

Research Summary Report

Driving uptake of the HPV vaccination in Kenya

August, 2022 | Busara Center for Behavioral Economics



In partnership with



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Executive summary

Context

Cervical cancer is the second most common cancer in women and is the leading cause of cancer death in Kenya, followed by breast, esophageal, colorectal, and prostate cancers. Human Papillomavirus (HPV) is the primary cause of 99.7 % of all cervical cancer cases. However, cervical cancer is preventable, including through HPV vaccination, which is most effective when administered to adolescent girls (9-14 years). In light of this, the Kenyan government scheduled a national rollout of the HPV vaccine starting in October 2019 which targeted 10 year old girls at the time, and the two-dose vaccine is offered free alongside other routine vaccines through over 9,000 public, private, NGO and faith-based health facilities.

In light of this, Busara, in collaboration with Burness and Women 4 Cancer Early Detection and Treatment with funding and technical assistance support from the American Cancer Society, undertook a study aimed at providing an evidence-based, locally effective, social and behavioural change communications solution to encourage uptake of the HPV vaccination among parents of adolescent girls across Kenya. The scope of this study was three-fold. First, the study sought to explore barriers and enablers to the uptake of the HPV vaccine. Second, the study designed communication interventions that leveraged the identified levers and targeted the barriers. Finally, the study tested these interventions to recommend the most effective solutions to drive optimal uptake of the HPV vaccine.

Approach

To further inform an effective strategy to drive uptake of HPV vaccination, we conducted the research in three phases:

Phase 1: Formative research and barrier mapping

In this phase, we utilised qualitative research methods in order to understand the behavioural, structural and environmental problems surrounding the uptake of the vaccine. To do so, we conducted a comprehensive literature review and qualitative interviews in the field with our target population: parents of adolescent girls. Busara then led a quantitative survey with the parents in order to understand and validate themes and behaviours that arose from the qualitative research.

Phase 2: Intervention design and rapid prototyping

In the next phase, communication intervention designs were developed that leveraged the levers and targeted the barriers identified in phase 1. The designs were then prototyped in the field with parents of adolescent girls and some key stakeholders in the public health space in Kenya like the Ministry of Health and UNICEF for iterative feedback and refinement before final roll-out. The designs were then finalised based on this feedback.

Phase 3: Testing and recommendations for scale-up

In the last stage of the project, we experimentally tested the different communications interventions designed in phase 2 on the field with parents of adolescent girls. Based on the results of the tests and interventions, we identified ways to best frame the messages for a health campaign.

This report presents our findings from all phases of the study including the barriers and levers that influence vaccine uptake decisions of parents of young girls, the solutions we designed and tested and the results from the testing.

Key findings from the formative research

Barriers to HPV vaccination uptake

Perceived lack of information: Lack of awareness of the vaccine and its practicalities like effectiveness, benefits, side-effects, cost and dosage arose as one of the major barriers to uptake of the HPV vaccine. Lack of adequate information around the HPV vaccine were found to have led parents to associate a cost with the vaccine and also rumours being spread resulting in myths and misconceptions around the vaccine being prevalent. A common misconception across both locations was that the vaccine was a form of family planning intended to cause infertility, this could be due to the fact that religious leaders claim that vaccines in general are a form of family planning. This lack of perceived information around the vaccine resulted in parents feeling under confident to make an informed decision whether they want their daughters to get the HPV vaccine.

Social stigma and social norms: Our study found high levels of social stigma with any discussions about sex and health-topics related to sex. This stigma is likely contributing to reported behaviours such as girls reaching out only to their friends about information and queries on sexual activity and visiting health clinics in the afternoons without parents for contraceptives. Since HPV infections are primarily transmitted through skin-to-skin contact during sex, there is likely low motivation and even reluctance in parents and communities to engage in conversations about HPV vaccination to prevent HPV infections. This is contributing to low and slow diffusion of facts about HPV vaccine and continued belief in myths, in turn contributing to lower parental and community acceptance and lower uptake of HPV vaccine.

Levers encouraging uptake of the HPV vaccination

Trusted sources of health related information: Parents were found to trust three key sources for health-related information: government, healthcare workers, and teachers. Parents were overwhelmingly trusting of the government due to the belief that the government could not approve a product that would cause harm to its people. Parents also viewed healthcare workers (doctors, nurses or CHVs) as the educated experts and therefore trust their recommendations. Parents rely on these healthcare workers to clarify any queries they have about healthcare products hence they are a valued source of information.

Compared to teachers and government, healthcare workers were reported to be more trusted for health related information by parents.

Parents' motivation to protect their child's health: Parents report always feeling a sense of responsibility for the health of their child, regardless of whether they are married or living separately. Further, they preferred prevention over cure primarily because they thought prevention was cheaper than curative medicine and that it was important to maintain health rather than waiting for a child to become sick before seeking care, as this could lead to death.

Fear of cancer and of consequences if unvaccinated: We found a high level of awareness and fear of cancer. While they may not be able to describe exactly what cancer is, parents were aware that it was a fatal disease as nearly half of them knew someone who had passed away from cancer. Further, there was a fear of adverse events in case a child was not vaccinated. The most common reason for this fear across both counties was a fear of children becoming disabled due to non-vaccination, most likely due to a polio ad campaign that shows a disabled man advocating for the vaccine. Majority of our sample of parents also believed that not getting their daughter an important vaccination could be fatal for her and about half believed that some parents put other children at risk by delaying getting their own children vaccinated.

How do we overcome these barriers?

Guided by the barriers and levers described above and following a multi-stakeholder co-design workshop, a communications package with three key elements: An endorsement of the HPV vaccine from a trusted source, a testimonial and a text nudge was recommended to be developed targeting parents. To ensure this package is the most effective in driving the intentions of parents to get their daughters the HPV vaccine, we experimentally tested two key aspects of communications based interventions: framing of the message and the messenger or endorser of the message.

Behavioural framing

To understand how best to frame the message around the HPV vaccine that will be the most effective in driving its uptake among parents, we tested the themes of **fear, positive gains or aspiration and social norms**. For each of the three themes, we designed the following communications materials:

1. Behaviourally framed awareness generation messages: We created messages to generate and drive awareness around the key aspects of the HPV vaccine such as the link between cervical cancer and the HPV vaccine, where to get the vaccine, eligibility for the vaccine and safety and efficacy of the vaccine. These messages were then framed according to the behavioural themes and tested in the form of a:

- i. Poster
- ii. Interactive SMS campaign that involved
 1. Key Message (same as in the poster)
 2. FAQs
 3. Stories

2. Behaviourally framed testimonials: We also created parent testimonials of getting their daughter vaccinated with the HPV vaccine in the form of audios. We created a testimonial audio for each theme.

Medical practitioner recommendation

The second part of the communications package primarily focused on understanding whether a medical practitioner's recommendation impacts parents' trust in the HPV vaccine and intention to have their daughters vaccinated and whether the effect of the medical practitioner's recommendation depends on the gender of the recommending medical practitioner. We thus designed the following as a poster:

1. Male doctor recommendation
2. Female doctor recommendation

How did we test these solutions?

We tested all solutions designed either via A/B testing where we ran experiments to understand the most effective version of a solution or via qualitative prototyping where we gathered feedback from the end users and other stakeholders to refine and iterate the solutions.

Behavioural framing

Behaviourally framed awareness generation messages: We experimentally tested (A/B testing) the poster and the interactive SMS campaign for each theme with a total of **800 parents**. As part of the experiment, participants received the poster with information about the HPV vaccine on their phones, as well as an interactive SMS campaign designed to improve knowledge about the HPV vaccine over the course of a week. The SMS campaign and poster contained similar information but differed in terms of exact content and imagery according to three behavioural themes selected.

All recruited participants were randomised into 4 groups according to which they received the relevant intervention materials: **1) Control:** A campaign control condition in which participants received a poster and an interactive SMS intervention with no explicit behavioural theme, **2) Fear:** Participants received the poster and an interactive SMS intervention designed to leverage feelings of regret about not getting vaccinated, **3) Aspirations/gains:** Participants received the poster and an interactive SMS intervention designed to leverage feelings of parents' aspiration for their daughters and **4) Social Norms:** Participants received posters and an interactive SMS intervention designed to leverage social norms around vaccine uptake.

Behaviourally framed testimonials: The behaviourally framed testimonial audios for each theme were qualitatively prototyped with end users and stakeholders in the public health space in Kenya. The aim of the prototyping was to validate and contextualise our audios and use the one for the theme that works best according to the experiment results in a final communications package.

Medical practitioner recommendation

We experimentally tested (A/B testing) the poster for each gender with a total sample of **600 parents**. As part of the experiment, participants received a link to a Qualtrics survey via SMS that could be completed using a smartphone. The posters contained the same information but differed in terms of the gender of the doctor endorsing the HPV vaccine.

We randomly assigned participants in equal proportions to one of three groups: **1) Control, 2) Female doctor recommendation (FDR)** and **3) Male doctor recommendation (MDR)**

What did we find?

We found that though none of the behavioural framings are strong enough to move intentions, aspirations or positive framing is effective in moving all other outcomes such as perceived sufficiency of information, comprehension of information provided around the vaccine, trust in the vaccine and strengthening knowledge of the vaccine. It is also effective in motivating parents to know more about the vaccine. This was primarily due to parents relating with the aspiration framing wanting to protect their daughters. They saw the HPV vaccine as a means to protect their daughters' future.

Further, while the interventions asked parents to get their daughters the HPV vaccine, a more immediate call to action was to get them to respond with a text message to know more about the vaccine. The outcome measure was the number of parents who text back. The majority of the parents, however, did not text back at all. This was primarily due to their busy schedules and lack of understanding that they were supposed to text back to learn more about the vaccine.

We also found that endorsements of the HPV vaccine from doctors strengthens parents' intentions to get their daughters the HPV vaccine and also strengthens their perceptions around the safety of the vaccine. Interestingly, recommendations coming from a male doctor and a female doctor work equally well.

Key recommendations

Guided by the findings of the study, we believe there is a need to consider the following solutions targeted to parents, to be integrated as part of an HPV vaccine promotion initiative in Kenya:

Use positive or aspirations framing: Parents have a sense of responsibility for their children throughout their lives and want to do everything in their power to protect their children and their future. Leveraging this sentiment, the vaccine promotion initiatives should frame messages targeted to parents in accordance with the aspirations framing linking the HPV vaccine to the aspirations of parents for their daughters' future.

Use visual communication of a doctor's support for the HPV vaccine: Doctors and other health workers including community health workers were reported as the most trusted sources of health related information. They are seen as experts in the health field and thus even more trusted than the

government. This immense trust in health workers should be leveraged by HPV promotion initiatives targeting parents.

Understand the audience and their contexts: It is imperative that practitioners understand the context and environment of their audience as not all channels of communication will work for all kinds of audiences. In our study we found that owing to busy schedules, the SMS campaign did not work very well with only a minority of parents texting back to learn more about the vaccine. This suggests that sending too many messages via SMS may not work in promoting the vaccine in the low income Kenyan context.

Framing of vaccine as “cancer preventing”: Another potentially impactful way of advertising the vaccine to improve take up is to make the link between the vaccine and cancer very clear due to the prevailing fear of cancer. This would involve framing the vaccine as a cancer-preventing rather than a HPV-preventing vaccine. By advertising it as a cancer prevention tool, parents might feel more intrinsically motivated to vaccinate their daughters.

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Introduction

Context

Cervical cancer is the second most common cancer in women and is the leading cause of cancer death in Kenya, followed by breast, esophageal, colorectal, and prostate cancers.¹ Human Papillomavirus (HPV) is the primary cause of 99.7 % of all cervical cancer cases.² Additionally, HPV is also responsible for 90% of penile and anal cancers globally.³ In Kenya, on average, 5,250 cervical cancer cases are reported every year, 63% of which result in death.⁴ According to WHO's International Agency for Research on Cancer, penile cancer in Kenya is also on the rise; with 53 men on average contracting it every year.⁵ In light of this rising prevalence, the Kenyan government scheduled a national rollout of the HPV vaccine in October 2019, offered free alongside other routine vaccines through over 9,000 public, private, NGO and faith-based health facilities.⁶

In a pilot conducted in 2012-13 in Eldoret, Kenya, the acceptance level for the HPV vaccine was high (among the 287 mothers of young girls surveyed), however, high acceptance was not a strong predictor of uptake.⁷ Furthermore, the constructs of the Health Belief Model⁸ also did not correlate with high uptake rates.⁹ Thus, while overall acceptance of the vaccine and personal characteristics of the mothers signal an intention to vaccinate girls, the low uptake rates reflect an intention-action gap that hampers the successful roll out of the HPV vaccine. This gap substantiates the role of behavioural biases in affecting uptake rates of the HPV vaccine. Under-investment in preventive health is a growing area of research within behavioural science. Behavioural science posits that individuals deviate from the standard economic principle of rationality and hence under invest in high-return opportunities. As a result, people significantly under-value or ignore the life-changing benefits of preventive health products like vaccinations,¹⁰ bed nets,¹¹ prenatal care,¹² and water chlorination,¹³ and over exaggerate

¹ International Agency for research on cancer, World Health Organisation (2021)

² Oketch, A. (2018, December 1). Girls set for free cancer vaccine from May 2019.

³ Oketch, A. (2018, December 1). Girls set for free cancer vaccine from May 2019.

⁴ Oketch, A. (2018, December 1). Girls set for free cancer vaccine from May 2019.

⁵ Diana M., (2018, October 9). Cancer vaccine approved for men and women aged 27 plus.

⁶ Oketch, A. (2018, December 1). Girls set for free cancer vaccine from May 2019.

⁷ Vermandere, H. (2016). Introduction of HPV vaccination in Kenya. *Afrika Focus*. 29. 10.21825/af.v29i2.4851.

⁸ "The health belief model (HBM) is a social psychological health behavior change model developed to explain and predict health-related behaviors, particularly in regard to the uptake of health services." - https://en.wikipedia.org/wiki/Health_belief_model

⁹ Vermandere, H., van Stam, M. A., Naanyu, V., Michielsen, K., Degomme, O., & Oort, F. (2016). Uptake of the human papillomavirus vaccine in Kenya: testing the health belief model through pathway modelling on cohort data. *Globalization and health*, 12(1), 72.

¹⁰ Banerjee Abhijit Vinayak, Duflo Esther, Glennerster Rachel, Kothari Dhruva. Improving immunisation coverage in rural India: clustered randomised controlled evaluation of immunisation campaigns with and without incentives *BMJ* 2010; 340 :c2220

¹¹ Cohen, J. and Dupas, P. Free distribution or cost-sharing? Evidence from a randomized Malaria prevention Experiment *Quarterly Journal of Economics*, CXXV February 2010 Issue 1

¹² Till SR, Everetts D, Haas DM. Incentives for increasing prenatal care use by women in order to improve maternal and neonatal outcomes. *Cochrane Database of Systematic Reviews* 2015, Issue 12. Art. No.: CD009916. DOI: 10.1002/14651858.CD009916.pub2.

¹³ Ashraf, N., Berry, J., & Shapiro, J. (2010). Can Higher Prices Stimulate Product Use? Evidence from a Field Experiment in Zambia. *The American Economic Review*, 100(5), 2383-2413. Retrieved from <http://www.jstor.org/stable/41038767>

the short-term costs of effort and inconvenience, which leads to lower uptake. Nonetheless, peoples' willingness to pay for curative health-care for children remains exponentially higher.¹⁴ This intention-action gap is often a product of present bias and procrastination.¹⁵ Thus, in order for public health response plans to be effective, social mobilisation efforts should account for the heuristics and biases of the target population.

In light of this, Busara, in collaboration with Burness and Women 4 Cancer Early Detection and Treatment with funding and technical assistance support from the American Cancer Society, undertook a study aimed at providing an evidence-based, locally effective, social and behavioural change communications solution to encourage uptake of the HPV vaccination among parents of adolescent girls across Kenya. The scope of this study was three-fold. First, the study sought to explore barriers and enablers to the uptake of the HPV vaccine. Second, the study designed communication interventions that leveraged the identified levers and targeted the barriers. Finally, the study tested these interventions to recommend the most effective solutions to drive optimal uptake of the HPV vaccine. To this end we conducted research in three phases:

Phase 1: Formative research and barrier mapping

In this phase, we utilised qualitative research methods in order to understand the behavioural, structural and environmental problems surrounding the uptake of the vaccine. To do so, we conducted a comprehensive literature review and qualitative interviews in the field with our target population: parents of adolescent girls. Busara then led a quantitative survey with the parents in order to understand and validate themes and behaviours that arose from the qualitative research.

Phase 2: Intervention design and rapid prototyping

In the next phase, communication intervention designs were developed that leveraged the levers and targeted the barriers identified in phase 1. The designs were then prototyped in the field with parents of adolescent girls and some key stakeholders in the public health space in Kenya like the Ministry of Health and UNICEF for iterative feedback and refinement before final roll-out. The designs were then finalised based on this feedback.

Phase 3: Testing and recommendations for scale-up

In the last stage of the project, we experimentally tested the different communications interventions designed in phase 2 on the field with parents of adolescent girls. Based on

¹⁴ Kremer, Michael, Gautam Rao, and Frank Schilbach. 2018. "Behavioral Development Economics." Forthcoming in Handbook of Behavioral Economics, Douglas Bernheim, Stefano DellaVigna, and David Laibson (eds.).

¹⁵ Kremer, Michael, Gautam Rao, and Frank Schilbach. 2018. "Behavioral Development Economics." Forthcoming in Handbook of Behavioral Economics, Douglas Bernheim, Stefano DellaVigna, and David Laibson (eds.).

the results of the tests and interventions, we identified ways to best frame the messages for a health campaign.

This report presents our findings from all phases of the study including the barriers and levers that influence vaccine uptake decisions of parents of young girls, the solutions we designed and tested and the testing results.

Engagement Overview



Objective

To provide evidence-based and cost-effective communication interventions that can be used by civil society and government to drive uptake of the HPV vaccination in Kenya.



Target Population and location

For all the different phases of the project, we sampled parents and guardians of young and adolescent girls across two Kenyan counties- Nairobi and Nakuru. In Nairobi, we conducted the research in urban slums where low income parents are a majority while in Nakuru, we sampled low income parents equally from urban and rural areas.



Approach

We conducted semi-structured individual in-depth interviews with our sample and findings from the qualitative phase informed the design of the quantitative surveys to lead us to key determinants of the acceptability and uptake of the HPV vaccine. Following a co-design session with key stakeholders we designed interventions and tested the different interventions either via rapid A/B testing¹⁶ or through qualitative prototyping.

¹⁶ A/B testing is a process in which we measure differences in users' reactions when they are randomly exposed to different variants of a product



Research Methodology

Phase 1: Formative research and barrier mapping

In the first phase of the study, we aimed to obtain a high-level understanding of the current beliefs, barriers and behaviours around the acceptability and potential uptake of the HPV vaccine. As a first step, we reviewed the literature to synthesise the behavioural problems facing the uptake of HPV which informed our design of the qualitative interviews. We then conducted semi-structured in-depth interviews. In-depth interviews (IDIs) are a narrative technique used to gather the story behind the participant's experience. IDIs were used to guide the participants through key elements and topics as they relate to decisions around vaccine take-up and knowledge about cervical cancer and the HPV vaccine. This exercise was aimed at getting a deeper understanding of participants' thoughts, experiences and insights on the topics outlined, as well as, identifying new emerging thoughts linked to the topics. Findings from the qualitative phase informed the design of the quantitative surveys to lead us to key determinants of the acceptability and uptake of the HPV vaccine.

The qualitative interviews were conducted with 48 parents/guardians whereas the quantitative surveys were conducted with 601 parents/guardians of young girls between the ages of 8-11.

Phase 2: Intervention design and rapid prototyping

Based on the barriers and levers identified in the first phase, we designed various interventions- mainly as forms of communications materials such as posters, audios and text messages- for parents/guardians to encourage them to get their daughters the HPV vaccine. The complete list of materials developed can be found in [Annex A](#). These materials were developed following a co-design workshop that brought together the expertise and perspectives of various stakeholders working towards a common goal of encouraging the uptake of HPV vaccination in Kenya. Stakeholders who attended the session were representatives of organisations like: National Vaccine Immunization Program (NVIP), National Vaccine Immunisation Programme (NVIP), Kenya Network of Cancer Organisations (KENCO), Kenya Paediatric Association, UNICEF, Clinton Health Access Initiative (CHAI) and PATH. The complete list of participants can be found in [Annex B](#). All materials were prototyped with parents of adolescent girls and some stakeholders who attended the co-design workshop to gather their feedback before finalising the designs.

To validate and contextualise our designs, we used a rapid prototyping approach: this is an iterative process used to get early feedback and validation from stakeholders and final users, and then refine the design taking into account their views. All designs were then refined and finalised based on the feedback gathered during this prototyping phase.

Phase 3: Testing and recommendations for scale-up

Some materials like posters and text messages and their different versions were tested via A/B testing. Behavioural science allows for rapid lab testing that causally identifies the optimal intervention that will motivate a change in behaviour. A/B testing is a process in which we experimentally measure differences in users' reactions when they are randomly exposed to different variants of a product. In this case, we presented different participants with different communication messages on posters and via text to quantify which one is the most effective.

We ran two separate experiments where we tested two key aspects of communications based interventions: framing of the message and the messenger or endorser of the message with a total sample of 1400 parents of adolescent girls across the two Nairobi and Nakuru. The detailed methodology for each experiment can be found in [this section](#).



Findings: Barriers and Levers Influencing Parents' Vaccine Decisions

Key findings from the formative research

We found that multiple barriers and levers act as key determinants of parents' decisions to get their daughters the HPV vaccine in Kenya. The prioritised barriers and levers that also guided the development of the intervention materials are as follows:

Barriers to vaccine uptake

1. Parents/guardians have little to no knowledge about HPV, or the HPV Vaccine and the link between cervical cancer

We found participants across both locations and across socioeconomic levels in the qualitative study spoke about lack of awareness or ignorance of parents as a major barrier to uptake of the HPV vaccine. Some parents directly stated that they lacked adequate information to make an informed decision regarding uptake of the HPV vaccine, and were therefore unsure whether to get the vaccine while others were less explicit, and said parents in the community lacked knowledge.

“I have not thought of taking my daughter for the vaccine and I am just ignorant since I have not gone to seek any information” Parent, Nairobi

This finding was validated from the quantitative surveys where the majority of the parents (51%) do not believe they have enough information to make an informed decision about if their daughter should receive the HPV vaccine. Parents reported wanting information on the importance and purpose of the vaccine, as the link between cervical cancer and HPV was not explicit enough. Further information required on the vaccine included effectiveness, duration and side effects. With little to no knowledge around HPV, HPV vaccine and its link with cervical cancer, parents are unable to comprehend the benefits and the importance of the HPV vaccine.

2. Parents/guardians don't know where or when to get the vaccine

In both Nairobi and Nakuru, parents among our qualitative sample of 48 parents lacked information about the HPV vaccine. Parents across both locations did not possess adequate information, with just under half completely unaware of the HPV vaccine. On

the other hand, the parents who were aware of the vaccine lacked practical information around it such as where or when to receive the vaccine or the doses required.

“I: Is there a vaccine against cervical cancer?”

R: I am not sure

I: Are you aware of any program providing HPV vaccine?”

R: No

I: Do you know where girls can get the vaccine?”

R: No” Parent, Nairobi

The same was also resonated in the quantitative research where the majority of the sample of parents reported not knowing where to get the HPV vaccine for their daughter, which suggests a lack of in-depth information around the vaccine. The majority of the sample thus recommended educating parents about the vaccine, more advertising and awareness creation, reassuring parents of the benefits, importance, efficacy and safety of the vaccine and door-to-door sensitization with the help of community health workers, especially on the practical information around the vaccine, such as where or when to get it, eligibility and dosage.

3. Parents/guardians assume there is a cost associated with the vaccine

About a third of our sample of parents (31%) that we surveyed ranked the cost of the vaccine among the top three barriers that are most likely to prevent them from getting their daughter the HPV vaccine. Moreover, slightly over a third of our sample (35%) also agreed that the cost of a vaccine is a factor that could prevent them from getting it, even if they or their daughter needs it. Given the HPV vaccine is free across the country, this suggests that parents either assume the vaccine may be costly for them thus suggesting lack of complete information around the vaccine or associated costs of transport may hinder take up. However, the cost of travelling to the nearest health facility is negligible as the median cost reported by our sample was zero KSH, suggesting that perceived cost of the vaccine due to lack of awareness may prevent parents from getting the vaccine.

4. Parents/guardians are worried about potential side-effects (like infertility) or risks of the vaccine.

Lack of adequate information around the HPV vaccine were found to have led to rumours being spread resulting in myths and misconceptions around the vaccine being prevalent. A common misconception across both locations was that the vaccine was a

form of family planning intended to cause infertility, this could be due to the fact that religious leaders claim that vaccines in general are a form of family planning. Moreover, across both locations parents were concerned of adverse reactions if they did vaccinate their children, due to hearing stories of children becoming paralysed, dying or getting cancer upon receiving a vaccination.

“There is this question of fertility since I am hearing in social media that it’s affecting fertility” Parent, Nairobi

“One of the villagers was vaccinated. He was a boy. After he was injected on the leg, it became difficult for him to walk. The child has been paralyzed till now. It was bad luck I think.” Parent, Nakuru

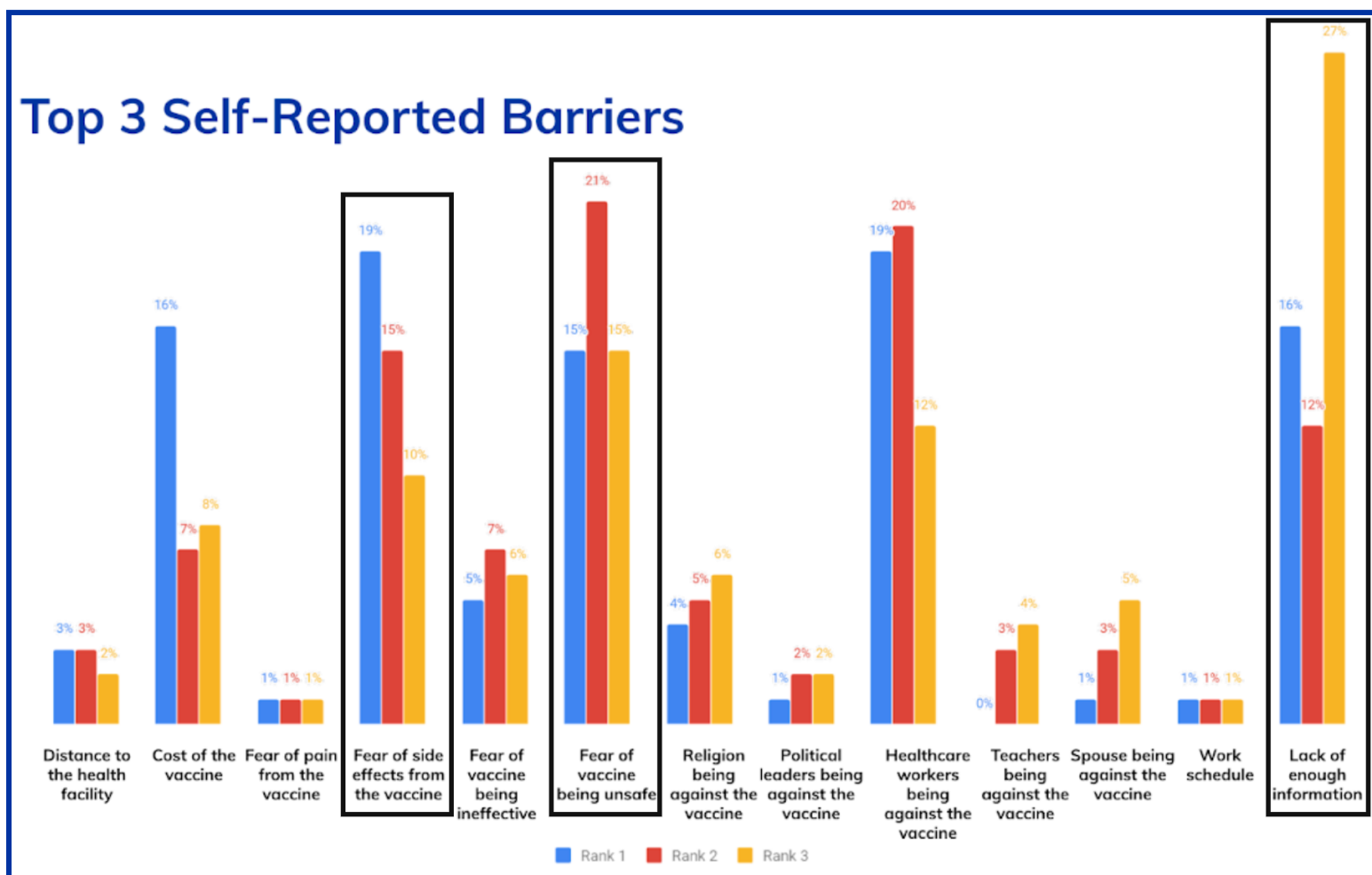
These findings were validated through the quantitative surveys as well where fear of side effects from the vaccine (44%) and fear of the vaccine being unsafe (54%) was ranked among the top three barriers that are most likely to prevent them from getting their daughter the HPV vaccine among the majority of our sample. Further, about a third of our sample agreed that the HPV vaccine may potentially interfere with their daughter’s fertility. Parents thus wanted to be reassured that the vaccine was not a form of family planning and would not cause infertility or physical disability.

5. Social stigma and social norms around the vaccine

Our study found high levels of social stigma with any discussions about sex and health-topics related to sex. This stigma is likely contributing to reported behaviours such as girls reaching out only to their friends about information and queries on sexual activity and visiting health clinics in the afternoons without parents for contraceptives. Since HPV infections are primarily transmitted through skin-to-skin contact during sex, there is likely low motivation and even reluctance in parents and communities to engage in conversations about HPV vaccination to prevent HPV infections. This is contributing to low and slow diffusion of facts about HPV vaccine and continued belief in myths, in turn contributing to lower parental and community acceptance and lower uptake of HPV vaccine.

“When they (communities) have a positive view, you will get more clients unlike when they have a negative view”, Parent, Nairobi

The figure below shows the list of top three barriers that parents in the quantitative sample reported would prevent them from getting their daughters the HPV vaccine.



Levers encouraging vaccine uptake

1. High levels of trust in healthcare workers and government

We found that parents trust the government, healthcare workers and teachers from the qualitative interviews. Across both locations parents were overwhelmingly trusting of the government due to the belief that the government could not approve a product that would cause harm to its people. High levels of trust in the government was also found from the quantitative surveys as the majority of the sample believed that the government makes decisions that are in their best interest with respect to the vaccines provided. Parents in both locations and across income levels also viewed healthcare workers (doctors, nurses or CHVs) as the educated experts and therefore trust their

recommendations. Parents rely on these healthcare workers to clarify any queries they have about healthcare products hence they are a valued source of information.

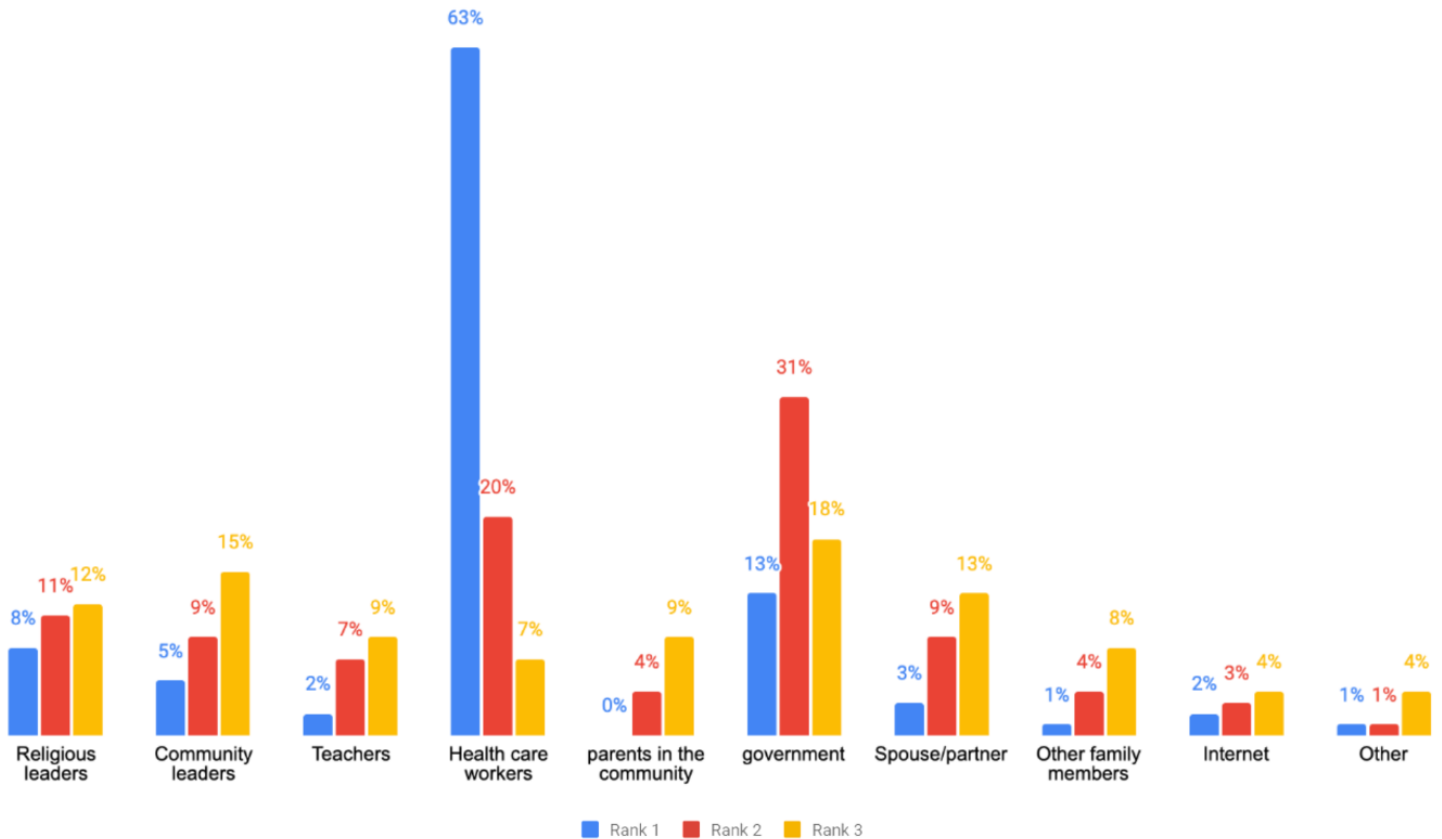
“The government cannot realise something that will harm people.” Parent, Nakuru

“I will always prefer the doctors because they’ve gone to school and trained on things to do with health, so we would seek advice from them and they advise us on what to do if an alarm is raised” Parent, Nairobi

This trust in healthcare workers was also found in the quantitative surveys as the majority of the parents (58%) report they would not trust the government’s health recommendations if healthcare workers are against it. Compared to teachers and government, healthcare workers were reported to be more trusted for health related information by parents. Healthcare workers also appeared to be the most influential source that is most likely to influence their decision of getting their daughter an adolescent vaccination with 58% of the sample of parents surveyed reporting so.

The figure below shows the list of top three sources of information that parents in the quantitative sample reported they would trust for health related information.

Top 3 Self-Reported Trusted Sources of Information



2. High prevalence of fear of cancer and motivation to get a “cancer preventing” vaccine

Across socioeconomic classes in both counties we found a high level of awareness and fear of cancer. Whilst many people had heard of the term cancer and were aware that it was a serious disease, most people lacked awareness on the causes and the biology behind cancer. While they may not be able to describe exactly what cancer is, they were aware that it was a fatal disease as nearly half the sample knew someone who had passed away from cancer. Another common mechanism for awareness of cancer was through the media with television being the most common source in both counties.

"It is a chronic disease that makes people suffer socially and economically. It pandemic." Parent, Nairobi

As a result of this fear of cancer, we found that most of the parents (98%) reported that they will be more motivated to get their daughter the HPV vaccine if it is made clear that

the vaccine prevents cervical cancer. This suggests that making the link between the HPV vaccine and cervical cancer prevention salient when marketing/advertising the vaccine may drive take up.

3. Parents' sense of responsibility for their children

In both locations and across income levels we found that parents always feel a sense of responsibility for the health of their child, regardless of whether they are married or living separately.

“Even if I became old I will continue advising the kids on their health even if they get married.” Parent, Nakuru

Further, for almost all parents (99%) in our quantitative survey, the sense of responsibility to decide whether to get the vaccine lies with parents and not daughters as they agreed that it is their responsibility as a parent to decide if their daughter gets the vaccine. This sense of responsibility throughout a child's life could be leveraged when advertising the HPV vaccine, as the positive effects of the vaccine will not be realised until later in life.

4. Understanding of importance of preventive health measures and vaccines in general

Every parent interviewed stated that they preferred prevention over cure, though the reasons for this varied. One reason common across parents was the fact that prevention was cheaper than curative medicine. Some parents thought that it was important to maintain health rather than waiting for a child to become sick before seeking care, as this could lead to death while some parents thought maintenance of health was important and easier to practice.

“R: I do prefer preventive measures before a disease attacks

I: Why?

R: It is expensive to treat. Even if it is just a cold.” Parent, Nakuru

Trust in and positive attitude around vaccines was also found in quantitative research. Most parents reported having gotten their children all necessary vaccines (98%) and have never refused a vaccination in the past (97%). Most parents also reported that


religious leaders, political leaders, community members, healthcare workers and teachers are all supportive of vaccines. Further, most parents (95%) believed that successful vaccination campaigns in the past (like that for polio) have had lasting impact and resulted in a positive attitude around vaccinations in general in their communities.

5. Fear of consequence if unvaccinated

It was more evident in Nakuru than Nairobi that there was a fear of adverse events in case a child was not vaccinated across income categories. In Nairobi there was a fear of adverse events for some showing this concern. The most common reason for this fear across both counties was a fear of children becoming disabled due to non-vaccination, most likely due to a polio ad campaign that shows a disabled man advocating for the vaccine. Some parents in Nakuru thought that non-vaccination could lead to death, having seen this occur.

“There was a church somewhere which was against it [polio vaccine]. They trusted in God and their faith could not allow them and their children became lame and disabled.” Parent, Nakuru


This finding was also validated through the quantitative surveys where the majority of our sample of parents (89%) believed that not getting their daughter an important vaccination could be fatal for her and about half believed that some parents put other children at risk by delaying getting their own children vaccinated.



How do we overcome these barriers?: Designing and Testing solutions

What solutions did we design and test?

Guided by the barriers and levers described above and following a co-design workshop with key stakeholders in the public health space in Kenya (held in March 2020), a communications package with three key elements was developed targeting parents:

		
Endorsement	Testimonial	Text Nudges
Trusted sources of health related information recommending the vaccine	Cervical cancer survivors leveraging personal stories to motivate parents to get the cancer preventing vaccine	Regular nudges to remind parents to get their eligible girls the HPV vaccine

To ensure this package is the most effective in driving the intentions of parents to get their daughters the HPV vaccine, we tested two key aspects of communications based interventions: framing of the message and the messenger or endorser of the message. We thus designed for and tested the following:

1. Behavioural framing (for parents)
2. Medical Practitioner recommendation

Behavioural framing

To make the communications package most effective, we framed and presented messages with the objective to motivate parents to get their daughters the HPV vaccine. While structural challenges impede use of health products, physiological factors such as fear, anticipated loss of time and health, fear of side effects and social signals can contribute to an individual's willingness to take up the vaccine.. The three behavioural themes that we tested were:



Fear of cancer

Fear appeals are persuasive messages that can persuade people to adopt the recommended behavior by arousing fear of the potential danger or consequences if they fail to do so.



Gain/Aspirations framing

Presenting information by making gains salient by emphasizing on the benefits of not engaging in a certain behavior makes people respond by taking the option.



Social norms

Social norms based message framing normalizes the desired or recommended behavior which can guide human behavior

For each of the three themes, we designed the following communications materials:

2. **Behaviourally framed awareness generation messages:** We created messages to generate and drive awareness around the key aspects of the HPV vaccine such as the link between cervical cancer and the HPV vaccine, where to get the vaccine, eligibility for the vaccine and safety and efficacy of the vaccine. These messages were then framed according to the behavioural themes and tested in the form of a:
 - a. Poster
 - b. Interactive SMS campaign that involved
 - i. Key Message (same as in the poster)
 - ii. FAQs
 - iii. Stories



Fear



Aspirations



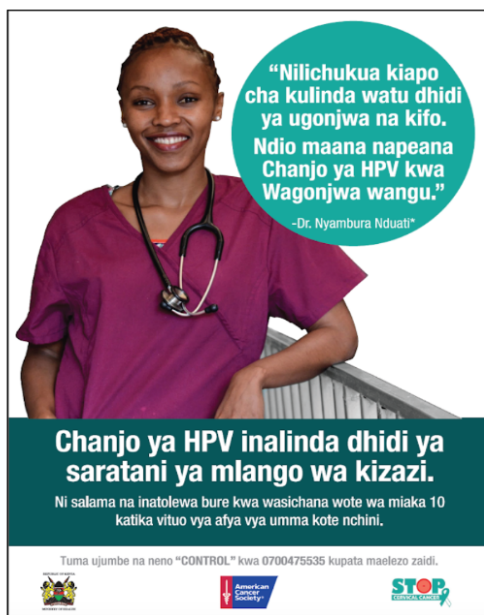
Social Norms

3. **Behaviourally framed testimonials:** We also created parent testimonials of getting their daughter vaccinated with the HPV vaccine in the form of audios. We created a testimonial audio for each theme.

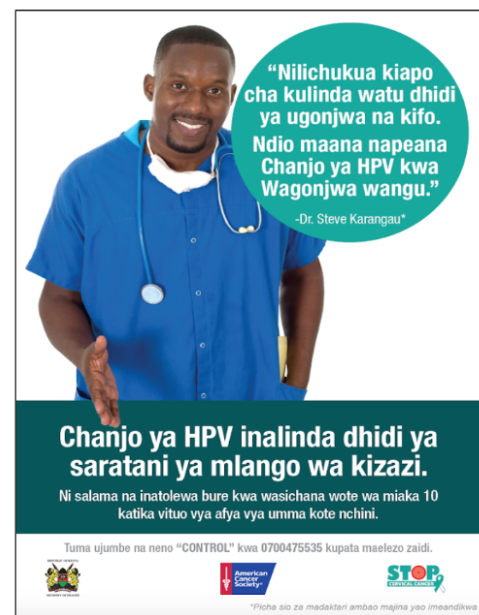
Medical practitioner recommendation

The second part of testing focused on understanding whether a medical practitioner's recommendation impacts parents' trust in the HPV vaccine and intention to have their daughters vaccinated and whether the effect of the medical practitioner's recommendation depends on the gender of the recommending medical practitioner. We thus designed the following as a poster:

1. **Male doctor recommendation**
2. **Female doctor recommendation**



Female endorsement



Male endorsement

How did we test the solutions?

We tested all solutions designed either via A/B testing where we ran experiments to understand the most effective version of a solution or via qualitative prototyping where we gathered feedback from the end users and other stakeholders to refine and iterate the solutions.

Behavioural framing

Behaviourally framed awareness generation messages

Experiment 1: To compare the effect of behavioural framings of messages in driving intentions of parents/guardians to take their daughters to the nearest health center for the HPV vaccine

We experimentally tested (A/B testing) the poster and the interactive SMS campaign for each theme with a total of 800 parents. As part of the experiment, participants received the poster with information about the HPV vaccine on their phones, as well as an interactive SMS campaign designed to improve knowledge about the HPV vaccine over the course of a week. The SMS campaign and poster contained similar information but differed in terms of exact content and imagery according to three behavioural themes selected. The participants were first recruited through a screening instrument where we also captured some baseline measures such as around their demographics including gender, age, income, educational background, religion, income, county and village of residence. Participants also rated the perceived likelihood that their daughter would contract HPV/cervical cancer in the future without an HPV vaccine on a four-point scale including the response options: “Not likely at all”, “Not too likely”, “Somewhat likely”, and “Very Likely” and the estimated percentage of men/women in their community with HPV. Estimated percentages were elicited with the following question “Out of 100 adult men[women] in your community, how many do you think have HPV infection at the moment?” with responses restricted to be between 0 and 100. All recruited participants were randomised into 4 groups according to which they received the relevant intervention materials:

1. **Control:** A campaign control condition in which participants received a poster and an interactive SMS intervention with no explicit behavioural theme.
2. **Fear:** Participants received the poster and an interactive SMS intervention designed to leverage feelings of regret about not getting vaccinated.
3. **Aspirations/gains:** Participants received the poster and an interactive SMS intervention designed to leverage feelings of parents’ aspiration for their daughters.
4. **Social Norms:** Participants received posters and an interactive SMS intervention designed to leverage social norms around vaccine uptake.

After receiving the poster and SMS, participants were called for an endline phone survey where we captured our primary outcome measures:

- **Self-reported likelihood to vaccinate:** After viewing the poster(s), participants were asked “How likely is it that you will get your daughter the HPV vaccine?” with response options on a five-point scale including: “Not likely at all”, “Not too likely”, “Somewhat likely”, “Very likely”, and “Extremely likely”.
- **Perceived sufficiency of information for decision to vaccinate their daughter:** We asked participants to report on a scale of 1-5 with 1=Strongly disagree, 2=Disagree, 3=Neutral, 4=Agree and 5= Strongly agree, how much did they agree with the following statement about the HPV vaccination: “I have enough information to make an informed decision about if my daughter should get the HPV vaccine.”
- **HPV knowledge:** We asked participants to report whether they think the following 10 statements around the HPV vaccine are true or false. We then calculated how many correct answers out of 10 each participant got.
- **Comprehension of information provided:** We asked participants “How well would you say you understood the information provided through the posters and messages?” with a four point scale including “Understood very well”, “Understood moderately well”, “Did not understand very well” and “Did not understand anything”.
- **Trust in information provided:** We asked participants “How much do you trust the information provided by us on the HPV vaccine?” with a five point scale including “No trust at all”, “Somewhat distrust”, “Neither trust nor distrust (neutral)”, “Somewhat trust” and “Strong trust”.
- **Call to Action:** Each poster and the message as part of the SMS campaign urged participants to text on a particular number if they wanted to learn more about the HPV vaccine. We then saw how many parents in each group texted on that number.

Behaviourally framed testimonials

The behaviourally framed testimonial audios for each theme were qualitatively prototyped with end users and stakeholders in the public health space in Kenya. The aim of the prototyping was to validate and contextualise our audios and use the one for the

theme that works best according to the experiment results in a final communications package.

Medical practitioner recommendation

Experiment 2: To study the effect of a doctor's endorsement in driving intentions of parents/guardians to take their daughters to the nearest health center for the HPV vaccine.

We experimentally tested (A/B testing) the poster for each gender with a total sample of 600 parents. As part of the experiment, participants received a link to a Qualtrics survey via SMS that could be completed using a smartphone. After consenting to the study, participants responded to baseline questions about their demographics including gender, age, income, educational background, religion, income, county and village of residence. Participants also rated the perceived likelihood that their daughter would contract HPV/cervical cancer in the future without an HPV vaccine on a four-point scale including the response options: "Not likely at all", "Not too likely", "Somewhat likely", and "Very Likely" and the estimated percentage of men/women in their community with HPV. Estimated percentages were elicited with the following question "Out of 100 adult men[women] in your community, how many do you think have HPV infection at the moment?" with responses restricted to be between 0 and 100.

We randomly assigned participants in equal proportions to one of three groups:

1. Control
2. Female doctor recommendation (FDR)
3. Male doctor recommendation (MDR)

We relied on Qualtrics' randomization feature for randomization. The groups varied only in the poster(s) they were shown: all participants were shown the poster used at the time of the survey as part of a national campaign for HPV vaccination. Additionally, the FDR (MDR) group were shown an additional poster with a photograph of a female (male) doctor and a brief quote noting that the doctor recommends the HPV vaccine. After the exposure to the relevant posters, the participants were asked to take an endline survey capturing our main outcome measures.

The primary outcomes for the study are:

- **Self-reported likelihood to vaccinate:** After viewing the poster(s), participants were asked "How likely is it that you will get your daughter the HPV vaccine?"

with response options on a five-point scale including: “Not likely at all”, “Not too likely”, “Somewhat likely”, “Very likely”, and “Extremely likely”.

- **Perceived vaccine safety.** We asked participants “How safe do you think the HPV vaccine is?” and provided response options on a five-point scale including: “Not at all safe”, “Slightly safe”, “Moderately safe”, “Very safe”, and “Extremely safe”.

What did we find from the experiments?

Behavioural framing

Behaviourally framed awareness generation messages

Experiment: To compare the effect of behavioural framings of messages in driving intentions of parents/guardians to take their daughters to the nearest health center for the HPV vaccine

The results from this experiment are presented in the table below that highlights for each outcome measure, which behavioural framing had an effect with our hypothesis being that each behavioural framing would move the outcome measures in a positive direction in comparison to the control group.

Measure	Fear	Aspirations	Social Norms
Likelihood of parents/guardians to give their daughters the HPV vaccine	Lower***	No significant difference	No significant difference
Perceived sufficiency of information for decision to vaccinate their daughter	Higher***	Higher***	No significant difference
HPV knowledge	Higher***	Higher***	Higher***
Comprehension of information provided	Higher***	Higher***	No significant difference
Trust in information provided	Lower***	Higher***	No significant difference
Call to Action	No significant difference	Higher**	No significant difference

Aspirations framing is more effective than fear and social norms in moving outcomes.

■ In line with the hypothesis

■ Against the hypothesis

*** Statistically significant at the 1% level.

** Statistically significant at the 5% level.

We found that though none of the treatments are strong enough to move intentions, **aspirations or positive framing is effective in moving all other outcomes such as perceived sufficiency of information, comprehension of information provided around**

the vaccine, trust in the vaccine and strengthening knowledge of the vaccine. It is also effective in motivating parents to know more about the vaccine. This was primarily due to parents relating with the aspiration framing wanting to protect their daughters. They saw the HPV vaccine as a means to protect their daughters' future.

Fear framing seems to have yielded counterproductive results in terms of intentions to vaccinate. Fear does positively affect some secondary outcomes such as perceived sufficient information, knowledge of the vaccine and comprehension of the information. However, it reduces the likelihood of parents trusting this information. This was primarily due to participants finding the fear poster very graphic and scary. As people's worldview overrides unwelcome facts and when faced with the possibility of "bad" outcomes, people tend to engage in different defensive tactics, one of them being reactance (Pluviano , et al., 2017)¹⁷ in the short term. People also tend to dismiss and ignore messages as a defence to the feeling of fear or of past traumas that fear appeals may bring up (Drug Free Action Alliance, 2013)¹⁸. Social norms framing is only effective in strengthening knowledge of the vaccine.

Deep dive into the "call to action"

While the interventions asked parents to get their daughters the HPV vaccine, a more immediate call to action was to get them to respond with a text message to know more about the vaccine. The outcome measure was the number of parents who text back. However, only about 12% of the total sample of parents texted back to know more about the vaccine with relatively higher income parents being significantly more likely to send the text message. All parents who texted back said they did so as they were interested to know more about the HPV vaccine. Most parents wanted to learn more about the vaccine in terms of the side effects of the vaccine and how it prevents cervical cancer which prompted them to text back.

"I had a daughter who could be affected so I wanted to know more." Parent, Nairobi

However, most parents only read FAQs and said they did so as they did not have enough time to go through all the information. They thus wanted to know more about only some specific questions.

¹⁷ Pluviano S, Watt C, Della Sala S (2017) Misinformation lingers in memory: Failure of three pro-vaccination strategies. PLoS ONE 12(7): e0181640. <https://doi.org/10.1371/journal.pone.0181640>

¹⁸ <https://preventionactionalliance.org/shop/scare-tactics-booklet/>

“I was busy with job and I had no time to study more.” Parent, Nairobi

Further, the majority of the parents did not text back at all. Some parents reported that the reason behind them not texting back was that they did not understand that they were supposed to text back and said they would have if they had known. Some parents also reported that they did not see the message asking them to text back. Parents’ busy schedules also played a part in them not texting back. Some parents reported that because of their busy schedules they forgot to text back while others said they did not have time to text back. Other reasons for not texting back included lack of credit and challenges with phones such as it being shared by the entire family.

“I never understood that I was supposed to text back to receive more information about the vaccine.” Parent, Nairobi

Medical practitioner recommendation

Experiment: To study the effect of a doctor’s endorsement in driving intentions of parents/guardians to take their daughters to the nearest health center for the HPV vaccine.

The results from this experiment are presented in the table below that highlights for each outcome measure, which behavioural framing had an effect with our hypothesis being that each behavioural framing would move the outcome measures in a positive direction in comparison to the control group.

Measure	Female Doctor endorsement	Male Doctor endorsement
Likelihood of parents/guardians to give their daughters the HPV vaccine	Higher***	Higher**
Perceived safety of the HPV vaccine among parents/guardians	Higher*	Higher**

Doctor endorsements, irrespective of the gender of the doctor, **is effective in improving the intentions to vaccinate and safety perceptions of the HPV vaccine** among parents/guardians of 10-year-old girls.

 In line with the hypothesis

 Against the hypothesis

*** Statistically significant at the 1% level,

** Statistically significant at the 5% level

* Statistically significant at the 10% level

We found that endorsements of the HPV vaccine from doctors strengthens parents' intentions to get their daughters the HPV vaccine and also strengthens their perceptions around the safety of the vaccine. Interestingly, recommendations coming from a male doctor and a female doctor work equally well.



Key Takeaways

We commenced this study with the aim of understanding the behavioural, structural and environmental barriers and enablers surrounding the uptake of the HPV vaccination in Kenya among parents of adolescent girls. We did this through qualitative interviews and quantitative surveys with parents of girls aged 8-11 years. We found lack of perceived information around the vaccine to be one of the biggest barriers to uptake. Parents have little to no knowledge about HPV, HPV vaccine and its link with cervical cancer. They also don't have practical information around the vaccine such as its importance, cost, eligibility and when or where to get the vaccine. Further, this lack of adequate information has led to the spread of misinformation around the vaccine hindering its uptake. On the other hand, we also found a number of enabling factors or levers that can be leveraged to encourage the uptake of the vaccine. We found parents place the highest levels of trust in health related information provided by the healthcare workers as they are often viewed as "experts". Further, we found that parents understand the importance of preventive health measures, including vaccines, and feel responsible for their children's health. They also view cancer as a fatal disease and thus would feel motivated to get their children a "cancer-preventing" vaccine as they also fear the consequences of their children being unvaccinated.

Guided by the barriers and levers described above, a communications package with three key elements: An endorsement of the HPV vaccine from a trusted source, a testimonial and a text nudge was recommended to be developed targeting parents. To ensure this package is the most effective in driving the intentions of parents to get their daughters the HPV vaccine, we experimentally tested two key aspects of communications based interventions: framing of the message and the messenger or endorser of the message. To understand how best to frame the message around the HPV vaccine that will be the most effective in driving its uptake among parents, we tested the themes of fear, positive gains or aspiration and social norms. We found that aspirations framing was the most effective in positively moving outcomes such as perceived sufficiency of information, comprehension of information provided around the vaccine, trust in the vaccine and knowledge of the vaccine. It was also found to be effective in motivating parents to take action to know more about the vaccine.

The second part of the communications package primarily focused on understanding whether a medical practitioner's recommendation impacts parents' trust in the HPV vaccine and intention to have their daughters vaccinated and whether the effect of the medical practitioner's recommendation depends on the gender of the recommending medical practitioner. We found that a doctor's recommendation, irrespective of their gender, was effective in strengthening parents' intentions to get their daughters the HPV vaccine and also strengthened their perceptions around the safety of the vaccine.

Guided by the findings of the study, we believe there is a need to consider the following solutions targeted to parents, to be integrated as part of an HPV vaccine promotion initiative in Kenya:

- **Use positive or aspirations framing:** Parents have a sense of responsibility for their children throughout their lives and want to do everything in their power to protect their children and their future. Leveraging this sentiment, the vaccine promotion initiatives should frame messages targeted to parents in accordance with the aspirations framing linking the HPV vaccine to the aspirations of parents for their daughters' future.
- **Use visual communication of a doctor's support for the HPV vaccine:** Doctors and other health workers including community health workers were reported as the most trusted sources of health related information. They are seen as experts in the health field and thus even more trusted than the government. This immense trust in health workers should be leveraged by HPV promotion initiatives targeting parents.
- **Understand the audience and their contexts:** It is imperative that practitioners understand the context and environment of their audience as not all channels of communication will work for all kinds of audiences. In our study we found that owing to busy schedules, the SMS campaign did not work very well with only a minority of parents texting back to learn more about the vaccine. This suggests that sending too many messages via SMS may not work in promoting the vaccine in the low income Kenyan context.
- **Framing of vaccine as “cancer preventing”:** Another potentially impactful way of advertising the vaccine to improve take up is to make the link between the vaccine and cancer very clear due to the prevailing fear of cancer. This would involve framing the vaccine as a cancer-preventing rather than a HPV-preventing vaccine. By advertising it as a cancer prevention tool, parents might feel more intrinsically motivated to vaccinate their daughters.



Appendix

Annex A: Communications materials developed

The following communications materials were developed following the formative research phase taking into account the barriers and levers found and following a co-design workshop:

1. For each of the three themes, fear, aspirations and social norms, we developed the following materials. These materials were experimentally tested
 - a. Poster: This poster had behaviourally themed messages around the HPV vaccine to increase awareness.
 - b. SMS campaign: This was an interactive campaign where parents could learn more about the HPV vaccine. It included the following elements:
 - i. Message (same as in the poster)
 - ii. FAQs
 - iii. Stories
2. For each gender, male and female, we developed a poster that endorsed the HPV vaccine. These posters were experimentally tested.
3. For each of the three themes, fear, aspirations and social norms, we also developed behaviourally framed parent testimonials in the form of audios. These were not experimentally tested but only qualitatively prototyped.

Annex B: List of co-design workshop participants

In March 2020, we organised a co-design workshop where stakeholders in the public health space in Kenya came together, bringing their expertise and immense experience, to help us brainstorm solutions to drive uptake of the HPV vaccine. Following organisations were represented in this workshop:

1. National Vaccine Immunisation Programme (NVIP)
2. UNICEF
3. Kenya Network of Cancer Organisations (KENCO)
4. Kenya Paediatric Association
5. John Snow, Inc (JSI)
6. Living Goods
7. Clinton Health Access Initiative (CHAI)
8. KANCO

9. County First Ladies Associations
10. Rotary Club of Karen
11. PATH
12. Africa Cancer Foundation (ACF)



Contact us for more information

contact@busaracenter.org

www.busaracenter.org

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