COVID-19 Vaccine Uptake and Hesitancy Survey in Northern Ireland and the Republic of Ireland: Applying the Theory of Planned Behaviour

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Publication Status:
Published (in print/issue): 25/03/2021

HSC R&D Behaviour Change Group

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Report No: #
COVID-19 Behaviour Change Cell
Date: 24/03/2021

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Executive Summary

The global COVID-19 pandemic first appeared in Wuhan, China in late 2019 (World Health Organisation, 2020) and since then has caused unprecedented economic and social disruption as well as presenting a major challenge to public health (World Health Organisation, 2020).

On the 8th December 2020 the first person in the UK received a Coronavirus vaccination, since then efforts to roll out the vaccine have been encouraging. As of March 15th, 2021, 24, 453,221 individuals have received their first vaccine dose, while 1,610,280 have received a second dose. In Northern Ireland 629, 461 received a first dose and 54,636 received a second dose (Public Health England 2021).

Despite the mass progress in the public health distribution of vaccinations, there are individuals who will perceive vaccination as unsafe and/or unnecessary. Vaccine hesitancy also known as anti-vaccination or anti-vax is when there is a delay in acceptance or refusal of a vaccine by an individual despite their availability to the public.

The overall aims of the survey were to assess COVID-19 vaccine uptake and hesitancy in Northern Ireland and the Republic of Ireland, and to offer evidence-based guidance on promoting uptake and reducing hesitancy.

Key findings:

- 66.7% of the sample intended to get a vaccination as soon as possible
- 27.15% reported that they will get their vaccine when others get theirs and when it is clear there are no side effects.
- 6.15% of the sample have no intention of getting a vaccine
- There is a high mean intention (M=6.12) to get a COVID-19 vaccine (TPB)
- There is a high level of confidence to get a COVID-19 vaccine (VCS)
- There was low vaccine hesitancy (score (M=2.49) as measured by the VAX scale
- There is uncertainty and mistrust of side effects for children, this may because there is no vaccine currently available for children, or parents being apprehensive about children receiving a safe vaccine in the future.

The report includes a detailed breakdown of the survey questions, and recommendations. A summary powerpoint presentation of the report is also available. Follow up interviews are currently underway with a subsample of those surveyed who were hesitant to receive a vaccine.

Cite as:

Breslin, Dempster, Berry, Cavanagh & Armstrong on behalf of the Public Health Agency Behaviour Change Group. _COVID-19 Vaccine Uptake and Hesitancy Survey in Northern Ireland and the Republic of Ireland: Applying the Theory of Planned Behaviour title_, Report No: #. Public Health Agency: Belfast; March 2021.

Introduction

The global COVID-19 pandemic first appeared in Wuhan, China in late 2019 (World Health Organisation, 2020) and since then has caused unprecedented economic and social disruption as well as presenting a major challenge to public health (World Health Organisation, 2020). As of March 12th, 2021, the disease has infected more than 118, 707, 983 people with 2, 631,385 deaths worldwide. In Europe there has been 38, 947, 362 confirmed cases and 881,973 reported deaths (Dong & Gardner, 2021). In the United Kingdom 4.26 million (England=3.73m; Scotland =210K; Wales = 207K; Northern Ireland =115K) cases of coronavirus and 126,000 (England= 111K; Scotland =7,510; Wales = 5,454; Northern Ireland =2099) deaths are reported (Dong & Gardner, 2021), while in the Republic of Ireland 227K confirmed cases and 4,534 deaths were reported.

Due to the initial lack of a vaccine governments worldwide introduced extreme lockdown and quarantine measures, social distancing, and restrictions in face to face education, workplace and commercially available shopping services all to protect the vulnerable and restrict demand on health care services. The impact on these lockdowns has seen an increase in unemployment rates, employees being furloughed, business disruption and school and university closure, with children being home schooled by parents/family, and university teaching being delivered online.

COVID-19 Vaccine

The development of an effective vaccine against coronavirus to avoid further human and social, and economic loss was required. Vaccinations are an important method of public health disease prevention involving the administration of a microorganism in a live, killed or weakened state to stimulate immunity against disease (Centers for Disease Control and Prevention, 2018).The development of a vaccine was expedited by the United Kingdom (UK) Government Vaccine Taskforce (VTF) with several Covid-19 vaccine trials undertaken to identify which vaccines are both safe and effective, so that vaccination programmes can start as early as possible.

On the 8th December 2020 the first person in the UK received a Coronavirus vaccination, since then efforts to roll out the vaccine have been encouraging. As of March 15th, 2021, 24, 453,221 individuals have received their first vaccine dose, while 1,610,280 have received a second dose. In Northern Ireland 629, 461 received a first dose and 54,636 received a second dose of a vaccine (Public Health England 2021). Vaccine distribution is different between NI and Republic of Ireland. In the Republic of Ireland as of the 13th March 2021 451,589 individuals received a first vaccine dose while 164,345 had received a second dose (Government of Ireland, Health Executive Service, 2021).

Encouragingly, 79% of 140,000 people surveyed in 140 countries indicated vaccines are safe and 73% reported that they trusted a doctor or nurse more than any other source of health advice (The Wellcome Trust, 2019). From the same survey of UK respondents (n=1000) 75% felt that vaccines were safe, and 95% of those with children have had their children vaccinated. These figures are similar to those in the Republic of Ireland, where 73% of participants felt vaccines were safe, and 93% have had their children vaccinated.
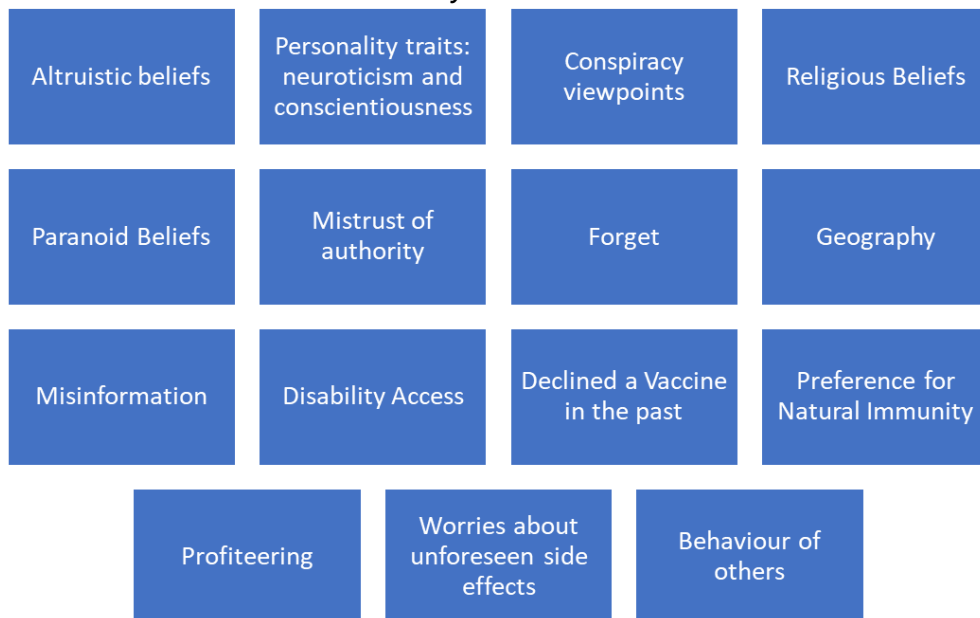
Vaccine Hesitancy

Despite the mass progress in the public health distribution of the vaccinations, there are individuals who will perceive vaccination as unsafe and/or unnecessary (Dubé et al., 2013). Vaccine hesitancy (also known as anti-vaccination or anti-vax) is defined as the delay in acceptance or refusal of a vaccine despite their availability to the public (Butler & MacDonald, 2018). Pre COVID-19, vaccine hesitancy was listed as one of the top ten threats to global public health, as a result it was recommended that countries incorporate plans to measure and address vaccine hesitancy into their public health programmes (WHO, 2018).

There are several explanations for vaccine hesitancy, some of which are medical and ethical concerns that have been in existence since the emergence of vaccines in the 1700's (Schwartz, 2012, Hussain et al., 2018). Recently, in 2019 the WHO identified complacency and inconvenience in accessing vaccines as some of the key reasons underlying vaccine hesitancy. Several psychological have also been proposed. These include: confidence to get a vaccine, altruistic beliefs about who is being protected; personality traits such as neuroticism and conscientiousness, conspiracy, religious beliefs, paranoid beliefs, mistrust of authority and the attitudes and behaviour of others (family, friends and health professionals) towards vaccines (Murphy et al, 2021).

Factors found to increase hesitancy include: forgetting to register for a vaccine, location of the vaccine centre, misinformation, lack of disabled access, previously declining a vaccine, a preference for natural immunity and worries about unforeseen future side effects of receiving a vaccine. A list of factors are shown in Figure 1.

Figure 1: Reasons for Vaccine Hesitancy

Vaccine Hesitancy and children

Vaccine hesitancy does not appear to be the same across the population. Over a decade ago hesitancy was reported to be on the rise amongst parents (Gowda & Dempsey, 2013) with concerns and a distrust about the potential side effects vaccines can have on children in the immediate and short-term. This distrust in vaccines for children may be in part due to a discredited case series in the Lancet (1997) that suggested measles, mumps and rubella (MMR) vaccine predisposed children to behavioural regression and pervasive developmental disorder (Rao & Andrade, 2011). The Lancet publication led to a plethora of studies, refuting the link between autism and vaccination (Taylor et al., 1999, Dales et al., 2001), although damage to parental confidence, and public opinion on vaccine certainty for children may have already occurred, evident in a measles outbreaks in the UK, USA and Canada in 2008/2009 due in part to parental hesitancy and children not being vaccinated (Eggertson, 2010). This finding would then suggest that public health authorities and effective communication to the public plays an important role in ensuring scientific guidance and information on vaccines is not misleading, and that anti-immunisation rhetoric or fashionable conspiracy theories are downplayed. According to Keelan et al., (2007) online anti-immunisation videos have gained a large viewing by the public, and social media support. The effects of anti-vaccine media has been shown to influence public attitudes, beliefs, and perceived social norms as predictors of vaccine uptake (Britt & Englebert, 2018). Vaccine Hesitancy and COVID-19.

Unfortunately, Covid-19 vaccine hesitancy research is limited in Northern Ireland and the Republic of Ireland making public health decisions regarding communicating effectively with the public more difficult. A study by Murphy et al (2021) examined the factors that influence vaccine hesitancy and uptake, they showed 35% of those in Republic of Ireland and 48.9% in Northern Ireland (Murphy, et al., 2021) were hesitant. The survey was conducted during the first COVID-19 national lockdown when a vaccine hadn't been developed, hence views of the public on a vaccine could be very different, furthermore a small sample size from NI (n=46) took part. To date, no studies have included a psychological behaviour change theory to predict COVID-19 vaccine uptake in NI that would provide a further level of detail when advising the public health authorities.

Psychological Behaviour Change

Several psychological behaviour change theories have their origins in social, and cognitive sciences, and explain, how and why individuals engage in intentional health behaviours (Craig et al., 2013; Hagger & Chatzisarantis, 2014). By integrating psychological behaviour change theory such as the Theory of Planned Behaviour into survey design of health intention and behaviours, the psychological mechanisms of behaviour change can be better understood, then operationalized when making recommendations on public health messaging (National Institute for Health & Care Excellence, 2018).

The Theory of Planned Behaviour (TPB, Ajzen, 1991) states that an individual's attitudes/beliefs, subjective norms and perceived behavioural control predict intentions and subsequent behaviours. The TPB, has been used previously to explain vaccine uptake, although the current study is the first where TPB will be applied to COVID-19 vaccine uptake and hesitancy in NI. As

already described in the introduction there are many factors that can predict hesitancy and uptake, so in addition to TPB factors, other factors will be included as predictors. These other factors include: Participant Demographics (Age, Gender, Employment, Educational Level, Ethnicity), Previous Experience of COVID-19 (i.e., having had a positive test for COVID-19, having had to self-isolation, knowing someone who has had COVID-19, knowing someone who has had a vaccine or being at an increased risk of COVID-19). Finally, as mistrust and confidence in the effectiveness of vaccines has been a reported issue for parents consenting to children receiving vaccines, parental mistrust and confidence in children being vaccinated will be included.

Aims of the Study

1.   To assess COVID-19 vaccine uptake and hesitancy in Northern Ireland and the Republic of Ireland.
2.   To assess Attitudes, Subjective Norms and Perceived Behavioural Control as predictors of intentions to vaccinate against COVID-19.
3.   To consider Demographic factors, Confidence in getting a vaccine and Previous experiences of COVID-19 on intention to vaccinate.
4.   To consider confidence in giving the COVID-19 vaccine to children
5.   To offer some suggestions for promoting uptake and reducing hesitancy.

Method

Research Design and Recruitment

Participants were recruited via social media platforms, Twitter and Facebook. Data was collected via a Qualtrics cross sectional survey between 29/01/2021 – 23/02/2021 (i.e. seven weeks after the first COVID-19 Vaccination, and during a national lockdown in NI and ROI).

Measures included in the Survey

Previous Experience of COVID-19

All participants reported either yes or no to: having had a positive test for COVID-19; are they at an increased risk of COVID-19; have they had to self-isolate; did they know someone with COVID-19; and did they know someone who had received a COVID-19 vaccination.

Vaccine Confidence Scale (Gilkey et al., 2014)

Consists of eight items assessing three factors: benefits of vaccination (Benefits), the harms of vaccination (Harms), and trust in health care providers (Trust). Each item used an 11-point response scale ranging from 0 (strongly disagree) to 10 (strongly agree). The scale is valid and reliable across many diverse populations (Gilkey et al., 2014: Gilkey et al., 2016).

Vaccine Attitudes Examination Scale (VAX) (Martin & Petrie, 2017)

Consists of 12 items assessing four factors (Vaccine Mistrust, future worries, profiteering, and preference for natural immunity). Items were presented in the form of statements, with

responses on a 6-point Likert-type scale ranging from "strongly agree" to "strongly disagree." Higher scores reflect stronger antivaccination attitudes.

Adapted version of Theory of Planned Behaviour Vaccine Questionnaire (Ajzen, 2013) Consists of 19 items that assess Attitudes, Subjective Norm, Perceived Behavioural Control and Intentions to receive a COVID-19 vaccination. Items were presented in a 7-point Likert Scale ranging from "strongly disagree" to "strongly agree". In the absence of a COVID-19 questionnaire, the original scale was adapted to include the word COVID-19 in items when referring to vaccination to make the scale specific to assessment of COVID-19.

Ethical Approval

Ethical approval was granted by Ulster University. All participants provided informed consent and were free to withdraw at any time. No personal identifying data was collected to ensure confidentiality. Participants on completion of the survey were invited to follow a separate online weblink to take part in interviews to discuss vaccine hesitancy, the interviews are ongoing and will be reported separately.

Data Handling

The mean or sum of participants' responses were calculated as per the scoring criteria for each measure. Analysis was conducted using Statistical Package for the Social Sciences 26 (copyright IBM corp., NY, USA) with the alpha level set to $p < .05$. Pearson's correlations were considered weak, moderate and strong when $r = .20$, $.50$ and $.80$ respectively. Given the sample size was n= 386, central limit theorem inferred the data was normally distributed. Levene's tests confirmed homogeneity of variances for all statistical tests henceforth. Pearson's bivariate correlations were conducted to assess whether relationships existed between TPB factors, VAX, VCS. Independent samples t-tests assessed whether there was a significant difference in gender or country. Linear Regression analysis was calculated to establish a best fit model for predicting vaccine intentions using the Theory of Planned Behaviour Factors (Attitudes, Subjective Norms, Perceived Competence, Intentions, gender and previous experience of COVID-19).

Results

Participant Demographics
A total of 439 participants took part with 386 (Mean Age = 42.23; SD = 12.16; Range = 19-81; 83% = female, 17% = male) completing all questions.
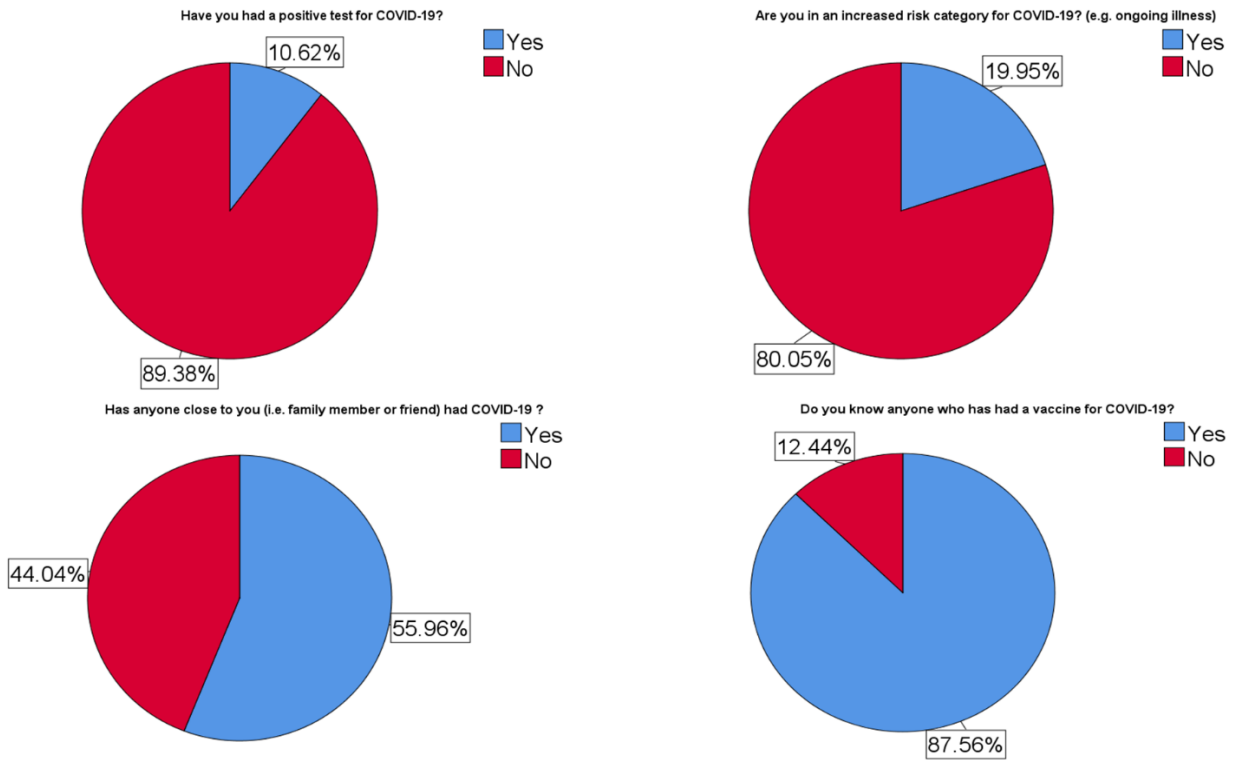
53% were from Northern Ireland, 43% Republic of Ireland, 5% from Germany, England, or USA.
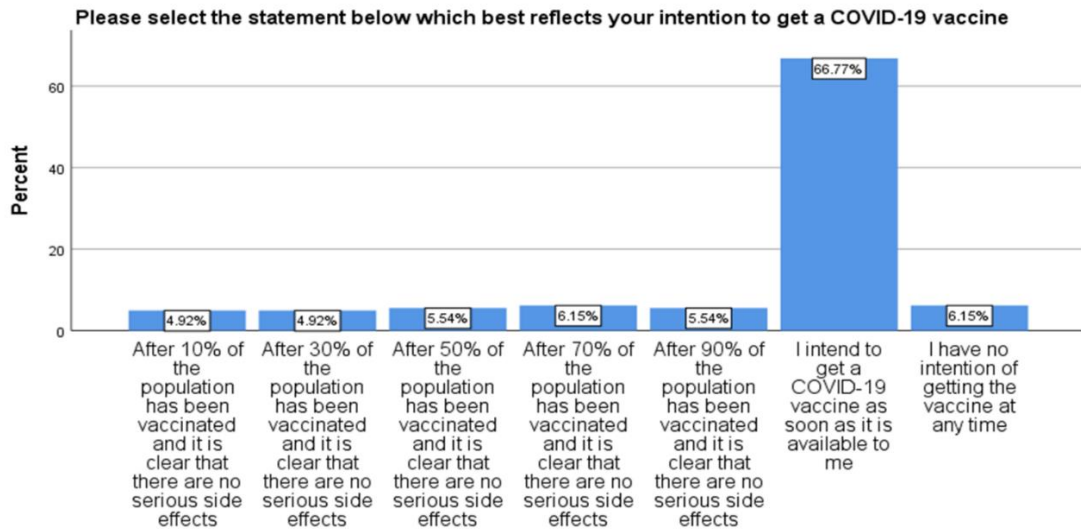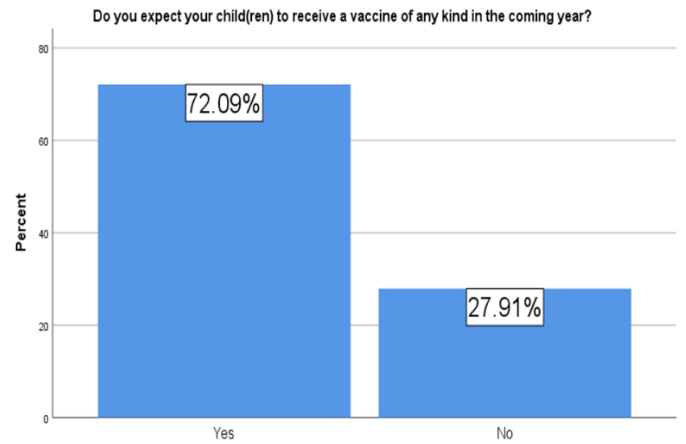
The majority of the sample were white 99%, .3% were Hispanic Latino, .3% Black, and .3% Mixed Race.

Educational achievement included University Bachelor Degree =7.3%, Master's Degree = 13.2%, PhD or higher =11.7%, Trade/school 39.1%, and 28.8% preferred not to say.

Most of the sample were in full time employment =53.4%, employed part time =19.2%, retired =9.6%, Unemployed/furloughed as a result of Covid-19 =6.7%, Unemployed seeking employment = 5.3%, and 6% preferred not to say.

Experience of COVID-19 and Views on Vaccination Uptake

Have you had a positive test for COVID-19?

10.62%

89.38%

Yes
No

Are you in an increased risk category for COVID-19? (e.g. ongoing illness)

19.95%

80.05%

Yes
No

Has anyone close to you (i.e. family member or friend) had COVID-19 ?

44.04%

55.96%

Yes
No

Do you know anyone who has had a vaccine for COVID-19?

12.44%

87.56%

Yes
No

Do you expect to get a vaccine of any kind in the coming year?

Percent

Yes	No
84.81%	15.19%

Do you expect your child(ren) to receive a vaccine of any kind in the coming year?

Percent

Yes	No
72.09%	27.91%

Please select the statement below which best reflects your intention to get a COVID-19 vaccine

Percent

After 10% of the population has been vaccinated and it is clear that there are no serious side effects	After 30% of the population has been vaccinated and it is clear that there are no serious side effects	After 50% of the population has been vaccinated and it is clear that there are no serious side effects	After 70% of the population has been vaccinated and it is clear that there are no serious side effects	After 90% of the population has been vaccinated and it is clear that there are no serious side effects	I intend to get a COVID-19 vaccine as soon as it is available to me	I have no intention of getting the vaccine at any time
4.92%	4.92%	5.54%	6.15%	5.54%	66.77%	6.15%

Do you feel your perception of the COVID vaccines are any different to your perception of other vaccines?
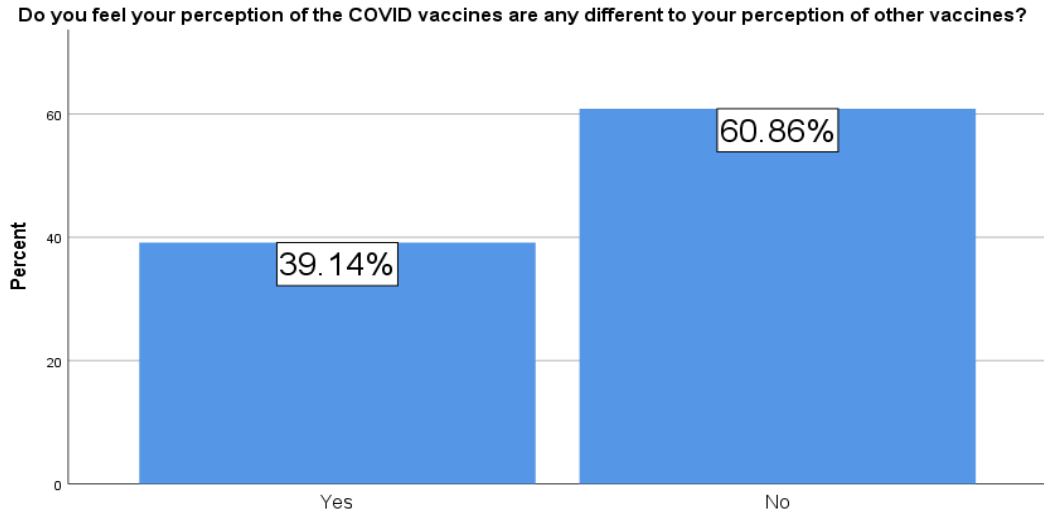

Table 1: Mean scores, standard deviation, range and possible range for the: Vaccine Confidence Scale; Vaccine Attitudes Examination (VAX) Scale; and Theory of Planned Behaviour subscales (Attitudes, Subjective Norms, Perceived Behavioural Control and Intention to get a vaccine).

	M	SD	Range	Possible Range
Vaccine Confidence Scale	7.98	1.79	$1-10$	1–10
Vaccine Attitudes Examination (VAX) Scale	2.49	.77	$1-5$	1-5
TPB Attitudes scale	2.34	1.38	1-7	1-7
TPB Subjective Norm scale	5.64	1.34	1-7	1-7
TPB Perceived behavioural control	4.35	.84	1-6	1-7
TPB Intention to get a vaccine	6.12	1.5	$1-7$	1–7

There was a high level of confidence (7.98) in getting the COVID-19 vaccine as indicated in the VCS scale. There was also a high mean intention score (6.12) to get a COVID-19 vaccine. There was a low mean score (2.49) on the VAX scale indicating low vaccine hesitancy in the sample. Subjective Norm and PBC scores were high. No gender effects were found for any of the scales. The mean scores for the sub factors of the VAX scale include: Worry about unforeseen future events as a result of the vaccine was the highest (M=3.32, SD=.82), followed by views of natural immunity (M=2.44, SD =.9), pharmaceutical company profiteering (M=2.17, SD=.98) and mistrust of vaccine benefit (M=1.97, SD=.89).

A linear multiple regression was calculated to determine what were the predictors of intention to vaccinate. Theory of Planned Behaviour factors that predicted Intentions to vaccinate included Attitudes, Subjective Norms, and the VAX Mistrust Factor. Other potential factors for vaccine uptake as listed on Table 2 did not predict intentions to vaccinate.

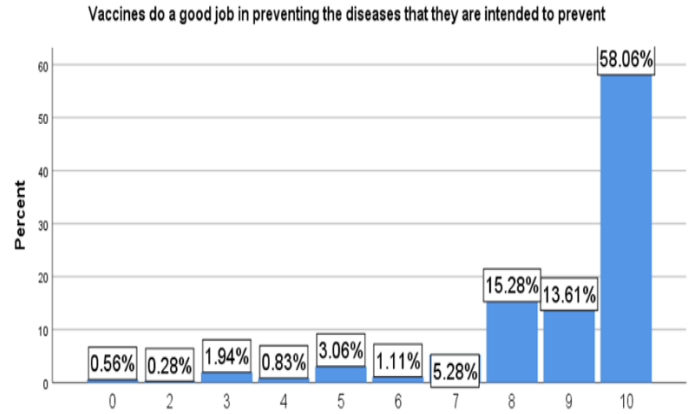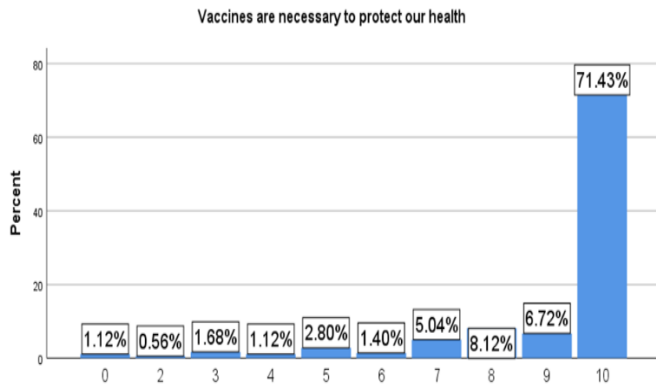*Table 2: Linear Regression Model Predicting Vaccine Intentions*

Regression Coefficients[a]

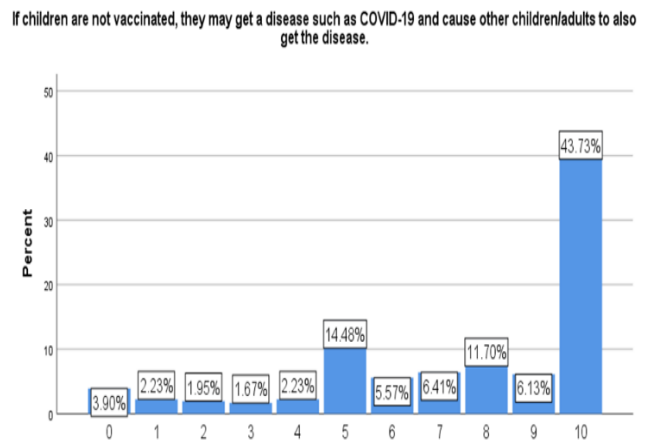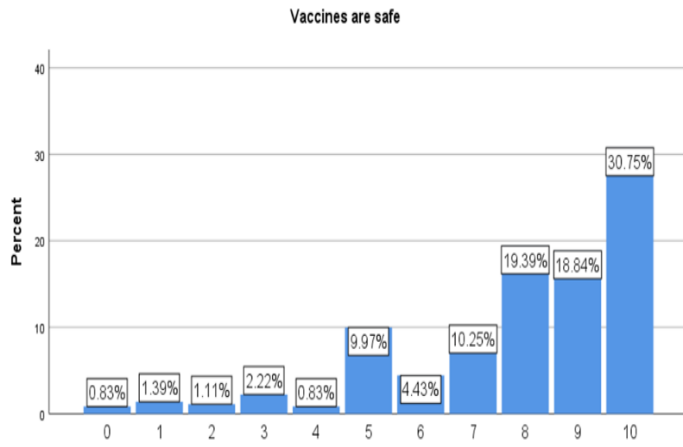| Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	6.244	.882		7.082	.000
	Gender	.043	.122	.011	.354	.723
	Have you had a positive test for COVID-19?	.159	.162	.033	.984	.326
	Have you had to self-isolate at any point during the COVID-19 pandemic?	.123	.101	.041	1.216	.225
	Are you in an increased risk category for COVID-19? (e.g. ongoing illness)	-.124	.114	-.033	-1.085	.279
	Has anyone close to you (i.e.family member or friend) had COVID-19?	.010	.096	.003	.108	.914
	Do you know anyone who has had a vaccine for COVID-19?	.147	.149	.031	.990	.323
	Perceived Beh Control	.058	.058	.032	.998	.319
	Subjective Norms	.109	.052	.097	2.105	.036
	Attitudes Mean for all questions	-.586	.065	-.538	-9.073	.000
	VAX mistrust factor	-.197	.091	-.114	-2.165	.031
	VAX worry factor	.006	.076	.003	.080	.937
	VAX profit factor	-.149	.079	-.095	-1.883	.061
	VAX immunity factor	.000	.076	.000	-.004	.996
	VCS Mean for all questions	.067	.047	.077	1.415	.158

a. Dependent Variable: Intentions Mean for all questions

Participant responses to the individual questions included in the Vaccine Confidence Scale and the VAX scale are presented below.
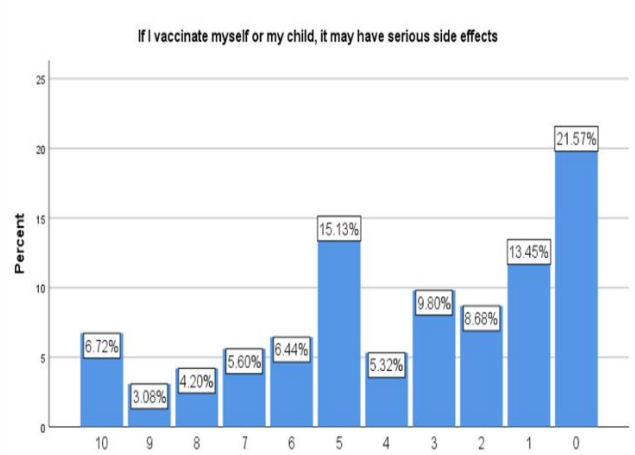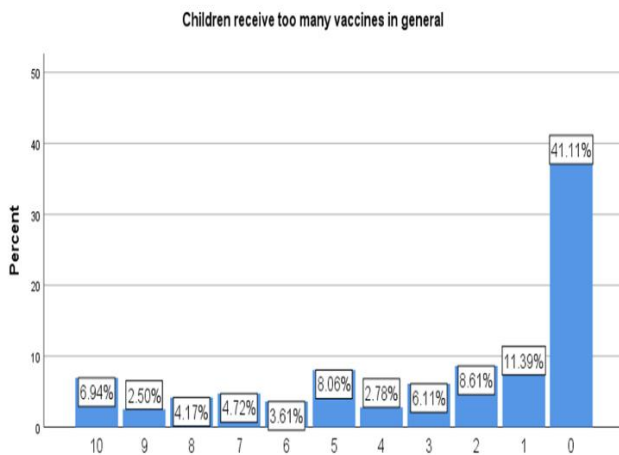
Vaccine Confidence Scale - Vaccine Benefit (4 items)

Vaccines are necessary to protect our health

Vaccines do a good job in preventing the diseases that they are intended to prevent

Please indicate 0 being "Strongly Disagree" and 10 being "Strongly Agree"

Vaccines are safe

Percent — values: 0: 0.83%, 1: 1.39%, 2: 1.11%, 3: 2.22%, 4: 0.83%, 5: 9.97%, 6: 4.43%, 7: 10.25%, 8: 19.39%, 9: 18.84%, 10: 30.75%

If children are not vaccinated, they may get a disease such as COVID-19 and cause other children/adults to also get the disease.

Percent — values: 0: 3.90%, 1: 2.23%, 2: 1.95%, 3: 1.67%, 4: 2.23%, 5: 14.48%, 6: 5.57%, 7: 6.41%, 8: 11.70%, 9: 6.13%, 10: 43.73%
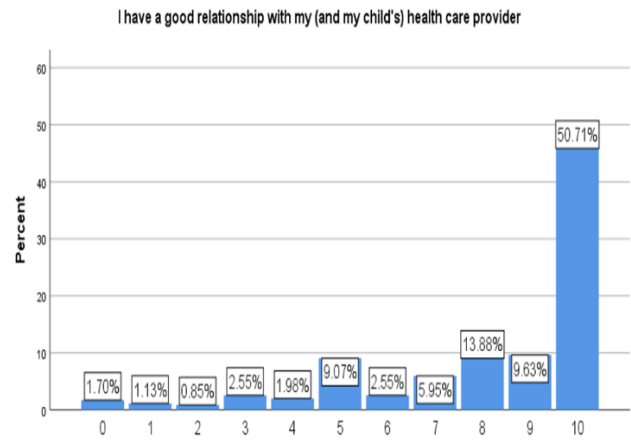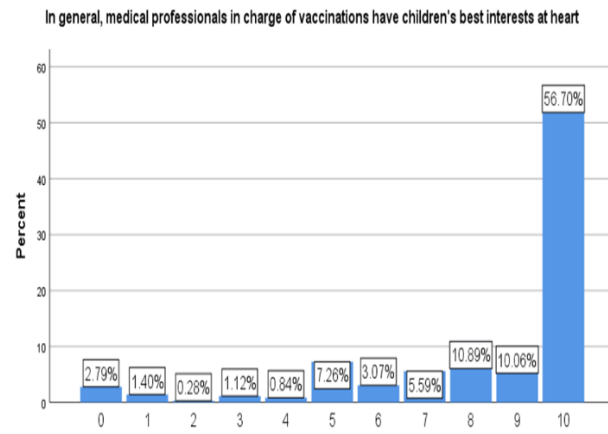
Please indicate 0 being "Strongly Disagree" and 10 being "Strongly Agree"

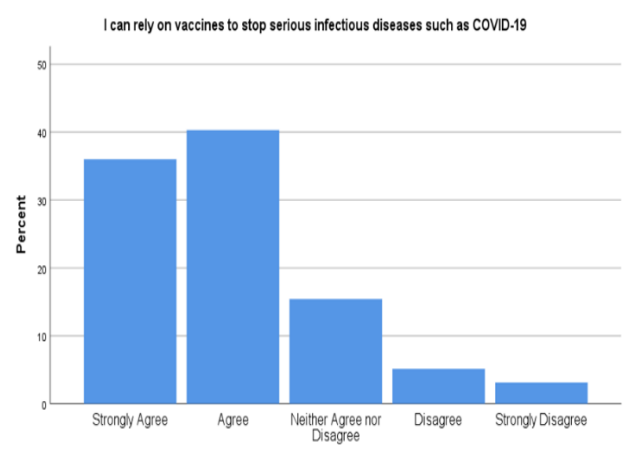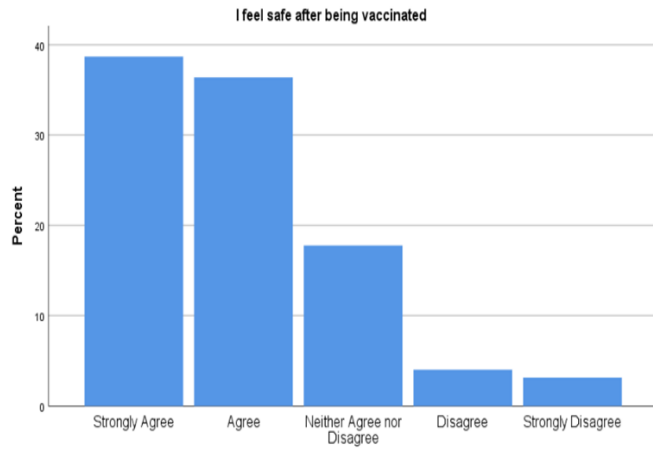Vaccine Confidence Scale - Vaccine Harm (2 items- Reverse Scored)

Children receive too many vaccines in general

Percent — values: 10: 6.94%, 9: 2.50%, 8: 4.17%, 7: 4.72%, 6: 3.61%, 5: 8.06%, 4: 2.78%, 3: 6.11%, 2: 8.61%, 1: 11.39%, 0: 41.11%

If I vaccinate myself or my child, it may have serious side effects

Percent — values: 10: 6.72%, 9: 3.08%, 8: 4.20%, 7: 5.60%, 6: 6.44%, 5: 15.13%, 4: 5.32%, 3: 9.80%, 2: 8.68%, 1: 13.45%, 0: 21.57%

Vaccine Confidence Scale - Trust in Medical/Health Providers (2 items)

In general, medical professionals in charge of vaccinations have children's best interests at heart

Score	Percent
0	2.79%
1	1.40%
2	0.28%
3	1.12%
4	0.84%
5	7.26%
6	3.07%
7	5.59%
8	10.89%
9	10.06%
10	56.70%

I have a good relationship with my (and my child's) health care provider

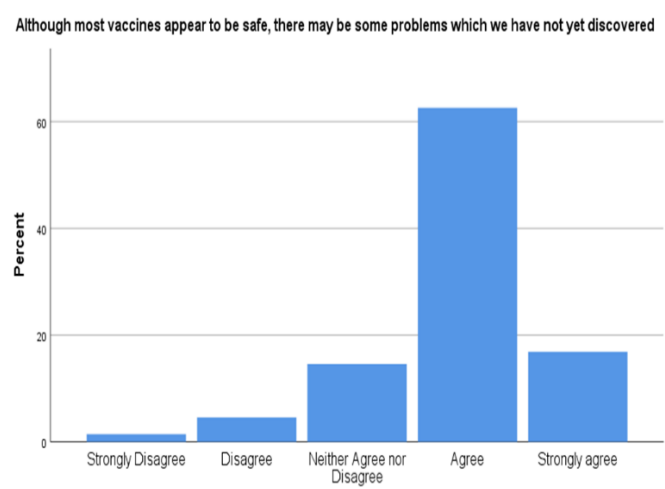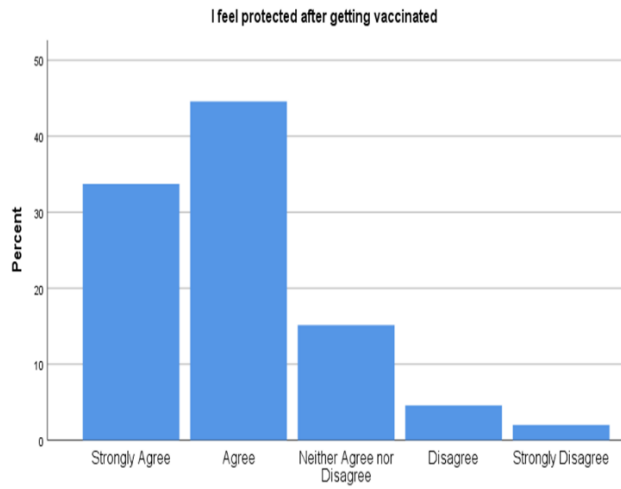| Score	Percent
0	1.70%
1	1.13%
2	0.85%
3	2.55%
4	1.98%
5	9.07%
6	2.55%
7	5.95%
8	13.88%
9	9.63%
10	50.71%

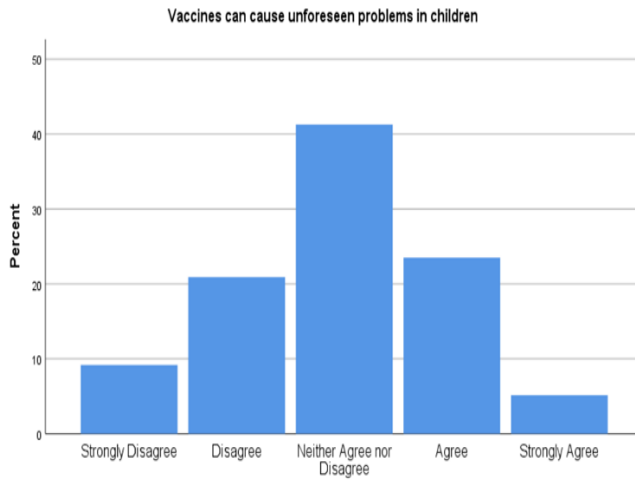**Please indicate 0 being "Strongly Disagree" and 10 being "Strongly Agree"**

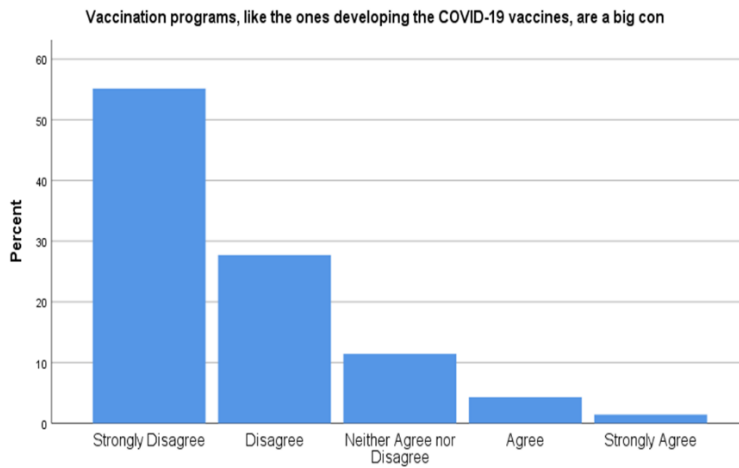# Vaccine Attitudes Examination (VAX) Scale – Mistrust of Vaccine Benefit (4 items)

I feel safe after being vaccinated

I can rely on vaccines to stop serious infectious diseases such as COVID-19

Vaccine Attitudes Examination (VAX) Scale – Mistrust of Vaccine benefit (4 items)

I feel protected after getting vaccinated

Although most vaccines appear to be safe, there may be some problems which we have not yet discovered

Vaccine Attitudes Examination (VAX) Scale – Worries about unforeseen future events (2 items)
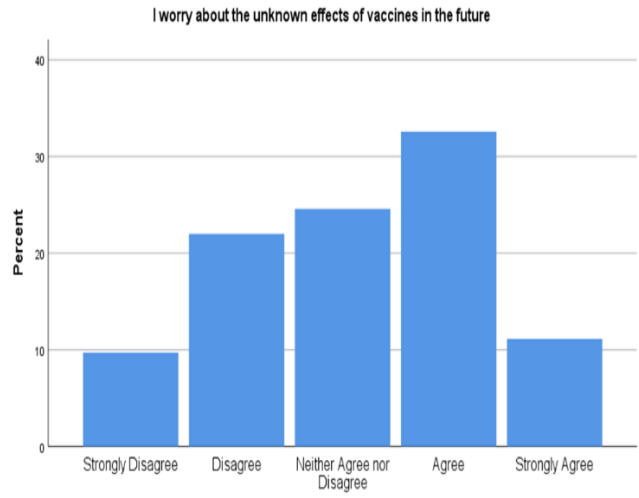
Vaccines can cause unforeseen problems in children

I worry about the unknown effects of vaccines in the future

Vaccine Attitudes Examination (VAX) Scale – Concerns about future profiteering (3 items)

Vaccination programs, like the ones developing the COVID-19 vaccines, are a big con
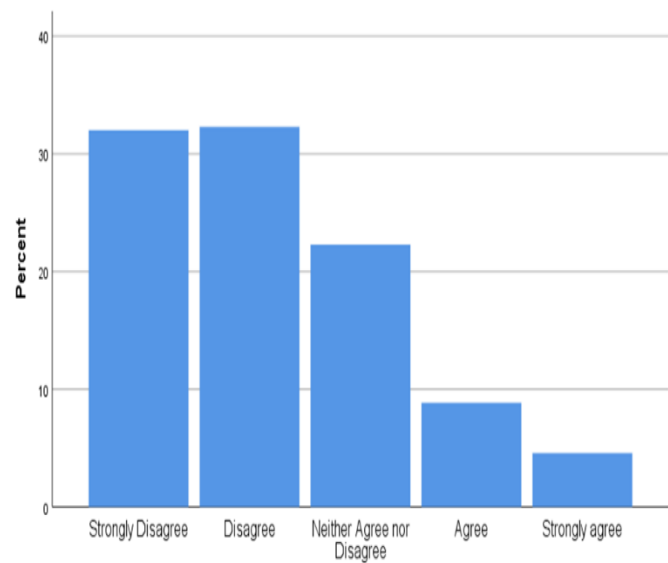

Vaccine Attitudes Examination (VAX) Scale – Concerns about future profiteering (3 items)

Vaccines make a lot of money for pharmaceutical companies, but do not do much for regular people like me
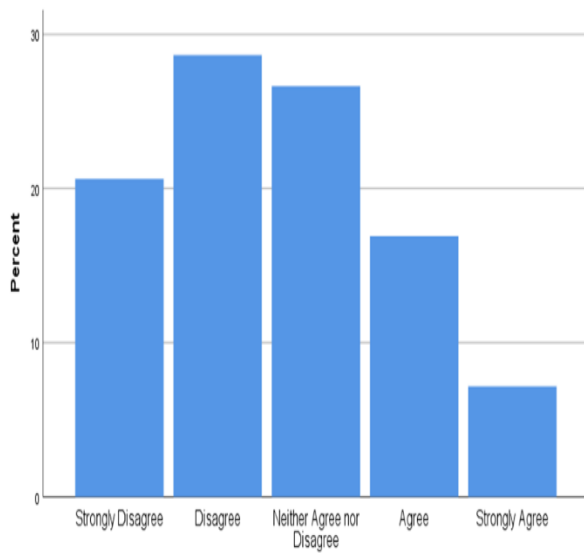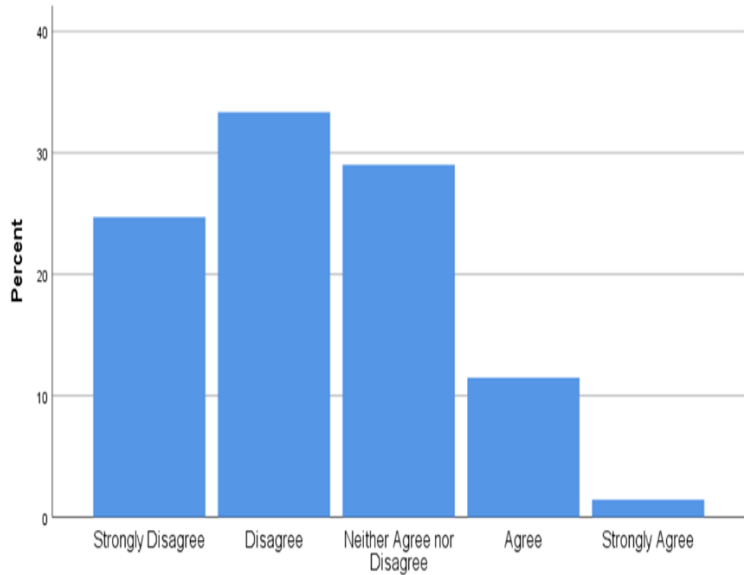

Authorities promote vaccination for their own financial gain, not for people's health
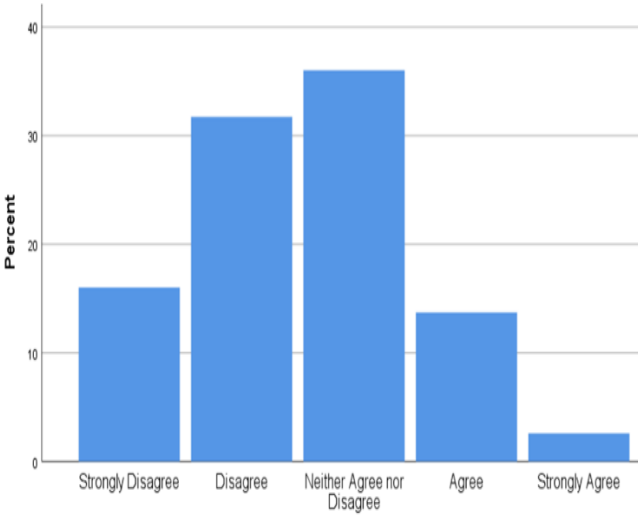
Vaccine Attitudes Examination (VAX) Scale – Preference for Natural Immunity (3 items)

Being exposed to diseases naturally is safer for the immune system than being exposed through vaccination
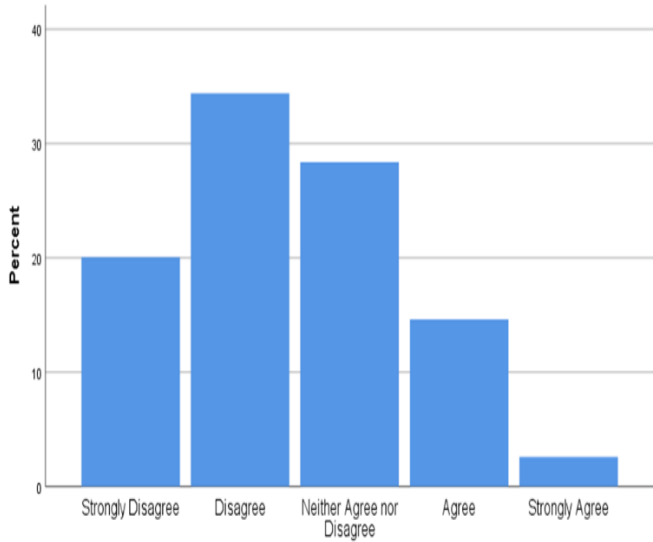

Vaccine Attitudes Examination (VAX) Scale – Preference for Natural Immunity (3 items)

Natural immunity lasts longer than a vaccination

Natural exposure to viruses and germs gives the safest protection

Conclusion

- Theory of Planned Behaviour factors predicted intention to vaccinate. In particular, attitudes towards COVID-19 vaccines, subjective norms and mistrust are the main factors that predict vaccine intention in Northern Ireland and the Republic of Ireland.
- 66.7% intend to get a vaccination as soon as possible
- 27.15% will get their vaccine when others get theirs and when it is clear there are no side effects.
- 6.15% of the sample have no intention of getting a vaccine
- There is a high mean intention (M=6.12) to get a COVID-19 vaccine (TPB)
- There is a high level of confidence to get a COVID-19 vaccine (VCS)
- There is a Low vaccine hesitancy (score (M=2.49) as measured by the VAX scale.
- Given the recent Astra Zenaca blood clotting reporting, mistrust maybe higher that reported

Recommendations:

- Encourage positive attitudes towards getting the vaccine.
- Target hesitant population to change attitudes through targeting subjective norms-campaigns that allow people to see and hear about others receiving the vaccine.
- Reduce mistrust and worry of the side effects of the vaccine
- There is uncertainty and mistrust of side effects for children, this may because there is no vaccine currently available for children, or parents being apprehensive about children receiving a safe vaccine in the future.
- Repeat a shorter version of the survey to monitor changes in attitudes, particularly mistrust and worry, be more targeted to parents, and those in the community who are likely more hesitant.
- Qualitative interviews are currently underway to understand those who were identified as hesitant. Considering targeting parents, or those in professions that are more likely to be hesitant is advised.
-

Limitations:

The study had several limitations that should be considered when interpreting the report.

- 83% of the sample were female
- Mean average age was 42 years
- Survey was completed 29th January- 23rd February, 7 weeks since the first vaccine was administered in Northern Ireland. Views of the public can change.

This report was prepared for the Public Health Agency Behaviour Change COVID-19 cell by:

Name: Dr Gavin Breslin
Organisation: Ulster University
Email: g.breslin1@ulster.ac.uk

Members of the HSC Research and Development Division Behaviour Change Group

Name	Position	Organisation
Dr Nicola Armstrong (Chair)	HSC R&D Division	PHA
Dr Janice Bailie	Assistant Director, HSC R&D Division	PHA
Ms Sarah Allen	Behavioural Scientist	Innovation Lab, NISRA
Dr Diane Anderson	Health Intelligence Division	PHA
Dr Stephen Bergin	Deputy Director of Public Health (Interim)	PHA
Dr Emma Berry	Lecturer, Psychology	QUB
Dr Declan Bradley	Consultant in PH	PHA and QUB
Dr Gavin Breslin	Senior Lecturer in Psychology	Ulster University
Dr Karen Casson	Lecturer in Health Promotion Course Director PGCert/PGDip/MSc Health Promotion and Public Health	UU
Dr Mary Dallat	Specialty Registrar	PHA
Prof Martin Dempster	Professor of Psychology	QUB
Dr Laura Dunne	Senior Lecturer	QUB
Dr Diana Gossrau-Breen	Health Intelligence Division	PHA
Prof Frank Kee	Director, COE	QUB
Prof Sarah Miller	Professor of Education	QUB
Mr Gary Maxwell	Health Development Policy Branch	DOH
Prof Maurice Mulvenna	Digital technologies/AI for Well Being, Assistive Living	UU
Dr Helen McAneney	Researcher	
Margaret McCrory	Communications Manager	PHA
Dr Diarmuid O'Donovan	Honorary Public Health Consultant	PHA
Mrs Colette Rogers	Health Improvement Manager	PHA
Dr Gillian Shorter	Lecturer, Psychology	QUB
Danielle Sinclair	Health & Social Wellbeing Improvement Manager	PHA
Ms Rachael Singleton	Behavioural Scientist	Innovation Lab, Dept of Finance
Mrs Fiona Teague	Health Improvement Manager	PHA

Professor Mark Tully	Director, Northern Ireland Public Health Research Network	UU
Mr Stephen Wilson	Acting Director of Operations	PHA
Dr Anita Yakkundi	Research Fellow, Network Coordinator, Northern Ireland Public Health Research Network	UU