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Antenatal immunisation intentions of expectant parents: Relationship to immunisation timeliness during infancy

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ABSTRACT

Background: Most women decide about infant immunisation during pregnancy. However, we have limited knowledge of the immunisation intentions of their partners. We aimed to describe what pregnant women and their partners intended for their future child's immunisations, and to identify associations between parental intentions and the subsequent timeliness of infant immunisation.

Methods: We recruited a cohort of pregnant New Zealand (NZ) women expecting to deliver between April 2009 and March 2010. The cohort included 11% of births in NZ during the recruitment period and was generalisable to the national birth cohort.

We completed antenatal interviews independently with mothers and partners. We determined immunisation receipt from the National Immunisation Register and defined timely immunisation as receiving all vaccines (scheduled at 6-weeks, 3- and 5-months) within 30 days of their due date. We described independent associations of immunisation intentions with timeliness using adjusted odds ratios (OR) and 95% confidence intervals (CI).

Results: Of 6172 women, 5014 (81%) intended full immunisation, 245 (4%) partial immunisation, 140 (2%) no immunisation and 773 (13%) were undecided. Of 4152 partners, 2942 (71%) intended full immunisation, 208 (5%) partial immunisation, 83 (2%) no immunisation and 921 (22%) were undecided. Agreement between mothers and partners was moderate (Kappa = 0.42).

Timely immunisation occurred in 70% of infants. Independent of their partner's intentions, infants of pregnant women who decided upon full immunisation were more likely to be immunised on time (OR = 7.65, 95% CI: 4.87 – 12.18). Independent of the future mother's intentions, infants of partners who had decided upon full immunisations were more likely to be immunised on time (OR = 3.33, 95% CI: 2.29 – 4.84).

Conclusions: During pregnancy, most future parents intend to fully immunise their child; however, more partners than mothers remain undecided about immunisation. Both future mothers' and future fathers' intentions are independently associated with the timeliness of their infant's immunisations.

Abbreviations: NZ, New Zealand; NZDep06, 2006 New Zealand Index of Deprivation; NIR, National Immunisation Register; NHI, National Health Index number; OR, odds ratio; CI, confidence interval.

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1. Introduction

Timely initiation of the primary infant immunisation series is necessary for maximal health benefits from immunisation [1,2]. With the first dose of this immunisation series being scheduled either at birth or at age 6 to 8 weeks in most countries, there are limited opportunities, following the birth of the child, for parents to make appropriately informed decisions regarding their child's immunisations. Therefore, the immunisation decision-making of future parents during the pregnancy is likely to be particularly relevant to the on-time completion of infant immunisation.

Indeed, most women make their decisions regarding their infant's immunisations whilst they are pregnant [3–5]. In comparison, our knowledge of the immunisation decisions made by partners during the pregnancy is minimal [6,7], and the extent to which mothers and their partners intentions differ is not known.

In this study, we describe the immunisation intentions of pregnant women and their partners, the extent to which mothers and partners have the same intentions, and whether the intentions of both the mother and partner are predictive of infant immunisation timeliness.

2. Methods

2.1. Study design and setting

Maternity care in NZ is government funded and delivered predominantly by midwives. Pregnant women chose a healthcare professional (midwife, obstetrician or general practitioner) to provide their maternity and immediate postnatal care. This is usually a different person from the woman's usual healthcare provider prior to pregnancy or the infant's primary healthcare provider [8].

National immunisation surveys in NZ from the 1990s and 2000s showed low immunisation coverage (<80% fully immunised at age two years) [9]. In 2007, improving immunisation coverage became a national health target and more precise measurement was enabled by the introduction of a National Immunisation Register in 2005 [10–12]. Since 2011, immunisation coverage at age two years has been between 90% and 95%; however, delay in receipt of scheduled immunisations continues to limit the potential benefits that immunisation offers to population health. For example, infant pertussis hospitalisation rates in NZ (2000–2009 average annual rate: 196/100,000)[13] are more than three times higher than in the US (2008: 39/100,000; 2009: 58/100,000) [14].

We completed this study within NZ's child cohort, *Growing Up in New Zealand* (*GUiNZ;* www.growingup.co.nz) [15]. All participants provided written, informed consent and we obtained ethical approval from the NZ Ministry of Health Regional Ethics Committee.

Antenatal recruitment, engagement with an ethnically and socioeconomically diverse sample and inclusion of partners were essential design features [16]. The cohort of pregnant women resided within a geographically defined region, where 29% of NZ's population lives [15,16]. We enrolled 11% of the national birth cohort born during the study recruitment period. Alignment of the enrolled cohort at birth with all NZ births from 2007 to 2010 has been described [17]. The cohort is representative of the ethnic and socioeconomic diversity of NZ [17]. The small but statistically significant differences in the proportion of enrolled infant with birthweight <2500 g (5% vs. 6%) and gestation <37 weeks (6% vs. 7%) between the *Growing Up in New Zealand* cohort and the national birth cohorts from 2007 to 2010 are in part due to survival to age 6 weeks being a prerequisite for the *Growing Up in New Zealand* cohort [17].

3. Participants

All pregnant women residing in the study region and expecting to deliver between April 2009 and March 2010 were eligible. When women agreed to an antenatal interview, we asked them to provide the contact details of their current partner (defined as the partner she was currently in a 'significant social relationship with'). We contacted partners independently to invite their participation.

4. Data sources/measurement

We collected information regarding immunisation intentions by separately asking women and partners:

'Have you decided yet if you will have your child immunised?' with the answers provided:

- Yes, I have decided I will have my child fully immunised
- Yes, I have decided I will have my child partially (selectively) immunised
- Yes, I have decided I will not have my child immunised
- No, I have not decided yet

For the analyses presented here, ethnicity was defined as the mother's and partner's self-prioritised ethnicity [18]. Parental socioeconomic status, educational qualifications and household income items were based on measures taken from Statistics NZ's 2006 national census and 2008 General Social Survey [19,20].

Area-level socioeconomic deprivation was measured using the 2006 NZ Index of Deprivation (NZDep06), grouped as deciles [21]. NZDep06, derived from 2006 census data on nine socioeconomic characteristics, is a well-validated measure of small area socioeconomic deprivation in NZ.

We conducted separate face-to-face interviews with each consenting woman and consenting partner. These interviews collected information describing family and household structure, and demographics [15].

Each infant's immunisation record was obtained via National Health Index (NHI) number linkage with the National Immunisation Register (NIR) [22]. The NHI number is a unique identifier assigned to every person having contact with health services in NZ. Over the time the cohort were born, no immunisations were recommended routinely or funded during pregnancy in NZ and the infant immunisation schedule included 6-week, 3-month and 5-month doses of two vaccines: a diphtheria/tetanus/acellular pertussis/haemophilus influenzae type B/hepatitis B/poliovirus vaccine and a pneumococcal conjugate vaccine [23].

The NIR was established in 2005 [23]. Via the NHI number assigned at birth, all children born in a hospital in NZ become listed on the NIR. For those children not born in a hospital, 3% of all births in NZ in 2011 [24], entry into the NIR is performed by their maternity healthcare provider or occurs when the child first makes contact with the NZ healthcare system [23].

Our definition of immunisation timeliness, the principal outcome measure for this study and previously used in the United States and Australia, defines timely immunisations as those received within 30 days of their due date [25–27]. The validity of this measure was assessed by comparison with the national estimates of immunisation coverage at age six months for the year ending December 2011, by which time all of the cohort children were at least 12 months old. This estimate is comparable to our definition of timely immunisations. Our estimate of immunisation timeliness for the cohort (70%) was very similar to the national immunisation coverage estimate at age six months (71%) [28].