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# *Staphylococcus aureus* bacteraemia in Australian public hospitals 2013–14

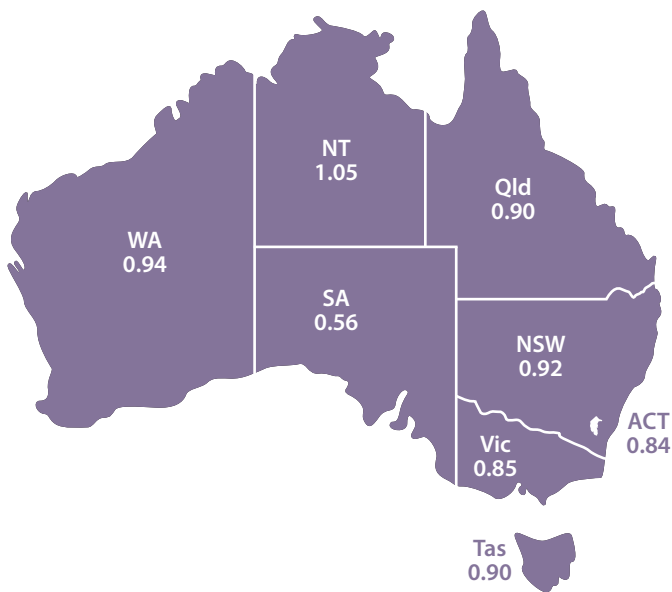


Australian hospital statistics

# Staphylococcus aureus bacteraemia (SAB) in Australian public hospitals 2013–14

SAB is a serious bloodstream infection that may be associated with hospital care. Hospitals aim to have as few cases as possible.

The nationally agreed benchmark is no more than 2.0 SAB cases per 10,000 days of patient care for acute care public hospitals in each state and territory.

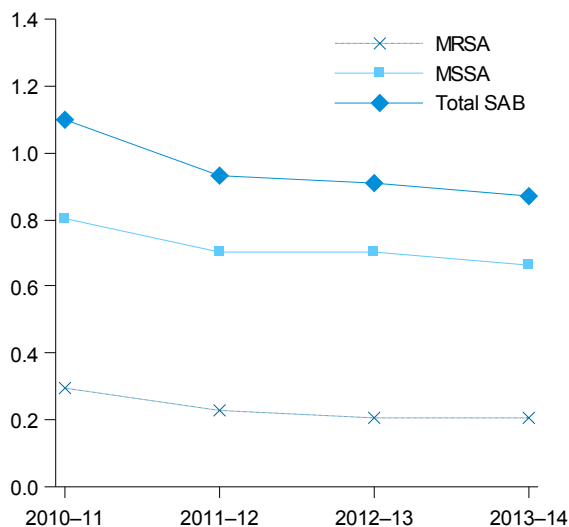


In 2013–14:

- the national rate of SAB in public hospitals was 0.87 cases per 10,000 days of patient care
- rates differed among the states and territories, but all jurisdictions had rates below the national benchmark
- 1,621 cases of SAB were reported
- 3 in 4 cases were treatable with commonly used antibiotics—methicillin-sensitive *Staphylococcus aureus* (MSSA) cases
- 1 in 4 cases was antibiotic resistant—methicillin-resistant *Staphylococcus aureus* (MRSA) cases.

Between 2010–11 and 2013–14, rates of SAB decreased from 1.10 cases to 0.87 cases per 10,000 days of patient care.

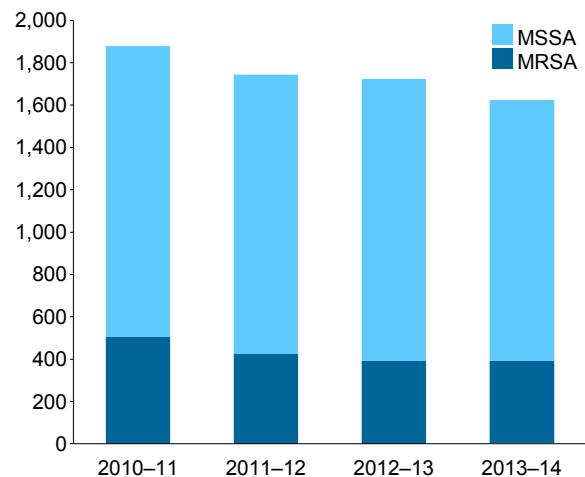
**SAB cases per 10,000 days of patient care**



The overall number of SAB cases decreased from 1,876 in 2010–11 to 1,621 cases in 2013–14.

The number of MRSA cases decreased from 505 to 389 cases.

**MSSA and MRSA cases**



# Introduction

This report presents the fourth year of nationally consistent information on cases of *Staphylococcus aureus* bacteraemia (SAB) associated with public hospitals in Australia. It contributes to ongoing robust national and jurisdictional arrangements to monitor and reduce SAB.

The report presents national information on cases of SAB associated with care provided by public hospitals for the period 1 July 2013 to 30 June 2014. In addition, summary data for the previous 3 years are included. SAB cases were defined as outlined in Box 1. The data were provided by states and territories to the Australian Institute of Health and Welfare (AIHW).

## What is *Staphylococcus aureus* bacteraemia?

SAB is a type of infection often associated with healthcare. It occurs when *Staphylococcus aureus* bacteria ('Golden staph') cause an infection of the bloodstream (bacteraemia). When associated with healthcare procedures, these infections are considered to be potentially preventable.

Patients who develop bloodstream infections such as SAB are more likely to suffer complications that result in longer stays in hospital, and the most serious infections can result in death. They also result in potentially unnecessary increases in the cost of hospitalisation.

The bacteria causing SAB are frequently found on the skin or in the nose of many individuals and are commonly spread from person to person in the community. In this form, they are usually harmless and most people are unaware that they are carrying them.

In hospitals, transmission is most commonly via the hands of healthcare workers. Bacteria from the patient's skin or from the hand of a healthcare worker can gain direct entry into the patient's bloodstream if they have open wounds or when intravascular devices, such as central or peripheral venous catheters, are inserted.

### Who is at risk?

Patients who have a greater risk of infection than the general public are those with:

- open wounds
- invasive devices such as catheters
- weakened immune systems (associated with cancer, or with transplant receipt, or with being very young or elderly)
- chronic disease such as diabetes or severe underlying illness
- prolonged or recurrent exposure to antibiotics.

#### Box 1: *Staphylococcus aureus* bacteraemia (SAB) cases

**A case (patient episode) of SAB** is defined as a positive blood culture for *Staphylococcus aureus*. For surveillance purposes, only the first isolate per patient is counted, unless at least 14 days has passed without a positive blood culture, after which an additional episode is recorded.

A case of SAB will be considered to be healthcare-associated if: the first positive blood culture is collected more than 48 hours after hospital admission or less than 48 hours after discharge, or, if the first positive blood culture is collected 48 hours or less after admission and one or more of the following key clinical criteria was met for the patient episode of SAB:

- SAB is a complication of the presence of an indwelling medical device (for example, intravascular line, haemodialysis vascular access, cerebrospinal fluid shunt, urinary catheter).
- SAB occurs within 30 days of a surgical procedure where the SAB is related to the surgical site.
- SAB was diagnosed within 48 hours of a related invasive instrumentation or incision.
- SAB is associated with neutropenia ( $<1 \times 10^9$ ) contributed to by cytotoxic therapy.

## SAB resistance to antibiotics

Antibiotic resistance can be defined as the ability of bacteria to survive and even replicate during a course of treatment with a specific antibiotic.

A SAB that is identified by a laboratory as being caused by methicillin-resistant *Staphylococcus aureus* is referred

to as SAB caused by MRSA. SAB caused by MRSA may cause more harm to patients and is associated with poorer outcomes as there are fewer antibiotics available to treat the infection.

A SAB that is identified by a laboratory as being caused by *Staphylococcus aureus* that is sensitive to commonly used antibiotics is referred to as SAB caused by MSSA.

## SAB is an indicator of the safety and quality of hospital care

In 2008, Australian health ministers endorsed the reporting of data on SAB cases occurring in public hospitals by states and territories as part of performance reporting under the National Healthcare Agreement (NHA). See Box 2.

The NHA sets out objectives for the Australian, state and territory governments for health care services and includes the outcome area *Australians receive appropriate high quality and affordable hospital and hospital-related care*. A performance benchmark for public hospital-associated SAB is included for that outcome area:

**The rate of SAB (including MRSA) is no more than 2.0 per 10,000 occupied bed days for acute care public hospitals by 2011–12 in each state and territory.**

### Box 2: National Healthcare Agreement performance indicator: Healthcare associated infections

The National Healthcare Agreement performance indicator is calculated using:

- the number of SAB patient episodes associated with public hospitals (both hospitals focussing on acute care and hospitals focussing on care such as rehabilitation), and
- the number of days of patient care for the public hospitals included in the SAB surveillance arrangements.

The performance indicator includes data on:

- counts of cases of SAB, with data presented separately for methicillin-resistant (MRSA) and methicillin-sensitive (MSSA) SAB cases.
- the rate of cases of SAB per 10,000 days of patient care for public hospitals included in the SAB surveillance arrangements.

Data are restricted to cases associated with care provided in public hospitals. Cases that are associated with care provided by private hospitals and with non-hospital care are excluded (even if the patients are subsequently treated for the SAB in a public hospital).

The detailed specification for the performance indicator is available on the AIHW website at <<http://meteor.aihw.gov.au/content/index.phtml/itemId/517636>>.

## There were 1,621 cases of SAB in public hospitals in 2013–14

- There were 1,621 cases of SAB reported in Australian public hospitals in 2013–14 (Table 1).
- About 76% of cases were methicillin-sensitive and therefore treatable with commonly used antibiotics.
- The reported SAB cases occurred during 18.6 million days of patient care under surveillance during 2013–14, or 98% of days of patient care in public hospitals.

## SAB rates were lower than the national benchmark in 2013–14

- The national rate was 0.87 cases per 10,000 days of patient care (Table 1).
- Nationally, and for each state and territory, the rate of SAB was lower than the national benchmark of 2.0 per 10,000 days of patient care.
- The rates of SAB ranged from 0.56 in South Australia to 1.05 in the Northern Territory.

**Table 1: Cases of *Staphylococcus aureus* bacteraemia (SAB) in public hospitals, MRSA and MSSA, states and territories, 2013–14<sup>(a)</sup>**

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Total
<b>SAB cases</b>									
Methicillin-resistant <i>Staphylococcus aureus</i>	180	95	46	24	24	3	6	11	389
Methicillin-sensitive <i>Staphylococcus aureus</i>	409	307	258	124	57	32	23	22	1,232
<b>Total</b>	<b>589</b>	<b>402</b>	<b>304</b>	<b>148</b>	<b>81</b>	<b>35</b>	<b>29</b>	<b>33</b>	<b>1,621</b>
<b>SAB cases per 10,000 days of patient care</b>									
Methicillin-resistant <i>Staphylococcus aureus</i>	0.28	0.20	0.14	0.15	0.17	0.08	0.17	0.35	0.21
Methicillin-sensitive <i>Staphylococcus aureus</i>	0.64	0.65	0.77	0.79	0.39	0.82	0.66	0.70	0.66
<b>Total</b>	<b>0.92</b>	<b>0.85</b>	<b>0.90</b>	<b>0.94</b>	<b>0.56</b>	<b>0.90</b>	<b>0.84</b>	<b>1.05</b>	<b>0.87</b>
Days of patient care under SAB surveillance ('000)	6,414	4,745	3,362	1,577	1,454	390	347	316	18,603
Coverage (per cent)	98	99	99	95	95	100	100	100	98

(a) See 'Data quality summary' in this report and the Data Quality Statement accompanying this report online.

Source: AIHW National *Staphylococcus aureus* Bacteraemia Data Collection.

## SAB cases and rates have decreased over time

Between 2010–11 and 2013–14:

- The number of SAB cases reported for Australian public hospitals decreased by 14%, from 1,876 to 1,621 cases (Table 2).
- The national rates of SAB decreased from 1.10 cases per 10,000 days of patient care under surveillance to 0.87 cases per 10,000.

- Rates decreased in New South Wales and South Australia, and fluctuated or remained about the same in the other states and territories (Figure 1).
- The number of MRSA cases decreased from 505 to 389 cases, and the proportion of all SAB cases that were MRSA decreased from 27% to 24% of the total.
- Coverage of the data collection (days of patient care under surveillance compared with all days of patient care) increased from 92% to 98%.

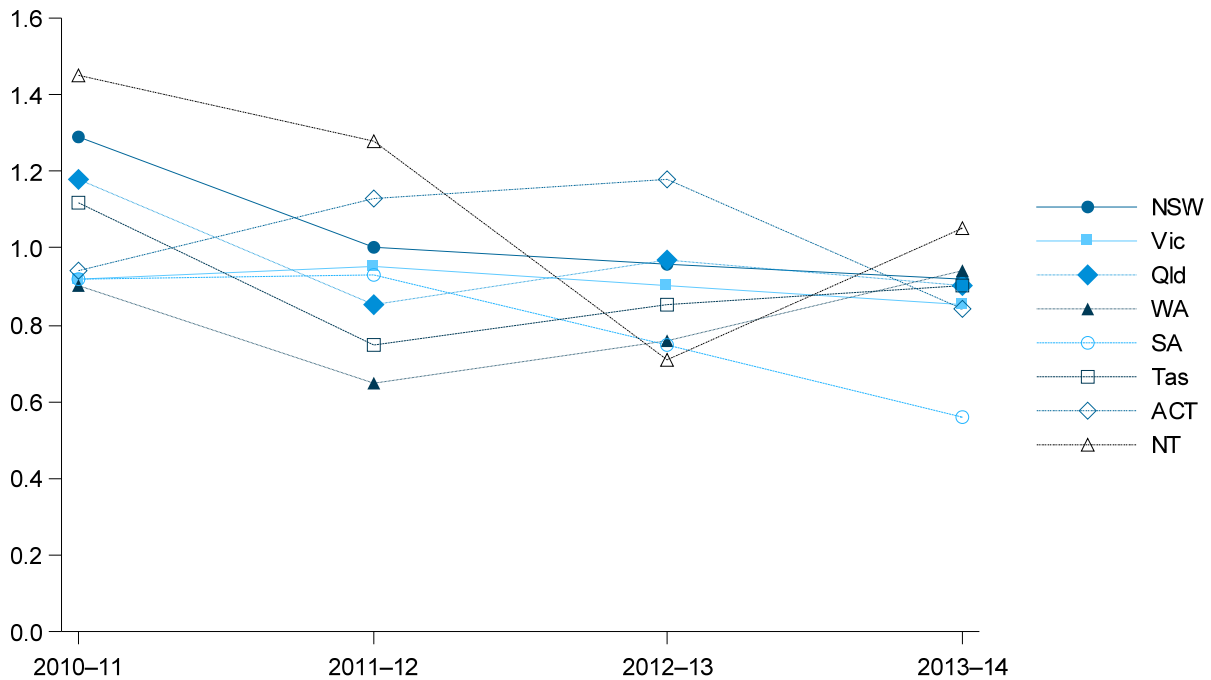
**Table 2: Cases of *Staphylococcus aureus* bacteraemia (SAB) in public hospitals, MRSA and MSSA, 2010–11 to 2013–14<sup>(a)</sup>**

	2010–11	2011–12	2012–13	2013–14
<b>SAB cases</b>				
Methicillin-resistant <i>Staphylococcus aureus</i>	505	424	391	389
Methicillin-sensitive <i>Staphylococcus aureus</i>	1,371	1,317	1,330	1,232
<b>Total cases</b>	<b>1,876</b>	<b>1,741</b>	<b>1,721</b>	<b>1,621</b>
<b>SAB cases per 10,000 days of patient care</b>				
Methicillin-resistant <i>Staphylococcus aureus</i>	0.30	0.23	0.21	0.21
Methicillin-sensitive <i>Staphylococcus aureus</i>	0.80	0.70	0.70	0.66
<b>Total SAB cases per 10,000 days</b>	<b>1.10</b>	<b>0.93</b>	<b>0.91</b>	<b>0.87</b>
Days of patient care under surveillance ('000)	17,081	18,731	18,934	18,603
Coverage of days of patient care under surveillance (per cent)	92	96	97	98

(a) See 'Data quality summary' in this report and the Data Quality Statement accompanying this report online.

Source: AIHW National *Staphylococcus aureus* Bacteraemia Data Collection.

**SAB cases per 10,000 days of patient care**



**Figure 1: *Staphylococcus aureus* bacteraemia rates in public hospitals, states and territories, 2010-11 to 2013-14**

## SAB rates vary by type of hospital

In 2013-14, about 55% of all SAB cases occurred in *Principal referral hospitals* and 29% occurred in *Public acute group A hospitals*. These two hospital peer groups together accounted for about 65% of days of patient care under surveillance.

In 2013-14, SAB rates were highest for *Principal referral hospitals*, followed by *Public acute group A hospitals*.

*Principal referral hospitals* provide a very broad range of services, have a range of highly specialised service units, and have very large patient volumes. The term 'referral' recognises that these hospitals have specialist facilities not typically found in smaller hospitals.

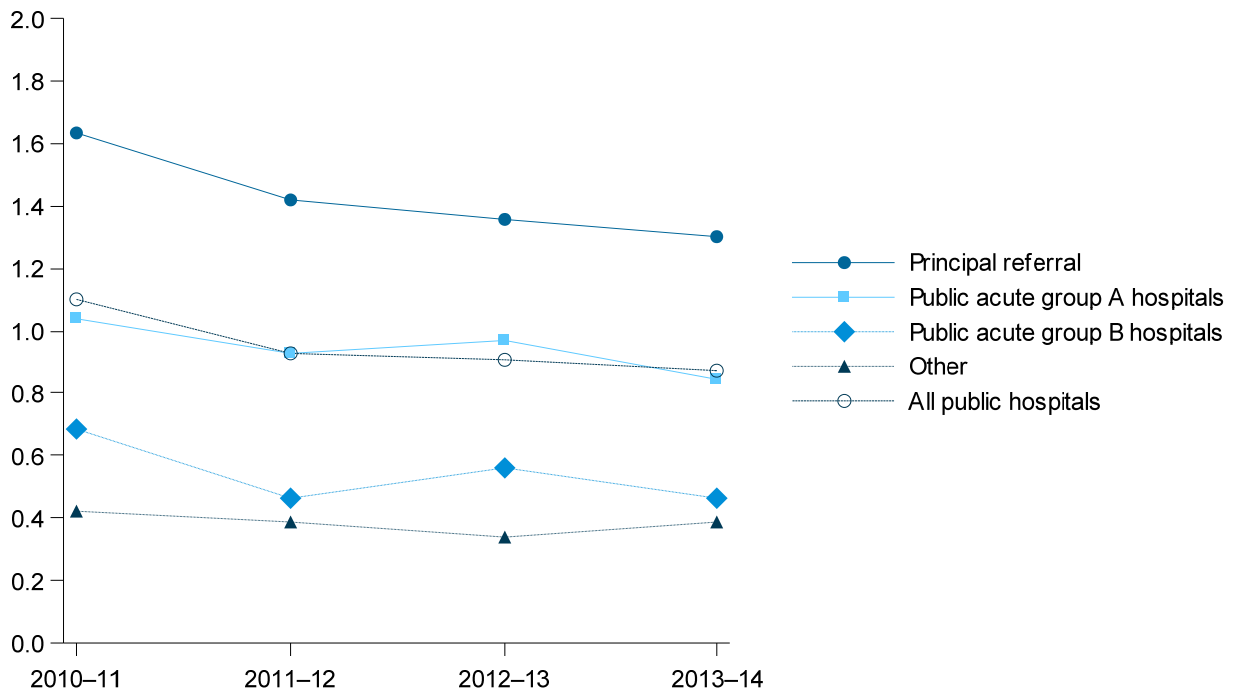
*Public acute group A hospitals* generally provide a wide range of services, but narrower than *Principal referral hospitals*. While complex patients may be treated, they are usually less complex than those seen in *Principal referral hospitals*.

Hence, these two hospital groups could be more likely to treat patients at risk of SAB than other hospital peer groups.

Between 2010-11 and 2013-14, SAB rates decreased for *Principal referral hospitals* and were relatively stable for hospitals in other peer groups (Figure 2).

For more information on public hospital peer groups see *Australian hospital statistics 2012-13* (AIHW 2014a) and *Australian hospital peer groups* (AIHW forthcoming).

**SAB cases per 10,000 days of patient care**



**Figure 2: *Staphylococcus aureus* bacteraemia rates in public hospitals, by peer group, 2010-11 to 2013-14**

## What is Australia doing to reduce SAB?

Healthcare-associated infections (HAIs) have been nominated as a priority area by the Australian Commission on Safety and Quality in Health Care (ACSQHC).

Consistent with the public health importance of HAIs, a range of national and local initiatives have been established throughout Australia to reduce the occurrence of SAB, with leadership provided by the ACSQHC (see Box 3).

These initiatives have been accompanied by the establishment of surveillance arrangements in public hospitals to monitor HAIs, and the development of an agreed national definition for cases of SAB (see Box 1).

These developments mean that nationally consistent data on public hospital-associated SAB cases can be reported.

## Hand hygiene

Improvements in the hand hygiene of healthcare workers is the highest priority area to reduce the risk of HAIs (HHA 2014).

Hand hygiene in hospitals generally refers to the washing and/or use of alcohol-based rubs by healthcare workers to clean their hands, and should be performed according to the World Health Organization's 'Five Moments for Hand Hygiene' (WHO 2014).

Between July 2009 and June 2014, hand hygiene compliance in public hospitals increased from about 64.1% to 81.0% (Figure 3).



### Box 3: Australian Commission on Safety and Quality in Health Care initiatives relating to SAB

The ACSQHC plays a major role in national improvements in safety and quality in healthcare, which includes reducing HAIs (ACSQHC 2014a).

A number of strategies have been introduced to reduce healthcare-associated infections, including SAB (ACSQHC 2014b):

- National Safety and Quality Health Service (NSQHS) Standards—a set of 10 Standards introduced for accreditation of all Australian health services. Standard 3: Preventing and Controlling Healthcare Associated Infections aims to prevent patients acquiring preventable HAIs, including SAB infections.
- National infection control guidelines—these evidence-based guidelines provide hospitals with guidance on how to prevent and control infections, including SAB. They include information on managing medical devices, such as cannulas and catheters.
- National standard definition for measuring SAB—ensuring surveillance of SAB infection is measured and reported in the same way in all public hospitals.
- National Hand Hygiene Initiative—educating and promoting change among all healthcare providers in Australia. Through this initiative, the ACSQHC supports an audit and reporting process for hospitals to measure how they are performing. Good hand hygiene is an important strategy in reducing preventable infections such as SAB.
- Antimicrobial Stewardship Clinical Care Standard—providing guidance on delivering appropriate care when prescribing antibiotics.

#### Average hand hygiene compliance (per cent)

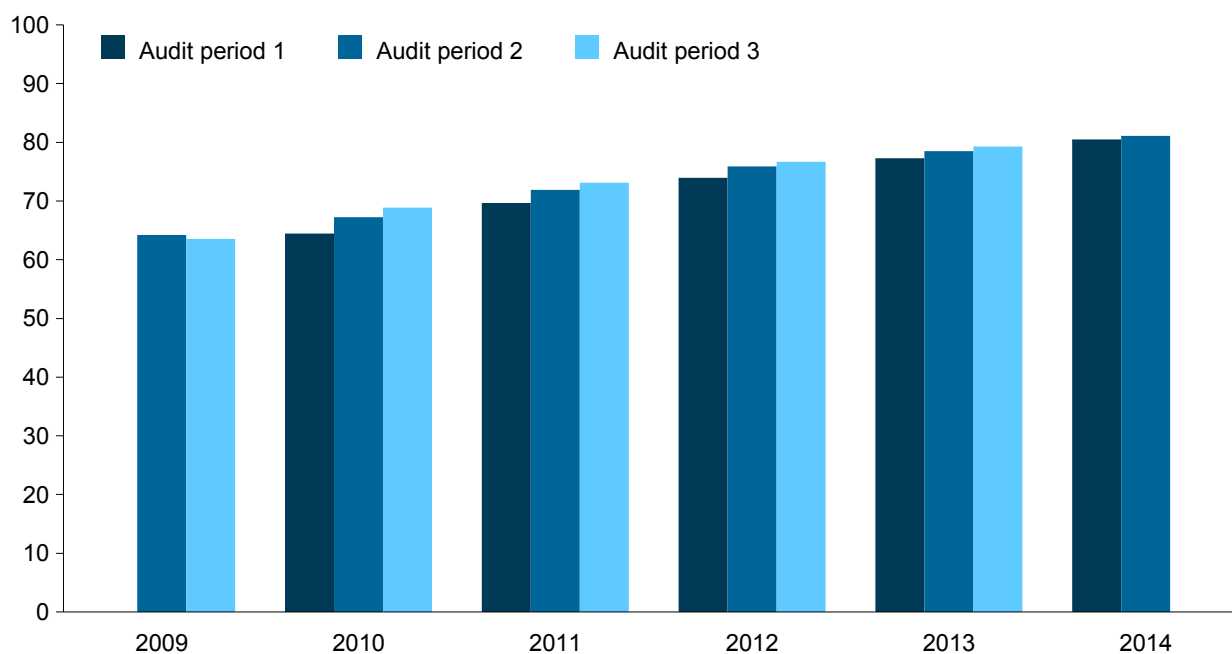


Figure 3: Hand hygiene compliance rates for public hospitals, July 2009 to June 2014

Source: HHA 2014.

## Data collection

The data on cases of SAB associated with public hospitals were collected by hospital staff for hospital infection surveillance. Without their work, the data would not have been available for this report.

The preparation of this report would also not have been possible without the cooperation of the state and territory health authorities which provided these data to the AIHW for national collation as the National *Staphylococcus aureus* Bacteraemia Data Collection (NSABDC). States and territories also provided data on days of patient care (sourced from data on admitted patient care), for the rate calculations.

## Data quality summary

This section presents a summary of information relevant to interpreting the data sourced from the NSABDC:

- The NSABDC is a data set that includes counts of cases of SAB for each public hospital covered by SAB surveillance arrangements, and for private hospitals that choose to provide data.
- Cases of SAB have been reported by all states and territories using the nationally agreed case definition.
- There may be imprecise exclusion of some SAB cases due to the inherent difficulties in determining the origins of SAB episodes, such as those originating in non-hospital health care settings.
- The days of patient care and coverage data may be preliminary for some hospitals or jurisdictions.
- For some states and territories, there is less than 100% coverage of public hospitals. Data have not been adjusted for under-coverage.

- The accuracy and comparability of the rates of SAB among jurisdictions and over time are also limited because the count of days of patient care (denominator) reflects the amount of admitted patient activity, but does not reflect the amount of non-admitted patient activity.
- The data for 2013–14 are generally comparable with those from 2012–13 and 2011–12.
- The data for 2010–11 are generally comparable with data for other periods, except for Queensland. For 2010–11, Queensland data were provided only for patients aged 14 and older.
- New South Wales provided the number of occupied bed days, rather than days of patient care under surveillance. The comparability of New South Wales data and data from other jurisdictions is therefore limited by the small extent that counts of occupied bed days would be expected to differ from counts of days of patient care as used in this report.
- Due to changes in the performance indicator specification and data revisions by jurisdictions, the data presented in this report for 2010–11 to 2012–13 differ from the data published in earlier AIHW reports on this subject (AIHW 2011, 2013a and 2013b).
- The data presented have not been adjusted for differences in casemix among the states and territories or among hospital peer groups. Casemix is a term that refers to the range and types of patients treated by a hospital or other health service. For SAB, relevant aspects of casemix (that affect the risk of SAB for patients) could include patient comorbidities and procedures performed.

A comprehensive data quality statement for the 2013–14 NSABDC collection is available at <http://meteor.aihw.gov.au>.

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ISSN 1036-613X

ISBN 978-1-74249-676-4

### Suggested citation

Australian Institute of Health and Welfare 2014. *Staphylococcus aureus* bacteraemia in Australian public hospitals 2013–14: Australian hospital statistics. Health services series no. 59. Cat. no. HSE 155. Canberra: AIHW.

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The Australian Institute of Health and Welfare is a major national agency which provides reliable, regular and relevant information and statistics on Australia's health and welfare. The Institute's mission is *authoritative information and statistics to promote better health and wellbeing.*

In 2013–14, 1,621 cases of hospital-associated *Staphylococcus aureus* bacteraemia (SAB) were reported in Australian public hospitals. The national rate of SAB in public hospitals was 0.87 cases per 10,000 days of patient care, and all states and territories had rates below the national benchmark of 2.0 cases per 10,000 days of patient care.

Between 2010–11 and 2013–14, rates of SAB decreased from 1.10 cases to 0.87 cases per 10,000 days of patient care.

Please note that there is the potential for minor revisions of data in this report. Please check the online version at <[www.aihw.gov.au](http://www.aihw.gov.au)> for any amendments.