

## Short report

# PERTUSSIS IMMUNISATION IN PREGNANCY: A SUMMARY OF FUNDED AUSTRALIAN STATE AND TERRITORY PROGRAMS

Frank H Beard

## Abstract

*The Australian Immunisation Handbook*, 10th edition now recommends pertussis vaccination during pregnancy as the preferred option for protecting vulnerable young infants. Jurisdictionally funded pertussis immunisation programs for pregnant women were progressively introduced in all Australian states and territories between August 2014 and June 2015. A meeting convened by the National Centre for Immunisation Research and Surveillance of Vaccine Preventable Diseases was held on 31 May 2015 to share information regarding jurisdictional policies and program implementation. This report of that meeting provides the first published comparison of these jurisdictional programs, which are of a broadly similar nature but with important differences. Monitoring and evaluation of the uptake, safety and impact of the current programs in Australia will be important to inform future policy decisions. *Commun Dis Intell* 2015;39(3):E329–E336.

Keywords; immunisation programs; pertussis

## Introduction

In 2013, the 10th edition of *The Australian Immunisation Handbook* included for the first time, the option of vaccinating pregnant women with pertussis vaccine in the 3rd trimester of pregnancy, rather than pre- or post-partum.<sup>1</sup> These 3 options were presented as equivalent in terms of protecting infants, due to the absence of sufficient evidence to support any clear preference. Cocooning (vaccinating close contacts of infants, including parents, to reduce the likelihood of exposure) has been recommended in Australia since 2003,<sup>2</sup> and some states and territories introduced funded cocoon programs in response to the recent pertussis epidemic. However, cocooning provides indirect protection and is only moderately effective.<sup>3</sup> Following the publication of evidence showing that pertussis vaccination during pregnancy is both highly effective in preventing infant disease<sup>4,5</sup> and safe,<sup>6–8</sup> *The Australian Immunisation Handbook* was updated in March 2015 to clearly recommend pertussis vaccination during pregnancy as the preferred

option, recommending optimal timing between 28 and 32 weeks gestation but that the vaccine can be given at any time during the 3rd trimester up to delivery.<sup>9</sup>

Jurisdictionally funded pertussis immunisation programs for pregnant women have been progressively introduced in all Australian states and territories between August 2014 and June 2015. These programs are broadly similar in nature but with some differences in terms of policy and implementation.

A meeting, convened by the National Centre for Immunisation Research and Surveillance of Vaccine Preventable Diseases (NCIRS), was held on 31 May 2015 immediately prior to the Communicable Disease Control Conference in Brisbane, aiming to share information regarding jurisdictional policies and program implementation, along with plans for evaluation of uptake, adverse events following immunisation, and disease impact. This meeting was attended by representatives from the Australian Government Department of Health and all 8 Australian states and territories except the Australian Capital Territory. This report summarises the key outcomes of this meeting and provides the first published summary of the commonalities and differences across jurisdictional programs and plans for evaluation.

## Meeting outcomes

### Program details

Commencement dates and implementation details for funded jurisdictional pertussis immunisation programs for pregnant women, along with whether any cocoon program is to be run simultaneously, are presented in the Table. Queensland was the first jurisdiction to introduce a program, commencing in August 2014, with all other jurisdictional programs introduced between March and June 2015.

All jurisdictions recommend vaccination from 28 weeks gestation and most note that 28–32 weeks is ideal. At the time of the meeting, Queensland

recommended vaccination only where no pertussis vaccine dose had been received in the last 5 years. However this was subsequently amended to accord with the updated *Australian Immunisation Handbook* recommendations (personal communication Scott Brown, Acting Manager, Immunisation Program, Department of Health, Queensland, 29 July 2015). Only 2 jurisdictions (Victoria and the Northern Territory) are funding a cocoon program in addition to their program for pregnant women.

### Implementation

All jurisdictions provide vaccine via general practitioners and hospital antenatal clinics, with some also utilising Aboriginal medical services, local councils, community health centres, and obstetricians.

### Evaluation

#### Coverage assessment

The most common plan for assessing vaccination coverage was through data from the relevant jurisdictional perinatal data collection (PDC). Vaccination during pregnancy will be captured on the Victorian and Queensland PDCs from July 2015 and on the New South Wales PDC at a state-wide level from January 2016. Some other jurisdictions reported attempts to organise inclusion on their PDC but a number of challenges were identified in achieving this. A range of alternative methods of coverage assessment were also planned, with the Northern Territory to use its own whole-of-life immunisation register and Western Australia an annual survey of a random sample of around 400 recently-delivered mothers.

Queensland advised an interim estimate of 40%–50% coverage as of May 2015, based on the number of births and consent forms returned centrally, and the use of a different brand of vaccine to that used in the adolescent school-based program allowing differentiation. Western Australia advised an interim estimate of around 55% coverage, based on the number of births in May 2015 and the number of forms returned by immunisation providers documenting administration of vaccine to pregnant women. Western Australia also reported that influenza vaccine coverage during pregnancy appeared to have improved as a result of the pertussis program, with the vaccines often co-administered.

#### Vaccine safety

Most jurisdictions reported that they will rely on existing (passive) surveillance systems for the

reporting of adverse events following immunisation (AEFI). These involve reporting of AEFI by immunisation providers, and sometimes patients, with subsequent follow-up by public health agencies.<sup>10</sup> In New South Wales this will be supplemented by emergency department syndromic surveillance while Western Australia will use active surveillance for AEFI with expansion of an SMS system used for AEFI monitoring for influenza vaccination during pregnancy.

### Disease impact/vaccine effectiveness

Queensland, New South Wales and Western Australia reported the most advanced plans for evaluation of their respective programs. Queensland will evaluate vaccine effectiveness via a cohort study, linking data from their state-based immunisation register (Vaccination Information and Vaccination Administration System) with notifications database, perinatal data collection data, and birth registry data, while New South Wales will evaluate via a case-control study based on notified infant cases. Western Australia plans to expand its existing cohort study of influenza vaccine effectiveness during pregnancy to assess pertussis vaccine effectiveness, via linked midwives data collection, hospitalisation, notification and emergency department data, and data on vaccination in pregnancy reported by immunisation providers.

### Conclusions

Currently, all available evidence supports vaccination during pregnancy as the best option for protecting vulnerable young infants from pertussis. Australia has high rates of pertussis, with high levels of hospitalisation (and occasional deaths) in young infants.<sup>11</sup> Australian states and territories have taken the lead in implementing pertussis immunisation programs for pregnant women on the basis of this evidence and updated *Australian Immunisation Handbook* recommendations.

With broadly similar pertussis immunisation programs for pregnant women now in place and funded by all jurisdictions, for the first time in recent history Australia has immunisation programs that are implemented across the entire country that universally target a particular population but are outside the National Immunisation Program (NIP). This situation is likely to be of questionable sustainability. Since 2005 vaccines have been required to go through a standardised process of application to and assessment by the Pharmaceutical Benefits Advisory Committee (PBAC) for consideration of suitability and cost-effectiveness for funding under the NIP.<sup>12,13</sup> It is currently unclear whether any vaccine manufacturer intends to submit an application

to the PBAC in regard to pertussis immunisation during pregnancy, and unclear what the outcome of such an application, if it eventuates, would be. Pertussis immunisation for pregnant women has been funded in national immunisation programs in the United Kingdom (though in the context of a temporary program with review after 5 years)<sup>14</sup> and in New Zealand,<sup>15</sup> and is recommended nationally by the Advisory Committee for Immunization Practices in the United States<sup>16</sup> and 'encouraged' by the Public Health Agency of Canada.<sup>17</sup> Monitoring and evaluation of the uptake, safety and impact of the current program arrangements in Australia will be important to inform future policy decisions.

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**Table: Funded pregnancy/cocoon pertussis immunisation program implementation, by Australian states and territories (information as of 31 May 2015)**

State or territory	Australian Capital Territory*	New South Wales	Northern Territory	Queensland	South Australia	Tasmania	Victoria	Western Australia
<b>Program dates and details</b>								
Start date	April 2015	April 2015	April 2015 <sup>†</sup>	August 2014	March 2015	June 2015	June 2015	April 2015
Vaccine	Boostrix® and Adacel®	Boostrix®	Boostrix®	Adacel® (cf adolescent program using Boostrix®)	Adacel® (cf adolescent program using Boostrix®)	Adacel® (cf adolescent program using Boostrix®)	Boostrix®	Boostrix® (cf adolescent program using Adacel®)
Target group in terms of gestational age	From 28 weeks pregnancy (recommended at 28 weeks gestation or as soon as possible after that)	From 28 weeks gestation in each pregnancy (ideally 28–32 weeks)	From 28 weeks gestation in each pregnancy, or as soon as possible after delivery	From 28 weeks gestation, if have not had a pertussis containing vaccine in the last 5 years <sup>†</sup>	From 28 weeks gestation in each pregnancy (ideally 28–32 weeks)	From 28 weeks gestation in each pregnancy (ideally 28–32 weeks)	From 28 weeks gestation in each pregnancy (ideally 28–32 weeks) or as soon as possible after delivery	From 28 weeks gestation in each pregnancy (ideally 28–32 weeks)
Funded cocoon program?	No	No	Yes (since 2008 – currently targets fathers/carers in household of an infant under the age of 7 months – can be given from time expectant mother reaches 28 weeks gestation)	No	No	No	Yes (parents and guardians of infants up to 6 months of age and born on or after 1 June 2015, and partners of women who are at least 28 weeks pregnant, if they have not received a pertussis booster in the last 10 years)	No
<b>Implementation</b>								
Providers	GPs, antenatal clinics.	GPs, AMSS, antenatal clinics	All providers, majority in community health centres. Also GPs and antenatal clinics	Mainly GPs, also antenatal clinics	Mainly GPs, also antenatal clinics and councils	GPs mainly, some in antenatal clinics	All providers – GPs, antenatal clinics and possibly councils	GPs, antenatal clinics and obstetricians

**Table (cont'd): Funded pregnancy/cocoon pertussis immunisation program implementation, by Australian states and territories (information as of 31 May 2015)**

State or territory	Australian Capital Territory*	New South Wales	Northern Territory	Queensland	South Australia	Tasmania	Victoria	Western Australia
<b>Evaluation</b>								
Coverage assessment		Via perinatal data collection (will be collected state-wide by 1 January 2016)	Northern Territory immunisation register	Use of Adacel® allows differentiation from adolescent program, also consent forms returned centrally Coverage estimated at 40%–50% Vaccination status will be in perinatal data collection from 1 July 2015	Not currently in perinatal data collection		Via perinatal data collection	Annual survey of a random sample of ~400 recently-delivered mothers (baseline coverage 5%) Working to get pertussis vaccination into perinatal data collection Coverage estimated at around 55%
Vaccine safety		Emergency department syndromic surveillance	Usual way	Follow-up of reported adverse events following pertussis-containing vaccine in women of child-bearing age; reviewed by expert advisory group	Usual way	Usual way	Usual way	Via SMS back system – expansion of existing system used for monitoring adverse events following influenza vaccination during pregnancy
Formal evaluation of impact/ vaccine effectiveness		Case-control study of vaccine effectiveness, based on notified infant cases	Planning evaluation	Cohort study of vaccine effectiveness – linkage of data from state-based immunisation register with notifications database, perinatal data collection, and birth registry data	None planned, but will capture maternal vaccination status in all infant pertussis cases	None planned, but will capture maternal vaccination status in all infant pertussis cases	Scoping options	Aim to expand cohort study of influenza vaccine effectiveness during pregnancy to assess pertussis vaccine effectiveness – linkage of midwives data collection, hospitalisation, notification and emergency department data

Table (cont'd): Funded pregnancy/cocoon pertussis immunisation program implementation, by Australian states and territories (information as of 31 May 2015)

State or territory	Australian Capital Territory*	New South Wales	Northern Territory	Queensland	South Australia	Tasmania	Victoria	Western Australia
	<b>Relevant website links for jurisdictional programs</b>							
GPs	<a href="#">Antenatal Pertussis Vaccination Program General Practitioners &amp; Immunisation Providers Q&amp;A<sup>18</sup></a>	<a href="#">NSW Health news<sup>20</sup></a> <a href="#">NSW Health Immunisation programs<sup>21</sup></a> <a href="#">NSW Pertussis Control Program 2015<sup>22</sup></a>	<a href="#">Immunisation<sup>23</sup></a> <a href="#">Pertussis (Whooping cough)<sup>24</sup></a> <a href="#">Adult and Special Groups Vaccination Schedule<sup>25</sup></a>	<a href="#">Pregnant and breastfeeding women<sup>26</sup></a> <a href="#">Whooping cough vaccine program for pregnant women<sup>27</sup></a> <a href="#">Whooping cough vaccine program for pregnant women information sheet<sup>28</sup></a>	<a href="#">Whooping cough vaccine in pregnancy<sup>29</sup></a> <a href="#">Diphtheria, tetanus and whooping cough combination vaccines<sup>30</sup></a>	<a href="#">Free whooping cough vaccine for pregnant women<sup>31</sup></a> <a href="#">Department of Health and Human Services Bulleting board<sup>32</sup></a>	<a href="#">Q&amp;A for health professionals - Parent's whooping cough vaccine program<sup>33</sup></a> <a href="#">Better Health Channel Whooping Cough<sup>34</sup></a>	<a href="#">Healthy WA: Adult immunisation schedule<sup>35</sup></a> <a href="#">Healthy WA: Pertussis vaccine in pregnancy – what expectant mothers need to know<sup>36</sup></a> <a href="#">Operational Directives and Information Circulats<sup>37</sup></a>

GPs general practitioners

AMSS Aboriginal medical services

\* Information sourced from ACT Health website

† Funded for use in third trimester of pregnancy from September 2013 but not the preferred option until April 2015

‡ Subsequently amended to accord with updated *Australian Immunisation Handbook* recommendations

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