

Introduction

- Vaccine hesitancy is a threat to global health which is complex and multifactorial^{1,2}
- Uptake of some recommended childhood immunisations in Ireland remain below the 95% World Health Organisation target³
- Existing regional immunisation information systems do not record parental characteristics and therefore it is not possible to determine from routinely collected data the factors that are associated with sub-optimal vaccine uptake in Ireland
- This study was the first national survey of parental attitudes towards childhood immunisation in Ireland

Aim

- To assess parental attitudes towards childhood immunisation among parents of children aged 0 to 48 months living in Ireland
- To explore the factors associated with vaccine uptake in Ireland

Methods

- A cross-sectional national survey of parental attitudes towards childhood vaccination was conducted among parents of children aged 0 to 48 months living in Ireland (N=855) between June and August 2021
- Computer assisted telephone interviews were carried out by trained interviewers using random digit dialling to generate mobile phone numbers
- Data were weighted to align the sample with the known population estimates for age, gender and educational attainment based on Census 2016 data⁴
- Parents whose children had not received all recommended vaccines within one month of them being due or parents who disagreed or strongly disagreed with the statement that vaccines are safe for their child were classified as being "vaccine hesitant"
- Descriptive analysis and univariate and multivariable logistic regression analysis was conducted to identify the association of parental characteristics with vaccine hesitancy

Results

The majority of children aged > 3 months received all recommended vaccines

- 92.5% (751/812) of parents and guardians surveyed reported that their child had received all recommended vaccines on time or within one month of vaccine due date (Figure 1)
- 96.1% (780/812) reported that their child had ultimately received all recommended vaccines (Figure 2)

Figure 1 Child vaccination status for children aged > 3 months (N=812)

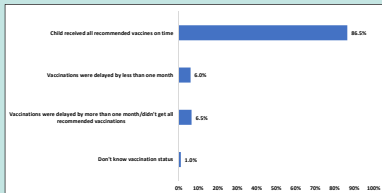
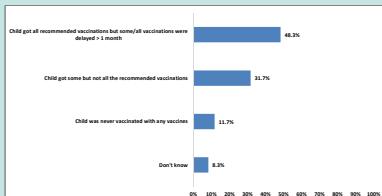


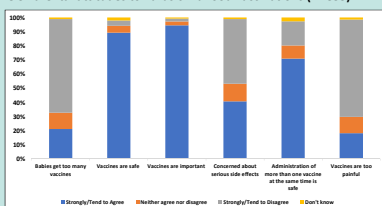
Figure 2 Child vaccination status among those whose vaccines were delayed by >1 month (N=60)



Parental attitudes towards childhood vaccination are positive

- The majority of parents strongly agreed or agreed that vaccines are important (94.4%, 807/855) and safe (89.2%, 763/855) (Figure 3)

Figure 3 Parental attitudes towards childhood vaccinations (N=855)



A national survey of parents' views on childhood vaccinations in Ireland

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Official sources of vaccine information are accessed and trusted by parents

- General Practitioners (GPs), practices nurses and the Health Service Executive (HSE) website and HSE information materials are commonly used and trusted sources of vaccine information (Figures 4 and 5)

Figure 4 Parental sources of vaccine information (N=855)

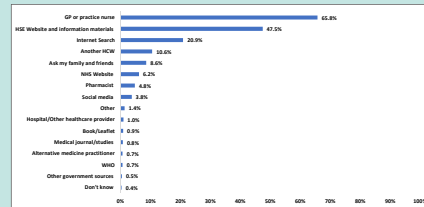
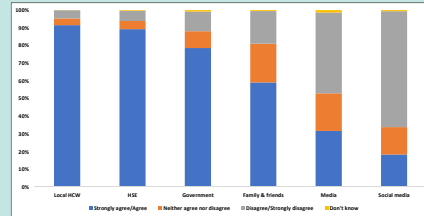


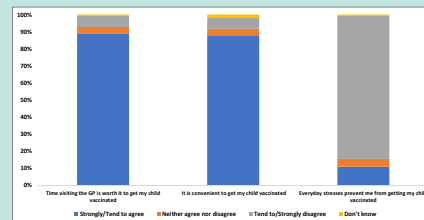
Figure 5 Parental trust in vaccine information (N=855)



Most parents report that it is convenient to get their child vaccinated

- 9 in 10 parents reported that it is convenient to get their child vaccinated
- 1 in 10 parents reported that everyday stresses prevent them from getting their child vaccinated (Figure 6)

Figure 6 Barriers to childhood vaccination (N=855)



A minority of parents are vaccine hesitant

- 7.1% (61/855) of parents were classified as vaccine hesitant
- Univariate and multivariable analysis examined the demographic and vaccine attitude predictors of vaccine hesitancy (Table 1 and 2)

Table 1 Demographic predictors of vaccine hesitancy

Age Category Parent	Unadjusted			Adjusted*		
	OR	CI Lower	CI Upper	aOR	CI Lower	CI Upper
16-29 years**	-	-	-	-	-	-
30-39 years	0.53	0.19	1.45	-	-	-
Over 40 years	0.73	0.26	2.06	-	-	-
Gender Parent						
Male**	-	-	-	-	-	-
Female	1.19	0.59	2.41	-	-	-
Level of Education						
Upper secondary or less**	-	-	-	-	-	-
Vocational or Certificate	1.39	0.65	2.98	-	-	-
Bachelor degree	1.16	0.54	2.49	-	-	-
Postgraduate or PhD	0.54	0.23	1.27	-	-	-
Region/Country of Birth						
Ireland**	-	-	-	-	-	-
Northern/Western/Southern Europe*	0.89	0.19	3.97	-	-	-
Central/Eastern Europe*	2.54	0.91	7.15	-	-	-
Rest of World	0.32	0.07	1.51	-	-	-
Relationship status						
Married**	-	-	-	-	-	-
Single parent	3.66	1.42	9.48	2.43	0.95	6.24
Co-habiting	1.9	0.79	4.56	2.05	0.83	5.1
Occupational status						
Working for payment**	-	-	-	-	-	-
Not working	5.15	1.46	18.14	3.1	0.95	10.11
Full time homemaker	1.33	0.56	3.19	0.8	0.29	2.18
Religious						
Yes**	-	-	-	-	-	-
No	0.93	0.34	2.55	-	-	-
Refused to answer	0.63	0.14	2.88	-	-	-
Annual income						
Less than €50,000**	-	-	-	-	-	-
€50,000 or more	0.44	0.18	1.06	-	-	-
Did not report income	0.64	0.27	1.51	-	-	-
Number of children						
1**	-	-	-	-	-	-
2	1.26	0.51	3.11	1.46	0.59	3.58
3	1.87	0.74	4.67	2.3	0.94	5.63
4+	3.75	1.3	10.8	3.58	1.17	10.98

* as defined by the OECD **reference category - adjusted for relationship status, occupational status, number of children

Table 2 Vaccine attitude predictors of vaccine hesitancy

Vaccine Attitude	Median Score	Unadjusted			Adjusted*		
		OR	CI Lower	CI Upper	aOR	CI Lower	CI Upper
Vaccine importance	0.23	0.15	0.35	0.72	0.43	0.21	1.21
Trust in official vaccine information sources	0.21	0.14	0.32	0.30	0.18	0.10	0.50
Trust in unofficial vaccine information sources	0.71	0.50	1.01	-	-	-	-
Vaccine convenience score	0.27	0.20	0.38	0.56	0.32	0.18	0.98
VPD knowledge score	0.29	0.16	0.52	0.93	0.46	0.26	1.88

In the multivariable models:

- Having four or more children was associated with a higher odds of vaccine hesitancy (aOR 3.75, 95% CI 1.30, 10.80) (Table 1)
- Increasing levels of parental trust in official vaccine information (aOR 0.30 95% CI 0.18, 0.50) and increasing belief in vaccine convenience was associated with a lower odds of vaccine hesitancy (aOR 0.56, 95% CI 0.32, 0.98) (Table 2)

Public Health Implications

- There was a strongly positive sentiment towards childhood vaccinations among parents of children aged 0 to 48 months in Ireland with high uptake and strong belief in the importance and safety of vaccines
- Official sources of information were trusted, with particular trust in healthcare professionals and HSE vaccination information
- Levels of vaccine hesitancy were low
- Among the minority of vaccine hesitant parents, a lack of convenience in accessing services and low levels of trust in official vaccine information sources was reported
- The findings of this study support the effectiveness of national vaccine information materials
- The high levels of trust in information provided by healthcare professionals in this study emphasises the importance of healthcare professionals as powerful influencers in the decision to accept vaccination
- Additional research is required to further assess and understand the factors associated with vaccine hesitancy in Ireland to enable the provision of tailored immunisation services and approaches to addressing parental concerns about childhood vaccination

Recommendations

- It is essential that convenient and accessible vaccination services are available to all parents to ensure that childhood immunisation uptake rates reach the WHO target of 95%. Accessible GP services are key enabler of this.
- Healthcare professionals are a trusted source of vaccine information and should be supported to provide information and communicate with parents who may be hesitant about vaccines. An e-learning module for healthcare professionals has been developed by the NIO to facilitate this.
- The development of a National Immunisation Information system should be urgently progressed to facilitate the collection and collation of high-quality immunisation data in a timely manner. This will allow for identification and prioritisation of populations with low vaccine uptake and tailoring of immunisation programmes to these groups.
- Further research is required, in collaboration with stakeholders and communities, to determine attitudes and barriers to vaccination in disadvantaged and vulnerable communities and those with language difficulties who may not have been reached by this survey.
- This survey should be repeated at intervals to enable tracking of attitudes towards vaccination over time within the Irish population, exploring attitudes and perceptions towards childhood immunisations and perceptions and intentions towards new vaccines within the Irish population. Funding and resources will be necessary to facilitate this.

REFERENCES

- World Health Organisation. Ten threats to global health in 2019. 2019 [Available from: <https://www.who.int/news-room/spotlight/ten-threats-to-global-health-in-2019>].
- Larson HJ, Jarrett C, Eckersberger E, Smith DM, Paterson P. Understanding vaccine hesitancy around vaccines and vaccination from a global perspective: a systematic review of published literature, 2007-2012. *Vaccine*. 2014;32(19):2150-9. 10.1016/j.vaccine.2014.01.081
- Health Protection Surveillance Centre. Immunisation uptake at 12 and 24 months of age, 2017. Dublin: HSE HPSC; 2018.
- Central Statistics Office. Census of Population of Ireland 2016. Ireland: CSO; 2016.