Preparing for Impact

Tips from Australia

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Chief Executive Officer, Bureau of Health Information

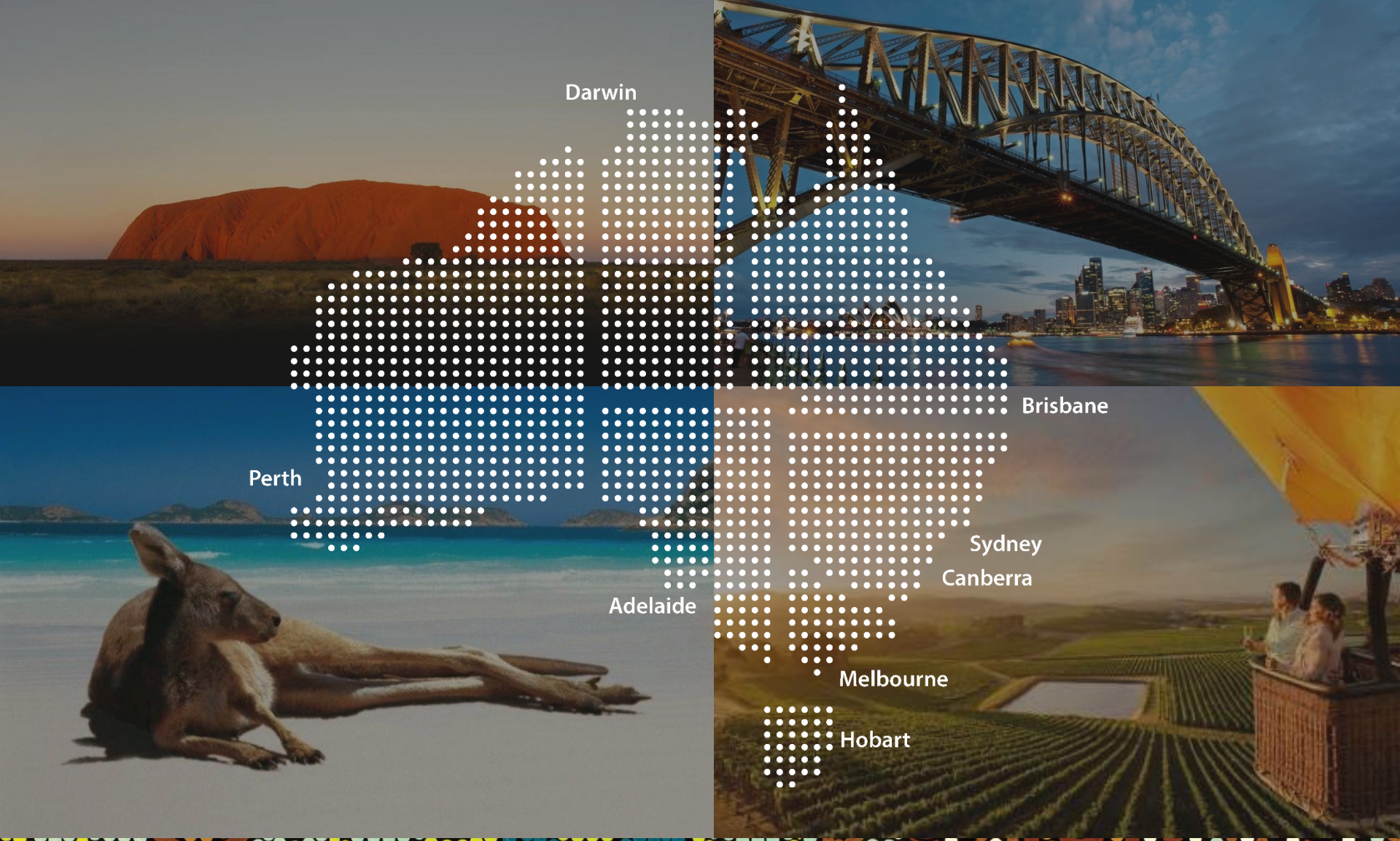
September 2018

bureau of health information

- Established in 2009 by the Government of New South Wales
- Board governed, statutory body
- 40 staff

- Established in 2012 by the Government of Australia
- Board governed, statutory body
- 75 staff

- Established in 2016 by the Government of Victoria
- Chief executive governed
- 65 staff


Darwin
Brisbane
Perth
Sydney
Canberra
Adelaide
Melbourne
Hobart

Purpose

- Describe examples from down under where analyses of big data have driven improvements in health and care
- Offer views on the attributes of big data organisations that have a big impact
- Reflect on the attributes of big data projects that result in a big impact.

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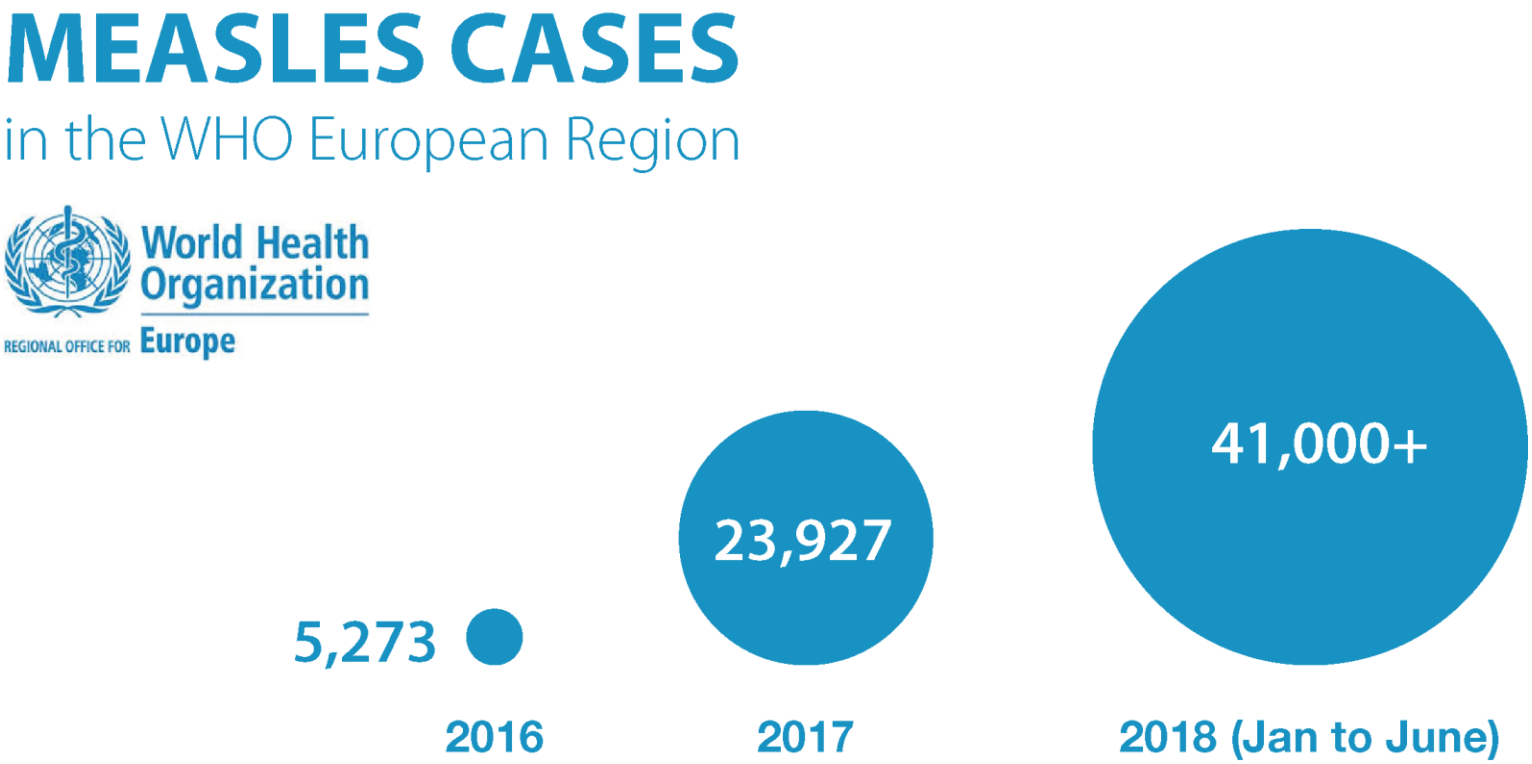
Underuse: The case of child immunisation



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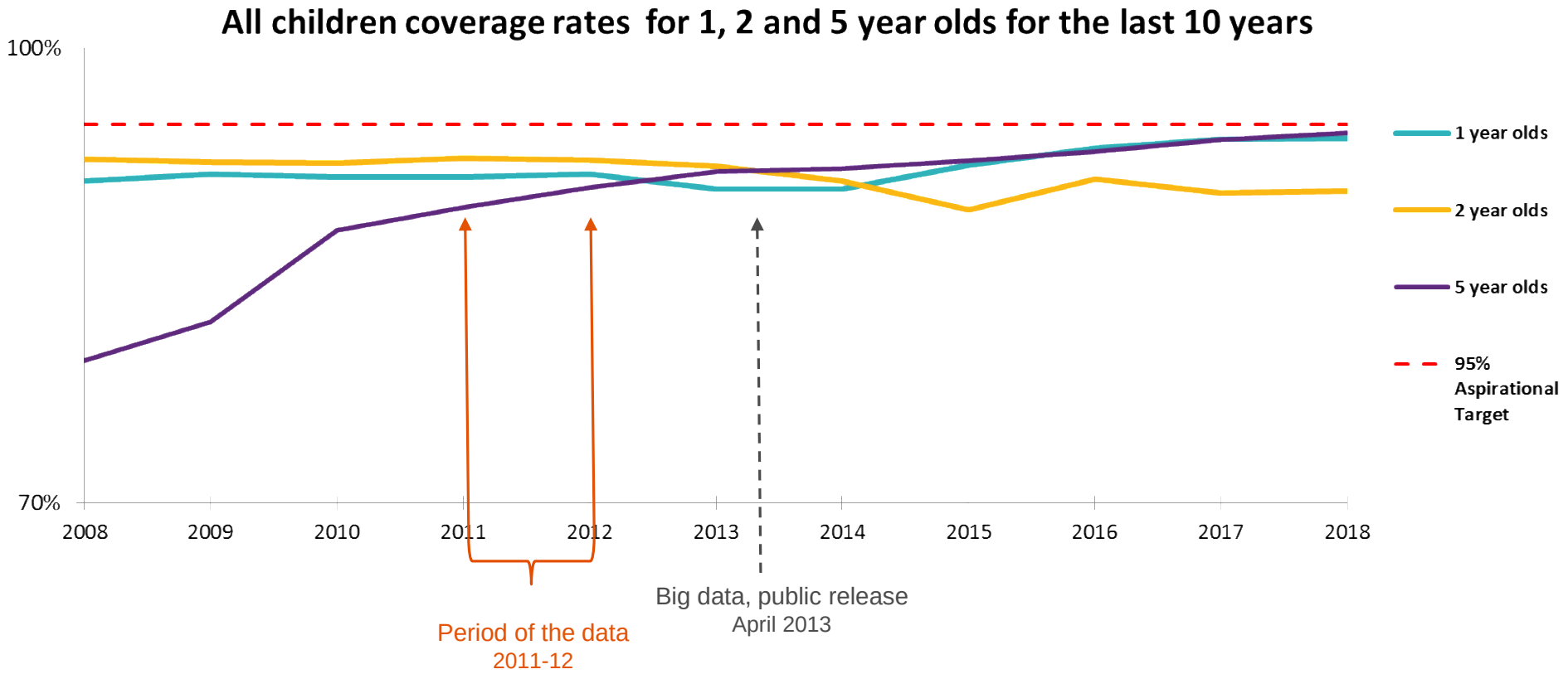
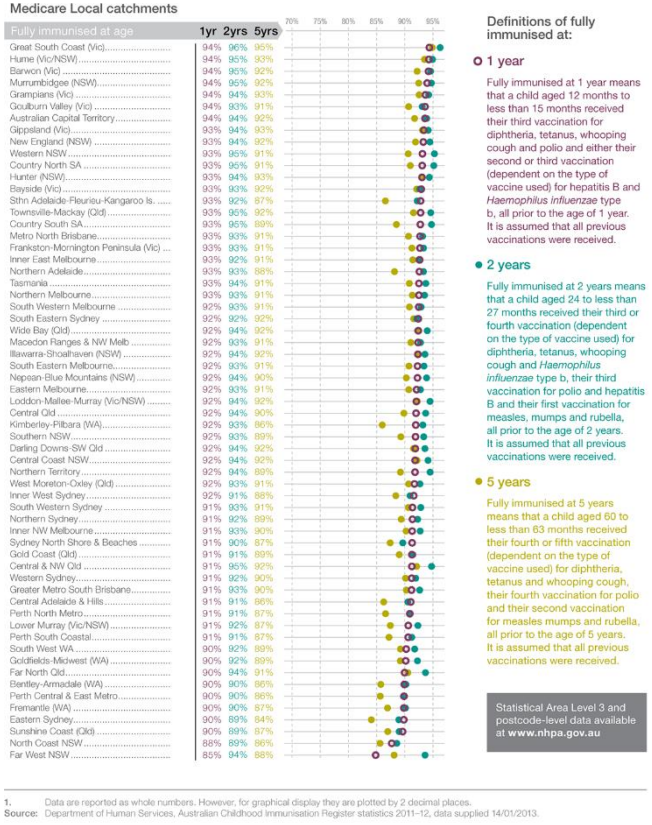


Underuse: The case of child immunisation

In 2013 Australia's National Health Performance Authority named 30 local communities where:

- 85% or less of 1, 2 or 5 year children who were not been fully immunised and, accordingly, at risk of being exposed to contagious diseases such as measles and whooping cough
- Among all 5 year olds, 23 of 61 catchments recorded less than 90% fully immunised. This was a much larger number of catchments than for all children aged 1 year (two out of 61 catchments) and 2 years (three out of 61 catchments)
- Percentages of Aboriginal and Torres Strait Islander children fully immunised were lower than for all children.

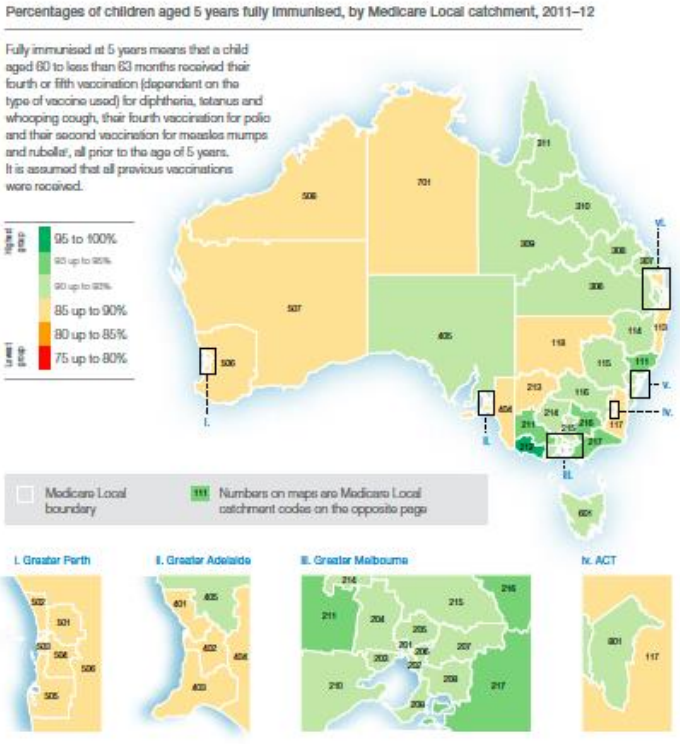
Figure 3: Percentages of all children[1] in each of 61 Medicare Local catchments that are fully immunised by age, 2011–12



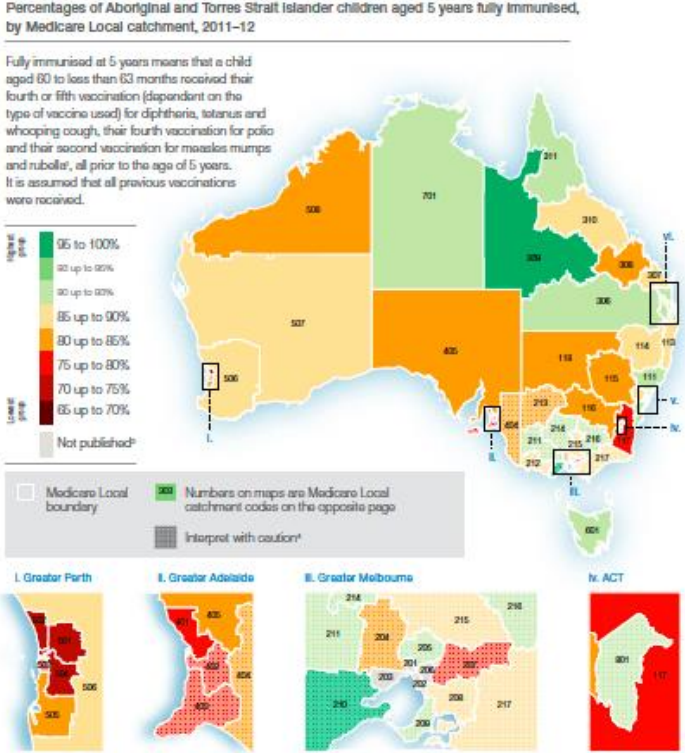
1. Data are reported as whole numbers. However, for graphical display they are plotted by 2 decimal places.
Source: Department of Human Services, Australian Childhood Immunisation Register statistics 2011–12, data supplied 14/01/2013.

Underuse: The case of child immunisation

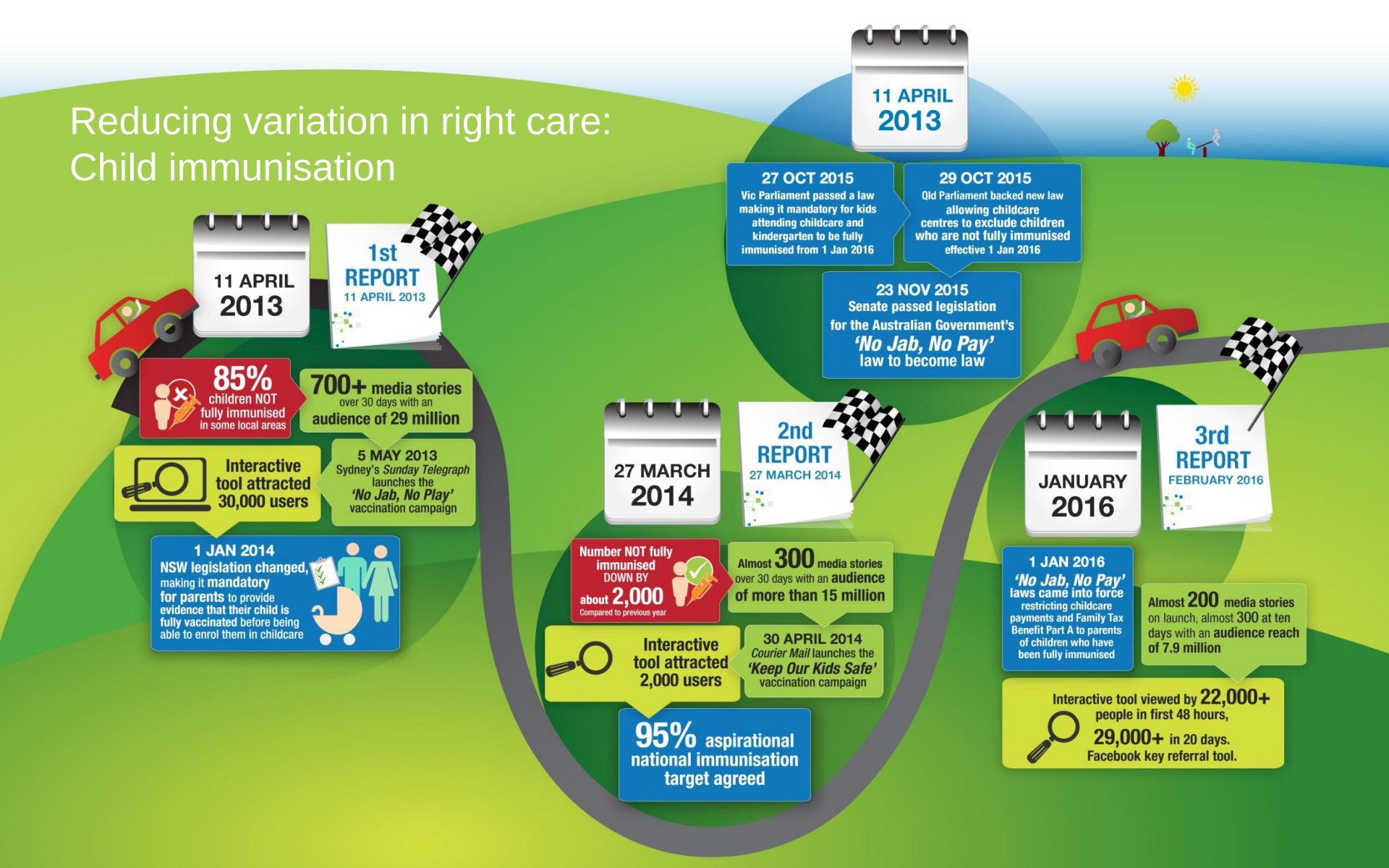
Children aged 5 years who were fully immunised, 2011–12



Aboriginal and Torres Strait Islander children aged 5 years who were fully immunised, 2011–12



Reducing variation in right care: Child immunisation



Underuse: The case of child immunisation

Cognitive and competitive levers

- Public reporting of 1, 2 & 5 year olds (small area) with resultant media campaign in 2013
- Aspirational national immunisation target agreed (95%) in 2015

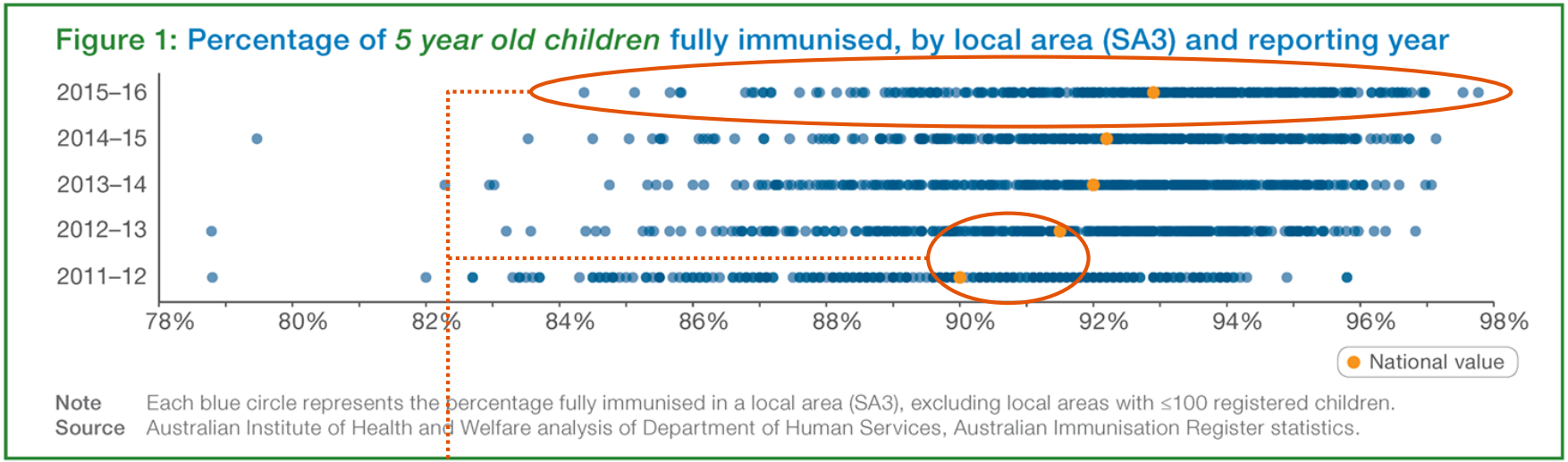
Normative, coercive and structural

- Change in legislation & regulations (*No jab, no play*) from 2014 to 2016 across states
- Change in family benefits policy (*No jab, No pay*) in 2016
- Performance Agreements with Primary Health Networks in 2015

Supportive levers

- Information for parents, educators and health professionals
- Decision support tools for parents

The result: Increased use of right care, reduction in variation



Reducing variation and increasing the national rate: Largest gain from commencement of public reporting and resultant media campaign in 2012-13. Subsequent gains related to changes to public health policy (No Jab, No Play) and social policy (No Jab, No Pay), establishment of an aspirational target (95%) and continued annual reporting of immunisation rates across small areas.

The result: Increased use of right care, reduction in variation

In 2012-13 **2/31** Primary Health Networks areas had rates **above the National target of 95% for fully immunised children (5 year olds)**.

In 2015-16 **3/31** Primary Health Network areas had rates **above the National Target of 95% for fully immunised children (5 year olds)**.

…. (see figure)

In 2016-17 **10/31** Primary Health Network areas had rates **above the National target of 95% for fully immunised children (5 year olds)** (data available online).

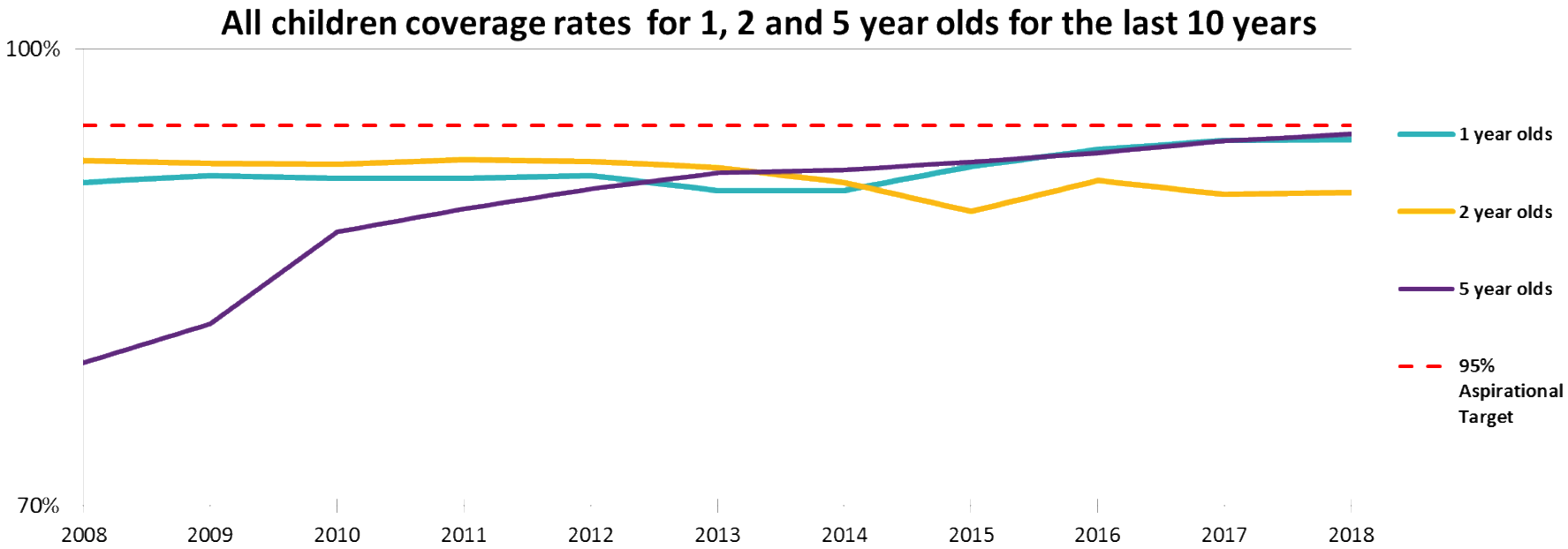
By March 2018 **17/31** Primary Health Network areas had rates **above the National Target of 95% for fully immunised children** (**5 year olds**) (data available online)

Figure 4: Immunisation rates for *5 year old children*, by Primary Health Network area, 2012–13 to 2015–16

Primary Health Network area	2012-13	2013-14	2014-15	2015-16
Western NSW	94.0	94.3	95.6	96.1
Murrumbidgee (NSW)	93.7	95.0	95.7	96.0
Hunter New Eng. & Cent. Coast (NSW)	93.9	94.5	94.8	95.4
Gippsland (Vic)	94.2	93.4	93.5	94.9
South Eastern NSW	93.1	93.9	93.5	94.7
Nepean Blue Mountains (NSW)	92.9	93.3	94.0	94.7
Western Queensland	92.2	94.5	92.9	94.4
Western Victoria	93.8	93.6	93.5	94.2
Murray (Vic & part NSW)	92.7	93.2	93.5	94.2
Northern Queensland	92.7	93.2	93.7	94.1
South Western Sydney (NSW)	92.5	93.0	93.8	94.0
Darling Downs & West Moreton (Qld)	93.0	93.2	93.3	94.0
Tasmania	92.9	92.7	92.6	93.8
Country WA	91.2	92.3	92.0	93.6
Australian Capital Territory	92.3	92.7	93.2	93.5
Country SA	92.0	92.5	91.7	93.4
North Western Melbourne (Vic)	92.4	92.5	92.5	93.2
Eastern Melbourne (Vic)	92.1	92.4	92.4	93.2
Western Sydney (NSW)	91.7	92.2	92.4	93.0
Brisbane North (Qld)	92.0	92.7	93.0	92.9
South Eastern Melbourne (Vic)	92.1	91.7	92.1	92.6
Brisbane South (Qld)	91.0	92.2	92.0	92.3
Northern Territory	90.9	91.4	92.4	91.9
Adelaide (SA)	90.4	90.4	90.5	91.9
Cent. Qld, Wide Bay & Sunshine Coast	90.8	91.6	91.0	91.6
Central & Eastern Sydney (NSW)	89.4	90.1	90.8	91.5
Northern Sydney (NSW)	89.0	89.9	90.4	91.3
Gold Coast (Qld)	89.3	90.1	90.7	90.8
Perth South (WA)	88.6	88.9	90.0	90.8
Perth North (WA)	89.2	89.1	90.3	90.6
North Coast (NSW)	88.0	88.7	89.2	90.3
National	91.5	92.0	92.2	92.9

95.0–100.0% 92.5–94.9% 90.0–92.4% 85.0–89.9%

Underuse: The case of child immunisation



By March 2018 **17/31** Primary Health Network areas had rates **above the National Target of 95% for fully immunised children for 5 year olds** and **12/31** Primary Health Networks had rates **above the National Target of 95% for fully immunised children for 1 year olds** (data available online).

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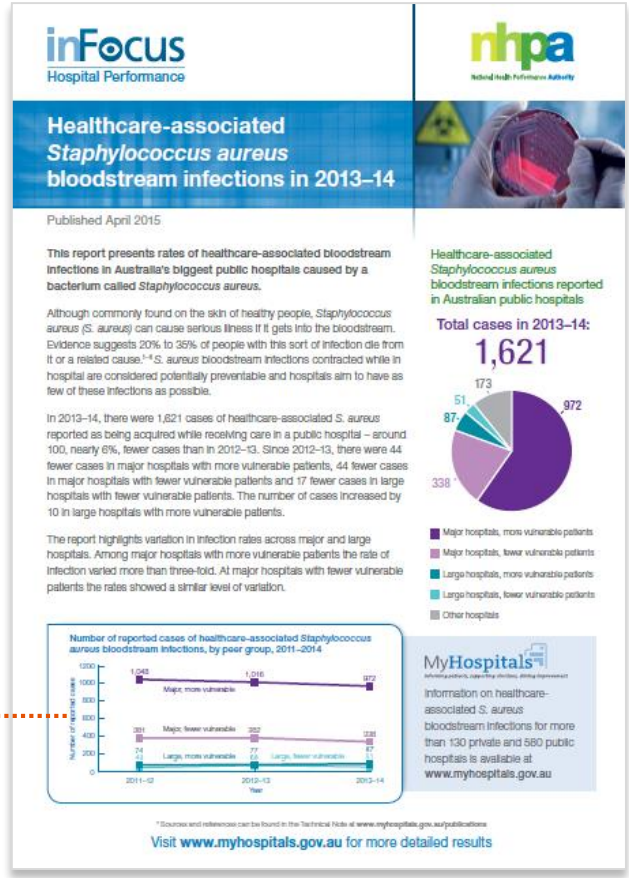
Improving outcomes: Healthcare-associated SAB infections



inFocus
Hospital Performance

nhpa
National Health Performance Authority

Healthcare-associated *Staphylococcus aureus* bloodstream infections in 2013–14

Published April 2015

This report presents rates of healthcare-associated bloodstream infections in Australia's biggest public hospitals caused by a bacterium called *Staphylococcus aureus*.

Although commonly found on the skin of healthy people, *Staphylococcus aureus* (*S. aureus*) can cause serious illness if it gets into the bloodstream. Evidence suggests 20% to 35% of people with this sort of infection die from it or a related cause.[1–4] *S. aureus* bloodstream infections contracted while in hospital are considered potentially preventable and hospitals aim to have as few of these infections as possible.

In 2013–14, there were 1,621 cases of healthcare-associated *S. aureus* reported as being acquired while receiving care in a public hospital – around 100, nearly 6%, fewer cases than in 2012–13. Since 2012–13, there were 44 fewer cases in major hospitals with more vulnerable patients, 44 fewer cases in major hospitals with fewer vulnerable patients and 17 fewer cases in large hospitals with fewer vulnerable patients. The number of cases increased by 10 in large hospitals with more vulnerable patients.

The report highlights variation in infection rates across major and large hospitals. Among major hospitals with more vulnerable patients the rate of infection varied more than three-fold. At major hospitals with fewer vulnerable patients the rates showed a similar level of variation.

Healthcare-associated *Staphylococcus aureus* bloodstream infections reported in Australian public hospitals

Total cases in 2013–14:

1,621

Number of reported cases of healthcare-associated *Staphylococcus aureus* bloodstream infections, by peer group, 2011–2014

MyHospitals

Information on healthcare-associated *S. aureus* bloodstream infections for more than 130 private and 580 public hospitals is available at www.myhospitals.gov.au

Visit **www.myhospitals.gov.au** for more detailed results

Figure 1: Healthcare-associated *S. aureus* bloodstream infections in public hospitals, by *major* and *large* hospitals, 2013–14

The government-agreed target calls for a rate of no more than 2.0 healthcare-associated *S. aureus* bloodstream infections per 10,000 patient bed days for each state and territory.

* More and fewer vulnerable patients refers to hospitals deemed to have, for their peer group, a high or low percentage of patient bed days under surveillance attributable to patients with one or more of the identified risk factors. Risk factors were not weighted to account for differences in the degree to which each factor contributes to risk of *S. aureus* infection. For more information on measures and peer groups, see the Technical Note www.myhospitals.gov.au

Sources: National Health Performance Authority analysis of Australian Institute of Health and Welfare, National Staphylococcus aureus Bacteraemia Data Collection 2013–14, data extracted 24 December 2014 and Australian Institute of Health and Welfare, Admitted Patient Care National Minimum Dataset 2011–12, data extracted 26 March 2012.

Peer groups based on risk of infection

150 less cases in 2 years

Inefficient care: Comparable costs of inpatient care

The cost of **providing care to similar acute patients** can be almost

2X

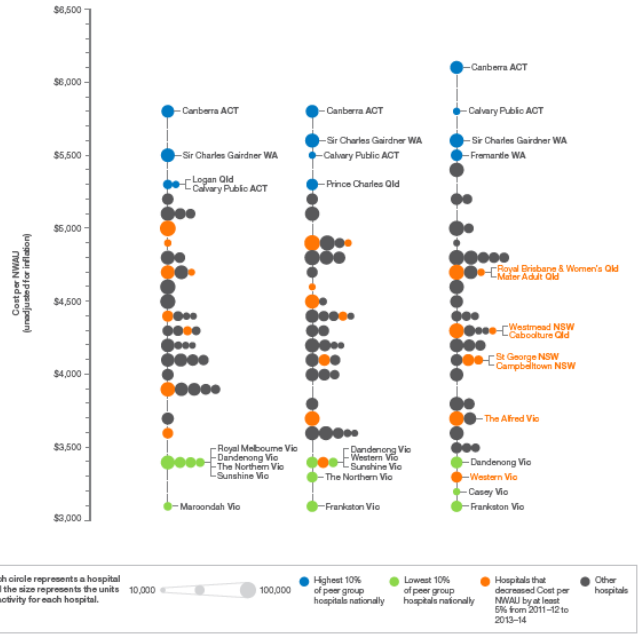
as high depending on the hospital

The costs incurred by public hospitals to deliver a notional 'average' service to acute admitted patients, ranged from:

$3,100 to $6,100

Figure 1: Cost per National Weighted Activity Unit (NWAU) for acute admitted patients, major metropolitan public hospitals, 2011–12 to 2013–14

	2011–12	2012–13	2013–14
Peer average expenditure per hospital	$214,775,000	$222,300,900	$228,444,200
Peer average NWAU per hospital	48,987	50,917	51,668
Peer average Cost per NWAU	$4,380	$4,370	$4,420



Note: References can be found in the Technical Supplement and definitions of terms in the Glossary at **www.myhospitals.gov.au**

Sources: National Health Performance Authority analysis of results calculated using the National Hospital Cost Data Collection, the Admitted Patient Care National Minimum Data Set and the Hospital Casemix Protocol Data Collection. Data supplied 18 and 28 October 2014 (2011–12 data) and 27 November 2015 (2012–13 and 2013–14 data).

Inefficiency: Comparable length of stay of inpatient services

Knee replacement

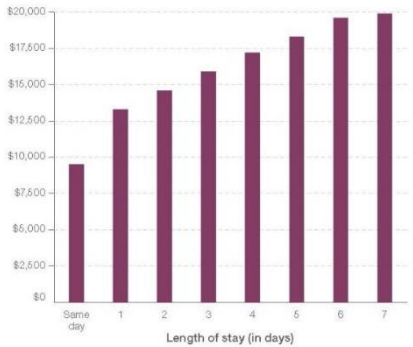
Without complications or comorbidities

In 2011–12, there were 5,613 admissions for knee replacements without complications or comorbidities in major metropolitan and major regional public hospitals.

CA

The average cost per admission in major metropolitan public hospitals ranged from $10,600 at one hospital to $29,300 at another.

Figure 13: Average cost for a knee replacement without complications or comorbidities in major public hospitals, by length of stay, 2011–12



Sources: National Health Performance Authority analysis of results calculated using the National Hospital Cost Data Collection 2011–12 and Admitted Patient Care National Minimum Dataset 2011–12.

Figure 25: Average length of stay for knee replacement in *major and large public hospitals*, 2011-12

Note:
- This report defines a "stay" as a period of care in a hospital for a single type of care, for example, acute care, rehabilitation or palliative care. If a patient changes from one type of care to another, or transfers hospital, this would be two episodes of care.
- Percentage refers to percentage of bed days in all public hospitals.
- For more information on measures and peer groups, see **www.myhospitals.gov.au**

Source: Admitted Patient Care National Minimum Dataset 2011–12, data extracted 26 March 2013.

Improving efficiency: Reducing comparable costs by 5+%

Table 3: Major metropolitan public hospitals that improved efficiency by decreasing the average cost of care by at least 5%, 2011–12 to 2013–14

Major metropolitan public hospitals	Reduced spending	Increased number of activity units (NWAUs)	Reduced spending & increased no. of activity units (NWAUs)
Caboolture Hospital (Qld)			●
Campbelltown Hospital (NSW)			●
Mater Adult Hospital (Qld)			●
Royal Brisbane & Women's Hospital (Qld)	●		
St George Hospital (NSW)		●	
The Alfred (Vic)			●
Western Hospital [Footscray] (Vic)			●
Westmead Hospital (NSW)		●	

Sources: National Health Performance Authority analysis of results calculated using the National Hospital Cost Data Collection, the Admitted Patient Care National Minimum Data Set and the Hospital Casemix Protocol Data Collection. Data supplied 18 and 28 October 2014 (2011–12 data) and 27 November 2015 (2012–13 and 2013–14 data).

Poor outcomes: Mortality within 30 days of admission

Dec 2015

June 2015

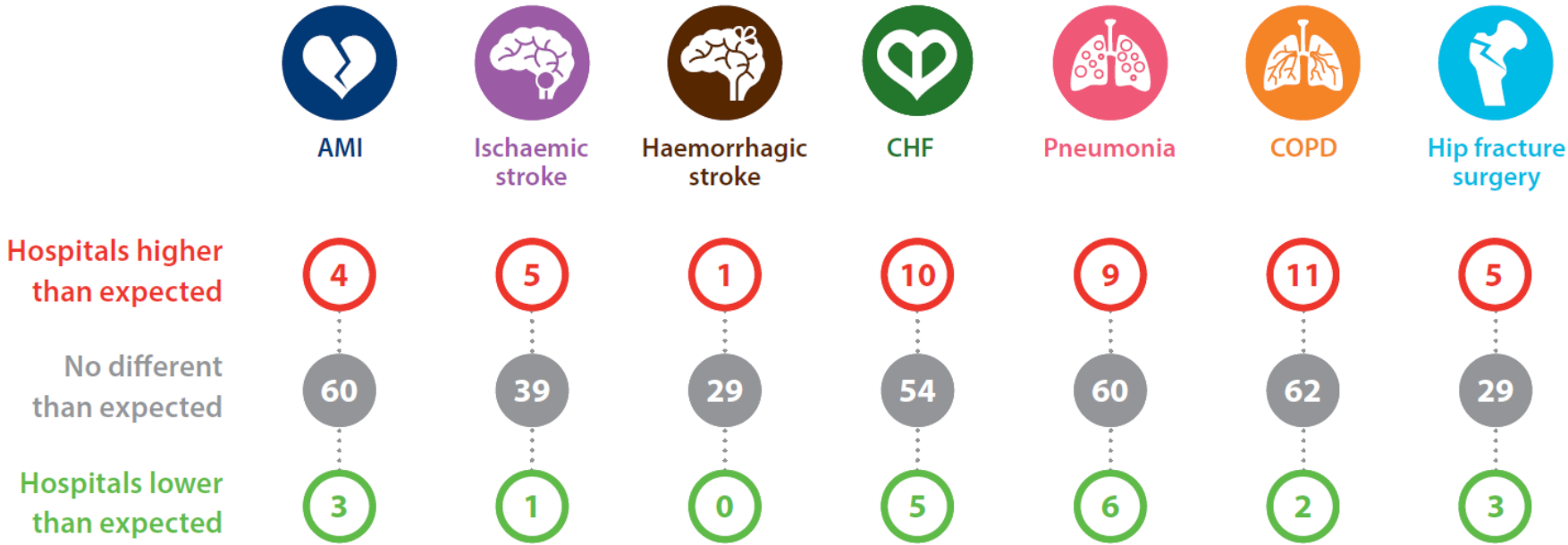
Aug 2015

May 2016

Apr 2017

Poor outcomes: Mortality within 30 days of admission

NSW public hospitals 30-day mortality results, by condition, NSW, July 2012 – June 2015



Poor outcomes: Mortality within 30 days of admission

30-day mortality, concentration of outlier results across hospitals, NSW, July 2012 – June 2015

Among 75 referral, major and district hospitals, between July 2012 and June 2015:

47 hospitals had no 'higher than expected' results

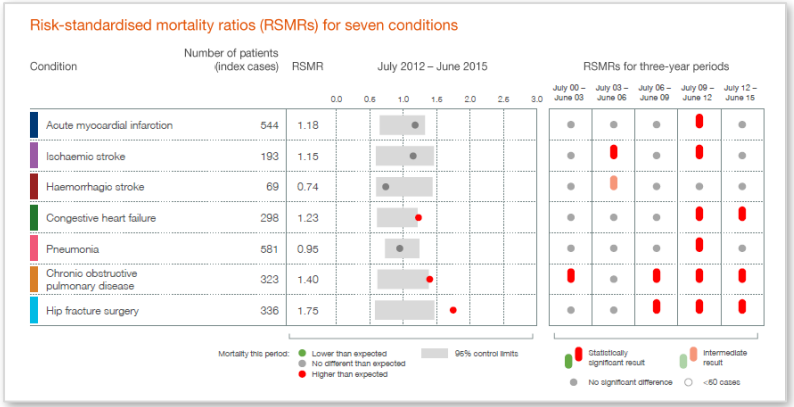
15 hospitals had higher than expected mortality for 1 condition

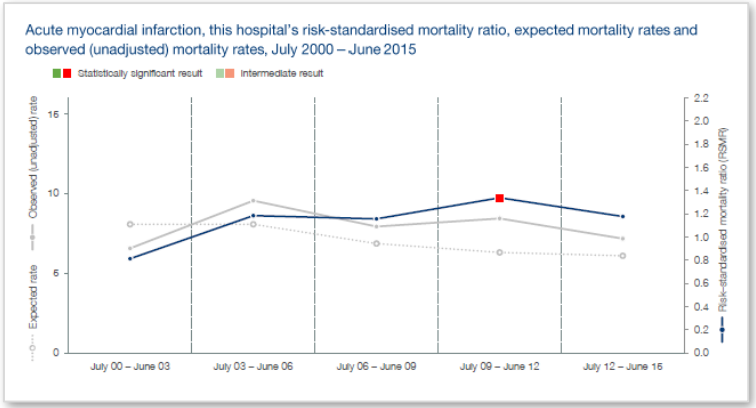
9 hospitals had higher than expected mortality for 2 conditions

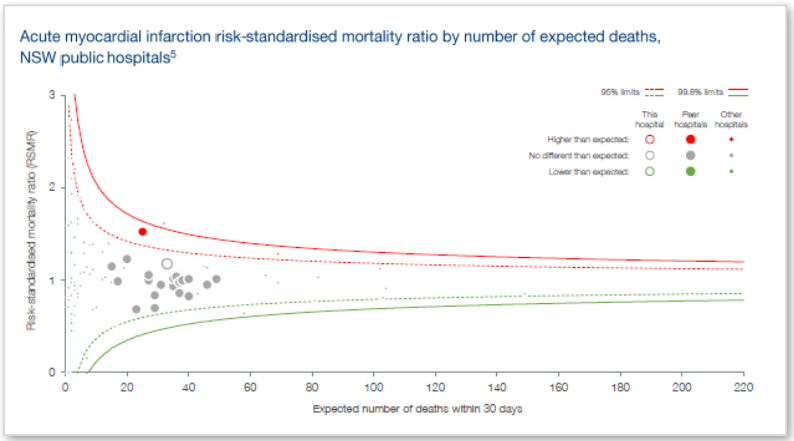
4 hospitals had higher than expected mortality for 3 conditions

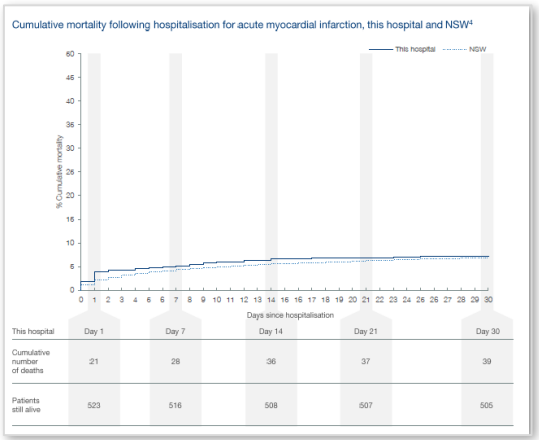
Poor outcomes: Mortality within 30 days of admission

Example hospital profile

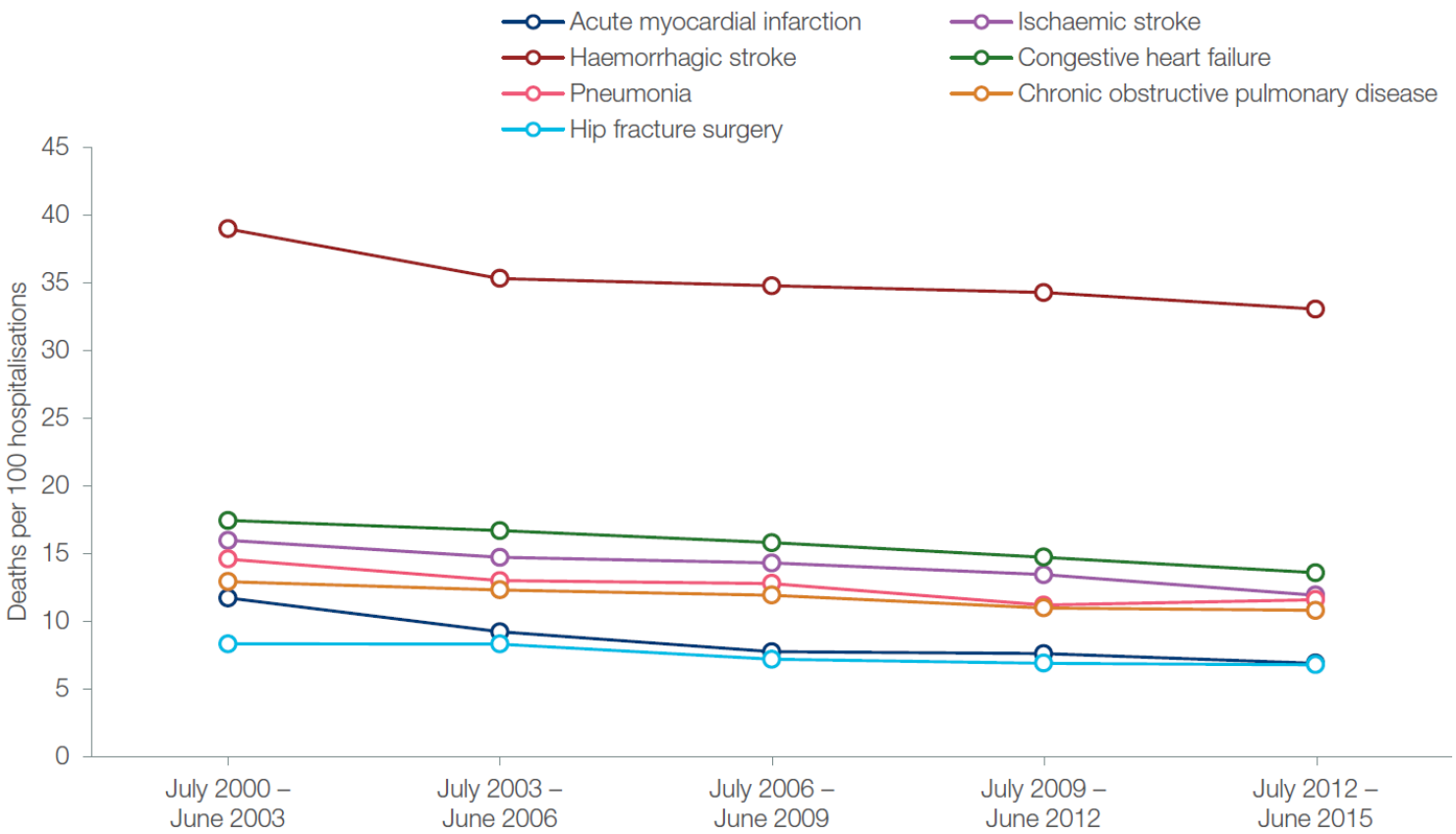








30-day mortality, age-sex standardised rate per 100 hospitalisations, NSW, July 2000 – June 2015



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Attributes of big data organisations that have a big impact

- Organisation governance structures and processes that support independence in editorial control of performance reports and information products on topics that align with health system priorities ~ right topics, impartial information
- Project governance structures and decision-making processes that ensure all performance reports and information products engage and respond to stakeholders priorities for information about selected topics ~ call to action, actionable insights
- Multidisciplinary group of specialists that work in collaborative teams to define and produce performance reports and information products ~ useful information
- Large group of communications specialists that ensure that the team continually focus on the priorities and learning styles of target audiences ~ accessible information
- Quality assurance processes to ensure rigor and reproducibility of information ~ trusted, credible information
- Reward innovation in aligning information products with stakeholder needs.

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- Describe examples from down under where analyses of big data have driven improvements in health and care
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Attributes of big data projects that have a big impact

- Organisation governance structures and processes that support independence in editorial control of performance reports and information products on topics that align with health system priorities ~ right topics, impartial information
- Project governance structures and processes that ensure all performance reports and information products engage and respond to stakeholders (e.g. report advisory committees, and seek out formative and final feedback from content expert reviewers, academic peer reviewers) ~ call to action, actionable insights
- Multidisciplinary group of specialists that work in collaborative teams to define and produce performance reports and information products ~ useful information
- Large group of communications specialists that ensure that the team continually focus on the priorities and learning styles of target audiences ~ accessible information
- Quality assurance processes to ensure rigor and reproducibility of information ~ trusted, credible information
- Reward innovation in information products that align with stakeholder needs.

Thank you

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bureau of health information

Providing the community, healthcare professionals and policy makers with information that enhances visibility of the performance of the health system in NSW, in order to inform actions to improve healthcare and strengthen accountability.