



Final Report: COVID-19 Vaccine Hesitancy in Papua New Guinea, 2021

COVID-19 vaccine hesitancy in essential workers and the community in Papua New Guinea: an exploratory mixed-methods study 28th April - 24th May 2021

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Cover photo: aFETPNG fellow receiving his COVID-19 vaccine in West Sepik Province, May 2021

ACKNOWLEDGEMENTS

We would like to express our gratitude to the many HCWs and community members who gave of their time to answer our questions and helped contribute to an understanding of the common concerns about the COVID-19 vaccine and identify the most effective communication strategies to improve vaccine uptake

Funding and logistical support

Financial support was provided by the World Health Organization, the Indo-Pacific Centre for Health Security and the Global Outbreak Alert and Response Network. St John's Ambulance PNG provided the logistical support for this study.

Translation

We would like to express appreciation to the translation team at the World Health Organization, who translated the survey into Tok Pisin.

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We would like to thank the interview team who conducted the interview administered survey; Nelson Andalu, Robina Tonny, Maureen Aophonse, Lucas Pulupe, Julia Sairere, Eron Oki, Nick Degoba, Nelson Tarabi, Jame Lekson, Mark Gebore and Thomas Dilu.

From the community, most people don't agree to get the vaccines due to many thoughts, rumours, and speculations about the vaccines not good because of side effects killing people and, they claimed that getting vaccine will actually give you corona virus and you become sick thus, they refuse to get the vaccine. Pharmacist, West Sepik.

Colleagues are very negative and strongly confused about the COVID-19 vaccine. In fact, many say, or will refuse to be vaccinated. Some think they will die. HCW, Manus.

The community thinks that COVID-19 vaccine is unsafe and cause long term effects and we should not be used as guinea pigs to trial out the vaccine. HCW. East New Britain.

ABBREVIATIONS

COVID-19	Coronavirus Disease 2019
FETPNG	Field Epidemiology Training Program Papua New Guinea
aFETPNG	advanced FETPNG
HCW	Health Care Worker
IEC	Information Education Communication
MRAC	Medical Research Advisory Committee
NCC	National Control Centre
NDoH	National Department of Health
PDCO	Provincial Disease Control Officer
PHA	Provincial Health Authorities
PNG	Papua New Guinea
SARS-Cov-2	Severe Acute Respiratory Syndrome - Coronavirus - 2
SJA	St John's Ambulance
SMS	Short Message Service
UNICEF	The United Nations Children's Fund
WHO	World Health Organization

EXECUTIVE SUMMARY

This report presents the findings from a nationwide vaccine hesitancy survey. The objectives of the survey were to identify beliefs and attitudes related to the COVID-19 vaccine, as well as primary sources of trusted information, to inform public health messaging to increase vaccine uptake in Papua New Guinea (PNG). The national survey was conducted in two parts: via a telephone survey with Health Care Workers (HCWs), and an electronic self-administered survey distributed through social media networks and through an advertisement distributed via a text messaging (SMS) blast to the wider community.

This survey was led by a team from the National Department of Health's (NDoH) Field Epidemiology Training Program of Papua New Guinea (FETPNG), in partnership with the World Health Organization's Global Outbreak Alert and Response Network and the Field Epidemiology in Action team in Australia. Collaborators included World Health Organization PNG country office, St John's Ambulance and the United Nations Children's Fund (UNICEF's) UReport team.

Misinformation and lack of information contribute to vaccine hesitancy and pose a threat to the containment of the COVID-19 pandemic globally. In addition, the speed at which the COVID-19 vaccinations have been developed and released for emergency use has increased anxiety. Understanding people's concerns about being vaccinated against COVID-19 is essential to target messaging and responses that provide timely and accurate information, while acknowledging and respecting concerns.

The first doses of the AstraZeneca COVID-19 vaccine arrived in PNG in early April 2021. Phase One of the national roll out of the COVID-19 vaccination in PNG has targeted essential workers, including HCWs. It was in this context that this study was conducted with the aim of understanding reasons for vaccine hesitancy in PNG and informing the targeting of risk communication and community awareness campaigns to increase vaccine uptake.

Key Findings

A total of 957 people participated in the survey, of which, 42% (n=402) were HCWs. Provincial participation was 100% (22/22) with district representation of 90% (80/89). HCW respondents were more willing to receive the COVID-19 vaccine compared to non-HCW respondents (56.2% and 38.6%, respectively), with both populations reporting similar concerns and preferred ways of receiving information about the vaccine.

1. Concerns about the vaccine

The main concerns were around the safety of the vaccine; specifically side effects, long-term effects and risk of blood clots.

Additional concerns around the speed of vaccine development, composition of the vaccine, and concerns related to the vaccine not being tested on the PNG population were commonly mentioned.

The most common conspiracy theories mentioned included the vaccine being related to a 'new world order', the vaccine being a means to reduce the black population of the world and the vaccine being used as a means of sterilisation.

2. Sources of information about the vaccine

The most common sources accessed for information about the vaccine included social media channels such as Facebook, WhatsApp, Instagram and YouTube. Other common sources of information included internet searches, newspaper, HCWs and local health authorities.

Local health authorities and HCWs were considered the most trusted sources of information related to the vaccine.

3. Information needs related to the vaccine

The most common topics indicated by participants regarding COVID-19 vaccine information needs included information on vaccine safety and development, side effects and why the Astra Zeneca vaccine was chosen for PNG

4. Preferred way of receiving of information about the vaccine

Respondents preferred to receive information about the vaccine through direct communication with HCWs and through videos of people who have received the vaccine talking about their experience. HCWs preferred to receive information directly from the Health Authorities.

Conclusion

The most significant finding from this study is that people prefer to receive information about the vaccine from HCWs. This is problematic in the current context where HCWs themselves have concerns related to vaccine safety and development, and nearly one third of HCWs are concerned about at least one conspiracy theory. To tackle vaccine hesitancy in PNG, HCWs must be equipped with timely and accurate information and supported to debunk myths and conspiracies associated with the COVID-19 vaccine.

Recommendations

1. The National Control Centre (NCC), the NDoH and Provincial Health Authorities (PHAs) should prioritise investment in information, education and communication (IEC) for HCWs in all provinces. HCWs should be equipped with correct information to enable them to answer questions from the community, and to make an informed decision about taking the vaccine themselves. Face to face group discussions with health care workers need to be prioritised where they are encouraged to ask questions and discuss vaccine hesitancy.
2. Educational resources should address common concerns and information needs reported by frontline workers and the community such as: side effects of the vaccine, where the vaccine comes from, the safety of the vaccine, how the vaccine could be developed so quickly, and what the vaccine is made from.
3. Communication strategies need to include videos with individuals who have received the vaccine, discussing their experience, and addressing common questions and views. IEC material should be disseminated using a combination of methods including social media posts, websites, newspapers, radio chat shows, and YouTube.
4. The NCC/NDoH and PHAs should prioritise investment in community engagement and risk communication in all provinces. A large campaign with increased visibility, discussion, and question and answer sessions are needed to debunk circulating myths and raise awareness in the provinces about the importance of the vaccine.
5. Education campaigns about the COVID-19 vaccine should utilise a “train-the-trainer” model, with representatives from every health centre in the country. Such programs can be run at the provincial or regional level, be used to disseminate IEC materials and strengthen networks for communication about the vaccine.

NDoH and WHO [need] to provide correct and accurate information to all HCWs about the COVID-19 vaccine, so that the HCWs wouldn't be afraid of the vaccine.
Paramedical student, Milne Bay

BACKGROUND

It has been over 12 months since the World Health Organization declared the spread of COVID-19 a pandemic.² Several COVID-19 vaccines have been fast-tracked through the vaccine development cycle and approved for use by various national regulators and the WHO. The global roll out of the COVID-19 vaccines has occurred simultaneously with nations experiencing their second and third waves of the pandemic. The roll out of the vaccine has also occurred in the context of a so-called “infodemic” of misinformation, conspiracy theories and mixed messaging which has had an impact on vaccine uptake.³

At the time of this report (May 2021), over 167 million people have been reported to have contracted COVID-19 with over 3.4 million deaths attributed to complications associated with the disease.⁴ On the 1st March, 2020, PNG reported the first confirmed case of COVID-19. As of the 27th May 2021, a total of 15,368 confirmed COVID-19 cases have been reported across PNG with 159 deaths.⁵ As of 25th May, 2021, 26,759 vaccine doses had been administered, including to 4,831 HCWs.⁵

Vaccination of at least 70% of the population is required to reach herd immunity. Unfortunately, misinformation related to the COVID-19 vaccine has been extensively disseminated through social media and contributed to widespread vaccine hesitancy across PNG. Of specific concern are common reports that many HCWs are hesitant to receive the vaccine. As key providers of health information for communities, if HCWs refuse the vaccine it is very unlikely members of their communities will be willing to be vaccinated.

An understanding of the specific concerns that are contributing to vaccine hesitancy in HCWs and community members across PNG was deemed essential to inform targeted communication strategies to increase vaccine uptake. The Field Epidemiology Training Program Papua New Guinea (FETPNG) network was utilized in the design and conduct of this study. a network of 96 graduates in all 22 provinces of PNG.

The overall aim of the Vaccine Hesitancy Survey

The overall aim of the survey was to understand from HCWs and community members the common concerns about the COVID-19 vaccine and identify the most effective communication tools and pathways to improve vaccine uptake.

Specific Objectives of the Vaccine Hesitancy Survey

1. Identify knowledge and attitudes related the COVID-19 vaccine
2. Identify circulating myths and beliefs related to the COVID-19 vaccine
3. Identify primary sources of trusted information related to the COVID-19 vaccine
4. Based on findings from objectives 1-3, provide recommendations for targeted messaging on the COVID-19 vaccination

Location

The survey was conducted in all 20 provinces of PNG, as well as the Autonomous Region of Bougainville and the National Capital District of Port Moresby. Figure 1 provides a provincial overview of PNG.



Figure 1: Provincial map of PNG¹

METHODS

A cross-sectional, exploratory mixed-methods design was used, including an initial scoping study, interviewer-administered questionnaire, and a self-administered online survey. The study population included two target groups: essential workers prioritised for the first phase of the COVID-19 vaccine roll out and the general community in PNG.

Survey participant selection

Interviewer-administered survey

A list of 579 HCWs (HCW) in PNG who have been trained to collect COVID-19 specimens was collated for a previous study on COVID-19 swabbing (MRAC approval #20.24).⁶ The same study population was used for the HCW telephone interviews in this study. The original list had been collated by Provincial Health Departments in October 2020, the name, position, health center and contact details of HCWs that had been trained to collect nasopharyngeal swabs for COVID-19 were recorded. This list had representation from all 22 provinces and over 90% of districts. Recognizing the challenges in obtaining a random sample of HCWs for a telephone survey, we decided the HCWs on the previously constructed list would provide a snapshot of HCW perceptions related to the COVID-19 vaccine from across the country.

¹ Map sourced from <https://www.worldatlas.com/upload/38/6e/67/papua-new-guinea-provinces-map.png>

Self-administered survey

A convenience and snowball sampling design were used to recruit participants for the online survey. The target population were other workers prioritized for the phase one roll out of the vaccination and the broader community in PNG. To maximise reach of the survey and capture community perspectives on the COVID-19 vaccine, a link to an online survey was distributed through social media networks (WhatsApp, Facebook, Twitter) (Figure 2). Each person receiving the link was asked to forward it through their social media networks.

The online survey link was also distributed by text message via the UNICEF UReport project, a network of young people (aged 15-35 years) who have volunteered to give feedback on polls and surveys using mobile phones.⁷ The UReport team designed four questions that were sent via their text message polling system to young people (aged 15-35) across PNG to gain insight into their perspective on the COVID-19 vaccine and availability of information. The poll was used as a means for disseminating the self-administered survey to a younger population. The initial four-question poll asked UReport participants for their views on the vaccine and they were provided a link to complete the full survey.

In addition, an SMS blast was done through Digicel to 50,000 mobile phone numbers on three separate days between the 15th May and 20th May.

All survey respondents were offered the chance to enter a draw to win K100 worth of phone data credits as an incentive to complete the survey, interviewer-administered and self-administered.



Figure 2: Social media and SMS blast advertisement

Survey development

During the initial scoping exercise, semi-structured interviews were held between 22nd - 28th March in Manus, West and East Sepik, Port Moresby, East New Britain, Oro, Morobe, and the Autonomous Region of Bougainville. FETPNG fellows conducted 33 interviews; 19 with HCWs, and 14 with members of the wider community. Five question guided the interviews:

1. What do your community/colleagues think about the COVID-19 vaccine?
2. What are some stories you are hearing about the vaccine?
3. What are some of the sources people receive information about the vaccine?
4. Which sources of information do people trust the most?
5. How could the NDoH / NCC and your provincial PHA best inform your community, your colleagues, and your family about the COVID-19 vaccine?

Interviewer field notes were collated in qualitative software NVivo 12. A rapid deductive analysis of interview data was conducted where data were coded under the five questions that guided the semi-structured interviews. Refer to Appendix 1 for a copy of the scoping report.

The survey questions were structured around key themes that emerged from responses to the semi-structured interviews, including:

1. Safety of the vaccine
2. Vaccine development
3. Stories about the vaccine
4. Information needs
5. Sources of information used
6. Trusted sources of information
7. Preferred ways of receiving information

Open ended questions were included to capture interview perceptions and provide opportunity for respondents to mention additional areas of concern / information needs / preferred ways of receiving information that were not provided in the survey. At the end of the survey participants were asked if they had any further comments related to the COVID-19 vaccine.

The survey questions were initially structured in English and translated into Tok Pisin by professional translators. A team of six bi-lingual FETPNG fellows reviewed the translation to check for construct and content validity. Discrepancies were discussed and updated where necessary. Once the survey translation was finalised it was converted into an electronic data collection form using REDCap.⁸ Refer to Appendix 2 for a copy of the survey.

Data collection

Pre-test

The survey and data collection methodologies were pre-tested with HCWs and community members. At the end of the interview, participants were asked to comment on the length of the survey, ease of understanding, content and offered the opportunity to make recommendations for improvement. The survey was further adapted based on feedback from the pre-test.

Survey administration

Interview-administered HCW survey

The telephone administered survey followed the same methodology used for a previous study.⁶ Ten university students received one day of training on interview techniques and the REDCap online data collection form. Interviewers were provided opportunity to conduct practice interviews and further developed proficiency during the pilot test.

During the initial telephone call, interviewers read the information sheet to the HCW which explained

the purpose of the study, the timing of the interview and how the data will be used. The HCW was also informed that the survey would be conducted anonymously and that their name would not be recorded anywhere on the data collection form. Oral consent was sought prior to continuing with the interview. Once the HCW consented to the interview the interviewer established a suitable day/time to conduct the interview. If the HCW indicated, they had time the interview was conducted during the initial call. HCW were given the option of completing the interview in English or Tok Pisin. The interviewer recorded responses directly into the REDCap electronic survey form.

If a HCW was not able to be contacted on first call, text messages and additional calls were made. Due to connectivity challenges in PNG, it was agreed that a total of five text messages would be sent and 15 call attempts would be conducted over a 7- day period prior to classifying the HCW as non-contactable (lost to follow-up). An interview log sheet was provided to each interviewer to log the number of times a HCW had been called, number of text messages sent, whether the HCW had been successfully contacted, if they had consented to be interviewed and if the interview had been successfully completed.

Self-administered online survey

Individuals who clicked on the survey link were directed to an information sheet which provided the same information about the study as described above for the telephone interviews. Participants were then asked to indicate if they consented to completing the survey. If they indicated 'Yes' they then taken to an option of completing the survey in English or in Tok Pisin. Responses were recorded directly into the REDCap electronic survey form.



Photo: aFETPNG fellow Bernnadine Smaghi training the interview team.

Quality control

The use of REDCap as an electronic data collection system facilitated data completeness and accuracy. In the initial roll out of the survey missing data was noted, so a forced answer was then applied to ensure every question was answered. This included options 'don't know' and 'don't want to answer' as an opt out option, improving data completeness but allowing participants to opt out of answering specific questions. Skip logic was employed to increase time efficiency and reduce duplication in questions. Regular review of survey data provided opportunity to identify errors in reporting. Interviewers were monitored by a team lead who assessed interview quality and provided feedback as required.

Data analysis

Survey data was downloaded from the REDCap database and stored securely on the three lead researchers' computers; two in PNG and one in Newcastle, Australia. Data was cleaned and analysed using Stata Data Analysis and Statistical Software (Statacorp v15).

Survey data analysis occurred throughout the data collection period. An infographic with summary statistics on key areas was distributed on a weekly basis to inform public health messaging around the vaccine while the survey was ongoing. The final infographic is provided in Appendix 3.

In addition to the analysis conducted for the infographic, descriptive analysis on participant characteristics, and key findings of each section of the survey was conducted. Where responses were rated using scores, medians, inter-quartile range, means and standard deviations were reported as relevant. The data was stratified by HCW/non-HCW to identify findings specific to HCWs. As was found in the scoping exercise and in this survey, HCWs are the primary trusted source of information about the vaccine. We sought to understand specifically HCWs information needs and concerns with respect to the vaccine to target appropriate messaging and develop specific resources for this group.

Data from the scoping exercise and open-ended questions was extracted and imported into NVIVO 12. A rapid qualitative analysis was conducted with an iterative approach structured under the main categories of willingness to be vaccinated, concerns about the COVID-19 vaccine, information needs and trusted sources of information. Illustrative quotes have been included in this report. Due to the importance of disseminating findings for immediate action a content analysis of qualitative findings will be disseminated at a later date.

Consent / Ethical Issues

This study was approved by the Health Secretary for PNG (Appendix 4). Informed consent was sought prior to interview. This study was developed by PNG health staff and therefore was sensitive to PNG culture and social values.

Once participants completed the survey they were directed to NDoH and WHO websites with approved information about the vaccine. A website was created on the study so that participants and other interested parties could follow the progress of the study, participants were provided the link when they completed the survey. The weekly infographic was posted on this website (<https://www.fieldepiinaction.com/vaccine-hesitancy>).

RESULTS

UReport poll

The UReport questionnaire generated 245 responses out of 264 polled individuals (93% response rate) to the five-questions, 62% (n=103) of respondents were male. The age breakdown of UReport respondents showed that the majority were in the 25-30 year age group (34%, n=90), 25% (n=66) were over 35 years of age, 24% (n=63) were between 20-24 years of age, 12% (n=32) between 31-34 years of age and 5% (n=13) between 15-19 years of age. Responses were from 18/22 provinces.

Table 1 summarises findings from the UReport questions. Findings from the UReport questions can be found at <https://png.ureport.in/opinion/5016/>. All UReport participants were sent the link to the self-administered vaccine hesitancy questionnaire after completing the short text message survey.

Table 1: Answers to the UReport text message poll questions, April 28th 2021

Question	Number of respondents/ number polled	Yes	No	Not sure
Do you trust the vaccine	245/264	23%	39%	38%
Do you think the vaccine is important to your health	241/246	34%	36%	30%
Do you think there is enough information about the vaccine	232/241	23%	67%	9%
Would you encourage a family member to have the vaccine if it was offered to them	226/233	28%	53%	19%

Survey Response Rate

Interview-administered survey

The sample population for the telephone interviews included contact details for 579 HCWs; an additional three HCWs requested to have their names added to the list, providing a total study population of 582 HCWs for the telephone interviews. A response rate of 68.4% (n=396) was achieved; 54 HCWs refused to participate in the survey, 71 HCWs were classified as lost to follow up, 25 telephone numbers were not current, three sim cards had been blocked, three HCWs opted to complete the self-administered survey instead of interview, 30 were non-contactable (voice mail only and non-responsive to text messages) and one had since passed away.

Self-administered online survey

A total of 561 responses were received through distribution via social media networks, the UReport and the Digicel SMS blast. We do not have a denominator to provide a response rate, however, we perceive this response to be low.

Final sample

The total sample (n=957) was comprised of 402 HCWs and 555 non-HCWs. Of the 561 self-administered respondents, 6 were HCWs.

Distribution of respondents across PNG

Respondents were from all 22 provinces and 90% (80/89) of districts, Figure 3. For a complete breakdown refer to Appendix 5. Most participants completed the survey in English (91.8%, n=879), with 8.2% (n=78) completing the survey in Tok Pisin. Of all respondents, 42% (n=402) were HCWs, with representation from all 22 provinces, Figure 4.

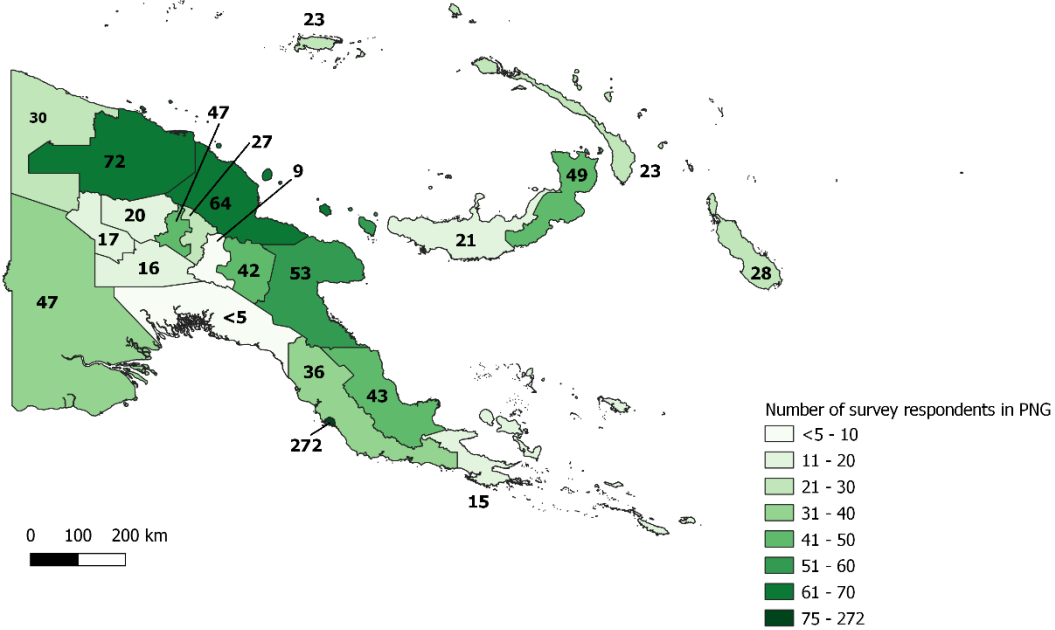


Figure 3: Provincial breakdown of all survey participants, COVID-19 Vaccine Hesitancy Survey (n=957)

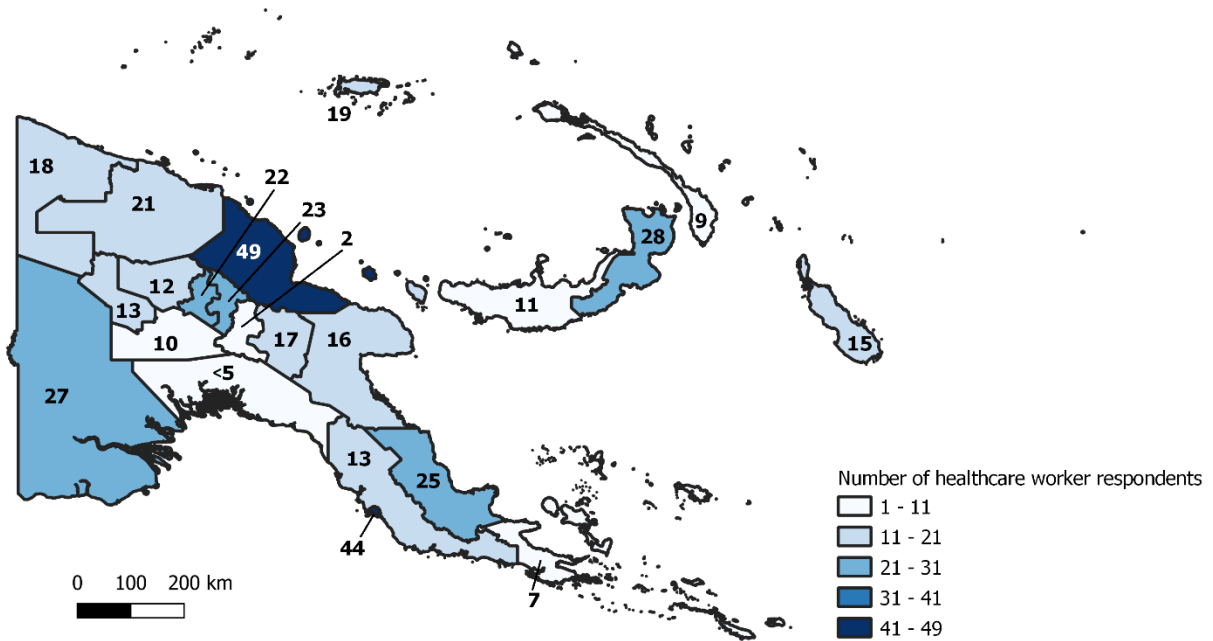


Figure 4: Provincial breakdown of health care worker participants, COVID-19 Vaccine Hesitancy Survey (n=402)

Respondents' characteristics

Tables 2a and 2b provide an overview of respondent characteristics. Respondents were predominantly male, 59% (n=563), and the median age was 38 years (interquartile range (IQR): 30 - 46 years, range 18 - 65 years).

More than half (54.4%, n=521) of respondents were workers prioritised for Phase One of the vaccine roll out, of which 402/521 (77.2%) were HCWs. Phase One priority workers included: HCWs in public and private health facilities, and all facility support staff including pharmacists, lab workers, clerks, cleaners, grounds keepers, and security guards at hospital or health facility. Any frontline workers in the COVID-19 response are also classified as Phase One priority workers, including paramedical students (nursing, laboratory, community health), prison guards/correctional services, border and immigration/customs officials, port/immigration officials, airport workers (especially frontline dealing with customers), workers at quarantine facilities/hotels, police, teachers, and defence force personnel.

Table 2a: Participant occupation, COVID-19 Vaccine Hesitancy Survey (n=957)

Occupation	N (%)
Health care worker	402 (42.0%)
Other Phase One prioritised worker	119 (12.4%)
Other occupation, not prioritised	272 (28.4%)
Student	76 (7.9%)
Not employed	69 (7.2%)
Occupation not specified	19 (2.0%)

Table 2b: Participant characteristics, COVID-19 Vaccine Hesitancy Survey

Characteristic	Total (N=957) n (%)	HCWs (N=402) n (%)	Non- HCW (N=555) n (%)
Sex*			
Male	563 (58.8%)	217 (53.4%)	346 (62.8%)
Female	379 (39.6%)	184 (45.3%)	195 (35.4%)
Other	1 (0.1%)	-	1 (0.002%)
Age category			
18 - 29 years	192 (20.1%)	42 (10.5%)	150 (27.0%)
30 - 39 years	327 (34.2%)	146 (36.4%)	181 (32.6%)
40 - 49 years	250 (26.1%)	137 (34.2%)	113 (20.4%)
50 - 59 years	124 (13.0%)	59 (14.7%)	65 (11.7%)
>= 60 years	43 (4.5%)	17 (4.2%)	26 (4.7%)
Unknown	21 (2.2%)	1 (0.002%)	20 (3.6%)

*Sex was not specified for 14 observations, 1 HCW and 13 non HCWs

Willingness to be vaccinated for COVID-19

Table 3 summarises participants' willingness to be vaccinated. Less than half of all respondents were willing to be vaccinated, with 20% undecided on whether they would receive the vaccine or not. Of the 402 HCWs, 56% (n=226) indicated they were willing to be vaccinated and 15% (n=61) were undecided.

Table 3: Willingness to be vaccinated, COVID-19 Vaccine Hesitancy Survey

Willing to be vaccinated for COVID-19	Total (N=957) n (%)	HCWs (n=402) n (%)	Non- HCW (n=555) n (%)
Yes	432 (45.1%)	226 (56.2%)	206 (38.6%)
No	316 (33.0%)	115 (28.6%)	201 (37.6%)
Unsure	118 (19.6%)	61 (15.2%)	127 (23.8%)
Did not want to answer	21 (2.2%)	-	21 (3.8%)

I think everyone should be vaccinated, because it's a must that everyone should get the covid 19 vaccine to prevent them from getting the virus. Student, Eastern Highlands

How can we help to convince the HCWs to get the Covid - 19 vaccine? Because most of them are afraid of being vaccinated. HCW, Milne Bay

NDoH and WHO [need] to provide correct and accurate information to all HCWs about the Covid-19 vaccine, so that the HCWs wouldn't be afraid of the vaccine. Paramedical student, Milne Bay

I cannot risk myself by vaccinating myself form the Vaccine as I for one don't even know any information about the Vaccine. Lending Officer, National Capital District

If you're from [the] highlands of PNG you will never know how to catch a shark, if you a from the coastal you will never know how to catch a bird of paradise, because they're not from our surrounding...why should we take a vaccine which is not ours, which we don't have any idea about. Unemployed, Central

It's a new thing to us so, I know that there should be more awareness about this covid-19 and the vaccine. More awareness needs to be done for the people and us also the HCWs. Health service delivery worker, Jiwaka

My point is there is a lack of awareness of the implications and benefits of the vaccine. I am sure the vaccine is produced and distributed to help prevent the spread of Covid 19 because there is a lack of research to justify that the vaccine has few to no negative side effects. Until then I will not get vaccinated nor encourage a family to be vaccinated. That is my honest point of view. Student, West Sepik

Concerns and information needs about the COVID-19 vaccine

Respondents were primarily concerned about vaccine development and vaccine safety with nearly one-third of respondents indicating concerns related to conspiracy theories about the vaccines, Table 4.

Table 4: Participant concerns about the vaccine, COVID-19 Vaccine Hesitancy Survey (n=957)

Category of concern	Number of respondents selecting items in this concern category	Proportion
Vaccine development	689	72.0%
Vaccine safety	672	70.2%
Conspiracy theories (stories)	327	34.2%

Tables 5a - 5c provide a breakdown of responses under each category for the complete sample and disaggregated by HCW status. With respect to concerns related to vaccine development, most respondents were concerned by how quickly the vaccine was developed (72%, n=689). More than half of the respondents expressed concern that the vaccine had not been tested in the PNG population, and concern about the vaccine ingredients and why the Astra Zeneca vaccine was chosen for PNG. A greater proportion of HCWs were concerned about the speed of vaccine development and the concern associated with the vaccine having not been tested on the PNG population than non-HCWs (77.1% compared to 68.3% and 68.9% compared to 56.0%, respectively).

For concerns related to vaccine safety, most respondents were concerned about side effects (70.2%, n=692) and long-term effects of the vaccine on their health (67%, n=641). More than half of the respondents also expressed concern about the potential blood clots after receiving the vaccine. Expressed concerns related to vaccine safety were similar for HCWs and non-HCWs.

Of note, is that nearly one third of respondents were concerned about at least one conspiracy theory or story they had heard about the vaccine. The most common concern was in reference to the vaccine being part of a new world order (34.2%, n=327), that the vaccine is a biological weapon designed to reduce the 'black' population (30%, n=287) and that the vaccine is being used for sterilisation (29.6%, n=283). While a smaller proportion of HCWs expressed concerns about conspiracy theories than non-HCWs, it is troubling that between 19-30% of HCWs selected at least one conspiracy theory they were worried about.

Table 5a: Participant concerns related to the vaccine development and by health care workers status, COVID-19 Vaccine Hesitancy Survey

Concerns related to the COVID-19 vaccine development	Total (N=957) n (%)	HCWs (n=402) n (%)	Non-HCW (N=555) n (%)
How quickly the vaccine was developed	689 (72.0%)	310 (77.1%)	379 (68.3%)
The vaccine has not been tested on the PNG population	597 (62.4%)	277 (68.9%)	311 (56.0%)
What the vaccine is made of (vaccine ingredients)	597 (62.4%)	264 (65.7%)	333 (60.0%)
The reason this vaccine was chosen for PNG	554 (57.9%)	230 (57.0%)	324 (58.4%)

*Multiple options were able to be selected

How did they come up with vaccine for covid so quickly whereas the scientist[s] haven't come up with any vaccine for HIV and AIDs up until today? Laboratory worker, Autonomous Region of Bougainville

My Concern is when the virus came out to the public in no months, then came this vaccine so I'm asking will it work or its going to be fake? How will it benefit the population? HCW, Milne Bay

If the Covid_19 vaccine (AstraZeneca) was manufactured in India and we got it from them, how come the Indians death rate is higher? HCW, East New Britain

Our Scientists should conduct tests with Papua New Guineans using the different vaccines in order to recommend the best vaccine that will work on us. Police Officer, National Capital District

The way we see it is that the development of the Vaccine is a bit fast, and it might not help us in some way - there might be some side effects. HCW, Madang

The vaccine has been developed so fast that people are confused and afraid to be vaccinated. People need more awareness and information about the vaccine. HCW, Autonomous Region of Bougainville

It's a newly introduced Vaccine with no proper research and awareness so how will the people know if the Vaccine will prevent them. HCW, Madang

Table 5a: Participant concerns related to the vaccine safety and by health care workers status, COVID-19 Vaccine Hesitancy Survey

Concerns related to vaccine safety	Total (N=957) n (%)	HCWs (n=402) n (%)	Non-HCW (n=555) n (%)
Side-effects from the vaccine	672 (70.2%)	274 (68.2%)	398 (71.7%)
Long-term effects of the vaccine on my health	641 (67.0%)	269 (66.9%)	372 (67.0%)
The vaccine will give me blood clots	493 (51.5%)	205 (51.0%)	288 (51.9%)
The vaccine is not safe	416 (43.5%)	158 (39.3%)	258 (46.5%)
The vaccine will have a negative effect on my DNA	393 (41.1%)	155 (38.6%)	238 (42.9%)
I may die after receiving the vaccine	270 (28.2%)	86 (21.4%)	184 (33.2%)
That the AstraZeneca vaccine will give me COVID-19	186 (19.4%)	74 (18.4%)	112 (20.2%)

*Multiple options were able to be selected

[The] vaccine was develop[ed] quickly and we don't know if it will have some effects later in the future. HCW, Western Highlands

People don't know the vaccine is safe. HCW, National Capital District

The vaccine was specifically made to treat COVID 19, the vaccine might have long term side effects. This is not tested and proven. Short term side effects are blood cloth, skin rashes etc. Accountant, National Capital District

Covid 19 Vaccine is different from Covid 19 virus that is now affecting the citizens around the globe. I for one believe that Covid 19 Vaccine is not related to the Covid 19 virus, it is something totally different altogether, and that will not fight the Covid 19 virus if I am infected. It's a health hazard and It will affect my immune system if I take it. Let us live our old ways as Covid 19 virus it comes to stay and not to go. This Covid 19 vaccine is bad to take for every PNG Citizen. Accounts Officer, Western Highlands

Have cough symptoms like Covid, doctor can use vaccine to kill people. Security guard, Morobe

Table 5c: Participant concerns related to the conspiracy theories and by health care workers status, COVID-19 Vaccine Hesitancy Survey

Concerns related to conspiracy theories	Total (N=957) n (%)	HCWs (N=402) n (%)	Non-HCW (N=555) n (%)
The vaccine is part of a new world order	327 (34.2%)	119 (29.6%)	208 (37.5%)
The vaccine is a biological weapon designed to reduce the black population	287 (30.0%)	112 (27.9%)	175 (31.5%)
The vaccine is being used for sterilisation	283 (29.6%)	91 (22.6%)	192 (34.6%)
The vaccine has a microchip	266 (27.8%)	99 (24.6%)	167 (30.0%)
The 666 mark is related to the vaccine	259 (27.1%)	92 (22.9%)	167 (30.0%)
People having the vaccine will be connected to 5G network	248 (25.9%)	93 (23.1%)	155 (27.9%)
The vaccine is going to spread COVID-19 in the population	186 (19.4%)	78 (19.4%)	70 (17.4%)

*Multiple options were able to be selected

I don't believe in the Vaccine because there are many rumors going around [on] social media. HCW, East New Britain

I heard a world news, I see video clips...stop world control, many countries get effected by the vaccine, worlds top billionaires and top leaders, top scientists, they illegal man made COVID 19 and vaccine too. They make secret plans for making money to the government, but we [of] Christian faith know that [this] fulfills the prophesies of the bible...on world government, one money, one country, one religion...vaccinate[d] person will be free to access around this world control by satellite. Ground's keeper, Enga

Just precautions if the vaccine is suitable for PNG and that the vaccine would be used to reduce "black" people. Lab worker, Chimbu

The vaccine will reduce my immune system and my body will not be able to fight against any diseases that invade my body. HCW, Southern Highlands

I heard the Vaccine will interfere with DNA cells and will change the DNA into RNA factors and eventually damaging the immune system in the long run. HCW, West New Britain

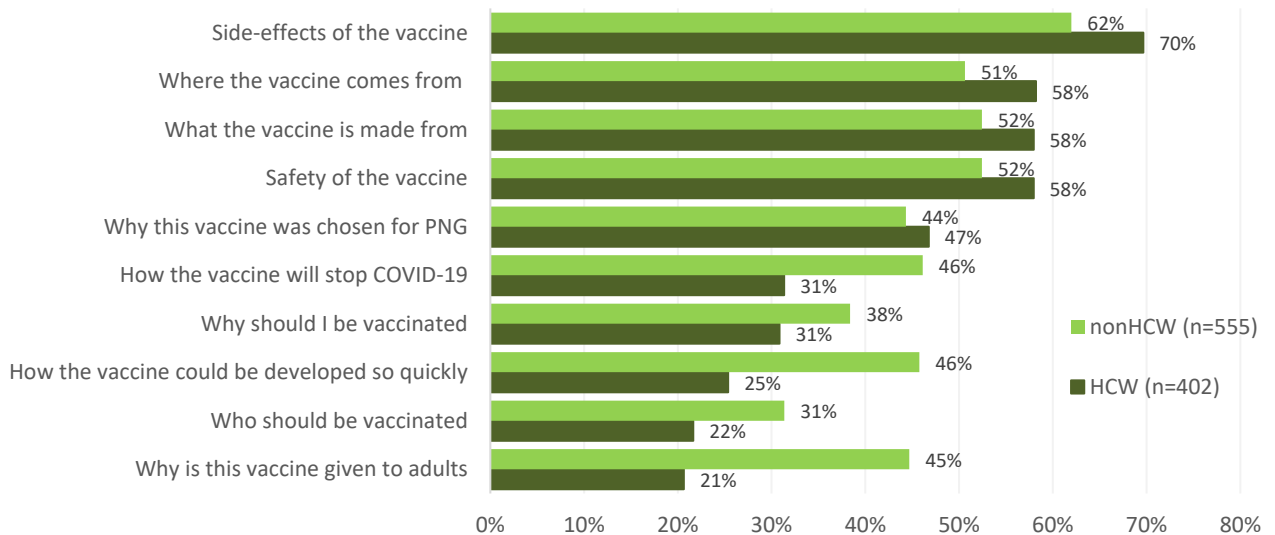
To summarize, in non-linear observation, this is a biological warfare on black people through the agenda of climate change, migration, resources demand and the unspoken concept of whites maintaining the global race hierarchy equally for global wealth possession which is currently in play behind the scenes. Employment not disclosed, National Capital District

PNG is a Christian Country then why did we accept vaccine. It is like we're serving other gods. This is kind of some religious test as I am seeing it. Plantation manager, East New Britain

That's all I'm concern ..if they vaccinating us we will be like guinea pigs and they will sit there and watched how the vaccine is doing inside our body system.. if any thing happened who is to blame for??? The decision we make will affect the our presents and determines our future so think ahead before choose ...thank you. Student, East Sepik

Most respondents indicated that they needed more information about the safety and development of the vaccine, refer to Figures 6. When disaggregated by HCW, findings were similar with slightly higher proportions focused on information needs related to side effects, vaccine origin, vaccine ingredients, and vaccine safety. Higher proportions of non-HCWs requested more information on why the vaccine is given to adults and how the vaccine could have been developed in such a short time frame.

Figure 6: Participant information needs related to the vaccine, COVID-19 Vaccine Hesitancy Survey (n=957)



The Vaccine is it safe does it have side effects because its being given too early to the people? HCW, Autonomous Region of Bougainville

COVID 19 vaccine should have an expiration date whilst in Human Body. What if the world becomes free of COVID 19 in the next 10 years' time? How can we get rid of COVID 19 vaccine in our system when the world becomes free of COVID 19? Defence personnel, Morobe

Can the PNG Health Department roll out more awareness to all Districts within PNG in regards to the COVID-19 vaccine before it is used. Most of us wants to know how it is made within the short period of time and the side effects of the COVID-19 vaccine. Employment not specified, Eastern Highlands

Why is the AstraZeneka vaccine being administered to those under 50 when in other countries they are said to be given only those over 50. Unemployed, National Capital District

You still have to wear masks, social distancing, and no guarantee you will be immune from the virus and you may catch the virus even if you are vaccinated, so what's the use of getting vaccinated? Employment not disclosed, National Capital District

Why would I be vaccinated if I am not sick, or COVID-19 tested. I am happy and healthy and moving around freely now. My concern now is I don't know much about this vaccine so if I end up taking it, it might have side effects in my body. So really, I don't want to take it now unless it is tested and proven and properly 100% working fine without any side effects then I can take it. Warehouse store manager, National Capital District

For how long will the vaccine protect me against COVID 19. Will the current vaccines protect me against all strains of COVID 19? HCW, East Sepik

How long will the vaccine be effective in our body? How long are we going to be immune to Covid after been vaccinated? HCW, Western Highlands

I am a victim of covid-19 who has not or is yet to get back to my normal level of physical fitness after I recovered from Covid-19. I'm wondering if I get the vaccine, will it solve my problem or make it worse? HCW, East New Britain

Common sources and most trusted sources of information

Tables 7a and 7b summarise the most common sources accessed for information related to the COVID-19 vaccine and the most trusted sources of information, respectively. Social media (Facebook, Instagram, WhatsApp, YouTube) were the most reported sources of information about the vaccine used by participants, as indicated by over half of survey respondents (56.8%, 544). Of concern is that less than a quarter of participants (22.8%, n=218) accessed government websites. When disaggregated by HCWs, a greater emphasis on sourcing information from local health authorities and health departments was noted, however, social media was similar at 56.7%, (228/407 HCWs). In the open-ended question requesting 'other' sources of information frequently accessed, the WHO was the most commonly mentioned by HCWs and non-HCWs.

The most trusted sources of information related to the vaccine were local health authorities and health department (38%, n=364), and health workers (30.7%, n=294), however, only 32.3% (n=309) and 32.1% (n=307) reported utilising these sources for access to COVID-19 vaccine information, respectively. When disaggregated by HCWs, a greater proportion reported trust in health authorities and the health department (42.8%, 172/402). Interestingly, government websites were trusted less by health workers (14.9%, 60/402) compared to the whole sample.

Table 7a: Most common sources accessed for information on the vaccine, COVID-19 Vaccine Hesitancy Survey (n=957)

Sources of information*	Total (N=957) n (%)	HCWs (n=402) n (%)	Non-HCW (n=555) n (%)
Social Media: Facebook, Instagram, WhatsApp, YouTube	544 (56.8%)	228 (56.7%)	316 (56.9%)
Internet searches	440 (46.0%)	150 (37.3%)	290 (52.2%)
Newspapers	385 (40.2%)	140 (34.8%)	245 (44.1%)
Television	362 (37.8%)	125 (31.0%)	237 (42.7%)
Local health authorities and health department	309 (32.2%)	172 (42.8%)	137 (24.7%)
Health workers	307 (32.1%)	141 (35.1%)	166 (29.9%)
Radio	276 (28.8%)	105 (26.1%)	171 (30.8%)
Work/ My-employer/-colleagues	253 (26.4%)	106 (26.4%)	147 (26.3%)
Government websites	218 (22.8%)	60 (14.9%)	158 (28.5%)
Family and friends	203 (21.2%)	40 (10.0%)	163 (29.4%)
Other	111 (11.6%)	66 (16.4%)	45 (8.1%)
Community members	107 (11.2%)	23 (5.7%)	84 (15.1%)
Church	84 (8.8%)	18 (4.5%)	66 (11.9%)
Prominent leaders in the community	50 (5.2%)	12 (3.0%)	38 (6.8%)
National Toll-Free Hotline 1-800200	36 (3.8%)	6 (1.5%)	30 (5.4%)
Local NGO	29 (3.0%)	9 (2.2%)	20 (3.6%)
Traditional healer	17 (1.8%)	7 (1.7%)	10 (1.8%)

*Multiple options were able to be selected

Table 7b: Trusted sources of information related to the vaccine, COVID-19 Vaccine Hesitancy Survey (n=957)

Trusted sources of information*	Total (N=957) n (%)	HCWs (N=402) n (%)	Non-HCW (N=555) n (%)
Local health authorities and health department	364 (38.0%)	172 (42.8%)	192 (34.6%)
Health workers	294 (30.7%)	113 (28.1%)	181 (32.6%)
Internet searches	244 (25.5%)	71 (17.7%)	173 (31.2%)
Government websites	238 (24.9%)	60 (14.9%)	178 (32.1%)
Newspapers	235 (24.6%)	62 (15.4%)	173 (31.1%)
TV	214 (22.4%)	48 (11.9%)	166 (29.9%)
Radio	170 (17.8%)	35 (8.7%)	135 (24.3%)
Social Media: Facebook, Instagram, WhatsApp, YouTube	142 (14.8%)	31 (7.7%)	111 (20.0%)
Other	133 (13.9%)	87 (21.6%)	46 (8.3%)
Work/ employer/colleagues	114 (11.9%)	59 (14.7%)	55 (10.0%)
National Toll-Free Hotline 1-800200	84 (8.8%)	21 (5.2%)	63 (11.4%)
Family and friends	76 (7.9%)	9 (2.2%)	67 (12.1%)
Church	75 (7.8%)	9 (2.2%)	66 (11.9%)
I would not trust any of these sources	73 (7.6%)	29 (7.2%)	44 (7.9%)
Community members	39 (4.1%)	9 (2.2%)	30 (5.4%)
Local NGO	35 (3.7%)	9 (2.2%)	26 (4.7%)
Prominent leaders in the community	33 (3.4%)	11 (2.7%)	22 (4.0%)

*Multiple options were able to be selected

In addition to being the most trusted source of information, most respondents indicated that they preferred to receive information about the vaccine directly from HCWs (54.9%, n=525), including health workers themselves (58.0%, 233/402). Respondents also indicated a preference for videos featuring people who have received that vaccine sharing their experience (44.9%, n=430). Refer to table 8 for a summary of preferred methods of receiving information about the COVID-19 vaccine.

Table 8: Preferences for receiving information about the vaccine, COVID-19 Vaccine Hesitancy Survey (n=957)

Preferred source of information*	Total (N=957) n(%)	HCWs (n=402) n(%)	Non-HCW (n=555) n(%)
Direct information from health workers	525 (54.9%)	233 (58.0%)	292 (52.6%)
Videos with people who have received the vaccine sharing their experience	430 (44.9%)	129 (32.1%)	301 (54.2%)
Face-to-Face communication from HCWs	410 (42.8%)	196 (48.8%)	214 (38.6%)
Videos of high-profile people talking about the vaccine	249 (26.0%)	74 (18.4%)	175 (31.5%)
Use people in the community to disseminate information so that their own people can understand	185 (19.3%)	67 (16.7%)	118 (21.3%)
Face-to-Face communication with prominent leaders in my community	133 (13.9%)	40 (10.0%)	93 (16.8%)
Church leaders providing correct information during church services	121 (12.6%)	31 (7.7%)	90 (16.2%)

*Multiple options were able to be selected

People in rural areas running away from health centers because of Covid -19. Asking if specialist, expects, doctors could go into the rural areas to make awareness on Covid-19 and the vaccine? Awareness to be well oriented like power point presentations just to convince the people and to educate them about the Covid -19 vaccine. Its better to show and explain. HCW, Western Province

Provide more awareness for the Covid-19 vaccine into rural areas. HCW, Western Province

More awareness on the vaccine, most people in the community do not have access to information and tend to be afraid because they do not know anything about the vaccine. HCW, East New Britain

Awareness has to be done right down to the rural HCWs and also doorstep awareness for the general public so people are aware. HCW, East New Britain

Carry out more awareness on the Covid -19 vaccine so the people in remote places may understand more about the vaccine and not to run away from it or try to attack HCWs. HCW, West New Britain

The views of the public about the vaccine. NDOH need to explain the Covid -19 vaccine in a lamish way for the general public to understand and not to be afraid of the vaccine but to be in a good understanding to come and be vaccinated. Environmental Health Officer, Milne Bay

Awareness has to go right into the rural areas because that's where a whole other half of the population is and most are illiterate, and they tend to be afraid of the things they do not understand and it makes it very challenging for frontline workers to reach out to them. HCW, Oro

We need to educate our people so that they'll understand properly and accept the Vaccine' because right now they're afraid. HCW, Oro

There hasn't been enough Advocacy and Awareness on this vaccine to our Rural Population. This is one reason negative information on social media has influenced our people on not accepting the vaccine. More Awareness and Advocacy must be conducted by vaccine experts to clear people's doubts so that people will come to accept the vaccine. Otherwise, HCWs will be violated and abused when conducting vaccination. HCW, West Sepik

DISCUSSION

PNG confirmed its first COVID-19 case on March 1st 2020 and as of 31st May 2021, a total of 15,848 confirmed COVID-19 cases have been reported, with 162 deaths. During March through May 2021, PNG has experienced a surge in cases nationwide, with 100-550 cases reported daily.⁵ Many health care facilities have had their capacity stretched responding to COVID-19 patients or have closed down due staff shortages.⁹ HCWs have been disproportionately impacted in PNG, with at least 10% of cases occurring among frontline workers.¹⁰

The vaccination campaign is fundamental to the control of the COVID-19 epidemic in the country and to mitigate the disruption of routine medical and public health services across the country. The Joint Agency Taskforce National Control Centre for COVID-19 has developed a strategy for vaccine roll out, starting with Phase One priority workers. The WHO COVAX initiative and the Australian Government have committed at least 140,000 doses of the Astra Zeneca vaccine for PNG to vaccinate priority Phase One workers within the next few months, with subsequent shipments planned to vaccinate vulnerable citizens (Phase Two).¹¹ As of May 25, 2021, 26,759 vaccines had been administered, including 4,831 health care workers.⁵

The delivery of primary health services in Papua New Guinea is extremely challenging, with over 800 different languages spoken and 80% of the population living in a rural and remote settings that are often very difficult to access by road.¹² Misinformation and distrust has complicated vaccination campaigns in PNG in the past, including the recent polio campaign, and an understanding of the key concerns and best methods for engagement with priority workers and the community is necessary for the national COVID-19 vaccination campaign to be effective.¹³

The main objective of this study was to understand from HCWs and community members the common concerns about the COVID-19 vaccine and identify the most effective communication tools and pathways to improve vaccine uptake.

Our findings have shown that only 45% of survey respondents are willing to have the COVID-19 vaccine, and only 58% of frontline HCWs. These findings are not unique to PNG. A systematic review of 31 articles from 33 countries revealed COVID-19 vaccine willingness rates ranging from 23-97%.¹⁴ Vaccine willingness rates were highest in east and South East Asia. To date, there have been no publications regarding COVID-19 vaccine hesitancy in the Asia Pacific, and only one pre-print article that is specific to Astra Zeneca hesitancy, in the United Kingdom.

Our findings show that action must be taken urgently to address the key concerns that are driving vaccine hesitancy in PNG priority workers and the wider community.

Addressing key concerns and information needs about the vaccine

The emergence of a novel virus capable of severe health and economic impacts has shaken the world. While the development of a vaccine is welcome by many as the primary means of reducing disease burden due to COVID-19, the rapid development of the vaccine within a one year time frame, as well as notifications of potential severe adverse events, has raised concerns in populations globally.¹⁵ These elements, combined with widespread sharing of misinformation and myths about the vaccine has created a complex interplay of vaccine hesitancy to address in many countries, including PNG. Several news articles have been published regarding vaccine hesitancy and the misinfodemic occurring in PNG, especially circulating myths and conspiracies, but until now a systematic survey of the population to understand concerns and beliefs in the community had not been conducted.^{16,17}

Our survey had a number of impactful findings with regards to concerns about the COVID-19 vaccine. Key concerns indicated by survey respondents revolved much more about vaccine development and safety (63% and 46% of respondents, respectively) and less around stories or conspiracies (20-30% of respondents) about the vaccine. Respondents were particularly concerned about side effects, where the vaccine comes from, how the vaccine could be developed so quickly, and what the vaccine is made from. These were also highlighted as important information needs by respondents. Other studies have highlighted the importance of vaccine safety concerns. An electronic survey administered by Finnish researchers via Facebook found that the strongest predictor of intentions to accept a COVID-19 vaccine recommended by authorities was the degree to which respondents trusted the vaccine to be safe.¹⁸ Two studies conducted in the United States among HCWs and the general adult population highlighted that vaccine safety and speed of development were the most common concerns or reasons for not wanting to be vaccinated.^{19,20} Targeting educational materials to address key concerns and information needs about safety and vaccine development is likely to address important foundations of vaccine hesitancy in PNG.

Delivering information using trusted sources and preferred methods

As for many countries, public health authorities have been actively encouraging the PNG population to be vaccinated. Strategies have included televising the Prime Minister receiving his vaccination, posters (see cover photo), and short sharp graphical videos with information about the virus that have been distributed on social media.

This survey provided insight into who PNG citizens trust to provide accurate information about the COVID-19 vaccine, and how they prefer to receive information. Over half of the respondents indicated that they trust the local health authorities and HCWs the most - more so than internet searches, government websites, newspapers, television, and social media. The survey also highlighted that most respondents preferred to receive information about the vaccine directly from HCWs. These findings provide valuable guidance to develop risk communication messages and strategies. While the importance of HCWs in promoting vaccination uptake is widely acknowledged, many vaccine campaigns emphasise gaining endorsements from community leaders.^{21,22} Based on our findings, education and training should be targeted towards local health authorities and front line HCWs who are likely to be asked questions about the vaccine by community members and need to feel empowered to confidently answer these questions and promote vaccine uptake in their local area. To increase trust, informational materials developed nationally should be adapted and branded by local health authorities.

Almost half of respondents indicated that they preferred to see videos of people talking about the vaccine and their experiences. People featured in these videos do not necessarily need to be 'high profile' in the community; only one third of survey respondents prefer videos of high-profile people talking about the vaccine. It is likely that the appeal of seeing others receive the vaccine, and talk about their experience, alleviates fears, and provides normalcy to the vaccination roll out. The strategy of "transforming individual vaccination decisions into a public act" has been discussed as a method to improve COVID-19 vaccine uptake, though the impact of such social accountability

and normalisation approaches has not been widely assessed.²²

The importance of frontline HCWs

Perhaps the most surprising finding from this survey was that most PNG citizens look to local health authorities and HCWs as their most trusted source of information, and that they prefer to receive information from HCWs. While resources should still be allocated towards education of prominent community leaders and church leaders, addressing vaccine hesitancy amongst HCWs must be urgently prioritised. Not only are they at high risk of contracting COVID-19, they are the key influencers in the community. Efforts should focus on educating and equipping HCWs to engage with community members and advocate for the vaccine. That only 58% of HCWs who completed this survey were willing to receive the COVID-19 vaccine shows that education is drastically required, and ideally delivered from other, trusted HCWs. As of the 25th May less than 17% of HCWs and 25% of other essential workers had received the COVID-19 vaccine, despite the first vaccination being given on the 29th March and the national roll out of the first phase, targeted at HCWs and other essential workers, commencing on the 4th May.

It is likely that a successful uptake of COVID-19 vaccination in HCWs in PNG would drive an increased uptake in the community, and encouragement and empowerment of this critical workforce should be a national priority.

Strengths and Limitations

This national survey via telephone interview of HCWs and broad dissemination of an online link was successful in gaining a substantial number of responses in a short span of time. The achievement of a 64% response rate using the telephone interview approach used in the previous HCW swabbing survey reaffirms that telephone surveys are a useful data collection method for operational public health research in PNG. A limitation we faced is that the completeness of the list used as the study population for telephone interviews was uncertain, however, as this study was focused on gaining the perspective of HCWs in general we do not anticipate this influenced the findings. The survey population listed included HCWs from every Province and over 80% of Districts, enabling the capture of views from across the country.

The utilisation of different methods for disseminating an electronic survey, including social media networks, collaboration with UNICEF's UReport, and Digicel's SMS blast resulted in over 500 responses, demonstrating electronic surveys could prove useful as a means for rapid data collection in public health emergencies. However, given that the online survey link was distributed via SMS blast and social media, the sample for the online survey is likely to have been biased towards people in PNG who own phones and have access to internet. As it is not possible to estimate a denominator for surveys distributed across multiple mediums we are unable to estimate a response rate for the electronic survey. The RedCap platform used did not allow us to capture the number of clicks on the survey link and compare this to the number of survey completions.

As we purposefully did not ask respondents of the online survey to submit an identifier in the survey it is possible that duplicate surveys were included in the analysis if multiple online forms were submitted by one respondent.

CONCLUSION

Since the start of the COVID-19 pandemic, there have been limited studies conducted to understand drivers of vaccine hesitancy. The importance of understanding such drivers are paramount in a country as culturally diverse as PNG. This is the first study conducted in PNG to understand from HCWs and community members the common concerns about the COVID-19

vaccine and identify the most effective communication tools and pathways to improve vaccine uptake.

The study concludes that concerns about vaccine safety and development are likely major drivers of vaccine hesitancy. The study identified local health authorities and HCWs are the most trusted sources of information about the COVID-19 vaccine, and that community members prefer to receive information from HCWs. The prioritisation of educational capacity development should be directed towards HCWs and local health authority staff.

We recommend follow-up studies to assess and evaluate the impact of interventions designed to improve vaccine uptake in priority phase one workers and the provision of ongoing feedback to strengthen the national roll out of the COVID-19 vaccine in PNG.

Before rolling out the vaccine the government should do a mass awareness targeting the rural population of Papua New Guinea. People are afraid of the vaccine because they are not aware. There us a lack of information on this vaccine. HCW, West Sepik

Can the WHO or NDOH provide more training about the Covid -19 vaccine for all nurses, HCWs? So that they can provide good and acurate informations out to the public. Is it safe for breastfeeding mothers to be vaccinated? HCW, Hela

TRANSLATIONAL IMPACTS

Infographic

The infographic produced weekly throughout the data collection period was used in media training and advocacy, generating much interest and many questions related to vaccine hesitancy (a

The infographic was presented to the National Control Centre COVID-19 Task Force and presented by the Health Secretary at a joint partner meeting focused on the COVID-19 vaccine roll out.

The weekly infographics were also shared on social media posts through a variety of networks across PNG and globally.

Questions and Answers

A vaccine question and answer pocket guide was developed for HCWs as a tool to assist them in answering questions about the vaccine in the community. The pocket guide has been distributed during rapid response team training in several provinces.

A question-and-answer page related to the vaccine was added on the Field Epidemiology in Action webpage and the link shared through field epidemiology networks in PNG.

<https://www.fieldepiinaction.com/vaccine-hesitancy>

Risk Communications Webinar

In recognition of the importance of risk communication and disseminating accurate information

about the vaccination to health workers and the population, the Field Epi in Action team and FETPNG team organised a Risk Communication for COVID-19 Webinar on Wednesday 2nd June with Pele Ursila Melepia from the Burnet Institute and Marilyn Poli, manager for policy and research in the Autonomous Region of Bougainville.



Photo: The Western Highlands Rapid Response Team watching the Risk Communication for COVID-19 Webinar on June 2nd

Video

Findings from the survey indicated respondents preferred to receive information from HCWs, and to see videos of people talking about their experience of having received the COVID-19 vaccine. Our team created a video recording of Martha Pogo (Acting Manager for the Expanded Program on Immunization for the NDoH and National Lead for the COVID-19 vaccine roll out) talking about her vaccination experience and vaccine safety. This short video clip was made available online (FEIA website and YouTube) and shared widely on social media (WhatsApp, Twitter and Facebook) (Figure 6).

The link to the recording is available h: [A message from Martha Pogo](#)

Field Epidemiology in Action @fieldepi_action · May 20

We love these simple, practical tips for being #VaccineChampions out in the community:

1. Share your story
2. Work together with other vaccine advocates
3. Help people find answers
4. Address vaccine misinformation
5. Encourage vaccination

#CommunityEngagement #FETP #SciComm

Jessica Kaufman @JessicaKaufman · May 20

A good media campaign about COVID vaccination is important, but to really increase acceptance you can't beat talking to people one on one, normalising vaccination and helping them find answers to their questions. @DanchinMargie @hollyseale @JulieLeask theconversation.com/from-faith-lea...

1 2 3

Field Epidemiology in Action @fieldepi_action

Replying to @fieldepi_action

Following idea number 1 and 5, one of our #FETP graduates (and Acting Manager of EPI) in #PNG Martha Pogo shares her vaccination story and encourages her colleagues to also get vaccinated here 🙌

A message from Martha Pogo — Field Epidemiology in Action FETPNG graduate, now-FETPNG faculty and Acting Manager of the Expanded Program for Immunisation for National ...
@fieldepiinaction.com

11:55 AM · May 20, 2021 · Twitter Web App

2 Retweets 5 Likes

Presenting findings from the study

The study team presented at the Royal Australasian College of Physicians webinar on Vaccine Hesitancy in the Pacific, where they was joined by representative from the Fiji Ministry of Health and Fiji National University.

The study team presented at TEPHINET's global teleconference focused on the theme of risk communication and community engagement in the context of COVID-19 vaccine hesitancy. Presentations will from the PNG FETP, Uganda Public Health Fellowship Program, Zambia FETP, Tunisia FETP, and Nigeria FELTP.

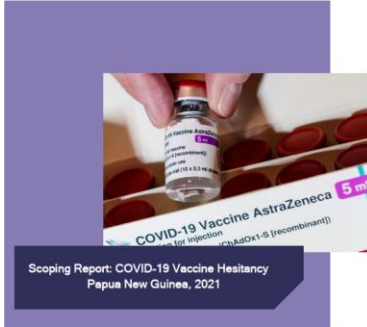
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Appendix 1

Initial scoping report that informed Survey development, to access click [here](#)



COVID-19 vaccine hesitancy in essential workers and the general community in Papua New Guinea: an exploratory mixed-methods study



Appendix 2

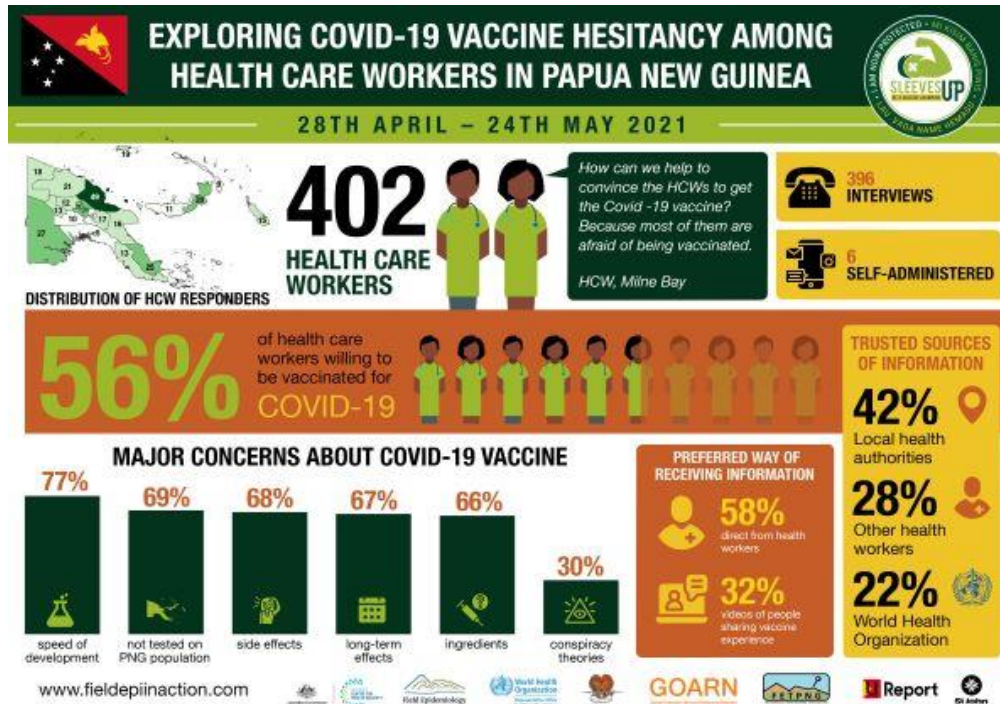
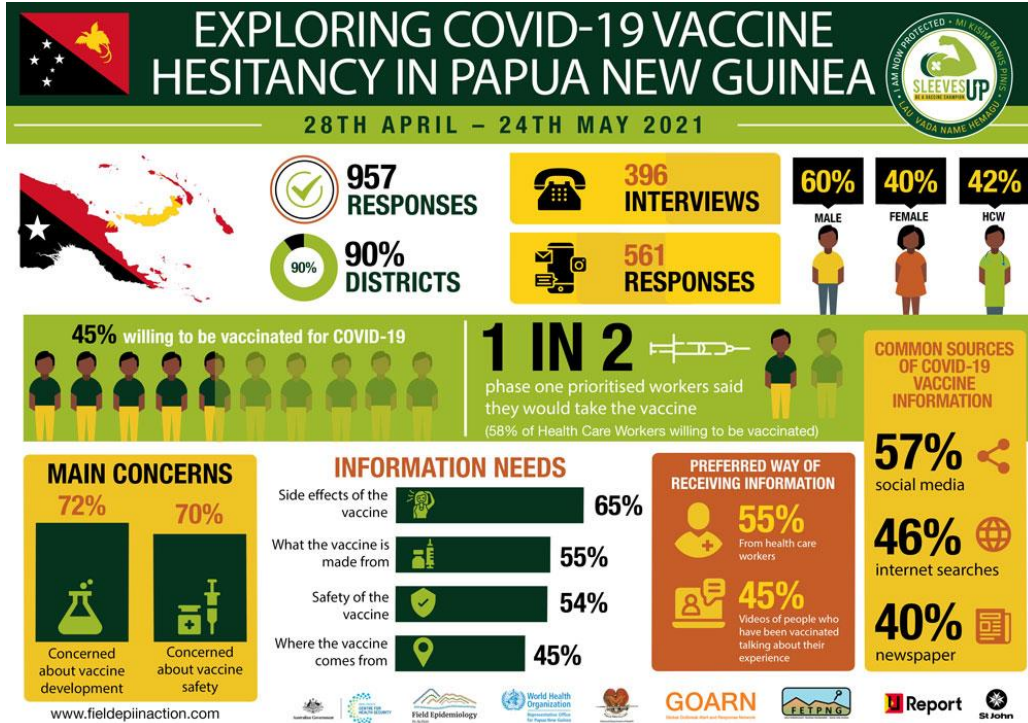
Vaccine Hesitancy Survey Questionnaire, English, to access click [here](#)

PNG COVID-19 Vaccine Hesitancy Study – Final Online English
Vaccine Hesitancy: Draft Questionnaire, Papua New Guinea 2021

No	Questions/Interviewer script	Notes for Interviewers
<p>Key *Interviewer script + questions – bold *Interviewer prompts – not bolded and italicized, with [] *Response options – normal text</p>		
	<p>Interview Date / survey access date (online): ___/___/___ (autoinsert)</p>	
	<p>We are sending this survey to community members across PNG to understand their thoughts and beliefs about the COVID-19 vaccine. The Public Health Authority (PHA) have all received a letter signed by the Incident Manager informing them of this survey. The information you provide would help us understand concerns about the vaccine and help us provide correct information to you, your family, colleagues and community.</p> <p>We want to let you know that this short survey is confidential – meaning, we will not be recording your name on the form. We will be asking some questions about where you get your information about the COVID-19 vaccine, which sources of information you trust, and what you think about the vaccine. We also want to know how you would like to receive information about the vaccine and about COVID-19 in the future.</p> <p>The survey will take about 10-15 minutes of your time. Once you have submitted the survey you will be directed to a page where you can enter your details to go into a draw to win 50 Kina of cash.</p>	
	<p>Are you happy to continue?</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p>	
	<p><i>[only interview administered survey]</i> Thankyou. Please ask me to explain any questions that are not clear and let me know if you would prefer not to answer a question. You are free to stop the interview at any time.</p> <p>Would you like the interview to be in English, Tok Pisin or Motu?</p> <p><input type="checkbox"/> English <input type="checkbox"/> Tok Pisin</p>	<p><i>This will only appear if they answer yes to Q3</i></p>
	<p>Do you mind telling me why you do not want to be interviewed? <i>[free text box]</i></p>	<p><i>This will only appear if they answer no to Q3</i></p>
1.	Can you tell me which province you live in?	

Appendix 3

Weekly infographic disseminated weekly during the data collection period.



Appendix 4

Official letter of permission to conduct the vaccine hesitancy survey



CIRCULAR NO: 21/2021

12th April, 2021

To: PHA CEO's
PHA Director Public Health
PHA Incident Managers

AN INVESTIGATION INTO BELIEFS AND ATTITUDES TOWARDS THE COVID-19 VACCINE

As you are aware, the first doses of the AstraZeneca COVID-19 vaccine have already arrived in Papua New Guinea (PNG) in early April 2021, with the roll out of the vaccination campaign targeting essential workers in its initial phase. With Papua New Guinea experiencing a surge in cases, many of whom are amongst health care workers, the uptake of the COVID-19 vaccination is going to be an essential control strategy for containing the pandemic in PNG.

Vaccine hesitancy is defined as 'a delay in acceptance or refusal of vaccination despite availability of vaccination services. Misinformation and lack of information propagate vaccine hesitancy and are a threat to the containment of the COVID-19 pandemic. In addition, the speed at which the COVID-19 vaccinations have been developed and released for emergency use has increased anxiety related to the unknown. Understanding people's concerns about being vaccinated against COVID-19 is essential to target messaging and responses that provide timely and accurate information, while acknowledging and respecting concerns.

The NDoH is planning to administer a survey in all 22 Provinces to gain a national understanding of people's knowledge, beliefs and attitudes toward the COVID-19 vaccination. The survey will be administered in a few different ways.

1. Telephone survey, the same as the recent health care workers survey on COVID-19 swabbing.
2. Interview administered survey – graduates of the Field Epidemiology Training Program will administer the survey to key people identified as prioritised for the first phase of the COVID-19 vaccine roll out. These include health care workers public and private including all support i.e. pharmacist, lab workers, clerks, cleaners, grounds keeper, security guard at hospital or health facility. All frontline workers in COVID-19 response national and provincial, paramedical students (nursing, lab, CHW), prison guards/correctional services, border and immigration/customs officials, port/immigrations officials, airport workers, especially frontline dealing with customers, workers at quarantine facilities/hotels, police, teachers, defence force personnel.

3. An online survey – this will be circulated through social media networks to the wider community in an effort to understand community perceptions towards the COVID-19 vaccine and trusted sources of information.

Information gained during the survey will inform public health messaging targeted at specific myths circulating in PNG, and providing accurate up to date information on the COVID-19 vaccine. Upon completion of this investigation, the full report will be presented to the National COVID-19 Task Force and distributed to all PHAs. An abridged report will also be sent to the PHA with the request to circulate widely through networks so that those who have participated in the survey have the opportunity to view the findings and recommendations.

If you require any further information, please do not hesitate to contact the team.

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Thank you.

DR OSBORNE LIKO
Secretary

Appendix 5

Table A1: Provincial breakdown of all survey participants and by health care worker status, COVID-19 Vaccine Hesitancy Survey (n=957)

Province (N=22)	Number of Districts in the Province	Number of Districts Participating	Number (%) of total respondents from each province	Number (%) of health workers from each province
TOTAL	89	80	957*	402
Autonomous Region of Bougainville	3	3	28 (3.0%)	15 (3.7%)
Central	4	3	36 (3.9%)	13 (3.2%)
Easter Highlands	8	8	42 (4.6%)	17 (4.2%)
East New Britain	4	4	49 (5.3%)	28 (7.0%)
East Sepik	6	6	72 (7.8%)	21 (5.2%)
Enga	5	4	20 (2.2%)	12 (3.0%)
Gulf	2	1	<5	<5
Hela	3	3	17 (1.8%)	13 (3.2%)
Jiwaka	3	3	27 (2.9%)	23 (5.7%)
Madang	6	6	64 (6.9%)	49 (12.2%)
Manus	1	1	23 (2.4%)	19 (4.7%)
Milne Bay	4	4	15 (1.6%)	7 (1.7%)
Morobe	9	8	53 (5.8%)	16 (4.0%)
National Capital District	1	1	272 (29.5%)	44 (11.0%)
New Ireland	2	2	23 (2.5%)	9 (2.2%)
Oro (Northern)	2	2	43 (4.7%)	25 (6.2%)
Sandaun (West Sepik)	4	4	30 (3.3%)	18 (4.5%)
Simbu (Chimbu)	6	4	9 (1.0%)	2 (0.5%)
Southern Highlands	5	5	16 (1.7%)	10 (2.5%)
Western (Fly)	3	3	35 (3.8%)	27 (6.7%)
West New Britain	2	2	21 (2.3%)	11 (2.7%)
Western Highlands	4	4	47 (5.1%)	22 (5.5%)

*14 observations were missing data on Province

