentially at risk of cervical cancer and that 317 women would develop the disease and 159 would die from it (WHO/ICO Information Centre on HPV and Cervical Cancer; Summary report on HPV and cervical cancer statistics in Laos, 2007). According to the study in Lao PDR, eight

hundred women were included in the study, and 58% claimed to know about cervical cancer. Approximately one third (38%) considered themselves to be at risk, but less than 5% had ever had a Papanicolau test. 62% believed it was possible to prevent cervical cancer and that vaccination may be a suitable method, but only 14% know about risk factors (Phongsavanh et al., 2009).

Lao PDR just introduced the HPV vaccine in 2 provinces such as Vientiane Capital City and Vientiane province in 2013 (McNab and Sychareun, 2013). The study was carried out in 2013 also found that the community has low knowledge about human papilloma virus and its link to cervical cancer, but is not aware of the need for screening. All respondents believe cervical cancer prevention should be promoted much more widely, and that a multi-sectoral effort is required. Besides the Ministry of Health, the Ministry of Education, the Lao Women's Union and others should be involved. There is general acceptance of HPV vaccination, but there is some concern about cost and sustainability (amongst policymakers and health care providers), and potential side effects (amongst most respondents) (McNab and Sychareun, 2013).

Project Design and Methods

This overall proposal will be separated into two subproposals focusing on two different interventions to increase access to vaccinations: one will focus on health education, while the other will focus on health service delivery.

Subproposal 1: Using health education to address barriers to vaccine access among adult women of child-bearing age

Study population: Women of child-bearing age (18-49 aged old)

Study location: Vietnam and Lao PDR

For each country, at least two areas will be selected for study, representing urban and rural areas. The criteria for study location selection will be 1) experiencing Influenza A (H1N1 and/or H5N1), tetanus, rubella, or hepatitis B epidemic in the last five years; 2) willing to participate in the study with high commitment; and 3) having local vaccination policies and vaccines available at each site.

In Vietnam, Hanoi and Hanam provinces will be selected to represent urban (Hanoi) and rural (Hanam) areas. In each province, 200 child-bearing age women in one commune will be selected for intervention site and 200 child-bearing age women in the other commune will be selected for control site.

In Lao PDR, the study will be conducted in Savannakhet province. Kaisone and Sepon districts will be the study sites. Kaisone district will represent an urban area while Sepon will represent a rural area. In each district, 200 women aged 15-49 years old will be selected for intervention site and another 200 women in other communes will be selected for control site.

Study design

A multi-country, prospective and community-based study will be carried out during three years (tentatively 2015-2017). Pre- and post-evaluation design and community-based randomized

control trials (RCT) will be applied. Researchers will conduct a situation analysis in the first year, implement the intervention in the second year, and evaluate the effective of the intervention in the final year.

I. BASELINE SURVEY

1. Objectives

The baseline survey has following specific objectives:

- To explore barriers and challenges to accessibility to and utilization of vaccination services among adult women of reproductive age at the locations of the project intervention(s) in each participating country.
- To provide inputs for the development of intervention(s) aim to improve vaccination service accessibility and utilization.
- To provide baseline data about the accessibility to and utilization of vaccination services for end-of-project evaluation of the intervention(s)' effectiveness.

2. Study design

The baseline survey is a cross-sectional, mixed method survey which combines a qualitative study with key informants and a quantitative survey with the targeted population. This baseline survey will be carried out in the project's intervention and controlled locations of one urban and one rural communes or equivalent administrative unit each in each participating country.

The qualitative study will be conducted through focus group discussions and in-depth interviews with key informants from the targeted population and health care managers and health care workers of primary health care facilities where vaccination services are delivered. The aim of this study is to provide a deep understanding the baseline situation of reproductive age women's accessibility to and utilization of vaccination services of vaccines of interest. Qualitative interviews and discussions are aiming to explore in narrative, from both customer and service provider perspective, barriers and challenges of reproductive-aged females to accessing vaccines of interest. Content of these interviews and discussions is also expected to provide significant inputs to the development of the quantitative study and to the development of interventions that will be delivered during this project to improve women accessing to and utilization of vaccination services.

The quantitative survey will be conducted using structured, pre-designed, self-administered questionnaire which is refined and finalized with inputs from the qualitative study, with selected individuals from the targeted population in the intervention commune and controlled commune. Findings of this quantitative survey are expected to provide baseline quantitative indicators which will be assessed again at the end of the project to evaluate the intervention(s) effectiveness by a similar designed survey.

The baseline survey will be conducted in collaboration with relevant local authorities in each project locations and an equivalent controlled area in each participating country.

Study participants, inclusion and exclusion criteria

2.1. ***Qualitative study*** will target two main groups of key informants in the study's locations in each participating country.

The first group of participants of this qualitative study is selected women at reproductive age, i.e. from 18 to 49 years old. Women will be selected to participate in focus group discussions and/or in-depth interviews if they meet the following inclusion criteria: i) any women living in the selected communes for at least one year; ii) older than 18 years old and younger than 49 years old at the time of the survey; iii) Having pregnancy at any gestational age at the time of the survey or having their baby delivered within the last 12 months; and iv) agree to participate in in-depth interview and/or focus group discussion.

Exclusion criteria: Women will be excluded from the qualitative study if they do not meet any of the inclusion criteria.

The third group of participants is health care managers and health care staff of primary health care facilities where vaccination program is delivered in each participating country. Persons will be recruited into in-depth interviews and/or focus-group discussions if they meet the following inclusion criteria: i) they are health staff or health manager of primary health care facilities at the study's locations; ii) working in these facilities for at least one year and iii) agree to participate in interviews and/or discussions.

2.2. Quantitative survey.

Participants of this quantitative survey are adult women of reproductive age. Women will be recruited in this quantitative survey if they meet the following inclusion criteria: i) any women living in the selected communes for at least one year; ii) older than 18 years old and younger than 49 years old at the time of the survey; iii) Having pregnancy at any gestational age at the time of the survey or having their baby delivered within the last 12 months; and iv) agree to participate in in-depth interview and/or focus group discussion.

Exclusion criteria: Women will be excluded from the quantitative study if they do not meet any of the inclusion criteria.

3. Sample size calculation

3.1. Qualitative study

It is estimated that 10 to 15 in-depth interviews and 3 focus discussions of six to eight women each will be conducted in each study locations, i.e. urban and rural commune in each participating country.

All health personnel from local commune health centers who are responsible for mother health will be interviewed about the barriers and challenges of providing vaccinations to women.

3.2. Quantitative study

It is estimated that all women who have pregnancy or having baby in the last 12 months from each commune or equivalent administrative unit participated in the study will be selected to participate in the quantitative survey.

4. Sampling method and recruitment

4.1. Qualitative study

In collaboration with local authorities, participants from reproductive-age women in the study locations in each participating country will be purposely and conveniently selected to participate in interviews and discussions of the qualitative study.

The potential women will be identified from the available list of pregnancy women and first year child-bearing women from each commune and equivalent administrative unit in each study location and invited to participate in interviews and discussions by local commune or equivalent administrative unit health centers. Local collaborators will do screening if potential participants meet the inclusion criteria. Eligible women will then be orally explained about the objectives of this qualitative study and other study related ethical considerations. If they agree to participate, they will be referred to investigators of this study in each participating country to set up an interview or discussion at appropriate time. Actual interviews and discussions will only be conducted upon receiving participant's signature in the Participant Information and Consent Inform Form.

Health staff responsible for maternal and women's health, and health managers from local primary health care facilities at the study locations in each participating country will be invited to participate in interviews and discussions. Interviews and/or discussions at convenient time for both parties will be set up following potential participants' agreement. Actual interviews and discussions will only be conducted upon receiving participant's signature in the Participant Information and Consent Inform Form

4.2. Quantitative study

The quantitative survey with pregnancy, recently having baby in the last 12 months This survey's sub-component will be conducted with the collaboration with the relevant local authorities. The research team will get list of all women who are pregnant, who have just had baby in the last 12 months and who have just married in the last 12 months from relevant local agencies. With the collaboration with the local authorities, all women living in the study locations who meet with the inclusion criteria will be approached by the research team at the suitable time, i.e. in the afternoon and evening. They will be orally explained about the aim of this quantitative study and other study's related ethical considerations. Potential participants will then be screened via a short questionnaire to ensure they meet with the inclusion criteria of the quantitative study. If they agree to participate, they will then be asked to sign in the Participant Information and Consent Form. Self-administered, structured questionnaire asking about knowledge, attitude and practice of the accessibility to and utilization of vaccines of interest, i.e. seasonal influenza, rubella, hepatitis B and tetanus, will be delivered to eligible women.

5. Collection tools

5.1. Qualitative study

Interview guide and group discussion guide will be developed for the qualitative study.
Interview and discussion guides for women of reproductive age will cover themes that explore their perspective of the barriers and challenging to access with and utilization of vaccination services of vaccine of interest from customer point of view. Participants will be interviewed and discussed about the availability, affordability of these vaccines, local attitude/view and practice of vaccination in general and each of vaccines of interest in particular, other socio-economic and structured factors that would affect the accessibility to and utilization of vaccination services. Interviews and discussions also explore their views of potential effective interventions

to improve vaccination accessibility and utilization of vaccine of interest for women in the locality.

Interview guides for health personnel of local health centers will cover themes that explore from provider point of view about barriers and challenging to provide vaccination of vaccine of interest for reproductive age women. Participants will be interviewed about structure and operation of vaccination services at local level and how this structure and operation could affect women's access to utilization of vaccination services. They are also asked, from their point of view, other barriers to accessibility and utilization of vaccines of interest for reproductive age women. Health care staff will also be interviewed about the potential intervention(s) to improve accessibility and utilization of vaccination services for reproductive age women living in their locality.

All interview and focus group discussion guides are developed by the research team in Vietnam with the inputs from research teams in Lao PDR. The interview and discussion guides will cover common themes for both countries, but may also cover specific questions to contextual situation in each country.

5.2. Quantitative study

The quantitative study will be conducted using a structured, pre-designed, self-administered questionnaire. This questionnaire is developed by the Vietnam research team with the inputs from research teams in other participating countries. The questionnaire will cover common questions for all participating countries but may cover specific questions to adapt with the contextual, specific situation in each participating country. The questionnaire will be finalized with the inputs from the qualitative study.

The questionnaire covers demographic information, health service accessibility and utilization, and knowledge, attitude, and practice of vaccination utilization. All data collection tools are developed in English and will then be professionally translated into the local language of the study locations. All tools are tested for the appropriateness of the language, feasibility of administration and timing before actual implementation. The questionnaire of the quantitative study will be finalized with the inputs came from the interviews and discussions.

6. Study indicators

The base-line, cross-sectional survey as well as the end-of-project evaluation have the following main indicators:

Indicator 1: The percent of women who have access to information about relevant vaccines of interest in each country (influenza, rubella, tetanus, hepatitis B, Human Papillomar Virus)

- Indicator 2: The percent of women with correct knowledge about the effects of relevant vaccines of interest in each country (influenza, rubella, tetanus, hepatitis B, Human Papillomar Virus)
- Indicator 3: The percent of women with positive attitude about the use of relevant vaccines of interest in each country (influenza, rubella, tetanus, hepatitis B, Human Papilloma Virus)

- Indicator 4: The percent of women vaccinated of relevant vaccines of interest in each country (influenza, rubella, tetanus, hepatitis B, Human Papilloma Virus) during the last 2 years.

II. INTERVENTIONS

1. Selecting project's intervention and controlled locations.

The selection of project intervention and controlled locations will be made by the research team in each participating country. In collaboration with relevant local authorities, the lists of all communes or equivalent administrative units of equal socio-economic conditions in two districts or equivalent administrative unit from one urban and one rural area in each participating country will be obtained. One commune or equivalent administrative unit in urban or rural area will be randomly selected to receive the project's intervention(s). The other commune or equivalent administrative unit in each urban or rural area will serve as the control unit. The process of selecting commune and allocating intervention is blinded, i.e. the people who do the selection and allocating the intervention do not know which commune will receive intervention.

2. Intervention package to improve women's accessibility to and utilization of vaccination services.

Each participating country will develop specific intervention package to address the barriers and challenging to women's accessibility to and utilization of vaccine services of vaccine of interest in their country. The intervention will be focused on health education initiatives, which would cover the following activities (but not limited to):

- Developing and printing health education materials which may include but not limited to leaflet, video clips, poster, etc.
- Training for health staff about the safe vaccination practice
- Raising vaccine awareness
- Other country-based specific communication activities

The project team in each participating country will work with its local partners to establish a project management unit to manage the delivery of the intervention(s). This management unit will be responsible for monthly implementation and reporting of project's intervention activities. The intervention(s) is expected to be implemented from the early of the second year and finish by the middle of the third year of the project life for a total of estimated 18 months. The intervention(s) will be implemented in the selected commune or equivalent administrative unit in one urban and rural area of each participating country.

III. END-OF-PROJECT EVALUATION

1. Objectives

The end-of-project evaluation has following specific objectives:

- To assess the accessibility to and utilization of vaccination services of women in the study locations after two years of project implementation.
- To evaluate the project intervention after two years of implementation.
- To provide policy recommendations for vaccination service provision at locality

2. Evaluation design

The end-of-project evaluation is a cross-sectional quantitative survey. This survey will be conducted with women in the project locations. The survey will be conducted with women in the intervention communes and women in the controlled communes in each country.
Participants, the calculation of sample size, sampling method and questionnaire using for this end-of-project evaluation are similar to those applied in the baseline survey. This similarity allows for the evaluation of the project intervention (s).
In the end-of-project evaluation, the four main indicators of the project will be assessed again to evaluate the effectiveness of the intervention. The measurement of the end-of-project's main indicators is covered in the quantitative study.
It is expected that after two years of implementation:

- Indicator 1: The percent of women have access with information about relevant vaccines of interest will increase by 50% comparing to the baseline data
- Indicator 2: The percent of women have correct knowledge about the effects of relevant vaccines will increase by 20% comparing to the baseline data
- Indicator 3: The percent of women have positive attitude about the use of relevant vaccines will increase by 20% comparing to the baseline data
- Indicator 4: The percent of women vaccinated of relevant vaccines during the last 3 months will increase by 10% comparing to the baseline data

Policy recommendations for the vaccination program improvement will be made from lessons learned from this project's intervention(s). It is estimated that an end-of-project workshop will be organized to synthesize lesions learned from each country and facilitate experience sharing among participating countries.

IV. ETHICAL CONSIDERATIONS

The research team will seek ethical approval from relevant Institutional Ethical Review Board(s) in each participating country for both the baseline survey and end-of-project evaluation.
All participants who participate in the baseline survey and end-of-project evaluation are provided with the Participant Information and Consent Form where participants can get full description of the survey's objectives, the voluntary and confidentiality principle of these surveys, the procedure of the surveys and the potential benefit to individual and broader community from these survey and the project's interventions. Only those who agree and sign this form will be involved in further steps of these surveys. Participants can withdraw from the study at any stage without any prejudice. Withdrawal will not affect their relationship with the research team and health service providers at their locality.

Subproposal 2: To develop and evaluate a pilot vaccination delivery services aiming to increase accessibility to adult immunizations

Study population and location

A pilot vaccination delivery model will be developed in Hanoi to increase the accessibility of immunization services for women of child bearing age in the locality. This facility will offer novel vaccination services such as off-clinic hours immunization services, mobile vaccination delivery, telephone-based and web-based vaccination consultations and follow up and reach out to the

community by innovative approaches, including web-based social network such as Facebook, Zalo, etc.

Study design

There will be 3 phases of the study including Phase 1 (exploratory phase), Phase 2 (implementation), Phase 3 (monitoring & evaluation).

I. PHASE I

1. Objectives

The objectives of Phase I are:

- To explore the needs from targeted population and from service provider perspective about and feasibility of a novel vaccination delivery services that can offer off-clinic vaccination services, mobile vaccination delivery, post-vaccination consultations and follow up and reach out to the targeted population via web-based and/or smartphone-based social networks such as Facebook and/or Zalo
- To develop and implement the pilot model of the best immunization services in Hanoi

2. Study design

The situation analysis will be integrated in the baseline survey of the Subproposal 1. Basically, this is a qualitative survey with the targeted population and health care manager and staff of the grass-root level vaccination service delivery facilities in Hanoi, Viet Nam.

The qualitative study will be conducted through focus group discussions and in-depth interviews with key informants from the targeted population and health care managers and health care workers of primary health care facilities where vaccination services are delivered. The aim of this study is to explore in narrative, from both customer and service provider perspective, a best model of a vaccination service delivery which may include (but not limited to) off-clinic hour vaccination services, mobile vaccination delivery, pre and post-vaccination consultation and follow up that could increase the accessibility and utilization of reproductive-aged females to vaccines of interest. This situation analysis also explores targeted population perspective about the feasibility of a novel way to disseminate vaccination service to targeted population via web-based and/or smart-phone based social network such as Facebook and/or Zalo.

Content of these interviews and discussions is also expected to provide significant inputs to the development of the pilot model that will be implemented during this project to improve women accessing to and utilization of vaccination services.

3. Study indicators

The baselines, cross-sectional survey as well as the end-of-project evaluation have the following main indicators:

- Number of women access to immunization service of this vaccination delivery pilot model at baseline and end of project.

- Quality service including immunization service, risk communication, cold chain management, percentage of vaccination schedule adherence.

PHASE II: Implementation and intervention

The implementation phase will be launched in Hanoi. The pilot model will be placed in the IPMPH building of Hanoi Medical University campus. This phase will include (but not limited to): renovating vaccination clinics; procuring of cold chain facilities including devices for mobile vaccination services; establishing a telephone and IT system to provide vaccination related consultations and follow up; developing a webpage to disseminate the model service to targeted population; implementing a social marketing activities via web-based and/or smartphone based social networks and staff trainings. The teams in Vietnam will seek funding support from IPMPH, HMU for vaccination cold chain and IT system procurement for the vaccination clinic. It is estimated that IPMPH will contribute US$12,000 for cold chain procurement and US$ 6<000 for IT system procurement for the pilot clinic in Hanoi.

This phase will include monitory and evaluation of the immunization service model. The immunization service pilot model for adult immunization will be developed based on the results of the situation analysis. IPMPH team plans to attend International Conference on Vaccination to disseminate the results of the baseline survey and situational analysis as well as present the pilot model of the innovative model of vaccination clinic that will increase the accessibility and utilization of vaccination services in Hanoi.

II. PHASE III: Evaluation design

The assessment of the model implementation will be conducted by using the same methodology with the first year and the expert group will conclude the recommendations for increasing accessibility of adult immunization.

It is expected that after two years of implementation:

- The target population's accessibility to vaccines in pilot model will to increase by 30% from baseline
- Service quality, including risk communication, cold chain management will better follow Vietnam Ministry of Health vaccination guidelines and Lao PDR's guidelines.

Policy recommendations for the vaccination program improvement will be made from lessons learned from this project's intervention(s). It is anticipated that there will be an end-of-project workshop to synthesize lessons learned from this pilot model, and facilitate experience sharing among participating countries.

III. ETHICAL CONSIDERATIONS

The research team will seek ethical approval from relevant Institutional Ethical Review Board(s) in each participating country for both the baseline survey and end-of-project evaluation.

All participants who participate in the baseline survey and end-of-project evaluation are provided with the Participant Information and Consent Form where participants can get full description of the survey's objectives, the voluntary and confidentiality principle of these surveys, the procedure of the surveys and the potential benefit to individual and broader community from these survey and the project's interventions. Only those who agree and sign

this form will be involved in further steps of these surveys. Participants can withdraw from the study at any stage without any prejudice. Withdrawal will not affect their relationship with the research team and health service providers at their locality.

Detailed Workplan and Deliverables Schedule

Subproposal 1: Health education intervention

This subproposal is divided into three main phases: the baseline/situational analysis phase, the intervention phase, and the monitoring and evaluation phase. Each phase is expected approximately one year each, for a total project duration of three years.

During the first year, each country will be focused on developing and implementing the baseline survey in order to analyze the current vaccination access situation in their respective countries. This will consist of having meeting with local stakeholders in order to identify the target population in each study location, creating the quantitative and qualitative surveys, and carrying out the developed surveys. All interactions in study areas will be done in conjunction with local officials. As such, the research team in both countries will be in constant communication with these local stakeholders, and will engage them in each step of the study. The research team will hold initial meetings with these stakeholders in preparation for Phase 2 as well.

Beyond conducting the situational analysis, each research team will also seek ethical clearance and approval to carry out the study in their respective countries. Once the data from each survey are collected, each team will analyze the data in order to get a sense of the issues and barriers to vaccines among the target population.

Phase 2 will be the intervention implementation phase. In this phase, each research team will utilize their findings from their baseline survey to develop an appropriate intervention that best addresses the barriers to vaccination access. This intervention will most likely be a health education intervention, but may be altered and adapted depending on the baseline findings and discussions with local officials. The intervention will be conducted in one rural location and one urban location. It will include dissemination of health education materials, and the training of local health staff in order to ensure sustainability of the intervention as well as increase local staff capacity.

Phase 3 will be the monitoring and evaluation phase. This phase will consist of evaluating the effectiveness of the intervention by utilizing the surveys developed in Phase 1. Similar to Phase 1, the surveys will be conducted with help from local staff and consequently analyzed to determine the effectiveness of the intervention. The results will then translated and disseminated. The research team plans to meet with both local health officials and senior health officials to discuss the findings and provide effective policy recommendations. Additionally, each research team will write up its results for both local and international journal publication.

The table of the work plan and deliverables schedule for Vietnam and Lao PDR is presented at the end of this section.

Subrproposal 2: Development of a vaccination service delivery pilot model

As with Subproposal 1, this subproposal will also be divided into three phases, with each phase lasting one year for a total project duration of three years.

The first phase is the planning and situation analysis phase. In this phase, Vietnam will focus on involving stakeholders and relevant officials first in order to ensure that the results from the study will contribute to meaningful policy impact on adult access to vaccinations. This will involve setting up meetings to gather support, and appointing a steering committee to help oversee the project and design an appropriate governance mechanism. These stakeholders will also be involved in developing the intervention model and questionnaire, and piloting these data collection materials. Once the intervention details become clearer, the Vietnam research team will also seek ethical clearance to conduct the study. The team will then conduct situation analysis using the designed data collection tools at the study locations, followed by data analysis. The results from this initial analysis will be shared with key partners and stakeholders at the end of the first year. They will also be used to inform the intervention in the second year.

Phase 2 is the intervention implementation phase. Part of this phase involves preparing for the pilot model, including (but not limited to) the following tentative activities: i) vaccination service delivery, ii) telephone and web based vaccination consultation and follow up, and iii) social marketing via web-based or smartphone-based social networks. The duration of the intervention itself is anticipated for 12 months, during which there will be regular monitoring and evaluation of the model through site visits and steering committee meetings. The intervention will be done with support from local health staff. Towards the end of the implementation period, the research team anticipates preliminary data analysis, and organizing another round of meetings to keep key stakeholders informed of the results and progress from this year.

Phase 3 is the monitoring and evaluation phase. This involves analyzing all the data from Phase 1 and Phase 2 in order to evaluate the effectiveness of the vaccination service delivery pilot model. From here, the research team will determine how best to increase the efficacy of the model in order to either increase access to adult vaccines and/or to expand the model to accommodate a larger implementation scale. The team will then present the findings to key partners and senior policy makers and provide them with policy recommendations based off this study. They will also translate their results via publications on both a national level and an international level.

Vietnam's work plan

YEAR 1

Key activities	Month											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
PREPARATION OF BASELINE SURVEY AND SITUATION ANALYSIS												
Develop data collection tools, plan for data analysis with Lao PDR team	X	X	X									
Pilot data collection tools in field			X									
Reach consensus on data collection tools				X								
Finalize data collection tool					X							
Organize training for participants from central level					X							
Print research tools					X							
IMPLEMENTATION OF BASELINE SURVEY AND SITUATION ANALYSIS												
Seek ethical approval	X	X	X									
Contact local authorities for field preparation				X								
Data collection in field						X						
Data entry and processing (qualitative, quantitative)						X						
Data analysis						X	X					
Report write up						X	X					
Printing and copying							X					
IMPLEMENTATION-SUBPROPOSAL 1												
Develop intervention packaged based							X	X				

on findings from baseline survey												
Meeting with Hanoi team and local staff in province via Skype for development of health education materials								X	X			
Discussion with Lao PDR team concerning development of health education materials									X			
Develop health education materials									X			
Dissemination/inception workshop									X			
Training of local staff									X	X		
Community vaccine awareness campaign in study sites										X	X	X
Site visits by trained local health staff										X	X	X
IMPLEMENTATION SUBPROPOSAL 2: VACCINATION DELIVERY PILOT MODEL												
Procurement of cold chain utilities										X	X	X
Setting up a telephone and IT system										X	X	X
Staff training										X	X	X

YEAR 2

Key activities	Month											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
IMPLEMENTATION-SUBPROPOSAL 1 (CONTINUED)												
Community vaccine awareness campaign in study sites	X	X	X	X	X	X	X	X	X	X	X	X
Site visits by trained local health staff	X	X	X	X	X	X	X	X	X	X	X	X

Communication between PI and co-PI concerning intervention implementation	X	X	X	X	X	X	X	X	X	X	X	X
Dissemination workshop								X				
Site visits by PI and local health staff team		X			X			X			X	
IMPLEMENTATION SUBPROPOSAL 2: VACCINATION DELIVERY PILOT MODEL												
On-site immunization service delivery	X	X	X	X	X	X	X	X	X	X	X	X
Telephone and web-based vaccination consultations and follow up	X	X	X	X	X	X	X	X	X	X	X	X
Social marketing in web-based social network	X	X	X	X	X	X	X	X	X	X	X	X
Site visits by PI		X			X			X			X	

YEAR 3

Key activities	Month											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
IMPLEMENTATION-SUBPROPOSAL 1 (CONTINUED)												
Community vaccine awareness campaign in study sites	X	X	X									
Site visits by trained local health staff	X	X	X									
Communication between PI and co-PI concerning intervention implementation	X	X	X									
Site visits by PI and local health staff team	X		X									
IMPLEMENTATION SUBPROPOSAL 2: VACCINATION DELIVERY PILOT MODEL												

On-site immunization service delivery	X	X	X									
Telephone and web-based vaccination consultations and follow up	X	X	X									
Social marketing in web-based social network	X	X	X									
Site visits by PI	X		X									
END OF PROJECT EVALUATION												
Agree on content for endline evaluation between Vietnam and Lao PDR				X								
Fieldwork preparation and training				X	X							
Data collection					X	X						
Create data entry form						X	X					
Data entry							X					
Data analysis								X	X			
Report write up										X		
OTHER ACTIVITIES												
Dissemination workshop											X	
Manuscript preparation									X	X	X	X
Look for suitable journal for publication									X	X	X	X
Submit to journal												X
Financial and technical report for funding agency												X

Lao PDR's work plan

YEAR 1

Key activities	Month											
	1	2	3	4	5	6	7	8	9	10	11	12
PREPARATION OF BASELINE SURVEY												
Communication with Vietnam team regarding research tools development	X	X	X									
Meeting with team in Vientiane for research tools development	X	X	X									
Communication with Co-PI in local areas via Skype/email regarding research tools development		X	X									
Printing research tools			X									
Organizing training for participants from central level			X									
IMPLEMENTATION OF BASELINE SURVEY												
Seek ethical approval			X									
Meet with Director of Public Health Office in local site			X									
Launch qualitative study in urban district				X								
Launch qualitative study in rural district				X								
Launch quantitative study in urban district					X							
Launch quantitative study in rural district					X							
Data collection				X	X	X						
Data analysis						X	X					

Report write up							X	X				
Printing and copying								X				
INTERVENTION PACKAGE												
Meeting with Vietnam team via Skype for development of health education materials								X	X			
Discussion with local team concerning development of health education materials								X	X			
Develop health education materials									X			
Inception workshop									X			
Training of local staff									X	X		
Community vaccine awareness campaign in study sites										X	X	X
Site visits by trained local health staff										X	X	X

YEAR 2

Key activities	**Month**											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
INTERVENTION PACAKGE (CONTINUED)												
Community vaccine awareness campaign in study sites	X	X	X	X	X	X	X	X	X	X	X	X
Site visits by trained local health staff	X	X	X	X	X	X	X	X	X	X	X	X
Communication between PI and co-PI concerning intervention implementation	X	X	X	X	X	X	X	X	X	X	X	X

Site visits by PI and local health staff team		X			X			X			X	

YEAR 3

Key activities	Month											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
INTERVENTION PACKAGE (CONTINUED)												
Community vaccine awareness campaign in study sites	X	X	X									
Site visits by trained local health staff	X	X	X									
Communication between PI and co-PI concerning intervention implementation	X	X	X									
Site visits by PI and local health staff team	X		X									
END OF PROJECT EVALUATION												
Meeting with Director of Public Health Office of study area to discuss preliminary results			X	X								
Data collection				X	X	X						
Create data entry form						X	X					
Data entry							X					
Data analysis								X	X			
Report write up										X		
OTHER ACTIVITIES												
Dissemination workshop											X	
Manuscript preparation									X	X	X	X

Look for suitable journal for publication									X	X	X	X
Submit to journal												X
Financial and technical report for funding agency												X

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