







## ORIGINAL ARTICLE

# Understanding factors that influence the decision to be vaccinated against influenza and pertussis in pregnancy: A qualitative study

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## Abstract

**Aims and Objectives:** To identify how pregnant women perceive pertussis and influenza and the factors that influence their decision to be vaccinated.

**Background:** Suffering from influenza during pregnancy increases complications in the pregnant woman, foetus and newborn. Pertussis in children under six months of age causes severe complications. Maternal vaccination against influenza and pertussis is effective and safe. However, vaccination rates are insufficient.

**Design:** We conducted a qualitative descriptive study, using semi-structured interviews. This research adheres to the COREQ guidelines and checklist.

**Methods:** We carried out 18 semi-structured face-to-face interviews with pregnant women, using intentional sampling and thematic analysis.

**Results:** We identified an overarching theme, 'factors that influenced participants' decision to be vaccinated or not', which was composed of four subthemes that were in turn made up of 12 categories. The factors that influenced participants' decision to be vaccinated against influenza and pertussis were related to their knowledge of and their perception of risk for these diseases. Participants perceived the risk of pertussis to be greater, and they focused their concern on the newborn. The recommendations and convictions of nurse-midwives were the most important factors encouraging vaccination. Participants trusted their nurse-midwives and most reported that they would have been vaccinated if their midwife had recommended it. Other factors were linked to lack of information, fear and concerns about economic interests.

**Conclusions:** The convictions and actions of the nurse-midwife in recommending vaccination to pregnant women are decisive. Strategies to improve vaccination rates

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should be directed to helping health professionals understand how their practice affects the final decision of pregnant women.

**Relevance to clinical practice:** Understanding the factors that limit vaccination rates among pregnant women provides valuable information to nurse-midwives that can help to improve vaccination strategies and practices. Increased maternal vaccination rates would reduce morbidity and mortality among pregnant women and newborns.

**KEYWORDS**

immunisation, influenza vaccination, maternal health, midwifery, pertussis vaccination, pregnant vaccine, prenatal care, qualitative research

## 1 | INTRODUCTION

Maternal vaccination is highly recommended to reduce the risk of vaccine-preventable diseases and their complications (Centers for Disease Control & Prevention, n.d.-b; National Immunisation Office, 2020; World Health Organisation, 2012, 2015). Vaccination rates for influenza and for tetanus, diphtheria, and acellular pertussis (Tdap) among pregnant women have risen. However, these vaccines continue to be underused.

## 2 | BACKGROUND

Maternal vaccination is a strategy that protects the pregnant woman, the foetus and the newborn against preventable diseases such as influenza and pertussis (Vermillion & Klein, 2018). The immunity developed by the pregnant woman is transferred via the placenta to the foetus, protecting the neonate until he or she can be vaccinated at age two months (Vilajeliu et al., 2015). Pregnant women are no more likely to contract influenza than the general population, but if they do contract it, they are more likely to suffer from severe respiratory symptoms that require hospitalisation or intensive care and/or result in death (Katz et al., 2017). Suffering from influenza during the first trimester of pregnancy is linked to complications, such as secondary pneumonia, acute respiratory failure, and a higher risk of preterm birth or stillbirth (Psarris et al., 2019; World Health Organisation, 2012). Pertussis infection, caused by the bacillus *Bordetella pertussis*, produces severe pulmonary, neurological and nutritional complications (World Health Organisation, 2015) and potentially death in infants under age six months (Centers for Disease Control & Prevention, n.d.-a).

Maternal vaccination is safe and effective against influenza (Bratton et al., 2015; Psarris et al., 2019; Vygen-Bonnet et al., 2020) and pertussis (Amirthalingam et al., 2014; McMillan et al., 2017). It protects the pregnant woman, foetus and newborn from possible complications (Committee on Obstetric Practice, 2017; Phadke & Omer, 2016; World Health Organisation, 2012).

The Advisory Committee on Immunization Practices of the United States has recommended that pregnant women receive the influenza vaccine since 2004 (Harper et al., 2004) and the Tdap vaccine since 2012 (Centers for Disease Control & Prevention, n.d.-b). However, the vaccination rate for both diseases remains below the target rates of

### What does this paper contribute to the wider global community?

- The study highlights the impact of nurse-midwives on pregnant women's decision-making about whether to be vaccinated against influenza and pertussis.
- The attitude and conviction of the nurse-midwife in recommending vaccination influenced the final decision of pregnant women.
- Strategies to improve maternal vaccination rates should focus on nurse-midwives who care for pregnant women throughout their pregnancy.

75%, especially for influenza, with differences across western countries (Centers for Disease Control & Prevention, n.d.-b; National Immunisation Office, 2020; World Health Organisation, 2012, 2015). In the United States, the vaccination rate among pregnant women was 53.6% for influenza in the 2016–2017 season (Ding et al., 2017) and between 64% and 89% for pertussis in 2017, depending on the state (Centers for Diseases Control & Prevention, 2017). In the 28 European countries that recommend the influenza vaccine to pregnant women, the vaccination rate ranged from 0.5% to 58.6% in 2017 (Mereckiene, 2018). Currently, eight European countries recommend maternal vaccination for pertussis, with a vaccination rate of 64% of pregnant women in Belgium (Maertens et al., 2016) and 80% in Spain (Ministerio de Sanidad, n.d.-b). In 2018, in Spain's Catalonia region the vaccination rate among pregnant women was 29.2% for influenza and 80.7% for pertussis (Ministerio de Sanidad, n.d.-a).

Pregnant women's final decision to receive the vaccines or not is multifactorial and is linked mainly to factors related to pregnant women themselves and to health professionals (Lutz et al., 2018). Barriers that are known to prevent professionals from recommending the vaccine to pregnant women include inadequate training, inadequate reimbursement, concerns about safety, increased workload or unavailability of staff with the certification required to administer vaccines (Lutz et al., 2018; Vilca et al., 2018; Wilson et al., 2015). Pregnant women report concerns about vaccine safety and the lack of a recommendation from their health provider as the main barriers to choosing to be vaccinated (Lutz et al., 2018; O'Shea et al.,

2018; Vilca et al., 2020). Similarly, receiving a recommendation from a health professional is a decisive factor in pregnant women's decision to be vaccinated (Lutz et al., 2018; O'Shea et al., 2018). Other determining factors are the influence of pregnant women's friends, family and colleagues, access to information, and access to the vaccine itself (Maisa et al., 2018; Wiley et al., 2015), although these vary based on the context and the population (Wilson et al., 2015).

Given the international consensus that pregnant women should be vaccinated against influenza and pertussis (Centers for Disease Control & Prevention, n.d.-b; National Immunisation Office, 2020; World Health Organisation, 2012, 2015) and the still low rates of vaccination, it is important to understand the factors that encourage vaccine uptake among pregnant women. Acquiring extensive, in-depth information about the issue from the point of view of pregnant women themselves is essential for understanding the phenomenon and for improving strategies to increase vaccination rates to be in line with international recommendations. Our objective was to identify how pregnant women perceive influenza and pertussis and the factors that influenced their decision to receive the corresponding vaccines or not.

### 3 | METHODS

#### 3.1 | Design

We chose a qualitative descriptive design (Colorafi & Evans, 2016), using semi-structured face-to-face interviews to meet the study objectives. This approach is ideal for understanding pregnant women's perceptions that condition their decision about whether to receive the influenza and pertussis vaccines. This research adheres to the Consolidated Criteria for Reporting Qualitative Research (COREQ; Tong et al., 2007; File S1).

#### 3.2 | Setting

The study took place at the Sexual and Reproductive Health Care (ASSIR) units of the province of Barcelona (Catalonia). The ASSIR units are part of a regional branch of the Spanish national health system providing care to 1,400,000 citizens from 71 municipalities and of diverse socioeconomic statuses (Institut Català de la Salut. Generalitat de Catalunya, n.d.). ASSIR units, which are linked to primary care, employ nurse-midwives, gynaecologist-obstetricians, nurses, psychologists and administrative personnel. The monitoring of low-risk pregnancies is conducted by nurse-midwives, who are nurses who received two years of specialised training. In Spain, the influenza and Tdap vaccines are available at primary care centres and ASSIRs and are publicly financed.

#### 3.3 | Participants

The population was pregnant women cared for at ASSIR units. The inclusion criteria were (1) being at least age 18; (2) being at

27–40 weeks of pregnancy (because the Tdap vaccine is administered between weeks 27 and 36); (3) having received the Tdap vaccine; and (4) not having communication difficulties. An intentional sampling method was used, incorporating homogeneity criteria (being pregnant) and heterogeneity criteria in order to obtain the maximum variability in responses. We sought maximum variation across the following axes: the socioeconomic profile of the catchment area of the ASSIR, whether the person had received the influenza vaccine or not, origin (locally born or foreign-born), age (>30 or <30) and education level (no education, basic education, university education). Candidates were identified by the nurse-midwives of the ASSIRs, whom we informed of the patient profiles needed for the study. The research team (AA, LM, RMC and AR) selected the candidates to be invited to participate in the study. A nurse-midwife contacted the selected participants by phone or during a scheduled visit, informed them about the study and sought their participation. When the candidate agreed to participate, an interview was scheduled to coincide with one of her visits to the ASSIR. On the day of the interview, the interviewer informed the participant about the study both orally and in writing, and the participant signed the informed consent document. There was no prior relationship between the participants and the researchers. None of the selected participants declined to join the study.

#### 3.4 | Data collection

Individual face-to-face semi-structured interviews were carried out between March 2018 and January 2019 to learn about the participants' views. Prior to the interviews, we developed a semi-structured interview guide containing the topics to be explored and some questions that could be used if necessary. The topics were chosen according to the study objectives, the existing literature and the researchers' reflections. The principal ones were knowledge about influenza/pertussis disease and vaccination, perception of safety, effectiveness and benefits of vaccines, factors in deciding whether to get vaccinated, and professionals' recommendation/non-recommendation to be vaccinated (Table 1). We tested the guide in the first interviews and made slight adjustments, which did not affect the topics, before arriving at the definitive guide. We added the question, 'Can you describe how they made the recommendation?'. The data from the pilot interviews were retained and included in the analysis. We prepared a data sheet to collect the participants' sociodemographic data (age, country of origin, education level and number of children), information about how each interview went, and the interviewer's impressions of each interview.

All of the interviews were conducted by the principal investigator (AA), who took descriptive field notes both during and after each interview. The field notes provided contextual information about the participant and the conditions in which each interview was conducted. The interviews were carried out in the ASSIR of each participant in a private space. The interviews were audio-recorded and lasted 35 min on average (between 22 and 50 min). At the end of each interview,

TABLE 1 Semi-structured interview guide

Knowledge about influenza/pertussis vaccination among pregnant women
Can you explain to me what you know about influenza/pertussis in pregnant women?
Do you think it's serious? For whom?
And what do you know about influenza/pertussis vaccination in pregnant women?
Factors in deciding to whether to get vaccinated
Can you explain to me the main reasons that led you to get vaccinated against influenza/pertussis?
Why did you get vaccinated against pertussis and not influenza?
Professionals' recommendation/non-recommendation to be vaccinated
Did a health professional recommend that you take the influenza/pertussis vaccine? Who? (gynaecologist, nurse-midwife...)?
Can you describe how they made the recommendation? What did they explain to you?
Was it decisive?
Would you have been vaccinated against influenza if the nurse-midwife had recommended it to you?
Would you have been vaccinated against pertussis if the nurse-midwife hadn't recommended it?
Perception of the benefits of being vaccinated or not against influenza/pertussis
Do you think there's any kind of benefit to getting vaccinated against influenza/pertussis when you're pregnant? What benefit? For whom?
Perception of risk from getting vaccinated or not against influenza/pertussis
Do you think there is any risk involved in a pregnant woman getting the influenza/pertussis vaccine? What are the risks? For whom?
Do you think there is any risk involved in a pregnant woman not getting the influenza/pertussis vaccine? What are the risks? For whom?
Perception of the safety of the influenza/pertussis vaccine
What is your opinion of the safety of the influenza/pertussis vaccine?
Perception of the effectiveness of the influenza/pertussis vaccine
What is your opinion of the effectiveness of the influenza/pertussis vaccine?
Opinion of family and friends about the influenza/pertussis vaccine
What is your family and friends' opinion of influenza/pertussis vaccination (in general or for pregnant women)? Do they usually get vaccinated?
Were you vaccinated as a child? Are your vaccines up to date?
Factors that can influence the vaccination of pregnant women
Are there any factors that you think discourage pregnant women from getting vaccinated against influenza/pertussis?

the interviewer conducted a member check, giving an oral report to the interviewee that summarised the interview. At that moment, the interviewee was asked whether the oral summary of her interview was

accurate and was given the opportunity to make changes. All of the participants agreed that the summaries were accurate, and none of them made changes. There was ongoing analysis after each interview and the team decided jointly when saturation had been achieved. Saturation was reached in interview 16, when new concepts and topics ceased emerging. However, we opted to conduct two more interviews to confirm saturation. Data collection was ceased after 18 interviews. Repeat interviews were not conducted.

### 3.5 | Analysis

Analysis was conducted in the following steps. 1. A thematic analysis was conducted (Berenguera et al., 2014) with the help of ATLAS-ti (version 8). Thematic analysis is a method for identifying, analysing and reporting patterns within data. 2. A word-for-word transcription of the interviews was conducted by an independent professional and checked later by two researchers (AA and MIF). 3. The transcripts and field notes were read and reread to achieve familiarisation with the data (AA). 4. The initial patterns detected in the pre-analysis were noted, and a list of provisional topics was constructed (AA). 5. A line-by-line coding to identify meaning units (fragments of text that had meaning for our research) was conducted (AA). 6. These codes were then grouped into categories of a higher analytical order. To undertake this process, we used categories gleaned from previous studies (deduction) and identified new categories in the interview responses (induction). We built an exhaustive system of categories that subsumed all of the codes described (AA and MIF). 7. An analysis was conducted category by category (AA and MIF). Steps 6 through 7 were first carried out by AA. Subsequently, AA and MIF discussed the initial analysis until reaching consensus. 8. An explanatory framework drawing on the existing literature was generated (AA). 9. All team members participated in a process of discussion and reflection until reaching consensus on the final analysis.

### 3.6 | Ethical considerations

The study adheres to Declaration of Helsinki standards and was approved by the Idiap Jordi Gol Ethics Committee. The principal investigator (PI) obtained written informed consent from each participant and ensured the participants' confidentiality by assigning an alphanumeric code to each one. Only the PI has access to the data, which is stored in a password-protected virtual space managed by the university.

### 3.7 | Enhancing trustworthiness

We applied trustworthiness criteria (Lincoln & Guba, 1985). Credibility was ensured by conducting a member check after each interview so that the participants could confirm the accuracy of the information collected (or rectify it if necessary). All participants

reported that our summary of their interview was accurate and none of them made changes. Credibility was also achieved by conducting two additional interviews after reaching saturation and by involving all of the researchers in the analysis phase. This approach also helped us attain dependability, as did the detailed description of each phase of the research and the decisions made. Transferability to other similar contexts is facilitated by describing the context, the selection of participants, the participants' characteristics, the data collection procedure and the analysis procedure. Finally, to reduce bias, research decisions were undertaken by the team through an arduous process of reflection, thus ensuring confirmability. Moreover, we conducted member checks in which the participants confirmed orally the accuracy of the information that we had recorded about them.

The team is composed of (1) nurses who hold a PhD and work in university-level teaching and research and (2) nurse-midwives who work in patient care and research. The PI (female) falls into the former category and additionally is an expert in qualitative methods. These aspects and the study objectives were communicated to participants.

## 4 | FINDINGS

Eighteen pregnant women participated in the study, although data saturation was reached at interview 16. Participants' mean age was 33.2 years, and their median age was 34 years (ranging from 20 to 39; Table 2). Fifty percent had university studies. The moment of gestation ranged from 29 to 39 weeks. Five participants had been vaccinated against influenza. Table 3 shows a summary of the process of data coding and categorisation. The findings are organised around the main theme (factors that influenced the participants' decision to be vaccinated or not), which included four subthemes and 12 categories.

### Factors that influenced participants' decision to be vaccinated or not

#### 4.1 | Factors related to the participants themselves

##### 4.1.1 | Knowledge about influenza and pertussis

Participants had different levels of knowledge about influenza and pertussis. They were aware of the symptoms and clinical course of influenza and what to do if they had it. Some described more specific information, such as periodic mutations and their effect on vaccines. This knowledge appeared to emerge from the mundanity of the flu, its seasonal recurrence and the fact that they or someone they knew had experienced it.

The flu, I'm more aware of it, because yes at some point in my life I've had it...

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TABLE 2 Participants' characteristics (n = 18)

	Frequency (%)
Age (in years)	
20–25	2 (11.1)
26–30	3 (16.7)
31–35	8 (44.4)
36–40	5 (27.8)
Origin	
Spain	15 (83.3)
Other countries	3 (16.7)
Education level	
University studies	9 (50.0)
No university studies	9 (50.0)
Socioeconomic status <sup>a</sup>	
Above average	2 (11.1)
Average	9 (50.0)
Below average	7 (38.9)
Number of children	
0	10 (55.6)
1	6 (33.3)
2	2 (11.1)
Vaccinated against pertussis	
Yes	18 (100)
No	0
Vaccinated against influenza	
Yes	5 (27.8)
No	13 (72.2)
Vaccinated against influenza prior to pregnancy	
Yes	3 (16.7)
No	15 (83.3)

<sup>a</sup>Calculated using the Índice Socioeconómico Territorial of the Instituto de Estadística de Cataluña. <https://www.idescat.cat/pub/?id=ist&lang=es>

The flu is something that's really, really ordinary. This year my husband and my son have had it.

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Pertussis is a disease that all participants had heard of, but most knew little about. They had not contracted it, nor did they know anyone who had. Mostly what they knew was that pertussis affects the respiratory capacity of newborns. One participant (I06) had heard of community outbreaks of pertussis.

I don't know very much. I know it's a disease that affects the lungs.

Question: In whose lungs? The baby's, the mother's, or whose?

TABLE 3 Overview of the coding process

Theme	Categories	Subcategories	Codes
Factors that influenced participants' decision to be vaccinated or not	Factors related to the participants themselves	Knowledge about influenza and pertussis	<p>About influenza:</p> <ul style="list-style-type: none"> <li>• The everyday nature of influenza</li> <li>• Banalisation of the process</li> <li>• Knowing how to behave when faced with influenza</li> <li>• Changing virus</li> <li>• Symptoms</li> <li>• Affects women</li> </ul> <p>About pertussis:</p> <ul style="list-style-type: none"> <li>• No knowledge</li> <li>• Little knowledge</li> </ul>
		Perception of the severity of influenza and pertussis	<p>Influenza:</p> <ul style="list-style-type: none"> <li>• It's not serious</li> <li>• It is transmitted to the baby</li> <li>• There can be complications if there are other conditions</li> </ul> <p>Pertussis:</p> <ul style="list-style-type: none"> <li>• Serious for the baby</li> <li>• Affects baby's breathing</li> </ul>
		Perception of the risk from not getting vaccinated	<p>From not getting vaccinated against pertussis:</p> <ul style="list-style-type: none"> <li>• The baby carries all of the risk</li> <li>• Breathing problems</li> <li>• I'm afraid of it</li> <li>• I don't want to have regrets</li> </ul> <p>From not getting vaccinated against influenza:</p> <ul style="list-style-type: none"> <li>• I wouldn't have gotten influenza</li> <li>• It only affects the mother</li> <li>• It's easy to get over it</li> <li>• It doesn't affect the baby</li> <li>• Greater risk than if you get vaccinated</li> </ul>
	Factors related to health professionals	Actions of the health professional: information and/or recommendation	<p>Pertussis:</p> <ul style="list-style-type: none"> <li>• Explicit recommendation</li> <li>• The professional takes vaccination for granted</li> <li>• 'It's time to get vaccinated'</li> <li>• You should get vaccinated</li> <li>• Decisive explanations</li> </ul> <p>Influenza:</p> <ul style="list-style-type: none"> <li>• No recommendation</li> <li>• Recommendation not to get the vaccine</li> <li>• It's not necessary</li> <li>• The nurse-midwife doesn't give her opinion</li> </ul>
		Trust in the professional	<ul style="list-style-type: none"> <li>• Professional advice</li> <li>• Full confidence</li> <li>• Putting yourself in their hands</li> <li>• Trusting in spite of not being sure</li> <li>• It depends on the professional</li> </ul>
		Participants who would have made a different decision if advised differently by the nurse-midwife	<p>Would you have been vaccinated against influenza if the nurse-midwife had recommended it to you?</p> <ul style="list-style-type: none"> <li>• Yes, if the nurse-midwife recommends it</li> <li>• Yes, if the gynaecologist recommends it</li> <li>• Yes, with information about benefits</li> <li>• Yes, with information about risks</li> <li>• Yes, in spite of past experience</li> <li>• Yes, trust in professional</li> <li>• Maybe, if there is an explanation about risks</li> <li>• I wouldn't have gotten vaccinated</li> </ul> <p>Would you have been vaccinated against pertussis if the nurse-midwife hadn't recommended it?</p> <ul style="list-style-type: none"> <li>• I wouldn't have gotten vaccinated</li> <li>• Maybe not</li> <li>• It depends on my trust in the professional</li> </ul>

(Continues)

TABLE 3 (Continued)

Theme	Categories	Subcategories	Codes
	Factors related to the vaccines	Benefits of the vaccine	General benefits: <ul style="list-style-type: none"> <li>• Individual and collective benefits</li> <li>• The more protection, the better</li> <li>• More benefits than risks</li> <li>• I don't know, but I trust the health professional</li> </ul> Pertussis vaccine: <ul style="list-style-type: none"> <li>• For the baby</li> <li>• For the baby and the mother</li> <li>• For the baby and the community</li> </ul> Influenza vaccine: <ul style="list-style-type: none"> <li>• For the mother</li> <li>• For the mother and the baby</li> <li>• In the end, you catch it anyway</li> </ul>
		Risks from getting vaccinated	<ul style="list-style-type: none"> <li>• There are no risks</li> <li>• There are no risks, but nothing is certain</li> <li>• I don't know, but I trust the professional</li> <li>• I don't know, but there are more benefits</li> <li>• There are risks, but there isn't any information</li> </ul>
		Vaccine safety	Influenza and pertussis vaccines: <ul style="list-style-type: none"> <li>• I think they are safe</li> <li>• I don't know</li> <li>• I don't know, but I think they are safe</li> <li>• I don't know, but it's worth it</li> <li>• You can catch influenza</li> </ul>
	Factors that limit vaccination	Information: too much or too little	<ul style="list-style-type: none"> <li>• Lack of professional information</li> <li>• Excess of non-professional information</li> <li>• The weight of others' opinions</li> <li>• Personal decision</li> </ul>
		Fear	<ul style="list-style-type: none"> <li>• Inoculation of the virus</li> <li>• Contracting the disease</li> </ul>
		Hidden interests and alternative trends	<ul style="list-style-type: none"> <li>• Vaccine hesitancy</li> <li>• Belief in alternative medicines</li> </ul>

I think the baby's. Because she [nurse-midwife] told me precisely that they give it to you now because until the baby's two months old they can't give it to them. So that way they're protected.... But I don't know much more, really. Because it's not a disease I've heard about much.

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Well, flu, it seems like we've all had it, right? You imagine those horrible seven days in bed, with a fever. Waiting for it to cycle through, and that's it. (...) But with the flu there's not that risk at birth.

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In fact, there are a lot of people that die from the flu. In the case of the elderly, or people with, for example, some kind of heart condition or a health problem that they already had before.

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#### 4.1.2 | Perception of the severity of influenza and pertussis

Participants perceived influenza and pertussis to have different degrees of severity. For the participants, influenza is not serious or at least not as serious as other diseases. They believed that symptoms could be more severe for pregnant women because they were unable to take medication, and for this reason, they talked about possible complications. One participant (104) talked about complications in high-risk groups such as older people or people with underlying health conditions. The participants did not identify pregnant women as a high-risk group.

Although participants knew that a mother could infect her newborn with influenza, none of them reported that this could be serious or involve complications for the baby (in contrast to their beliefs about pertussis).

I don't think it [the flu] is very serious, like hepatitis or something like that. But as soon as you get the flu, the baby has it too.

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In terms of pertussis, although participants had little knowledge about it, they perceived it as dangerous, especially for the baby.

Well, it's a bacteria that lives in our body and that can affect babies more seriously... in the sense that they don't have the same defences that adults have, and I think, if I'm not wrong, that with babies it can even be deadly. I'm not very sure, but I think more or less it's that, that it would be more serious for them if they caught it. (...) As far as I understood, it's more for the baby so that there wouldn't be a problem. If I get it, I can take an antibiotic, right?

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This perception of the risk of pertussis (in spite of participants' limited knowledge) in many cases was constructed based on what the nurse-midwife told them. This health professional is the person that expressed to them the seriousness of pertussis in newborns.

Well, the nurse-midwife explained it to me. That for babies it could be pretty serious.

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The truth is that until the nurse-midwife told me, I'd never heard of pertussis.

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#### 4.1.3 | Perception of the risk from not getting vaccinated

Participants perceived the risk of not getting vaccinated differently for influenza and pertussis. In the case of influenza, the perceived risk was linked mainly to the mother and was understood as an illness that they could overcome with typical treatments known to the general public. Moreover, participants referred to the possibility of becoming infected despite having been vaccinated. They perceived the risk of influenza to the newborn as small or non-existent. Even participants who had been vaccinated against influenza (e.g. 104) perceived the risk as minimal.

But you think that maybe it's, I don't know. You have a bit of fever. (...) But you think, "Well, look, a cold or a flu that you can get over. As long as it doesn't affect the foetus." In contrast, the other one [pertussis]. If the baby is born and doesn't have these defences, since it's him by himself, right? How he has to fight it, that's scarier.

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I think if I hadn't gotten the flu vaccine, nothing would have happened. I mean, nothing would have changed, because I doubt I would have caught the virus, really.

Because I never have [caught the virus], so why would I now?

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However, the perceived risk of not getting vaccinated against pertussis was greater. Even though participants lacked full information, they reported that newborns lack of defences during the first months of life (information that they received during the pregnancy check-ups). They knew that not getting vaccinated against pertussis made the newborn more vulnerable to contracting the disease. Participants expressed fear and the desire to avoid feeling regret for not having been vaccinated, if their baby was infected.

I don't know about pertussis, but I'd rather prevent it. I'd rather prevent it. Because at work we've seen some children, although they were older, that caught pertussis... that were hospitalised and had a hard time. So, I'd rather prevent it. I don't want to have to regret it [not getting vaccinated] later.

104

Moreover, some participants reported that they chose to be vaccinated because of the benefits to their child and would not have done so if the benefits were only to themselves.

I guess that if you get vaccinated against the flu, you're less exposed. But that doesn't mean that you won't get it, because I've seen people that got vaccinated and they had it anyway. (...) If you don't get vaccinated against pertussis and the risk is for the baby. And for the baby sometimes you do things that... you wouldn't do for yourself.

107

## 4.2 | Factors related to health professionals

The role that the nurse-midwife played in the vaccination of participants was decisive in most cases, in particular her attitude toward vaccines and the trust that she inspired in participants. Participants recognised that they would have made a different decision if it were not for the nurse-midwife.

### 4.2.1 | Actions of the health professional: information and/or recommendation

Participants reported receiving different information from their nurse-midwife depending on the vaccine in question. In the case of pertussis, the nurse-midwife gave them information, or an explicit recommendation to get vaccinated, or even scheduled the vaccination appointment for them. The information that they recalled focused on risks to the newborn if they did not receive the vaccine and



benefits to the newborn if they did. However, several participants reported that they would have liked to receive more information. The nurse-midwife's recommendation to be vaccinated was decisive. Even in cases in which the participant's partner was reluctant.

And the way she said it, she offered it to me, and she talked to me. And I said, "Well ok" (...) I didn't seek documentation about what I need to do, whether I need to get vaccinated or not while pregnant. I've always let the nurse-midwife guide me.

I11

Ten participants reported that their nurse-midwife informed them about the pertussis vaccine before advising that they get it. In other cases, the participants do not recall whether they received any information before receiving the recommendation. In seven cases, it was the proactive attitude of the nurse-midwife that influenced the decision, rather than a recommendation per se. The nurse-midwife scheduled the first appointment for the pertussis vaccine in upcoming visits, along with other routine care.

The first day I went... I mean, the first appointment after taking the pregnancy test...they give you a sheet where they organise all the appointments that you're going to have until the delivery. Maybe it says, "First trimester blood work, second trimester blood work and third trimester blood work" and it already says, "week 30, pertussis vaccine".

I13

In such cases, the nurse-midwife understood the pertussis vaccine to be a standard procedure.

"Today it's time to give you the vaccine," and she got up and vaccinated me.

I12

The way in which nurse-midwives informed participants about the vaccine and recommended it to them also influenced their final decision. Mostly, the participants did not recall having been asked explicitly whether they wanted to be vaccinated. Instead, almost all participants (17) recalled receiving an explicit recommendation or being told how beneficial it would be for the newborn.

When she was scheduling the next visit, she said, "At the next appointment it would be a good idea to get the pertussis vaccine, because there are these risks. The baby can't be vaccinated until he's two months old and this way he would be covered." And so it seemed ok to me. (...) But she didn't ask, "Do you want to or not?".

I16

The actions of nurse-midwives surrounding the influenza vaccine were not perceived in the same way by participants. Twelve participants did not recall receiving information or the recommendation to receive the vaccine.

She told me about pertussis. She didn't say anything about the flu.

I16

When participants received advice from their nurse-midwife to be vaccinated against influenza, they often chose to do so. In fact, all of the participants who had been vaccinated against influenza had received this explicit recommendation (in one case by her family doctor).

When I was pregnant it was flu season, and I was working. Then X [nurse-midwife] told me that she recommended that I get vaccinated and I didn't mind.

I04

In other cases, although the nurse-midwife recommended the influenza vaccine, the participant did not feel the same need as with pertussis.

She really said, "In week 28 it's time for pertussis. This one you do have to get." She offered me the flu vaccine, but not so... But pertussis yeah.

I01

When the participant asked her health professional about getting the influenza vaccine (which happened infrequently), she was offered the vaccine and information about it, but was not given a specific recommendation about whether to take it.

She didn't really advise that I take it. I asked her if she could go out on a limb and tell me whether to take it or not. And she told me she couldn't. That the information that she had wasn't so clear as to be able to give me a resounding yes or a resounding no. Then she explained what it's about and that it's offered to pregnant women and older people because it's a benefit. But she didn't advise me one way or another.

I18

#### 4.2.2 | Trust in the professional

Trust in the nurse-midwife was another aspect that was important to participants when they made a decision about vaccination. Trust is basic in the face of little-known health problems, especially considering that they could affect participants' babies and that they were exposed to a wide array of information and opinions.

I like her a lot. I trust her a lot, yes. She has given me a lot of confidence and I've seen that she's, I don't know... She cares a lot about her patients. So, I let her guide me, and if she tells me to do something, I believe that it's good for me and my baby. And because I don't want to take any risks.

116

Participants did not trust just any health professional. They trusted professionals who had showed concern for them and their future newborn.

X [nurse-midwife's name], I do trust her. Because she's a pretty up-to-date professional... But there are professionals and professionals... and in the day-to-day you see it. There are people who are not... Well, that have fallen behind. (...)

E03

Some participants trusted their nurse-midwife fully and did whatever she recommended. This trust even overcame their reluctance about vaccination.

I trust all of the professionals that take care of me, unless you've seen something that stands out... In my case, both the gynaecologist and the nurse-midwife are people that I trust completely. I mean, if there are facts that I don't know very well and they say to me, "Look, the most recommendable thing is..." then I go ahead with what they tell me.

117

#### 4.2.3 | Participants who would have made a different decision if advised differently by the nurse-midwife

We asked participants if their decision to receive the vaccines or not would have been different if their health professional had made a different recommendation. Most participants who were not vaccinated against influenza (10 out of 13) reported that they would have taken the influenza vaccine if their nurse-midwife or gynaecologist had recommended it, but she had not. In contrast, they generally had received a recommendation to be vaccinated against pertussis. Among these participants, some alluded to the trust they had placed in their health professional when making decisions about topics they were not familiar with.

I also would have read to see if there were pros and cons, but if the professionals tell you, you have to let them guide you, right? If you don't know anything, it's not your field... Well, if they say it, then it must be good for you, right?

113

The view and recommendation of the health professional were so important that one participant said that she would have taken the vaccine even though prior to her pregnancy she had caught influenza in spite of being vaccinated.

Yes. If she had said to me, "Yes. You have to get it [the influenza vaccine]," then I would have gotten it. Even though that happened the other time [contracting influenza despite being vaccinated]. If she had said, "Yes, yes, get it," I would have gone, obviously.

105

Some participants reported that they would have chosen to receive the vaccine if the nurse-midwife had offered information about the benefits of doing so or the risks of not doing so.

Yes, if the nurse-midwife had told me to do it, surely I would have. It's just that the reason that I looked for information is also because of that, because she never gave me a resounding yes. So maybe that's also a reason why I took the initiative to seek out more information.

118

Participants claimed that they would have chosen to receive the influenza shot if the recommendation from their health professional had been as convincing and directive as the recommendation for the pertussis vaccine.

I think so, in the sense that if she had given me an explanation or had said to me, "Look [participant's name], in your case it would be a good idea because of this, because of that..." I would have let her guide me like I did for pertussis.

103

Some participants did not have such a clear sense of what their response would have been, but they also believed that, had they received information about the risk that influenza posed to their newborn, they might have considered vaccination. None of the participants said they would not have chosen to receive the influenza vaccine even if it had been recommended by their health professional.

If they'd explained that there were risks for the baby, I might have thought about it.

101

As for pertussis, most participants (13) reported that if their nurse-midwife had not recommended this vaccine—or as in some cases, if they had not taken for granted that the vaccine was required—they would not have chosen to be vaccinated. However, some added that even if their nurse-midwife had not recommended this vaccine, they would have obtained information from other sources, because they already knew about its importance.

Mmm... no. If the nurse-midwife hadn't told me, no [I wouldn't have received the vaccine].

114

I would have found out on my own, because of course things change, studies change. So, I guess I'm someone who trusts the most recent studies, really. (...) I mean, I guess I would have searched for information on my own and I would have asked other professionals, to find out what I should do and decide.

103

### 4.3 | Factors related to the vaccines

#### 4.3.1 | Benefits of the vaccine

For participants, receiving the vaccine meant protecting themselves and their community against diseases. Protecting themselves benefited both their future newborn and the general population. They perceived this collective benefit as important in the context of vaccine hesitancy among some segments of the population. They reported that the more people who got vaccinated, the greater the benefit for everyone.

I know that now is a time when vaccines are pretty controversial, but I think they're beneficial for the person and society. Of course, I make sure that I don't get infected and I also won't infect anyone else. And this way everything will go a bit better and with small gestures we can get to where diseases that can't be treated prophylactically don't develop.

106

But now when I was pregnant, the more prevention the better.

104

However, despite the benefits of vaccines that some participants described, the majority mentioned different beneficiaries, depending on the vaccine. They believed that getting the pertussis vaccine protected the foetus or newborn and only secondarily the mother. In contrast, they believed that the influenza vaccine benefited primarily the mother and only secondarily the newborn. In some cases, the participant perceived no benefit, or she minimised it.

I didn't get it [the pertussis vaccine] for myself, because that one's for the baby. And thinking about the baby, I thought, "Yes [I'll get it]." And they say that later they don't have to vaccinate the baby, right? I did it more for him than for myself.

107

The flu vaccine, they didn't tell me it was for the baby, but for me, so that I wouldn't get it during my pregnancy.

105

This information about benefits comes from different places. Information about pertussis mainly came from health professionals. But influenza was already known to them as a common infection, as pointed out above.

#### 4.3.2 | Risks from receiving the vaccine

Most participants (15) talked about small risks linked to vaccination, which they contextualised within the view that there is no such thing as 'zero risk'. Participants tended to be unconcerned about risks from vaccines and some reported that, in general, vaccines carried no risk for the pregnant woman, the foetus or the newborn. They believed either that the recommended vaccines posed no risk or posed only a minimal risk. This argument is also valid for the participants that questioned the safety of vaccines.

I mean, for me the risk is minimal. For the baby, I understand that if it's the recommendation of a medical team and of a group of people that really care about health, then the risk must be very, very small. And in this case, I pretty much trusted this judgement.

106

Some participants believed that the influenza vaccine could make a pregnant woman more likely to contract the virus. This idea came not from professionals but from the media. Despite its lack of scientific validity, in some cases, this belief led participants to be vaccinated against pertussis and not influenza. Some also reported the supposedly high risk of not being vaccinated.

Because the flu vaccine, everyone says... Then yeah, when they get it, they get sick. I haven't heard that about the pertussis vaccine. But anyway, I don't know.

101

I think there's a greater risk from not getting vaccinated [against the flu], I believe.

109

#### 4.3.3 | Vaccine safety

On the whole, participants were not worried about vaccine safety. They believed that both vaccines were safe or said they were not sure if they were safe. Only the participants who spoke about vaccine-related risks and about hidden interests doubted the vaccines' safety. Health professionals' recommendations and convictions about vaccines were sufficient to convince participants that vaccines have low risk.

I mean, there's a margin that I don't think it's 100% safe. But I think that margin is smaller than that of contracting the disease.

110

But I think that, being pregnant, I believe that there's a lot behind vaccines, economic interests, pharmaceutical companies, etc.

112

#### 4.4 | Factors that limit vaccination

When we asked explicitly about factors that kept pregnant women from choosing to be vaccinated, the responses were in line with the ones outlined above.

##### 4.4.1 | Information: too much or too little

Some participants talked about the overload of non-professional information, which overwhelmed them and led to misinformation. The lack of professional information about risks and the consequences of not receiving the vaccines led some to choose not to be vaccinated.

And out of ignorance, maybe, if a nurse-midwife doesn't recommend it, if she doesn't recommend that they get vaccinated.

111

Even among some participants who believed that vaccination is a personal decision, the fact that they had professional information about pertussis but not influenza was crucial.

Of course, I guess that it will be at the personal level, a personal decision... Because the information, at least in my case, about pertussis, they gave it to me.

108.

##### 4.4.2 | Fear

Fear of vaccines or of other dangerous substances or concern that the vaccine could cause the disease (in the case of the influenza vaccine) was a factor keeping some women from getting vaccinated.

There are people that say that if you get vaccinated, sometimes, it's like they give you the virus. So, you can get the disease, and it wouldn't happen if they didn't vaccinate you.

106

##### 4.4.3 | Hidden interests, alternative medicine and vaccine hesitancy

The existence of economic interests behind vaccination, trends in alternative medicine and vaccine hesitancy were also mentioned by participants as factors limiting vaccination.

## 5 | DISCUSSION

The findings were obtained through face-to-face interviews with participants, an aspect that favoured rapport and facilitated communication (Berenguera et al., 2014). This facet distinguishes our study from other qualitative studies based on telephone interviews.

In terms of factors related to pregnant women, participants had limited knowledge about influenza and pertussis and their severity, impressions that affected their decision to be vaccinated or not. They had general knowledge about influenza, but they did not know that pregnant women were considered a high-risk group because of the complications it can cause in them and their newborns. As a result, they assigned little importance to influenza. They perceived the risk to be low for themselves and non-existent for their newborn. These findings differ in part from those published by Maher et al. (2013). In this study carried out in Australia, most pregnant women (69%) believed that influenza had severe consequences for pregnant women. This perception of severity is linked significantly to their willingness to be vaccinated, even though the risk, as in our findings, focused on pregnant women (and not the newborn) and the belief that the influenza vaccine provided greater protection to pregnant women. Only 29% believed that maternal vaccination protected the newborn (Maher et al., 2013). The perception of severity, evidenced in Maher's study and not perceived by our participants, marked the difference between deciding to be vaccinated or not.

Our findings also showed that pregnant women had limited information about pertussis, coinciding with other studies that signal that more than a third of pregnant women did not know about the risk that pertussis poses to babies under age one (Agricola et al., 2016). Even so, they perceived a greater risk from pertussis than from influenza, and they understood this risk to be focused in the foetus and the newborn, which led them to be vaccinated (Wiley et al., 2015).

The participants indicated that the decision to be vaccinated would have been less clear if the benefit was only to themselves and not to their future newborn. Although women know that both vaccines are recommended during pregnancy (Healy et al., 2015), they associate the pertussis vaccine with protecting the newborn and the influenza vaccine with protecting the mother or with protecting both equally (Vilca et al., 2020; Wilcox et al., 2018). This association is also seen in online media articles on maternal vaccination and might explain lower rates of vaccination against influenza (Wilcox et al., 2018). It seems, therefore, that pregnant women value protecting their newborn more than protecting themselves, and they feel an anticipated regret at the thought of something bad happening to their newborn because they did not get vaccinated (Maise et al., 2018). Pregnant women are more likely to agree to be vaccinated when they understand that influenza and pertussis are risky for both the

pregnant woman and the newborn and when they know that maternal vaccination protects the newborn (Yakut et al., 2020). For this reason, it is essential to increase pregnant women's perception of risk and offer them more information that positions the newborn as the main beneficiary of vaccination (Rodríguez-Blanco et al., 2019; Wilcox et al., 2018; Wiley et al., 2015).

In terms of health professionals, as shown in numerous studies, our findings identify their recommendation as the most important aspect for pregnant women's decision to be vaccinated (Agricola et al., 2016; Lutz et al., 2018; O'Shea et al., 2018; Vilca et al., 2020) or at least among the main ones (Strassberg et al., 2018; Wales et al., 2020; Yakut et al., 2020). The actions of the nurse-midwife—informing and/or recommending—were crucial in our study for participants' decision-making, although these actions were perceived differently depending on the vaccine. Nurse-midwives recommended the pertussis vaccine, sometimes without even providing information to the participant. However, participants reported that nurse-midwives did not recommend the influenza vaccine or inform them about it. Not talking about vaccination with the health professional is a noteworthy factor in a systematic review and other studies conducted in the United States, which show that pregnant women want to receive more information from their care providers (Ellingson & Chamberlain, 2018; Lutz et al., 2018). The fact that nurse-midwives gave information and recommendations about the influenza vaccine less often than about the pertussis vaccine is congruent with the lower vaccination rate for influenza in pregnant women (29%) for Catalonia during the 2018–2019 vaccination campaign (Ministerio de Sanidad, n.d.-a). It seems that nurse-midwives did not consider the influenza vaccine to be important and therefore recommended it less frequently than they recommended the pertussis vaccine. Additionally, only 28% of health professionals in Catalonia were vaccinated against influenza in the 2018–2019 vaccination campaign. The main reason not to be vaccinated against influenza is fear of adverse effects, followed by the perceived lack of seriousness of the disease (Ferragut et al., 2020). Health professionals' concern or scepticism about influenza vaccination could also explain this fact (Sammon et al., 2013). There is a positive association between professionals' perception of risk from influenza and their knowledge about the infection, as seen in studies conducted in Australia. These factors condition both their attitude about vaccination and their propensity to recommend it to others (Smith et al., 2016a, 2016b).

The findings highlight factors that can be interpreted as even more important than receiving the recommendation to be vaccinated: the attitude, conviction and emphasis of the professional, which are different for the influenza vaccine than for other vaccines (Maher et al., 2014). Some nurse-midwives conveyed conviction in their recommendation and even took vaccination for granted, treating it as a necessary procedure. Others opted to inform their patients and allowed them to decide for themselves whether to be vaccinated. However, relying on the person's informed decision-making requires providing relevant information about options, benefits and

risks, and helping the person to make decisions that are congruent with her personal values (Stacey et al., 2017). When nurse-midwives do not provide this information, as seen in our findings, pregnant women may assume that their nurse-midwife has not recommended the vaccine because she has doubts about its efficacy and side effects, as seen in other studies (Maher et al., 2014). Encouraging a change in attitude among health professionals is a priority, considering that professionals' attitude is key to achieving high vaccination rates (Maertens et al., 2016).

Trust in the health professional is critical (Wiley et al., 2015), and our participants reported that they would have taken the influenza vaccine if it had been recommended by their nurse-midwife (see also Maertens et al., 2016, Maisa et al., 2018, and Agricola et al., 2016). According to Agricola, 34% of participants would have been vaccinated if recommended by their care provider, even though 48% of them expressed concerns about vaccination. In work by Maher et al. (2013) and Healy et al. (2015), these percentages were higher: 67% and 82%, respectively, said they would have been vaccinated. The role of the health professional in decision-making is clear and suggests yet again the need to encourage health professionals to support vaccination in their patients.

Regarding vaccination, most participants perceived it to be beneficial and to bear minimal risks that they had not thought much about, findings that coincide with a previous Australian study (Wiley et al., 2015). Our participants also showed little concern about vaccine safety, which coincides with a Belgian study (Maertens et al., 2016) and contrasts with other research (Wilson et al., 2015). In any case, it leads us to conclude that there was not an a priori negative view of vaccines that had a major impact on participants' decision. Along with the existence of a certain level of confidence in vaccines (Wales et al., 2020), we see the key role of nurse-midwives in recommending vaccines, dispelling the erroneous idea that the influenza vaccine benefits only—or primarily—the mother (Maher et al., 2013; Wilcox et al., 2018), and explaining that the influenza vaccine cannot cause influenza infection (Maisa et al., 2018). Keeping in mind that pregnant women tend to place their newborns' health ahead of their own, emphasising the benefits to the newborn of maternal vaccination against influenza could foster vaccination (Maher et al., 2013).

Finally, participants explicitly described as limiting factors fear, concerns about economic interests, and the lack of professional information (which leads pregnant women to seek information from non-scientific sources). Again, we see the importance of having the health professional inform pregnant women about vaccination. If they do not do so, they run the risk that patients will resort to unreliable sources of information. Although some pregnant women consult official sources, most use sources such as google to find information related to influenza and pertussis (Wiley et al., 2015). Information without a scientific basis can generate confusion and false beliefs about side effects that can discourage pregnant women from being vaccinated. Overexposure to this unreliable information, when not counterbalanced with reliable information from health professionals, can lead to confusion and the decision not to be vaccinated.

## 5.1 | Limitations

A possible limitation is that all participants were cared for in Spain's public health system. This system is used by most pregnant women in Spain, but some pregnant women are cared for in private centres. However, women cared for in these centres still have the right to be vaccinated in the public health system. Additionally, the ASSIRs we chose were located in areas with different income levels, allowing us to ensure maximum variability across participants.

## 6 | CONCLUSION

Our findings point to nurse-midwives and their professional actions as the main factor in participants' decision to be vaccinated or not. For this reason, efforts to improve maternal vaccination rates should be oriented toward these professionals. Nurse-midwives could make a stronger and more convincing recommendation to their patients to be vaccinated, especially against influenza. To do so, professionals need full conviction of the need for and suitability of these vaccines, based on scientific evidence. They also need to be aware that their professional practices can be decisive in their patients' decision to be vaccinated or not. Professional advice should fill the empty space that pregnant women often fill with non-scientific information that can ultimately hurt their health and that of their future newborn. These changes, in addition to local or national policies, can improve maternal vaccination rates and reduce morbidity and mortality among both pregnant women and newborns.

## 7 | RELEVANCE TO CLINICAL PRACTICE

Maternal vaccination against influenza and pertussis is clearly recommended by health institutions. Understanding the factors that can lead a pregnant woman to be vaccinated or not can help policymakers and health administrators improve strategies to increase maternal vaccination rates. We draw special attention to nurse-midwives, who are responsible for providing information and recommendations about vaccination to pregnant women. Because of their influence on patients, nurse-midwives have the opportunity to encourage vaccination practices based on scientific evidence, which clearly supports maternal vaccination not only against pertussis, but also against influenza. In order to encourage nurse-midwives to recommend the influenza vaccine more resoundingly, a fuller understanding of why they do not recommend this vaccine as much as the pertussis vaccine is needed. We will address this issue in our next study.

### CONFLICT OF INTEREST

The authors declare that they have no conflict of interests.

### AUTHOR CONTRIBUTIONS

All authors met the criteria for authorship and all entitled to authorship are listed as authors. AA and MIF involved in conceptualisation


and research design. AA, LM, RMC and AR involved in data collection. AA and MIF involved in data analysis. AA and MIF involved in manuscript draft preparation and editing. All authors contributed to critical review of the manuscript and final version approval.

### DATA AVAILABILITY STATEMENT

Data available on request from the authors.

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## SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section.

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