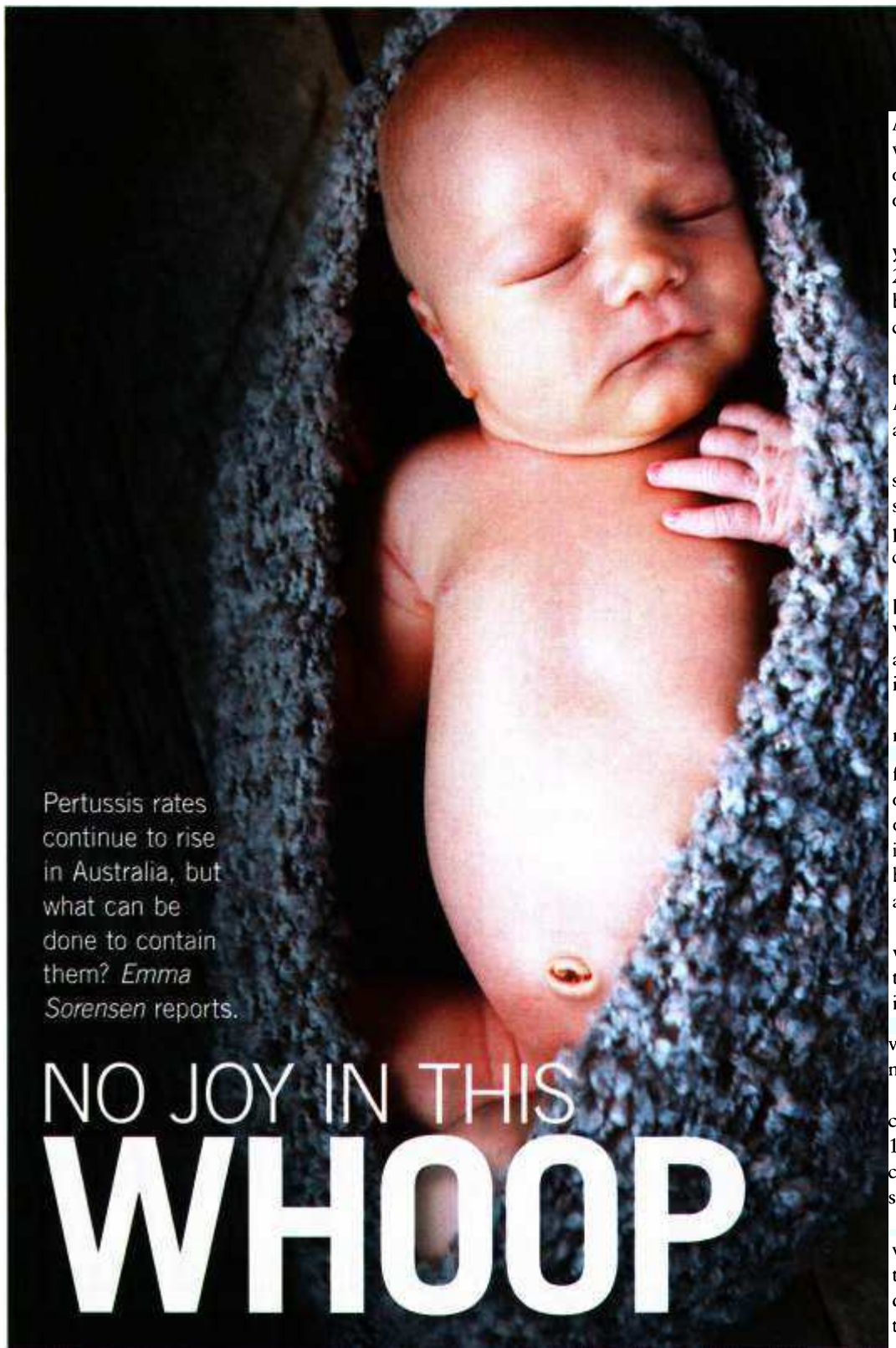




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Pertussis rates continue to rise in Australia, but what can be done to contain them? *Emma Sorensen reports.*

# NO JOY IN THIS WHOOP

**“Last year, there were... 35,000 notified whooping cough cases nationally, while... we had three cases of tetanus”** Dr Eizenberg

AUSTRALIA holds an undesirable world record: the greatest number of reported incidences of pertussis of any country in the world.<sup>1</sup>

Periodic epidemics every 3–4 years (1997–98, 2001, 2005–06, 2008–10), have been set against a background of endemic pertussis circulation (see box).

But what is contributing to the rise of whooping cough in Australia and what can be done about it?

According to experts, there are several factors driving the pertussis epidemic and just as many potential strategies proposed to combat it.

Dr Peter Eizenberg is a Melbourne GP, chair of Northeast Valley Division of General Practice and a former member of national immunisation committees.

“It’s certainly a significant rise, consistent with the national figures. Quite often we get cases of modified whooping cough, in older children and adults, which is often not typical in presentation but can still be infectious to babies and others,” Dr Eizenberg says.

Neither natural infection or vaccination provides lifelong protection against pertussis, with immunity waning 4–12 years after vaccination and 4–20 years after natural infection.

While vaccination has been carried out in Australia since the 1950s, pertussis is the least well controlled of all diseases with long-standing vaccination programs.

Between 1993 and 2006 there were 21 deaths attributed to pertussis, with all but four of these deaths occurring in infants less than 12 months of age.

It is problematic in two age groups: those over 20, who accounted for 60% of notifications in 2008, and those under six months, who accounted for 21% of notifications.



According to Professor Peter McIntyre, director of the National Centre for Immunisation Research and Surveillance, there's been a pertussis 'perfect storm'.

"Firstly acellular vaccines which don't last as long, secondly the booster was removed at 18 months, thirdly an epidemic, and fourthly more testing, and with a much more sensitive test we're picking it up far more," he says.

Some critics attribute the rise in pertussis cases to the move to an acellular vaccine, associated with less adverse reactions.

Professor McIntyre agrees acellular vaccines do seem to have a shortened duration of immunity, and without a dose in the second year of life, cases emerge from age two onwards.

"You would anticipate a booster could reduce that, but in places like the US, which do have a booster then, they are also seeing increased cases of pertussis in children who have received all acellular vaccines, particularly in children aged over eight."

Professor McIntyre says exciting research into the concept of a live vaccine in a weakened form administered intranasally, which, if found to be safe and effective, could be the future as it would more closely replicate disease-acquired immunity.

#### THE COCOONING STRATEGY

Meanwhile, in an effort to prevent the alarming rate of deaths in babies, 'cocooning strategies' – that is, immunising family

members of newborns against pertussis – have been implemented by most states but not standardised nationally.

An Australian Technical Advisory Group on Immunisation (ATAGI) spokesperson says it has been watching overseas trends very closely, including US research that indicates cocooning is an insufficient national strategy to prevent pertussis morbidity and mortality in newborn infants.

Last July, the Pharmaceutical Benefits Advisory Committee (PBAC) rejected a submission from GlaxoSmithKline for ongoing public funding to list dTpa vaccine (Boostrix) for use in parents of newborn infants on the National Immunisation Program (NIP).

The decision was made on the basis of uncertain clinical effectiveness and highly uncertain cost effectiveness.

Professor McIntyre believes cocooning at the time it was recommended in the *Australian Immunisation Handbook* (2008) was the best option to minimise young babies getting pertussis, but it comes with complex questions around who – and how many people – to include in the cocoon.

"Although theoretically it should help, we don't have a good sense of how much, which is probably a function more of how well it is delivered than its intrinsic effectiveness," says Professor McIntyre.

Earlier this year the US Advisory Committee on Immunization

Practices (ACIP) recommended giving pertussis vaccine to pregnant women after 20 weeks' gestation over postpartum administration because it provided greater certainty and cocooning strategies were difficult to implement.

ATAGI says it is monitoring the US move.

The advantage is targeting the baby with a dose of antibody direct from the mother, but Professor McIntyre questions if pregnant women and their doctors would accept it.

"We also don't know what the downstream questions would be: what happens with subsequent immunisations for the infant... and do you need to immunise in every pregnancy or just one?" Professor McIntyre says.

ATAGI recommends the first dose of pertussis vaccine be given as early as six weeks after birth.

Professor McIntyre says "there's every reason to think responses would be comparable, and it's approved by the TGA for use down to six weeks. This one dose would only provide partial protection, and there would be some lag, but it is likely to cut off a few more cases".

He argues it is likely the chance of an infant dying is reduced by one dose, the chance of being hospitalised is reduced by two doses, and the third dose is consolidatory.

Professor McIntyre is leading an Australian group trialling babies to receive a pertussis vaccine in the first few days after birth, to be given with the hepatitis B vaccine, if successful.

#### THE BOOSTER SCHEDULE

A recent article in *The Lancet* suggests policymakers in Europe consider regular pertussis booster vaccination, particularly in pre-schoolers, adolescents and adults.<sup>2</sup>

This is in line with both the USA's Advisory Committee on Immunization Procedures and the Global Pertussis Initiative.

The NIP vaccinates children at two, four, six months and four



years of age, with an adolescent booster dose via school-based programs at 12–17 years of age.

The 18 months dose was stopped in September 2003 due to adverse reactions, which may have resulted in waning immunity and increased infection.

Australian research found that the most frequently identified sources of whooping cough infection in children under 12 months were siblings (36%) and parents (24%).<sup>3</sup>

But it's not just the young.

Dr Eizenberg argues that the tetanus booster recommended (but not funded) at age 50 should contain the pertussis vaccine as well.

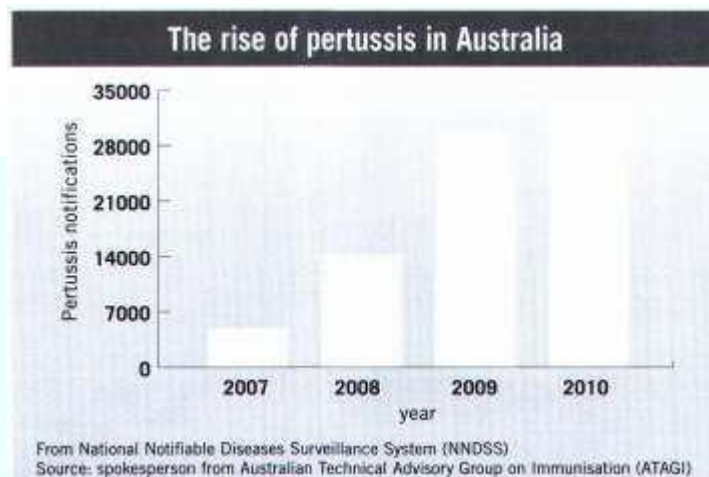
“Last year, there were almost 35,000 notified whooping cough cases nationally, while for the country we had three cases of tetanus,” Dr Eizenberg says.

A local study by Booy *et al* supports this idea, finding Boostrix was safe as a decennial booster in adults.<sup>4</sup>

Dr Eizenberg recommends swapping the emergency tetanus vaccine in the doctor's bag with the combination vaccine that also contains pertussis protection, a move the PBAC rejected as not being cost effective.

“The NHMRC's own recommendations say that when anyone is having a tetanus shot they should be offered pertussis protection as well, and this was written five years ago when the levels were far lower than they are now,” says Dr Eizenberg.

A study led by Professor David Durrheim, director of health protection for Hunter New England Health, is looking at using dTpa instead of the old Td vaccine for tetanus-prone wounds



in emergency departments in the region.

“It provides an excellent booster opportunity, particularly for young males or potential fathers who may have little contact with their GPs,” Professor Durrheim says.

**WHERE TO NEXT?**

Changing the immunisation schedule is a huge undertaking, with the challenge of balancing best clinical practice with PBAC practicalities, like cost.

An ATAGI spokesperson told *MO* the Pertussis Working Group, formed at the beginning of the current epidemic, is due to meet in

February 2012. It is considering a number of issues including cocooning strategies and boosters.

As Professor McIntyre says, the good news is that for the youngest babies under six months the numbers diagnosed haven't changed that much compared to the late 1990s when fewer babies were being immunised, despite more sensitive diagnostic tests.

“In the late '90s there were nine infant deaths. We've had seven deaths over a longer period despite the increased testing. It's still a major concern, but we... are seeing protection against the most severe cases.”

References at [medobs.com.au](http://medobs.com.au)