

# Examining Enablers of Vaccine Hesitancy Toward Routine Childhood and Adolescent Vaccination in Malawi

Gbadebo Collins Adeyanju (✉ [gbadebo.adeyanju@uni-erfurt.de](mailto:gbadebo.adeyanju@uni-erfurt.de))

Universität Erfurt <https://orcid.org/0000-0002-5398-0183>

Comelia Betsch

Universität Erfurt

Abdu A. Adamu

Stellenbosch University Faculty of Medicine and Health Sciences

Khadijah Sanusi Gumbi

Ahmadu Bello University Faculty of Social Science

Michael G Head

University of Southampton Faculty of Medicine

Aristide Aplogan

Agence de Medecine Preventive

Haoua Tall

Agence de Medecine Preventive

Tene-Alima Essoh

Agence de Medecine Preventive

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## Research

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## Abstract

**Background:** Vaccine hesitancy is the delay or refusal of vaccines despite their availability. Here, we explored factors that influence hesitancy among caregivers of children and adolescent girls eligible for routine immunisation and the human papillomavirus (HPV) vaccine in Malawi.

**Methods:** The study used key informant interviews and focus-group discussions. Information was obtained from caregivers and national and district-level representatives of the expanded program on immunisation (EPI) and community stakeholders. There were 25 key informant interviews, and two focus-group discussions with 13 participants conducted April May 2020. Interviews were audio-recorded, transcribed, and analysed using a thematic content analysis.

**Results:** Most vaccine-hesitancy drivers for routine immunisation were also relevant for the HPV vaccine. Drivers included inadequate awareness of the vaccination schedule, rumours and conspiracy theories exacerbated by religious beliefs, low literacy levels of caregivers, distance and transport to the vaccination clinic, and a disconnect between community healthcare and community leaders.

**Conclusion:** This study provides insights into determinants of vaccine hesitancy within the Malawian context. The findings can inform context-specific interventions by decision-makers. There is need for further study around the prevalence and impact of each factor, as well as their causal relationships to vaccine uptake.

## Introduction

The contribution of vaccination to global public health and community wellbeing is one of the greatest success stories of modern medicine [1]. Despite this, in 2018, 13.5 million children missed at least one of their routine vaccinations, and this contributed to about 1.5 million deaths from vaccine-preventable diseases [2]. In the Sub-Saharan Africa (SSA) region [3], basic vaccination coverage (DTP3) is 76%, which is lowest among World Health Organisation (WHO) member regions and lower than the global average of 86% [4].

In Malawi, the overall vaccination uptake has typically been higher than much of sub-Saharan Africa but there are still gaps in coverage. There was a 92% uptake of DTP3 in 2018, and a 92% uptake of the first dose of the measles vaccine; however, this dropped to 75% for the second dose [5]. For newly introduced immunisations, there was a 91% and 89% uptake for rotavirus and pneumococcal vaccine respectively. The HPV vaccination showed a drop from the first to the second dose, for example, in the districts of Rumphi (98–88%) and Zomba (89–76%) [6, 7]. Vaccine hesitancy is discussed as one reason for difficulties in maximizing vaccination uptake [8].

Vaccine hesitancy is defined as the delay or refusal of vaccines despite the availability of vaccination services [8]. It has been labelled one of the ten threats to global public health in 2019 [9], and is influenced by many factors, including safety concerns, rumours and conspiracy theories, fears of adverse events [10–12]. Much of the evidence around hesitancy has been focused on high-income settings, and little is known about the extent of, and reasons for, hesitancy in lower income settings [13]. The drivers can be different when introducing new vaccines such as against HPV and or the COVID-19 immunisations [14, 15]. Exploring these potential differences in drivers is crucial, as knowledge about these factors will improve the chances of a successful implementation of a new vaccine.

Since the introduction of the vaccine against HPV through the pilot phase in Malawi in 2013 and the EPI routine program in January 2019, there is emerging evidence that hesitancy may negatively affect uptake [10, 16]. Cervical cancer constitutes the fourth most-common form of cancer globally among women [17, 18]. Out of the countries with the highest prevalence of cervical cancer in 2018, more than 90% were in the African region [19, 20]. Malawi has the highest incidence of cervical cancer in the world and number one among women aged 15–44 years with a 50% mortality rate [18, 21, 22].

Studies in 13 SSA countries (not including Malawi) show that barriers to HPV vaccine uptake are associated with access to health facilities, perceived risks of receiving the vaccine, safety and effectiveness concerns, low levels of knowledge and awareness [23–25]. Preliminary pilot studies have suggested that similar drivers could also be relevant in Malawi [26, 27].

The Government of Malawi Health Sector Strategic Plan II (2017–2022) has set a goal “of ensuring that the people of Malawi attain the highest possible level of health and quality of life” [28]. This will be achieved by ensuring universal coverage of basic health care, which is the obligation of the government guaranteed under the republican constitution. One of the key objectives of this plan is to reduce the burden of communicable diseases by rolling out nationwide immunisation programs. In Malawi, there is a paucity of evidence to support the national government’s efforts to achieve the above plan using evidence-based strategies.

The goal of this qualitative study was to understand factors that drive vaccine hesitancy through the lenses of immunisation stakeholders and community members in Malawi. The research focused on routine immunisation and also specifically the HPV vaccine.

## Methods

This study utilized 25 individual Key Informant Interviews (KII) using a semi-structured interview guide and two multi-stakeholder Focus Group Discussions (FGD). The study considered exploring evidence from both purposively selected key informants and the assembly of community members, not only to corroborate evidence but also to explore the dynamics of the relationship between vaccine demand and supply. The FGD provided an in-depth understanding of contextual or social issues, while KII generated knowledge insights into the phenomena under study [29].

The study was conducted in the Salima, Lilongwe, Dowa, and Zomba districts of Malawi (Figure 1). The districts were selected based on the following criteria: one district with high vaccine coverage (Lilongwe), one with low vaccine coverage (Dowa), and one each in an urban (Zomba) and rural (Salima) districts where the HPV vaccine had been implemented. The two latter districts were selected not based on coverage but on the rural–urban difference.

The respondents were purposively selected. For the KII at the central level, we included the National EPI Manager, one EPI social mobilization officer, one NITAG member, one UNICEF representative, and one WHO representative. At each district level, participants included the district EPI manager, one community leader (CL), one community health care worker (HCW), one religious group representative or representatives of civil society organisations (RGR or CSR), and one teacher from a school where an HPV demonstration project was conducted. For the FGD, included participants were stakeholders and caregivers comprising one community leader, one community health care worker, one religious group representative, one representative of civil society organisations, one caregiver whose daughter was eligible for HPV vaccination, one teacher from a school with the HPV demo project, and one caregiver whose child was eligible for RI.

A total sample size of 25 key informants was interviewed, while six discussants in Zomba and seven in Salima participated in the two focus-group discussions. For the two focus-group discussions, participants were purposively identified and selected from communities where EPI has implemented programs. Participants at the Salima FGD comprised three females and four males, while participants at Zomba FDG comprised three males and three females. The KII lasted 30 minutes on average, while each of the FGD sessions was conducted for an average time of 90 minutes. The interviews and discussions were voice-recorded and transcribed verbatim.

The interview guide comprised the following themes and topics: knowledge of immunisation (“What do you know or think about immunisation?”); knowledge of HPV/cervical cancer (“Do you know or have you heard about cervical cancer and/or the HPV vaccine?”); attitude toward childhood RI and the HPV vaccine (“Do you think childhood RI is an important topic for you and/or your community?...How?” and “What do you think about the HPV vaccine and the target group?...Why do you think that way?”); barriers against childhood RI (“Do you know about vaccine hesitancy and what are the reasons for low childhood immunisation demand?...Please describe why?”); barriers against HPV vaccine acceptance (“Do you know about hesitation against HPV vaccine?...If so, what are they, among whom are they, and why?”).

The data were analysed using thematic deductive content analysis [30]. Main themes and sub-themes were identified after analysing each individual transcript and categorised based on the above themes explored. Transcribed data were coded as follows: the central level was coded C001 and C002, while districts were coded as KII001 and KII002. The FGDs were coded as FDG001 and FDG002. The analysis resulted in the development of a thematic index based on the themes explored, such as knowledge, attitude/perception toward vaccination, and general barriers against vaccine acceptance.

The WHO Strategic Advisory Working Group (SAGE) vaccine hesitancy model [8] was used to organise factors driving vaccine hesitancy in Malawi for both childhood RI and HPV vaccines. The model identified three dimensions for organising vaccine-hesitancy determinants: vaccine/vaccination-specific issues, individual and group influences, and contextual influences.

Vaccine/vaccination-specific issues are factors surrounding concerns about vaccines or vaccination; individual and group influences refer to individual perceptions or individuals’ social environments; and contextual influences aim at understanding vaccine hesitancy arising due to historic, socio-cultural, environmental, health system/institutional, economic, or political factors [8].

In the data, trends of recurring patterns were identified that reflected what factors the participants felt most strongly about. These factors were categorised under knowledge of RI, perception/attitude toward vaccinations, vaccine importance, specific HPV vaccine and cervical cancer knowledge and attitude, and drivers of vaccine hesitancy on RI and HPV. These are important features for understanding vaccination behaviour and demand among caregivers [15, 31–33].

## Results

The resulting factors that influenced acceptance or non-acceptance of RI and HPV vaccines are summarized in Figure 2. Each bubble represents the identified vaccine hesitancy drivers in reference to RI (left), to HPV vaccination (right), or both (middle). The figure summarises results from both KII and FGD.

### Factors Driving Vaccine Hesitancy toward Routine Immunisation

## Vaccine/Vaccination-specific Issues

**Competing or Poorly Scheduled Healthcare Services:** Participants reported that based on their experiences, “outreach clinics are opened most of the time around 9:00am. Sometimes outreach clinics are missed by caregivers due to other services scheduled at the same time, such as family planning and ante-natal care services” (HCW 2, Salima District). Outreach clinics are usually makeshift medical services stepped down to reach disadvantaged communities or hard-to-reach terrains, to provide essential healthcare services, especially immunisation services. Participants alluded to missed appointments resulting in incomplete immunisation when all the immunisation services were not centralized in one spot or operated on different schedules.

## Individual and Group Influence

**Lack of Confidence:** The study participants acknowledged the presence of RI and other types of immunisation services that are being provided in Malawi. However, most participants reported that despite the number of almost five to six healthcare workers providing some of these services at the facility, which was adequate for the setting, the number of adolescent girls and under-fives receiving vaccinations remained low in some districts. A FGD 001 participant alluded to confidence issues: “Many people do not trust immunisation because of stories they hear” (EPI Manager, Zomba District).

**Attitude toward Vaccination versus Behaviour:** Study participants acknowledged that vaccination is vital to caregivers for protecting their children against vaccine-preventable diseases and agreed that vaccination is a vital topic within their household. However, immunisation was not considered a top priority: “immunisation is very important but there are other equally important things to the family” (Caregiver 2 - Dowa District; FGD002). Further probing indicated the dominance of husbands in household vaccination decision-making as a factor that prevented turning intentions into behaviour. “Well, even though we know the importance of immunisation, our husbands must still agree before we can carry our children to hospital” (Caregiver 1; FGD, Dowa District). “On major market days, attendance is poor because mothers take husbands’ farm produce to market, so they miss childhood immunisation” (HCW 1; FGD, Dowa District).

## Contextual Influence

### Inadequate Resources Decrease Motivation for Vaccination Uptake

Most participants reported a lack of resources and medical equipment at village clinics. These necessitated caregivers to sacrifice their personal items for immunisation activities, hence reducing their motivation and willingness to want to continue immunisation. “We use our own resources (e.g., transportation, sanitary items, furniture, etc.) whenever we want to do vaccination activities at the village” (HCW 2, Lilongwe).

**Low Literacy Level of Caregivers:** The participants also revealed that their caregivers’ literacy levels are very low in the communities. This makes the effective health promotion of issues surrounding the importance of vaccination difficult, especially for those without any formal education: “Sometimes some people distribute pamphlets on immunisation, but many of us cannot read” (Caregiver 1, Zomba district).

**Distance and Logistics in Accessing Health Centers:** The majority of participants described long distances of travel to the clinics, impacting uptake of vaccination: “Lack of easy access to health centers results in lots of missed immunisation schedules” (Caregivers 1, Zomba District). These sentiments were echoed among all caregivers.

### Disconnect between Healthcare System and Community Gatekeepers/Leaders

Most participants revealed that essential stakeholders (e.g., community leaders, religious leaders, etc.) were usually not consulted by the Expanded Program on Immunisation (EPI) and Healthcare System managers. “The EPI does not care about our opinion” (CL, Dowa District). This affected not only attitude, but also the turnout for both RI and adolescent girls for the HPV vaccine.

## Factors Driving Hesitancy toward the Human Papillomavirus Vaccine

### Vaccine/Vaccination-specific Issues

#### Lack of Confidence in Safety and Effectiveness of HPV Vaccine

There were some levels of awareness and even campaigns; however, the communities are not always confident that the HPV vaccine is safe and effective. In many districts, “parents generally, especially fathers, are reluctant to let their eligible daughters receive the HPV vaccine” (HCW 1-2, Lilongwe, Caregivers 1-2, Zomba). “We have heard about the HPV vaccine, but we are not sure about it” (Caregiver 1; RL, Dowa/Zomba/Lilongwe).

#### Attitude Toward Vaccination versus Behaviour

More than half of the study participants in all four districts acknowledged that there was knowledge of the HPV vaccine; however, this knowledge has not translated into behaviour. The negative behaviour might be connected to the perception of existing traditional beliefs and cultural practices, which have not changed about vaccination in general and specifically about a vaccine that targets young girls (HPV vaccine). "We have not been convinced why the vaccine targets our girls specifically" (Caregivers 2, Lilongwe/Dowa/Lilongwe/Zomba). Therefore, high intentions to vaccinate due to knowledge about the HPV vaccine did not affect uptake behaviour.

### **Complacency**

The caregivers do not believe cervical cancer was prevalent because there are almost no cervical cancer screening opportunities outside the main city centers. "There is little data to support arguments about high HPV prevalence in our area" (CSO, Salima District). This attitude generated low risk perception of HPV, hence complacent behaviour.

### **Lack of Awareness of Vaccination Schedule**

Participants expressed a lack of awareness of the vaccination schedule (dates/timing) as a reason why caregivers missed both routine and HPV vaccinations.

### **Individual and Group Influences**

**Misconceptions, Rumours, and Conspiracy Theories:** The participants reported a misconception that once their daughters get vaccinated against HPV, they become infertile. Other caregivers queried why HPV vaccines target only girls: "Ignorance among community members because of rumours on the HPV vaccine drives vaccine hesitancy...such as the belief that the HPV vaccine will reduce the libido of girls when they become sexually active and make them become reproductively infertile" (EPI Logistician, Dowa/Zomba).

### **Contextual Influences**

#### **Religious Beliefs**

Participants discussed that there were no widespread traditional or cultural beliefs among Malawian communities that specifically hindered vaccine acceptance. However, there were some specific misconceptions about the vaccine, especially from the Zion and Apostolic faith sects. These groups denied some aspects of modern medicine, including vaccinations, and amplified conspiracy theories surrounding the HPV vaccine, such as that it promotes immoral behaviour and leads to infertility among the recipients. "The HPV vaccine promotes promiscuity and exposes young girls to sex and abortion" (RL, Salima/Zomba).

## **Discussion**

This study identified some key drivers behind vaccine hesitancy in Malawi, focusing on childhood RI and the HPV vaccine. Determinants of vaccine hesitancy included a lack of awareness of the vaccination schedule, lack of trust in the safety and effectiveness of vaccines, complacency, religious beliefs, rumours, and beliefs in conspiracy theories. The study shows that misinformation, rumours around sterility, and reluctance by senior family members or fathers are factors that keep caregivers from vaccination. The lack of easily accessible evidence around disease the prevalence is lacking, supporting complacent caregiver behaviour. However, the study also shows that even correct knowledge and positive attitudes toward vaccination do not reliably turn into actual vaccination behaviour. Other healthcare activities, such as antenatal care and general out-patient services, are prioritized over vaccination appointments when programs appear to "compete" with each other. Male supremacy in household decision-making can negatively affects vaccination uptake behaviour. However, overall, the majority of participants acknowledged that caregivers typically wish for their children to be immunised against vaccine-preventable diseases and agreed that vaccination is a vital topic within households.

Our findings reflect the relatively high national uptake for routine childhood immunisations and indicated that while there is clearly some hesitancy in Malawi, it has not yet translated into widespread declines in childhood vaccination uptake.

The demand for vaccination requires a general perception that vaccines are safe and effective, thereby increasing the feeling of protection from serious illness [31]. This requires that immunisation campaigns be perceived to be of good-quality and have local targets. Given the conservative nature of the setting, fathers or husbands are an important target group and should be given significant priority in educational and advocacy strategies.

Low levels of literacy influence the understanding of public health messaging, and this is most common in caregivers without any formal education who are more likely to miss vaccination clinics [34]. Studies show that insufficient or low literacy is linked to low levels of protective behaviour and can eventually lead to vaccine hesitancy [35]. Our findings here also reflect previous studies across Africa, suggesting that residents with low adult literacy have lower acceptance of vaccination [35]. Vaccination messaging should be target-driven. Written messages

directed at communities with low literacy levels should be designed using pictures or symbols that are easy to comprehend. In this regard, an overhaul of the immunisation communication system and educational program of the EPI, which has often focused on urban (high literacy area) compared to rural (low literacy area) settings, must be addressed. Future campaigns should fully consider rural and remote settings in the production planning and dissemination of immunisation knowledge or information, including consideration for local languages or dialects. This study exposed this disparity, and efforts should be geared toward addressing it.

Healthcare-seeking behaviour is driven by numerous factors; for example, our findings show that distance and logistics were not always a primary determinant of vaccination decisions but that the perceived severity of a particular disease also played a part in driving healthcare-seeking behaviour. The decision to forego or miss an immunisation appointment is not determined by circumstances beyond caregivers' control, but by the convenience of doing it vis-a-vis other commitments and value placed on immunisation. Planning health services is therefore also important. Participants here highlighted that they had to, for example, choose between attending ante-natal or immunisation services. Thus, subsequent national immunisation programs should pay attention to how caregivers can prioritize immunisation while at the same time still making use of other health services. Aligning these appointments, combining the presence of services to allow for multiple interventions in one visit, or incentivizing immunisation may help translate caregivers' intentions into actual behaviour. Aligning services may also allow outreach services to visit more communities in hard-to-reach areas, shortening travel time and accessing more of the population.

Communication with the local "gatekeepers" (for example, village elders) is critical when building and strengthening co-operatives and can boost local confidence in healthcare services. Also, integrating an SMS reminder system will go a long way in addressing the vaccination schedule problems identified among caregivers (i.e., for those who have mobile devices).

Vaccine hesitancy, particularly for HPV, is prevalent among some Malawian communities regardless of their cultural or religious affiliations. In the Rumphi and Zomba districts, some parents declined consent for their daughters to receive the vaccine, believing the immunisation to be dangerous [10]. Some misconceptions about the HPV vaccine can be conveyed by local religious leaders, including the Zion and Apostolic Christian faith sects. These are among groups that continue to doubt the safety of vaccines. In the case of the polio eradication program in countries like Afghanistan, Pakistan, and Nigeria, a small number of local Muslim leaders have sometimes convinced their followers that "it is an American ploy to sterilize the Muslim communities" [36]. It is important for proactive health promotion campaigns to understand and appropriately counter these sentiments. Therefore, efforts of intervention in Malawi must be directed at opinion leaders and gatekeepers, especially community leaders, who wield strong influence to change the narrative.

While the study provided behavioural insights regarding vaccination behaviour in Malawi, there is need for further quantitative studies that can assess the prevalence of the determinants as well as their causal relationship to vaccine uptake.

The main limitation experienced during this study was the problem of the COVID-19 pandemic, which resulted in unanticipated travel restrictions. This forced the study to substitute two of the originally planned districts (Nsanje and Rumphi) for convenient ones (Salima and Lilongwe) to enable swift and easy access to the data collection sites due to travel distance. Second, interviews at the central level (Lilongwe) took longer than expected to complete because some respondents were COVID-19 essential-services personnel and found it difficult to make time for interviews. Overall, the limitations were minimal, partly because the infection rate in Malawi during the data collection in March/April 2020 was not significant and COVID-19-related restrictions were not yet fully active in most districts.

## Conclusion

The evidence presented here, and the lessons learned from the roll-out of new vaccines such as against HPV, can provide a starting point for creating tailored public health messages that are specific to the Malawi population. This has implications both for current levels of vaccine acceptance, but also for the introduction of any new vaccine, such as the vaccine against COVID-19. The study shows that a network of factors determines vaccine hesitancy for RI and HPV, and some of them are interrelated with one another. Strategies developed to address vaccine hesitancy must be multicomponent and wide-ranging. Invariably, the factors that lower the demand for childhood RI are also key to low demand for the HPV vaccine and vice versa. For the introduction of the new COVID-19 vaccines, the following will be especially important: considering the literacy level of the population and allowing the communication campaigns to be sensitive to local settings; ensuring that messaging on safety and vaccine effectiveness are driven by gatekeepers and religious leaders, especially from the most sceptical Christian sects; and dealing with low risk perception and conspiracy theories inspired by rumours and misinformation by using local celebrities or credible community mobilizers. A proactive and coordinated approach to health promotion will be vital in ensuring high levels of acceptance and increased uptake.

## Abbreviations

**AMP Afrique**

Agence de Médecine Preventive Afrique

**CEREB**

Center for Empirical Research in Economics and Behavioural Sciences

**CL**

Community Leaders

**CSO**

Civil Society Organisation

**DPT3**

Third Dose of Diphtheria, Tetanus, and Pertussis Vaccine

**EPI**

Expanded Program on Immunisation

**FGD**

Focus Group Discussion

**GAVI**

Global Alliance for Vaccine and Immunisation

**GHP3**

Global Health Population, Poverty, and Policy

**HCW**

Healthcare Workers

**HPV**

Human Papilloma Virus

**IARC**

International Agency for Research on Cancer

**KII**

Key Informant Interview

**NHSRC**

National Health Science Research Committee

**RI**

Routine Immunisation

**RL**

Religious Leaders

**SDG**

Sustainable Development Goals

**SSA**

Sub-Saharan Africa

**TRA**

Theory of Reasoned Action

**UHC**

Universal Health Coverage

**UNICEF**

United Nations Children Emergency Fund

**VPD**

Vaccine Preventive Disease

**WHO**

World Health Organisation

**WUENIC**

WHO UNICEF Immunisation Coverage Estimates

## **Declarations**

### **Ethics approval and consent to participate**

Ethics approval from the National Health Sciences Research Committee (NHSRC) in Malawi was received, with protocol reference number 20/04/2544. Also, authorization was obtained from the Malawi Ministry of Health, reference number MED/1/3. Informed consent was obtained from all subjects.

### **Consent for publication**

Not applicable.

## Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

## Competing interests

The authors declare that they have no competing interests.

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## Authors' Contributions

Conceptualization: GCA, TAE, AAA, HT and AA.

Methodology: GCA, TAE and AAA.

Investigation: GCA, TAE and AAA.

Result Analysis: GCA, TAE, and KSG.

Writing – original draft: GCA, TAE, KSG, MGH and CB.

Writing – review & editing: GCA, TAE, AAA, MGH and CB.

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## Figures

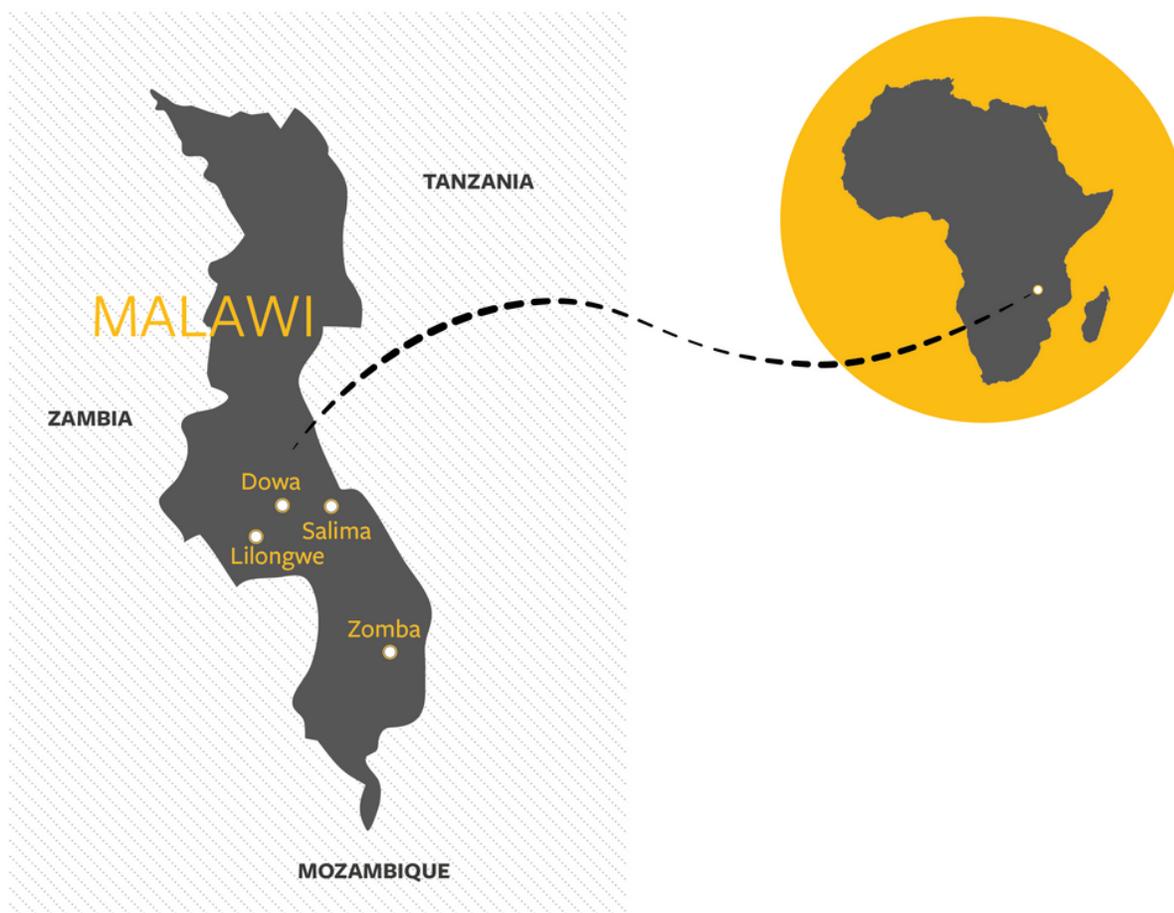
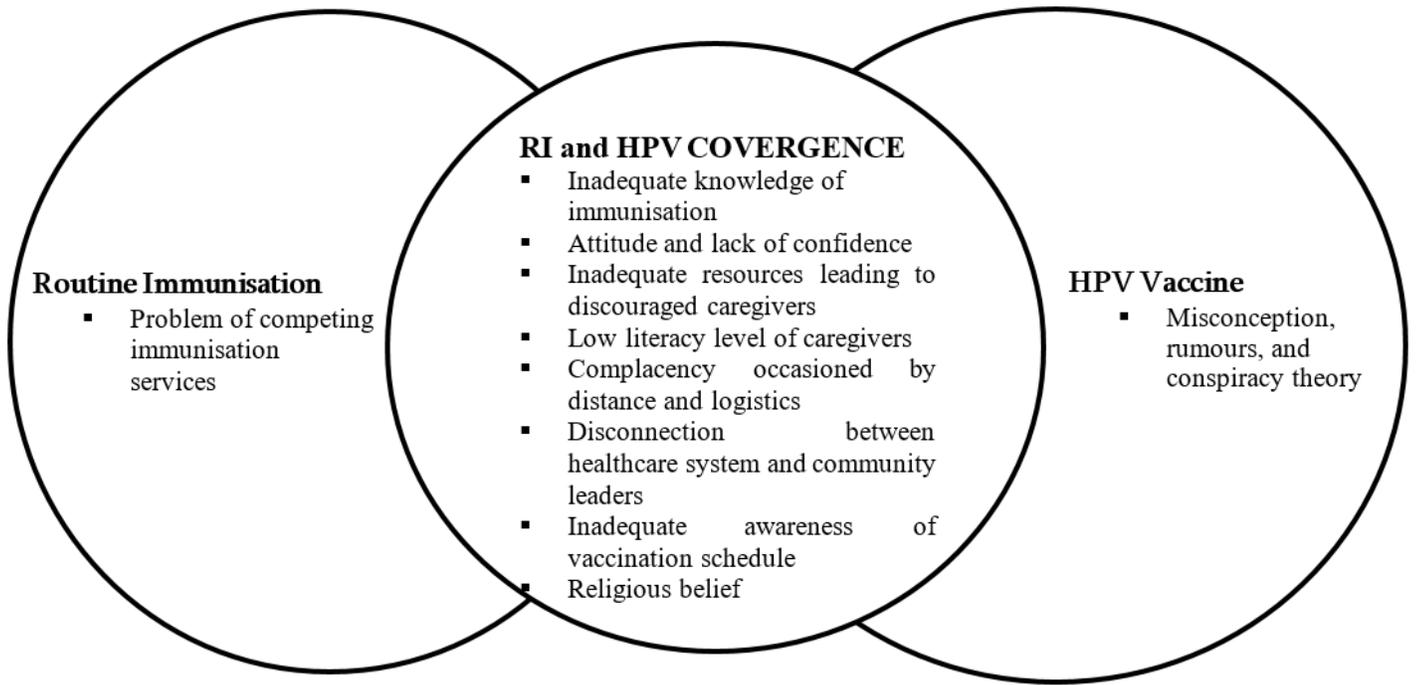


Figure 1

Map of study locations in Malawi



**Figure 2**

Overview of identified drivers of vaccine hesitancy in Malawi for RI (left), HPV vaccination (right), and both (middle)