Public Health Services

Tasmanian Infection Prevention and Control Surveillance Report

Annual report 2023

Department of **Health**

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Tasmanian Infection Prevention and Control Surveillance Report - Annual Report 2023

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Notes

Data are subject to ongoing revision so data from previous reports should not be relied upon. Use the most up to date report when citing data.

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Summary

This report provides an overview of the Tasmanian acute public hospitals' healthcare associated infection surveillance for the calendar years 2019 – 2023 with a focus on 2023. The report highlights data for the four larger acute public hospitals – Royal Hobart Hospital (RHH), Launceston General Hospital (LGH), Mersey Community Hospital (MCH) and the North-West Regional Hospital (NWRH) but also includes some district and rural hospital and community surveillance data.

Key findings for 2023:

- The annual rate of healthcare associated *Staphylococcus aureus bloodstream infection* (HCA - SABSI) in 2023 for RHH and MCH was less than the National Healthcare Agreement target (no more than 1.0 HCA-SABSI per 10 000 patient days), and NWRH was at threshold, while LGH exceeded the threshold with a rate of 1.3 HCA-SABSI per 10 000 patient days.
- There were 771 new isolates of vancomycin resistant enterococcus (VRE) in 2023 which was a 44% increase in number over 2022.The proportion of clinical specimens increased slightly in 2023 to 9.2% of total specimens.
- The combined larger acute public rate of both 'hospital identified *Clostridioides difficile* infection (CDI)' and 'healthcare associated-healthcare facility onset (HCA-HCF) CDI' decreased to 6.3 and 3.1 per 10 000 patient days over 2023.
- The number of cases of carbapenemase-producing Enterobacterales (CPE) remain low with two cases notified in 2023 compared with not more than three cases per annum between 2019 – 2022.
- The consolidated Tasmanian public hospital hand hygiene compliance rate in 2023 of 81 per cent was above the National Hand Hygiene Benchmark (NHHI) of 80 per cent.
- Antimicrobial use has improved amongst the larger acute public hospitals with the average use of both Vancomycin and Carbapenems at the four larger Tasmanian acute public hospitals being lower than the National Comparator Rates for these antimicrobials.
- Appropriate antimicrobial use in district and rural hospitals increased to 70% in 2023 over the 2022 figure of 63%.

Any form of comparison between hospitals should be done with caution because data are not adjusted for patient characteristics that vary between hospitals. Further, the relatively small Tasmanian population combined with a small number of events can result in a wide variation in rates over time. The raw data in the appendices illustrate this.

Staphylococcus aureus bloodstream infection

Staphylococcus aureus is a common cause of serious bloodstream infection and may cause significant morbidity and mortality. *Staphylococcus aureus* bloodstream infection (SABSI) is notifiable in Tasmania pursuant to the *Public Health Act 1997* as outlined in the *Guidelines for Notifying Diseases and Food Contaminants*. SABSI surveillance is carried out in Tasmania using the TIPCU SABSI Surveillance Protocol which is based on the Australian Commission on Safety and Quality in Health Care (ACSQHC) national surveillance (see Appendix 1 for definitions).

Total SABSI number and incidence

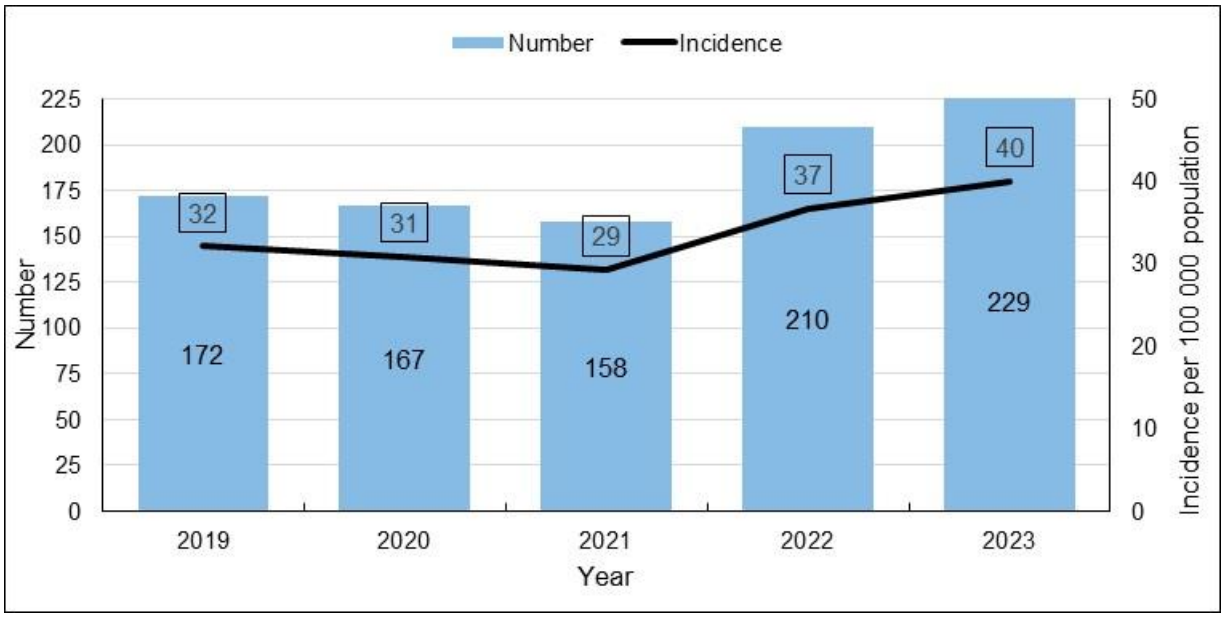

Figure *1* Total number and incidence of SABSI notified in Tasmania by calendar year.Figure ***1*** illustrates the total number of SABSI notified in Tasmania 2019–2023 and the incidence of SABSI per 100 000 population per annum over the same time. Both the total number and incidence have increased over the past two years with the 2023 figures being the highest since surveillance commenced in 2010.

Classification of SABSI

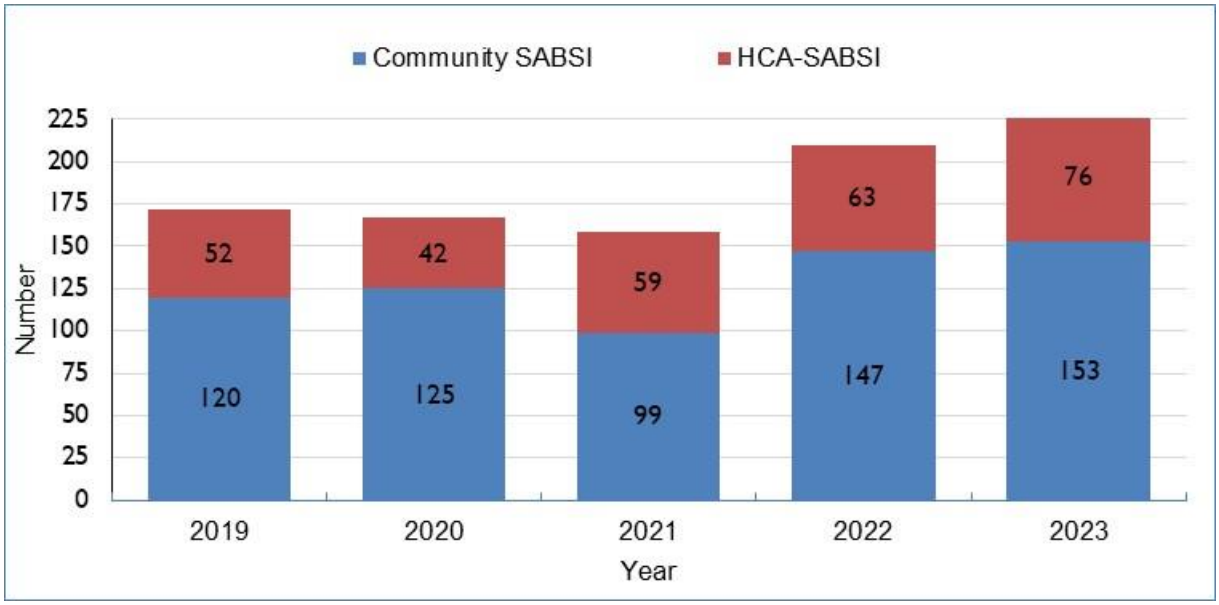

Figure 2 Classification of total SABSI 2019–2023.

All SABSI notified to Public Health Services are classified as to the likely place of acquisition, as outlined in the national surveillance definitions and the TIPCU SABSI Surveillance Protocol. They are initially classified as healthcare or community associated with around two thirds being community associated which is illustrated in Figure 2. The HCA-SABSI figure above is SABSI reported from all public and private healthcare facilities in Tasmania.

Healthcare associated SABSI - larger acute public hospitals

The national benchmark for HCA-SABSI is no more than 1.0 HCA-SABSI per 10 000 patient days and was implemented in Tasmania on 1 July 2020. The previous benchmark was no more than 2.0 HCA-SABSI per 10 000 patient days.

Risk factors for healthcare associated *Staphylococcus aureus* bloodstream infection (HCA-SABSI) include the insertion of an intravascular or invasive medical device and surgical procedures.

Please note that Figures 3–6 and Table 1 only illustrate HCA-SABSI acquired at the four larger acute public hospitals.

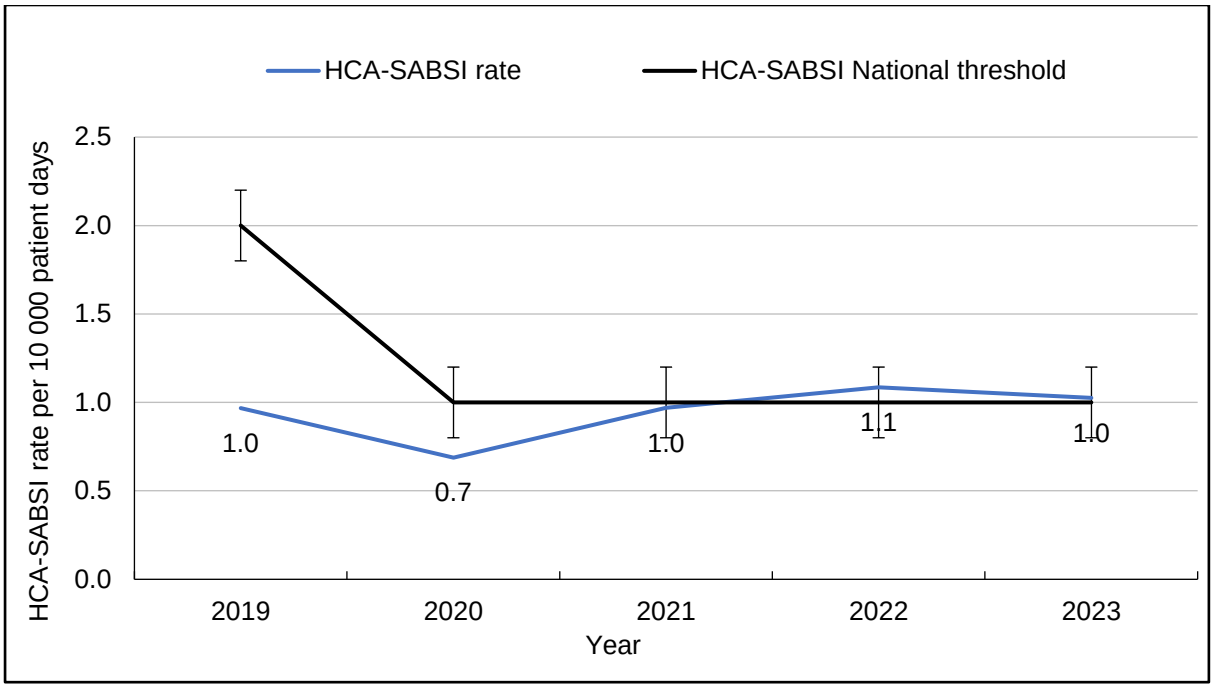

Figure 3 Combined rate of HCA-SABSI per 10 000 patient days in larger acute public hospitals in Tasmania, 2019–2023.

Figure 3 illustrates the combined HCA-SABSI rate across the four larger acute public hospitals in 2023 of 1.04 HCA-SABSI per 10 000 patient days (95% CI 0.7–1.3). The combined annual rate of HCA-SABSI for these hospitals has remained stable at around 1.0 per 10 000 patient days for the past five years, although the number of HCA-SABSI in 2023 (n=51) was the highest number per annum since SABSI surveillance commenced in 2008.

Individual hospital SABSI rates

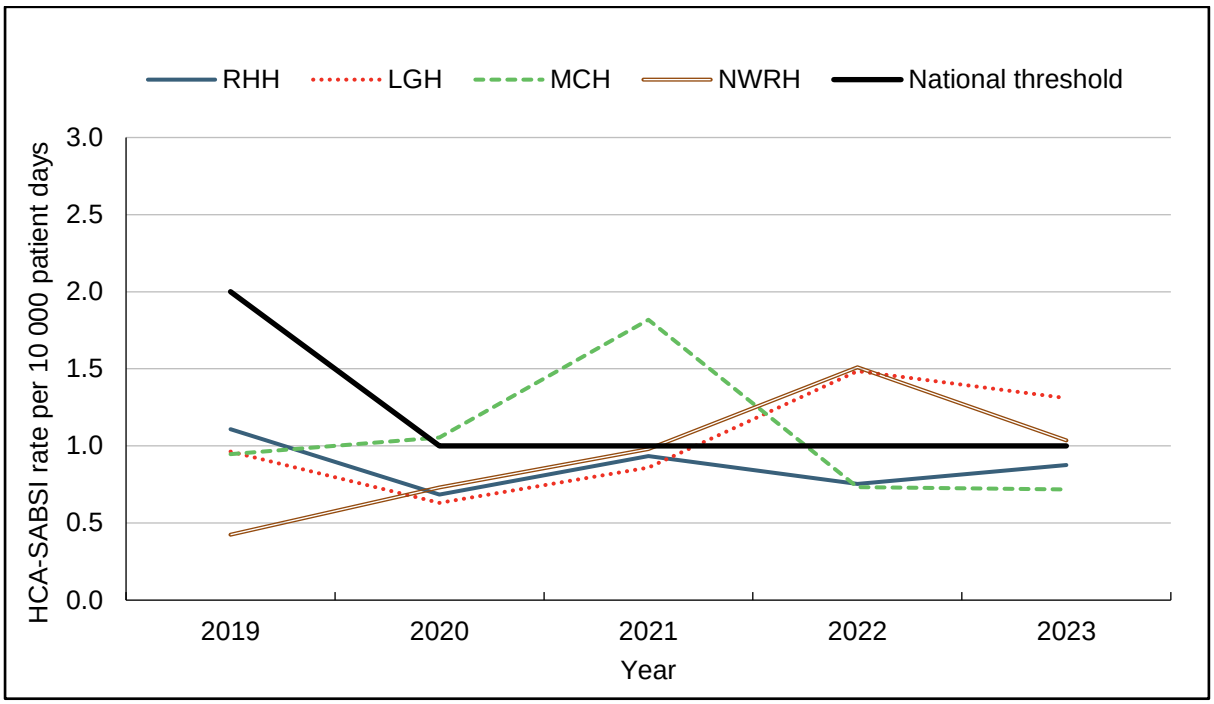

Figure 4 Rate of HCA-SABSI per 10 000 patient days in individual larger acute public hospitals in Tasmania, 2019–2023.

Figure 4 illustrates the annual HCA-SABSI rate in 2023 for each of the larger acute public hospitals. The HCA rate for RHH and MCH was less than the National Healthcare Agreement target of no more than 1.0 HCA-SABSI per 10 000 patient days while NWRH was at threshold. LGH was over the threshold with a rate of 1.3 HCA-SABSI per 10 000 patient days which represents 21 notifications of HCA-SABSI.

HCA-SABSI according to methicillin susceptibility

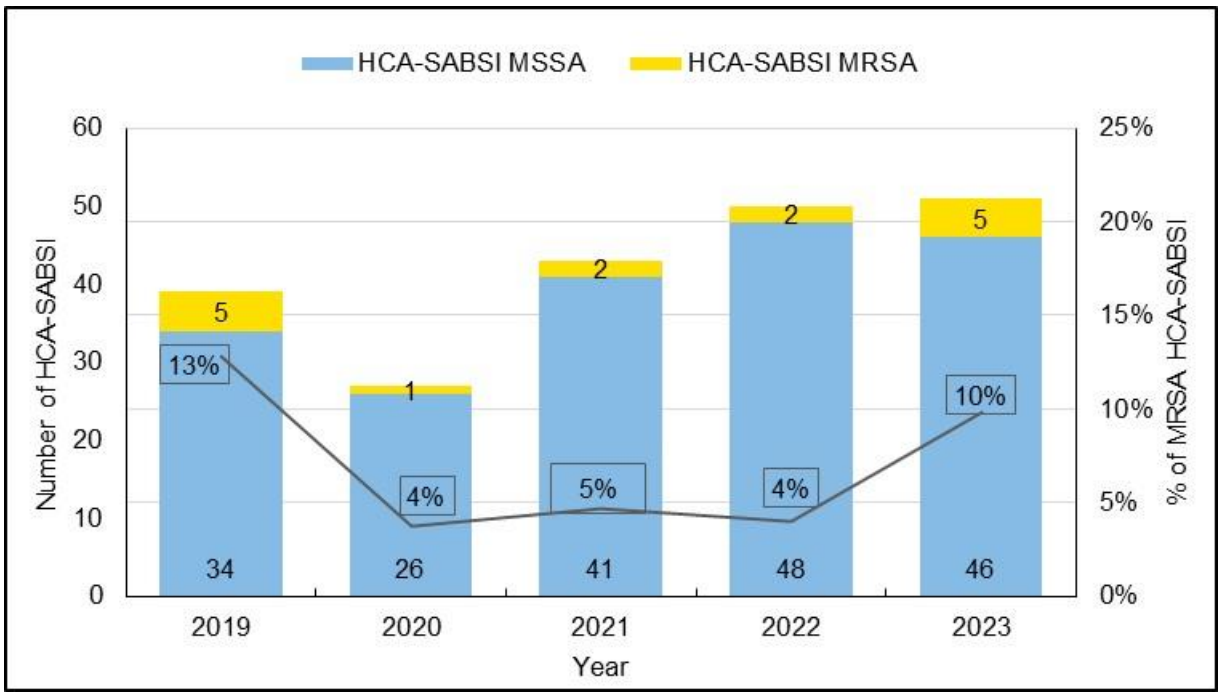

Figure 5 Number of MSSA and MRSA HCA-SABSI, and proportion of MRSA HCA-SABSI in larger acute public hospitals in Tasmania, 2019–2023.

Figure 5 presents the larger acute public hospitals HCA-SABSI according to methicillin susceptibility - methicillin sensitive *Staphylococcus aureus* (MSSA) and methicillin resistant *Staphylococcus aureus* (MRSA).

The majority of HCA-SABSI are methicillin sensitive with the total annual proportion of MRSA HCA-SABSI remaining relatively stable from 2020–2022. The annual proportion doubled in 2023 which represents five MRSA HCA-SABSI, versus two in 2022.

Classification of HCA-SABSI related to source

The larger acute public hospital HCA-SABSIs are classified where possible into four categories: HCA-SABSI related to an indwelling medical device, a surgical site, invasive instrumentation or cytotoxic therapy induced neutropenia.

Indwelling medical devices are further classified into intravenous (IV) device related (central venous catheter (CVC) related and other intravascular (IV) device related); and non-IV device related.

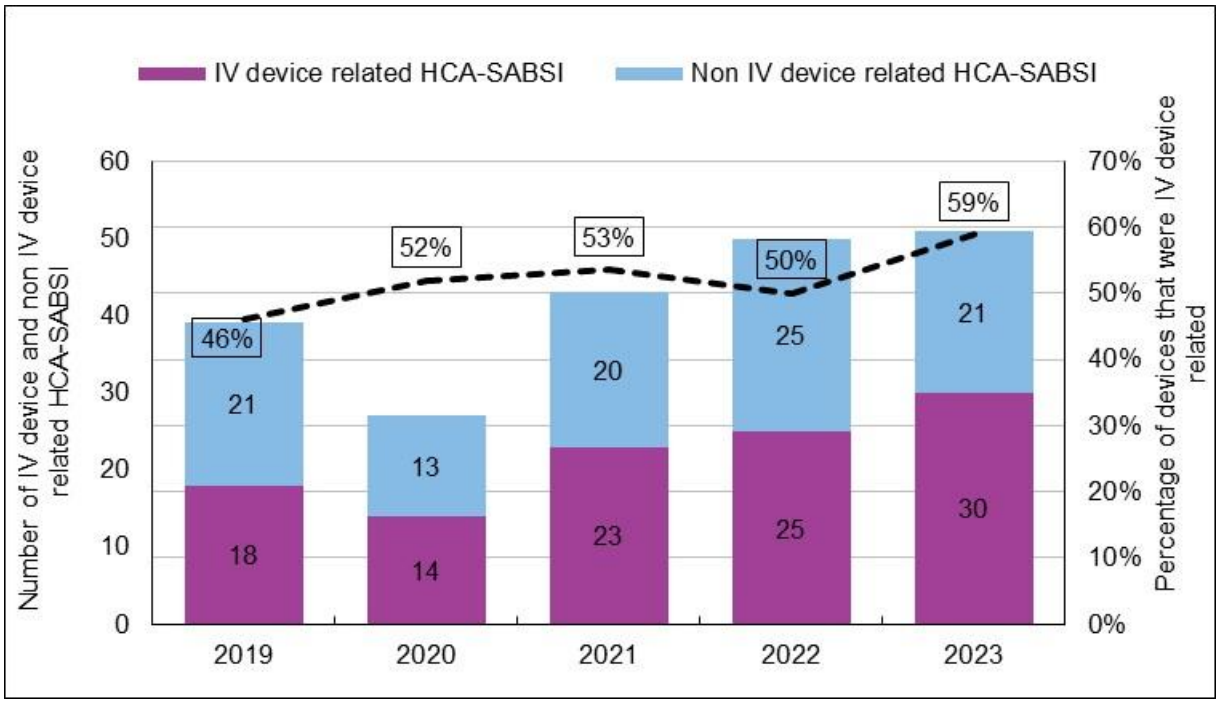

Figure 6 Number of HCA-SABSI by classification and proportion of IV device related HCA-SABSI in Tasmania, 2019 – 2023.

Table 1 Number and percentage of types of intravascular devices related to HCA-SABSI in Tasmania, 2019–2023.

Year	Central venous catheter	Peripheral intravenous catheter	Arterio-venous fistula	TOTAL (number)	5-year mean (number)
2019	8 (44%)	9 (50%)	1 (6%)	18	19
2020	3 (21%)	11 (79%)	-	14	19
2021	4 (17%)	19 (83%)	-	23	17
2022	5 (20%)	19 (76%)	1 (4%)	25	18
2023	7 (23%)	22 (73%)	1 (3%)	30	20

There has been a sustained increase in the number of IV device related HCA-SABSI over the past three years, particularly those related to peripheral IV devices. Over the past five years, most IV device related HCA-SABSI have been related to peripheral IVs with 73% (n=22) related to peripheral IV devices in 2023. Over the past three years, the total annual number of IV device related HCA-SABSI has been greater than the five-year mean.

Infection prevention strategies such as intravenous device management procedures and processes in conjunction with the ACSQHC Management of Peripheral Intravenous Catheters Clinical Care Standard 2021[1] can reduce the risk of patients developing a SABSI secondary to an IV device. These strategies should be reviewed as a matter of priority and evaluated in all healthcare settings where IV devices are used.

Community associated SABSI

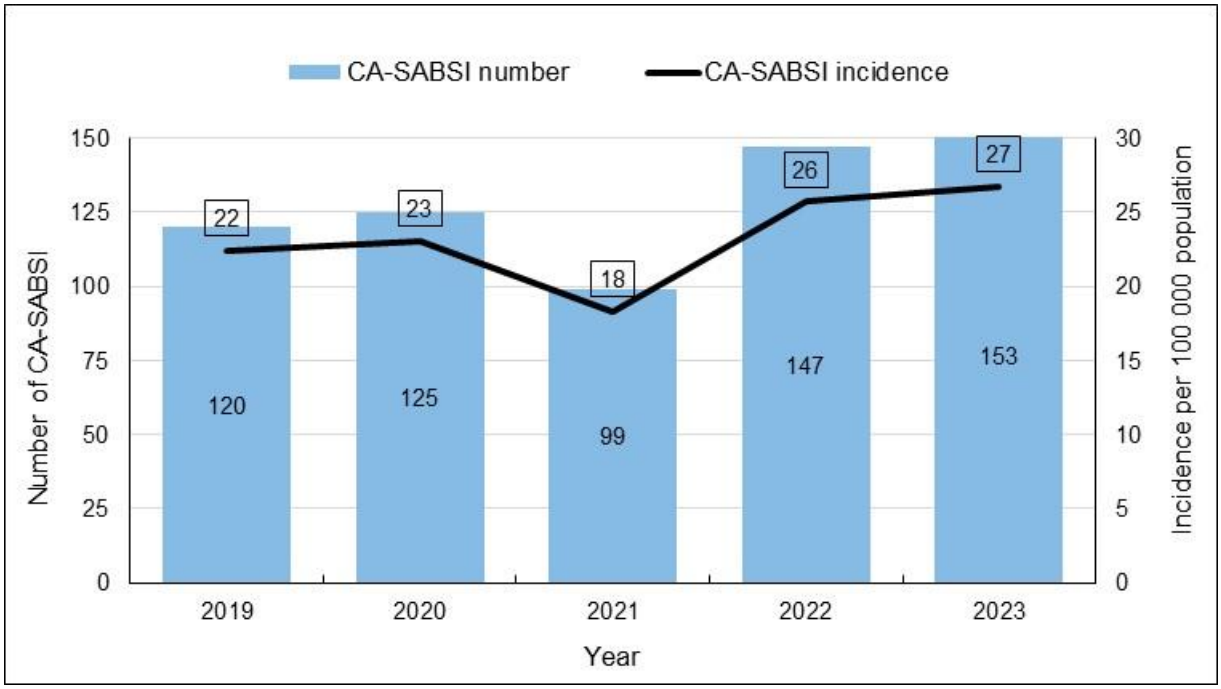

Figure 7 Number and incidence rate per 100 000 population of community associated CA-SABSI in Tasmania, 2019–2023.

Sixty seven per cent of the total SABSI (153/229) reported in 2023 were community associated.

The number (153) and incidence (27/100 000 population) of CA-SABSI in 2023 was the highest reported since surveillance began in 2008 but the reason/s for the increase were unknown and require further investigation.

Vancomycin resistant enterococci

Enterococci are bacteria normally present in the human gastrointestinal and uro-genital tract and can cause infections of the urinary tract, bloodstream, and wounds. Enterococci that have acquired resistance to the antibiotic vancomycin are called vancomycin-resistant enterococci or VRE. VRE infections are more difficult to treat then those caused by vancomycin sensitive enterococci.

Factors that can contribute to the transmission of VRE in hospitals are inadequate infection control practices including suboptimal environmental cleanliness.

VRE surveillance is carried out in Tasmania using the TIPCU Surveillance Protocol

Identification of VRE is notifiable in Tasmania pursuant to the *Public Health Act 1997* as outlined in the *Guidelines for Notifying Diseases and Food Contaminants*.

Figure 8 presents all patients with a first VRE isolate identified within Tasmania from 2019 to 2023. These numbers include all new patients identified within Tasmania from public and private hospitals, district and rural hospitals, General Practitioner (GP) clinics and long term and residential care facilities. A person's first VRE isolate is classified according to whether it is a screening or a clinical specimen.

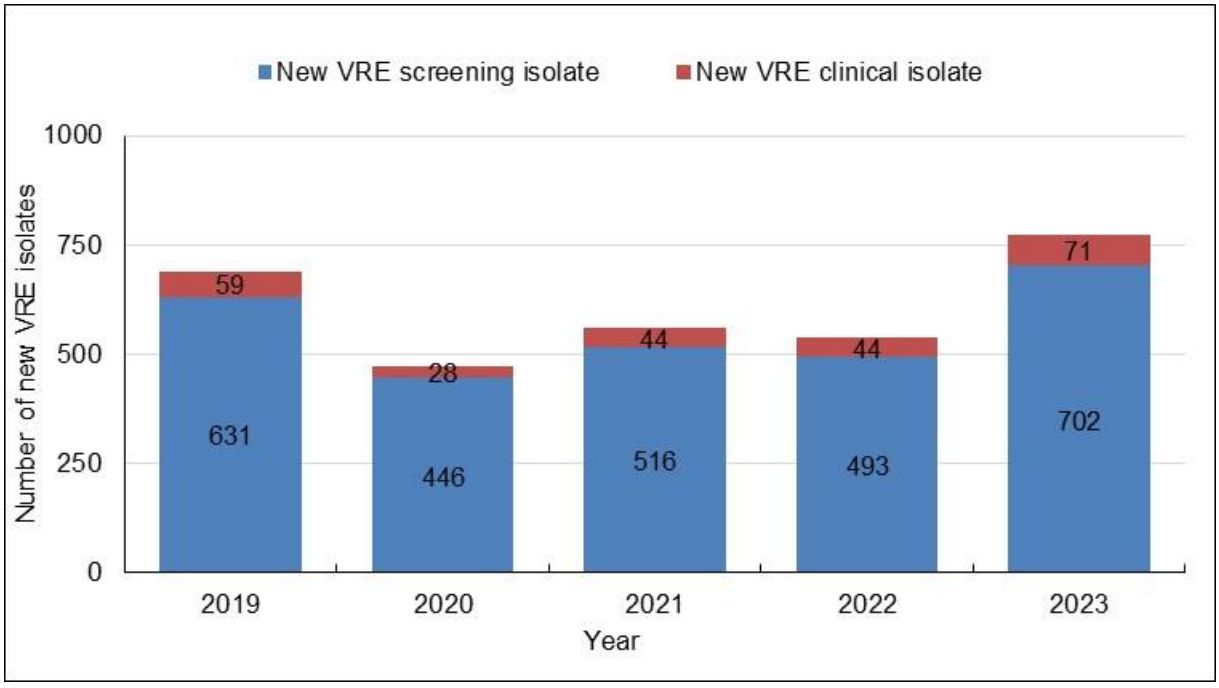

Figure 8 Number of first VRE isolate by classification in Tasmania, 2019–2023.

The number of new VRE identified in 2023 (n=773) was a 44% increase in number over 2022 but the proportion of clinical specimens only increased slightly from 7.6% to 9.2% of total specimens.

The identification of VRE in patients at a hospital does not necessarily reflect that VRE was acquired there. The numbers of VRE isolates identified can also be affected by the amount of screening undertaken by individual hospitals and those that have an intensive screening program will identify more VRE.

VRE genotypes

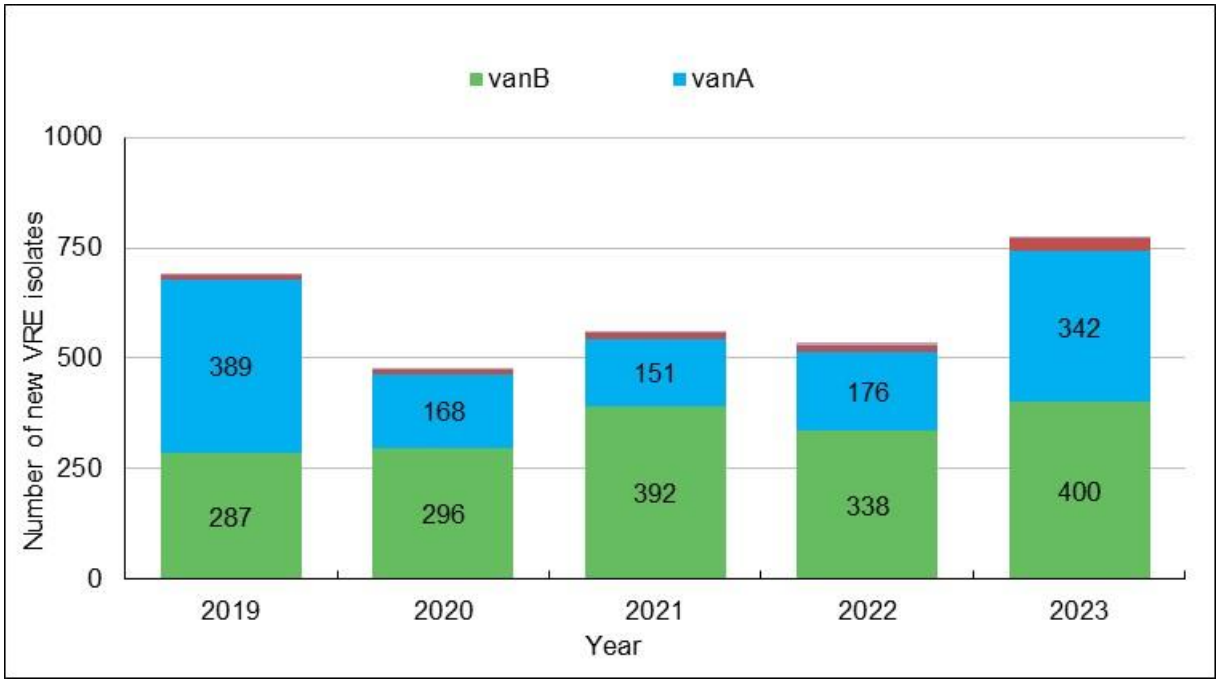

Figure 9 Number of first VRE isolates identified in Tasmania by genotype, 2019–2023.

Figure 9 illustrates the change in the proportion of VRE genotypes identified between 2019–2023, with a marked decrease in the proportion of *vanA* genotype being identified after 2019 and the *vanB* genotype being the predominant genotype from 2020 to 2023.

NB – *VanA and Van B (red bar)*, and unknown not labelled due to small numbers.

Clostridioides difficile infection

Clostridioides difficile infection (CDI) is a bowel infection caused by the bacterium *Clostridioides difficile* and is a common cause of healthcare associated diarrhoea. CDI causes significant patient morbidity and mortality and can result in increased hospital stays and costs. Factors that may contribute to higher CDI rates include the inappropriate use of antibiotics and ineffective infection control processes including suboptimal environmental cleanliness.

CDI surveillance is carried out in Tasmania using the TIPCU CDI Surveillance Protocol which is based on the Australian Commission on Safety and Quality in Health Care (ACSQHC) national surveillance (see Appendix 1 for definitions). There is no national benchmark for CDI and it is not a notifiable condition in Tasmania.

Hospital identified CDI are CDI infections identified in a hospital irrespective of attribution of infection.

Healthcare associated – healthcare facility onset (HCA-HCF) CDI are a sub-group of hospital identified cases. It only includes infections that occurred 48 hours or more after a patient was admitted to hospital.

Tasmanian rates

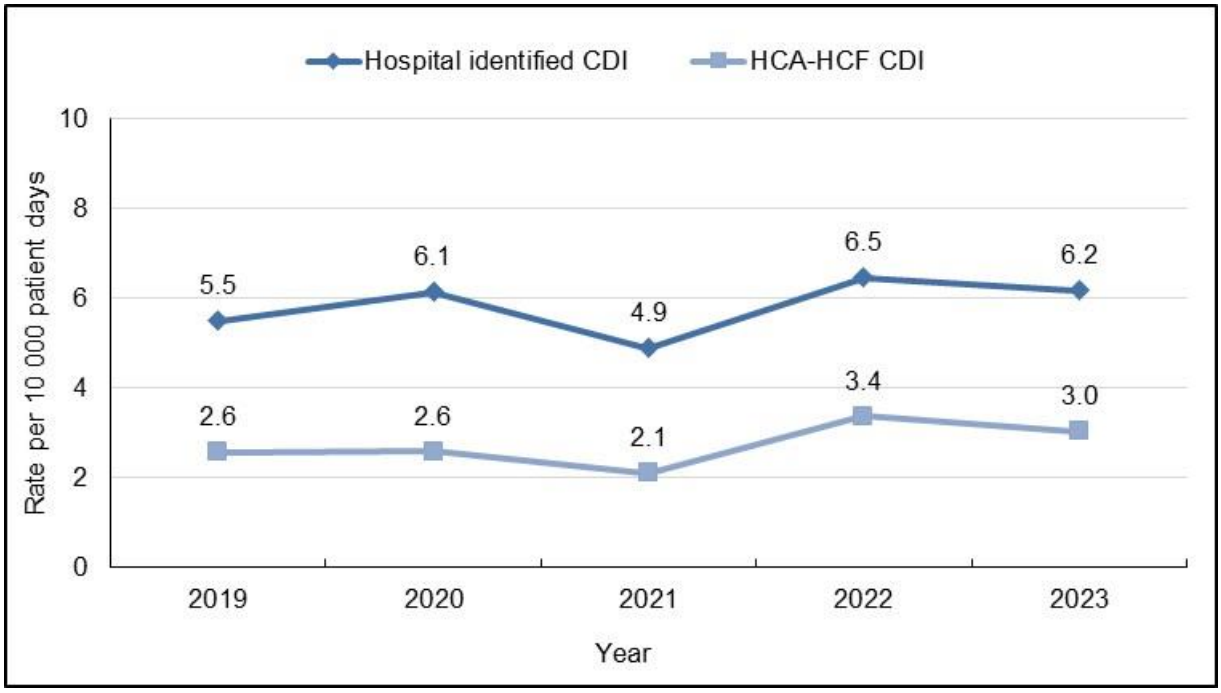

Figure 10 Rate of larger acute public hospital identified CDI and HCA-HCF CDI per 10 000 patient days in Tasmania, 2019–2023.

In 2023, the mean (average) rate of the larger acute public hospital identified CDI was 6.2 per 10 000 patient days (95% CI 5.5–6.9) and HCA-HCF CDI was 3.0 per 10 000 patient days (95% CI 2.5–3.5) (**Figure 10**). The number and rate of both hospital identified CDI, and HCA-HCF CDI decreased in 2023 over 2022.

Hospital rates

Figure 11 and Figure 12 presents the individual larger acute public hospital rates of hospital identified CDI, and healthcare associated – healthcare facility onset (HCA-HCF) CDI by calendar year 2019 – 2023.

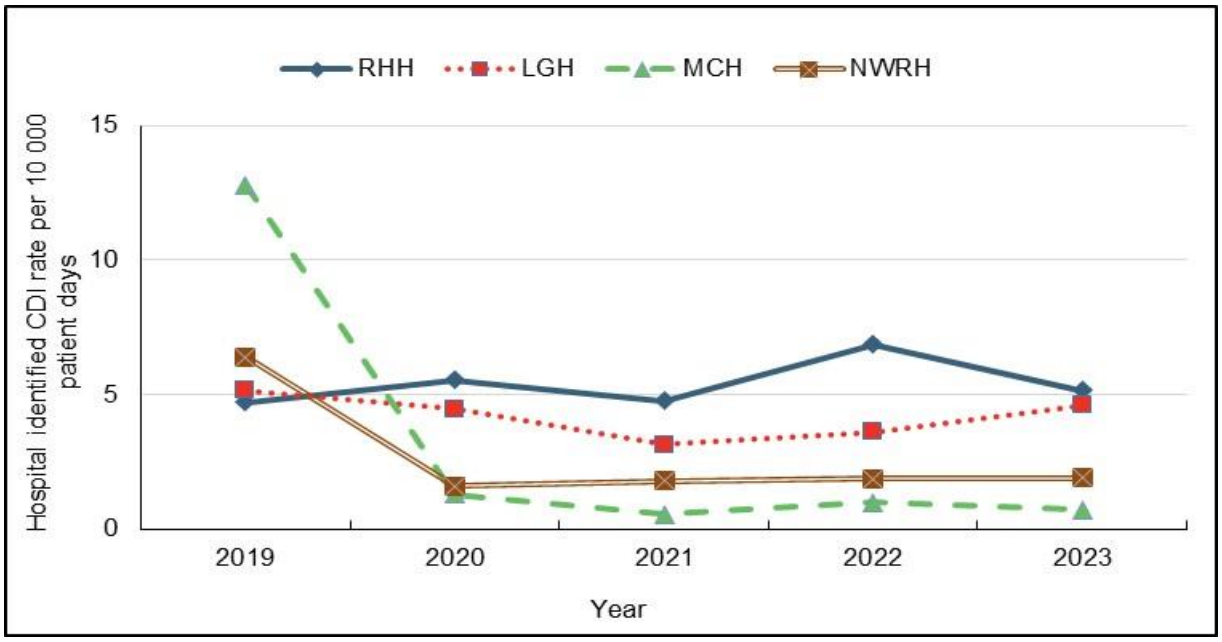

Figure 11 Rate of hospital identified CDI per 10 000 patient days in larger acute public hospitals in Tasmania, 2019–2023.

In 2023, RHH and MCH both had a decrease in the hospital identified CDI rate, NWRH had no change, and LGH had an increase.

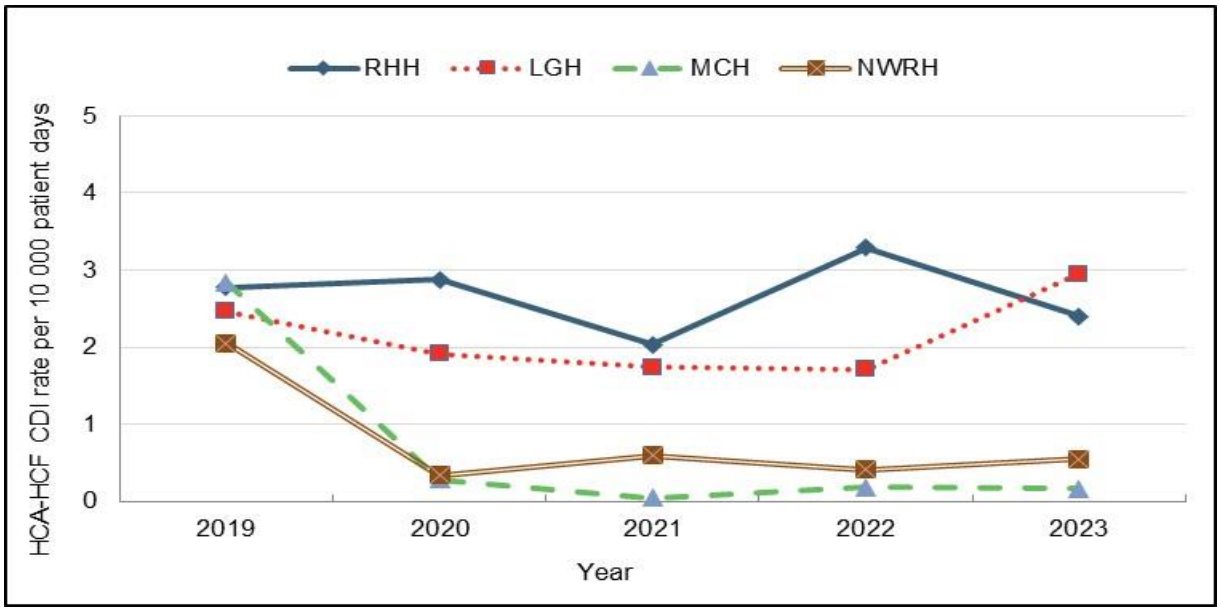

Figure 12 Rate of HCA-HCF CDI per 10 000 patient days in larger acute public hospitals in Tasmania, 2019–2023.

In 2023, RHH had a decrease in HCA-HCF CDI rate, MCH had no change, and LGH and NWRH had an increase.

Critical antimicrobial resistances

The Antimicrobial Use and Resistance in Australia (AURA) Surveillance System integrates surveillance of antimicrobial use and antimicrobial resistance, monitoring trends and measuring the effects of interventions over time. An important element of this project is the National Alert System for Critical Antimicrobial Resistances (CARAlert). The definition of critical antimicrobial resistances (CARs) are 'a resistance mechanism, or profile, known to be a serious threat to the effectiveness of last-line antimicrobial agents'. CARAlert allows early recognition and communication of critical antimicrobial resistances to all jurisdictions across Australia. Please refer to the CARAlert annual report 2022 for further details.

Carbapenemase-producing Enterobacterales

Carbapenem resistance in Enterobacterales is an emerging clinical and public health problem that threatens the effectiveness of an important antibiotic group – carbapenems – that are highly active against multi-drug resistant Gram-negative organisms.

The epidemiology of carbapenemase-producing Enterobacterales (CPE) varies between countries, and it is evident that without active surveillance and subsequent stringent infection control measures these organisms may rapidly become endemic.

With a current low incidence rate in Tasmania, surveillance through mandatory laboratory notification creates an opportunity for proactive measures to prevent, detect and contain CPE within Tasmania.

Identification of CPE was made notifiable in Tasmania in 2016 pursuant to the *Public Health Act 1997* as outlined in the *Guidelines for Notifying Diseases and Food Contaminants*. CPE are also one of the critical antimicrobial resistances captured by CARAlert.

There were two new isolates of CPE identified in Tasmania in 2023 following three in 2022, none in 2021, two in 2020, and three in 2019.

Table 2 Characteristics of the cases of CPE identified in Tasmania in 2023

Organism	Type of CPE	Specimen type	Risk factors
E. coli	NDM	Clinical	Returned from overseas within the previous 12 months
E. coli	NDM	Clinical	Unknown

Hand hygiene

Hand hygiene compliance is the established outcome for assessing the effectiveness of a hand hygiene program for facilities participating in the National Hand Hygiene Initiative (NHHI). Compliance auditing is conducted by direct observation of healthcare workers performing hand hygiene at the appropriate moments. These '5 Moments for Hand Hygiene' are the critical times in clinical situations when hand hygiene should be performed. The 5 moments for hand hygiene are:

- Moment 1 – before touching a patient/client
- Moment 2 – before a procedure
- Moment 3 – after a procedure or body fluid exposure risk
- Moment 4 – after touching a patient/client
- Moment 5 – after touching a patient's/client's immediate environment

Auditing occurs continuously across three audit periods per year. The NHHI benchmark is ≥80 per cent for total moments, individual moments, and each healthcare worker group.

Tasmanian rates

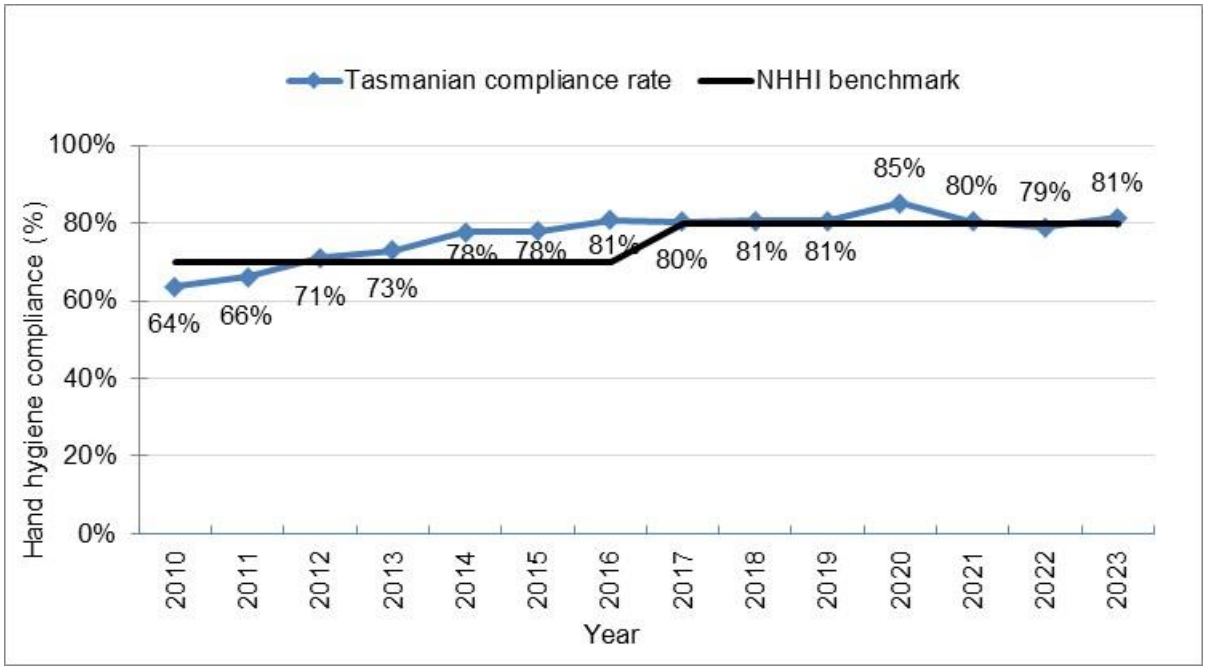

Figure 13 Hand hygiene compliance (%) compared to the NHHI benchmark, Tasmania, 2010 – 2023.

Figure 13 presents the combined hand hygiene compliance percentage of all Tasmanian public healthcare facilities participating in the NHHI and illustrates that compliance increased in 2023 and was once again, over the NHHI 80% benchmark.

Hospital rates

The following figures and tables present hand hygiene compliance data for each of the three audit periods in 2023.

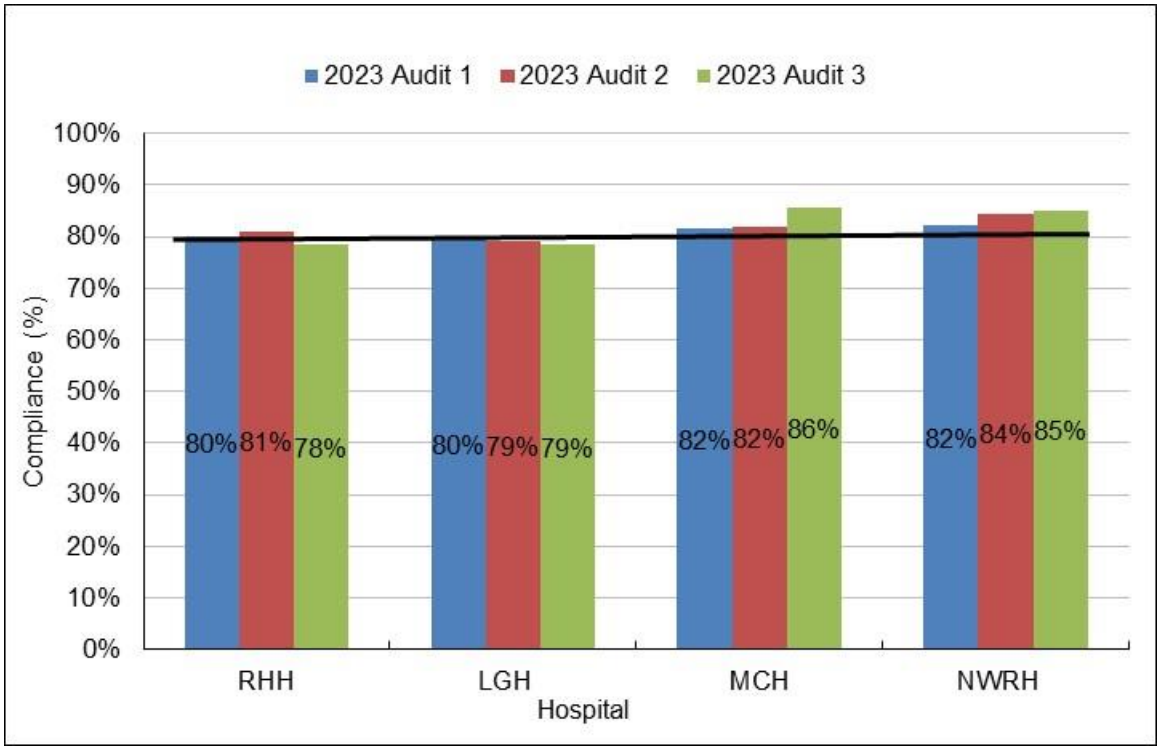

Figure 14 Hand hygiene compliance (%) in larger acute public hospitals in Tasmania, 2023.

In 2023, the MCH and NWRH exceeded the National benchmark in all three audit periods. The RHH met the benchmark in two of the three audit periods, while the LGH met the benchmark in one of the three audit periods. These figures are an improvement over 2022 when the MCH did not meet the benchmark in one audit period, the LGH did not meet the benchmark in all three audit periods, and the RHH met the benchmark in one of the two audit periods they participated in.

Table 3 Hand hygiene compliance (%) by Tasmanian district hospitals in Tasmania, 2023

	Audit 1	Audit 2	Audit 3
Midlands MPC	90%	92%	94%
New Norfolk DH	88%	92%	92%
Beaconsfield DHS	92%	90%	85%
Campbell Town MPC	92%	96%	93%
Deloraine DH	88%	92%	95%
Flinders Is. MPC	90%	91%	80%
George Town Hospital	90%	88%	83%
NESM Scottsdale	84%	89%	89%
St Helens DH	87%	83%	86%
St Marys CHC	84%	88%	86%
King Island Hospital	75%	86%	89%
Smithton DH	84%	83%	83%
West Coast DH	72%	89%	80%

Table 3 presents the hand hygiene compliance at the 13 Tasmanian district and rural hospitals. These smaller sites are required to audit a minimum of 50 moments per audit period.

All but two of these hospitals met the 80% benchmark for all three audit periods.

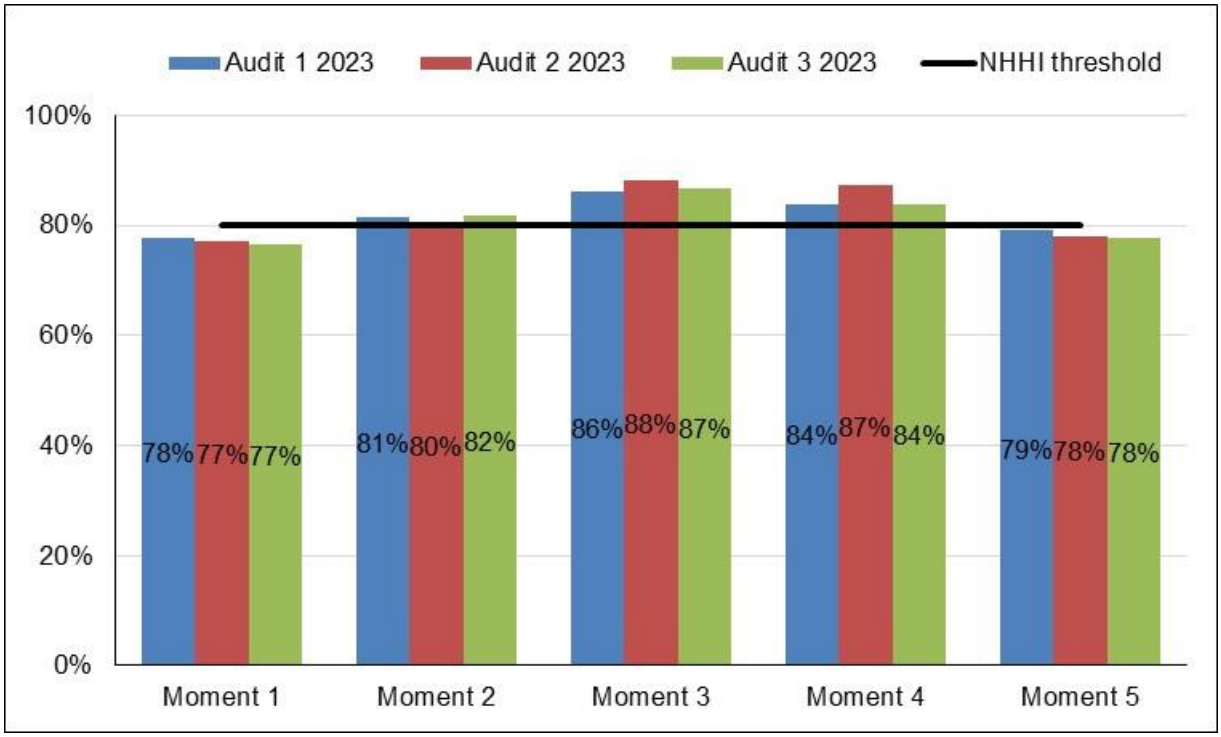

Figure 15 Hand hygiene compliance (%) by moment in Tasmania, 2023.

Moment 1 and Moment 2 are key opportunities for hand hygiene that may have a direct effect on the risk of transmission of pathogens within the healthcare setting. Moment 2 particularly relates to compliance with appropriate aseptic technique and procedural activity.

Compliance with Moment 1 and Moment 5 were below the threshold for all three audit periods, while Moment 2, Moment 3 and Moment 4 all met the 80% threshold in all three audit periods. These results indicate a very small increase in compliance for all Moments compared to 2022.

Table 4 Hand hygiene compliance by healthcare worker category in Tasmania 2023

	Audit 1	Audit 2	Audit 3
Nurse/Midwife	83%	84%	83%
Doctor	67%	66%	70%
Allied Health	88%	87%	82%
Personal Care Staff	78%	78%	76%
Student Nurse/Midwife	82%	84%	84%
Invasive Technician	76%	80%	65%
Student Doctor	78%	89%	81%
Clerical	84%	90%	100%
Other	55%	63%	100%
Ambulance Worker	57%	50%	14%
Student Allied Health	82%	24%	100%
Student Personal Care	_	100%	80%

The number of hand hygiene moments observed between the different healthcare worker groups varies. Most moments (~70%) are collected from nurses/midwives with the next highest category (12%) being from doctors.

The average hand hygiene compliance across the three audit periods of the six healthcare worker groups (allied health, domestic, doctor, nurse/midwife, personal care staff, student nurse/midwife) who contributed 1% or more of the total moments, saw an increase in the compliance in the doctor and student nurse/midwife staff groups, a slight decrease compliance in the nurse/midwife and personal care staff groups and a continued decrease in compliance in the allied health staff group. Compliance in the doctor and personal care staff groups was below the NHHI threshold in all three audit periods in 2023.

The following healthcare worker groups – clerical, invasive technician, student doctor, ambulance worker, student allied healthcare worker and other – contribute 1% or less of the total hand hygiene moments per audit period therefore their results should be interpreted with caution as such low numbers of moments from these groups were captured.

Antibiotic use surveillance

Inappropriate antimicrobial use is associated with the emergence of antimicrobial resistant bacteria. Antimicrobial resistance remains a significant and growing threat to public health worldwide. To ensure that antimicrobials remain effective for treating important infections, it is critical that antimicrobials are prescribed appropriately with consideration for antimicrobial stewardship principles to minimise overuse of certain antimicrobials or antimicrobial classes, in particular cephalosporins, fluoroquinolones, carbapenems, beta-lactamase inhibitor combinations (e.g. piperacillin/tazobactam) and vancomycin.

The National Antimicrobial Utilisation Surveillance Program | SA Health (NAUSP) began in 2004 to conduct surveillance of hospital antimicrobials, principally antibiotic use. The program enables individual institutions to examine their own antimicrobial use rates and trends over time and provides peer group benchmarks for comparison. Data can be used to identify trends in antimicrobial use over time and focus local interventions to promote appropriate antimicrobial use. All four Tasmanian larger acute public hospitals contribute data to NAUSP and data presented shows use over a two-year period until December 2023.

Rates presented are for six antimicrobials or antimicrobial classes: third and fourth generation cephalosporins (ceftriaxone, cefotaxime, ceftazidime, cefepime); fluoroquinolones (ciprofloxacin, moxifloxacin, norfloxacin); carbapenems (ertapenem, imipenem, meropenem); linezolid, piperacillin-tazobactam, and vancomycin. These were chosen for their relevance to other indicators in this report. Antimicrobial usage rates are calculated using the number of defined daily doses (DDDs) of specific antimicrobial agents or classes consumed each month per 1 000 occupied bed days (OBDs).

The graphs show the use of the antimicrobial class or specific antimicrobial in each of the four larger acute public hospitals. TIPCU use a three-point rolling average to calculate the average rate of the current, and two previous months, and uses this to show trends over time. Tasmanian hospitals vary in services provided so comparisons between hospitals are not recommended. For example, a hospital that has a dedicated cancer service may use more antimicrobials to combat infections in this susceptible patient group than another hospital without such a service. In addition, small changes in DDD's or OBDs at a smaller hospital such as MCH, can cause large changes in apparent usage rates.

The National Comparator Rate for each antimicrobial in this report uses the total NAUSP hospital antimicrobial utilisation annual rate for each specific antimicrobial.

NB – please note the difference in the Y axis scales in the following six charts.

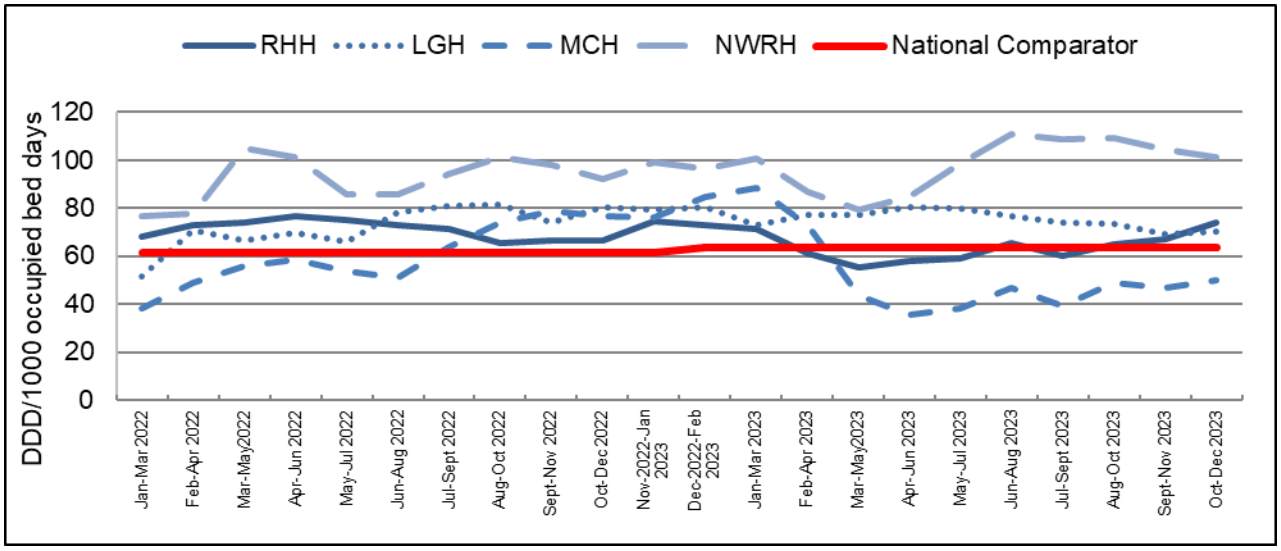

Figure 16 Cephalosporin (third and fourth generation) usage rates (defined daily doses (DDD) per 1 000 occupied bed days (OBD)) in hospitals in Tasmania, 2022-2023.

The 2023 National Comparator Rate for total hospital use of third and fourth generation cephalosporins was 63.7 DDD per 1000 OBDs. RHH, LGH and NWRH had an average use greater than this in 2023. RHH average usage rate for 2023 was 65.8 DDD per 1 000 OBDs but increased in the latter half of the year, whereas use at LGH decreased over the year to an average usage of 74.4 DDD per 1 000 OBDs. The average usage rates at NWRH over 2023 were 98.8 DDD per 1 000 OBDs which was the highest of the four hospitals. This would need further breakdown to determine which cephalosporin had contributed to this exponential increase. Overall usage at MCH was low at the beginning of 2023, but increased in the latter half, with an average annual usage of 51.7 DDD per 1 000 OBDs.

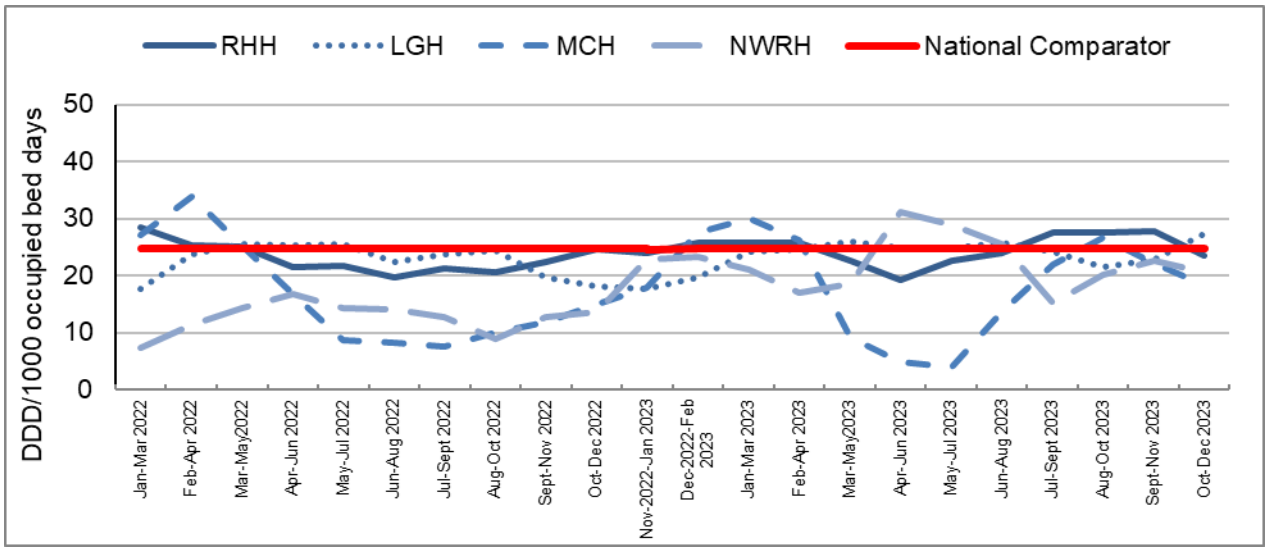

Figure 17 Fluoroquinolone usage rates (defined daily doses (DDD) per 1 000 occupied bed days (OBD)) in hospitals in Tasmania, 2022-2023.

The 2023 National Comparator Rate for total hospital use of fluoroquinolones was 24.7 DDD per 1 000 OBDs with LGH having average usage rates higher than this at 25.1 DDD per 1 000 OBDs. Each of RHH, MCH and NWRH had usage rates lower than the National Comparator rate at 24.0, 17.6 and 23.0 DDD per 1 000 OBDs respectively.

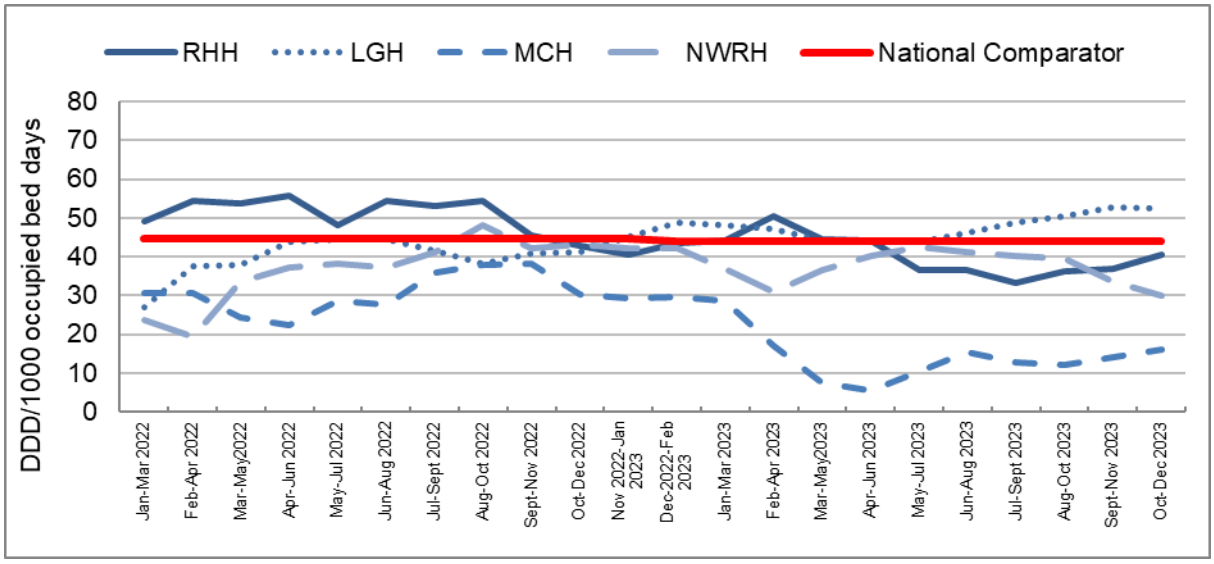

Figure 18 Piperacillin-tazobactam usage rates (defined daily doses (DDD) per 1 000 occupied bed days (OBD)) in hospitals in Tasmania, 2022-2023.

The 2023 National Comparator Rate for total hospital use of piperacillin-tazobactam was 44.1 DDD per 1 000 OBDs. RHH had an average use of 40.6 DDD per 1 000 OBDs, lower than the National Comparator and use fell in the middle of the year. The average use at LGH was higher than the National Comparator at 48.3 DDD per 1 000 OBDs. This was higher than use in 2022. NWRH and MCH average usage of 36.9 and 14.9 DDD per 1 000 OBDs were below the National Comparator Rate.

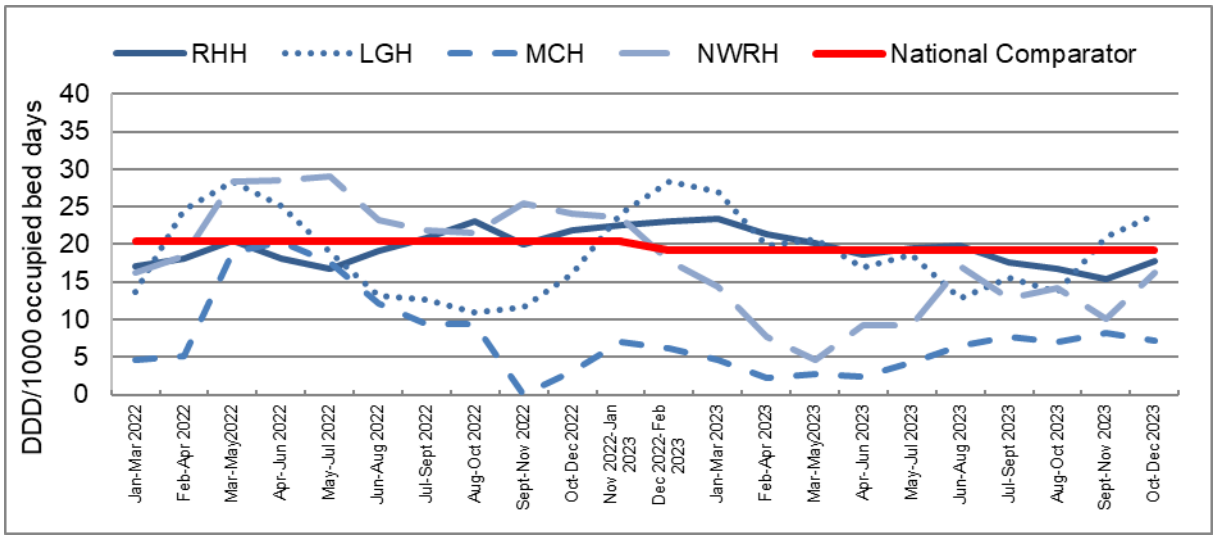

Figure 19 Vancomycin usage rates (defined daily doses (DDD) per 1 000 occupied bed days (OBD)) in hospitals in Tasmania, 2022-2023.

The 2023 National Comparator Rate for total hospital use of vancomycin was 19.3 DDD per 1 000 OBDs. During 2023, all hospitals use fell below this at some stage. The average use at LGH was higher than the National Comparator at 20.9 DDD per 1 000 OBDs and fluctuated throughout the year. This was higher than LGH use in 2022. Each of RHH, MCH and NWRH average use fell compared with 2022. Average use at RHH equalled the national average rate of 19.3 DDD per 1000 OBDs. MCH and NWRH were well below the National Comparator rate at 5.2 and 13.1 DDD per 1 000 OBDs respectively.

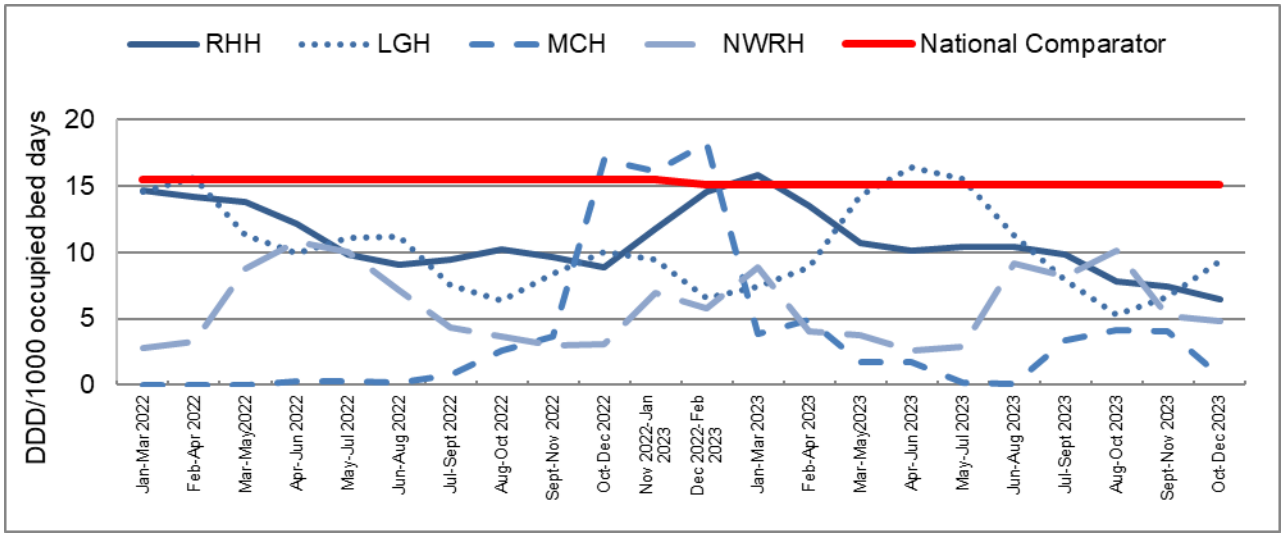

Figure 20 Carbapenem usage rates (defined daily doses (DDD) per 1 000 occupied bed days (OBD)) in hospitals in Tasmania, 2022-2023.

The 2023 National Comparator Rate for total hospital use of carbapenem was 15.1 DDD per 1 000 OBDs. Average use over 2023 at all four larger Tasmanian acute public hospitals was less than the National Comparator Rate.

Use has sustainably fallen over the year at RHH with an average use of 10.5 DDD per 1 000 OBDs and average use was lower than in 2022. At LGH, the average usage rate of 10.3 DDD per 1 000 OBDs was less than in 2022. Use fluctuated at NWRH with the average usage at 6.1 DDD per 1 000 OBDs. There was minimal use at MCH with the average usage at 2.4 DDD per 1 000 OBDs which was less than in 2022. This again demonstrates the volatility of usage rates at the smaller hospitals.

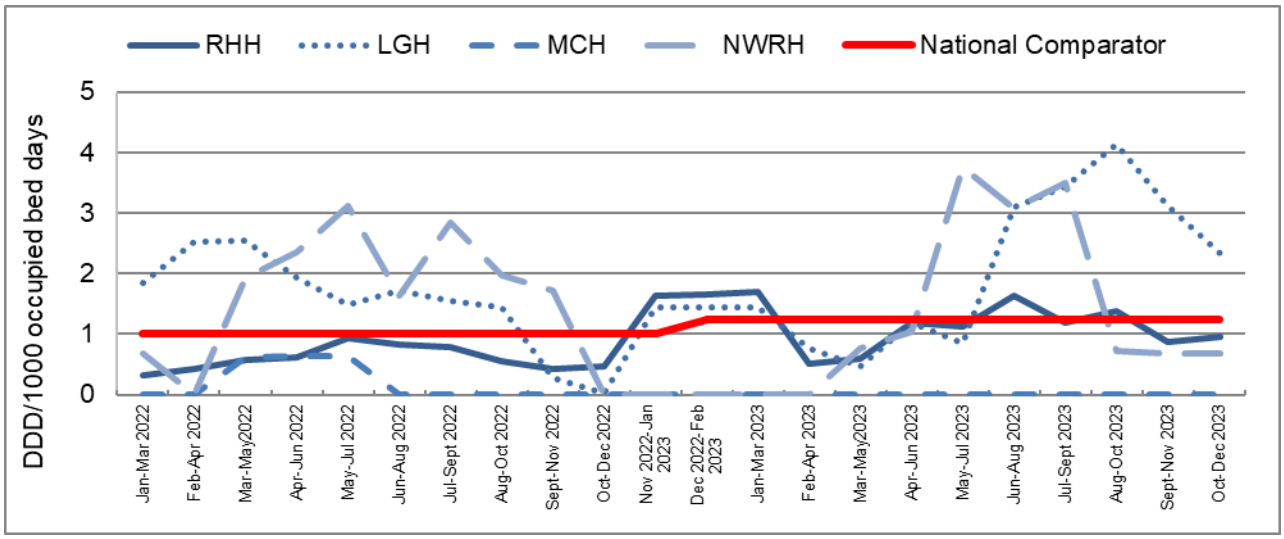

Figure 21 Linezolid usage rates (defined daily doses (DDD) per 1 000 occupied bed days (OBD)) in hospitals in Tasmania, 2022-2023.

The 2023 National Comparator Rate for total hospital use of linezolid was 1.2 DDD per 1 000 OBDs. During 2023, RHH, LGH and NWRH had an average use greater than the National Comparator rate with rates of 1.3, 2.1 and 1.3 DDD per 1 000 OBDs respectively. MCH had no use of linezolid recorded in 2023.

Antimicrobial use in District Hospitals

The Tasmanian Infection Prevention and Control Unit (TIPCU) antimicrobial use surveillance module for district and rural hospitals (AUTasDH) has been performed annually in Tasmanian district and rural hospitals since 2015.

The aims of this surveillance are to quantify antimicrobial use within these hospitals over a defined audit period and to assess the appropriateness of this antimicrobial use in accordance with Therapeutic Guidelines: Antibiotic (TG). The methodology and definitions of appropriateness have been based upon the National Antimicrobial Prevalence Survey (NAPS) methodology since 2016 and the method for surveillance is outlined in the 'TIPCU Antimicrobial use surveillance protocol'

AUTasDH 2023 results

The survey period was from 1 – 31 August 2023 inclusive.

Overall, 12 of the 15 Tasmanian district hospitals participated during the survey period with one facility not recording any antimicrobial prescriptions during the survey period.

There was a large increase in the number of antimicrobials prescribed in 2023 with 170 prescriptions, compared with 98 prescriptions in 2022. This could be the result of two more hospitals participating in the survey in 2023 than in 2022, as only one of the participating hospitals had a substantial increase in the number of prescriptions in 2023 over 2022.

The overall appropriateness of antimicrobial prescribing was 70% which was higher than 2022 (63%) but less than 2021 (82%). There was an increase in appropriateness of prescriptions between 2022 to 2023 in half of the hospitals who recorded antimicrobial prescriptions. These ranged from a 7% increase to a 30% increase.

The five most common antimicrobials prescribed were ceftriaxone, doxycycline, amoxicillin-clavulanic acid, cefalexin, and amoxicillin and these accounted for 49% of the total prescriptions.

Documentation of indications continues to be high with 97% of prescriptions having an indication documented.

Further results can be found in Appendix 3.

Acknowledgements

This report is the culmination of data collection, analysis, and input from several different organisations. We acknowledge:

- Executive Director of Nursing and Midwifery Services, Hospitals North
- Executive Director of Nursing and Midwifery, Hospitals North West
- Executive Director of Nursing and Midwifery, Hospitals South
- Launceston General Hospital Infection Prevention and Control Unit
- North West Regional Hospital Infection Control Team
- Mersey Community Hospital Infection Control Team
- Royal Hobart Hospital Infection Prevention and Control Unit
- Microbiology Departments at the Royal Hobart Hospital, Launceston General Hospital and DSPL
- Australian Commission on Safety and Quality in Health Care
- Communicable Diseases Prevention Unit, Public Health Services
- Contributing Primary Health Sites

Appendix 1

Explanatory notes

Types of healthcare surveillance done in Tasmania

TIPCU undertakes surveillance of the following:

- *Staphylococcus aureus* bloodstream infection (SABSI)
- *Clostridioides difficile* infection (CDI)
- Vancomycin resistant enterococci (VRE)
- CARs including carbapenemase-producing Enterobacterales (CPE)
- Hand hygiene compliance rates
- Antibiotic utilisation – reported annually
- Antimicrobial surveillance within district and rural inpatient facilities.

The '5 Moments for Hand Hygiene'

The 5 Moments for Hand Hygiene are the critical times in clinical situations when hand hygiene should be performed. Hand hygiene performed in accordance with the '5 Moments for Hand Hygiene' protects patients and clients from acquiring infectious agents from the hands of the healthcare worker; protects patients and clients from infectious agents entering their bodies during procedures; and protects healthcare workers and the healthcare surroundings from acquiring patients' and clients' infectious agents.

The 5 moments for hand hygiene are:

Moment 1 – before touching a patient/client

Moment 2 – before a procedure

Moment 3 – after a procedure or body fluid exposure risk

Moment 4 – after touching a patient/client

Moment 5 – after touching a patient's/client's immediate environment.

What the rates mean

The healthcare surveillance data are expressed as a rate and/or as a raw number. SABSI and CDI are expressed as a rate per 10 000 patient days, VRE is expressed as a raw number, hand hygiene compliance is expressed as a percentage and antibiotic utilisation is expressed as hospital use measured by defined daily doses, per 1 000 occupied bed days.

Definitions for *Staphylococcus aureus* bloodstream infection (SABSI)

Case definition - a blood culture positive for *Staphylococcus aureus* (*S. aureus*)

Healthcare associated SABSI

- **Criterion A** the patient/client's first *S. aureus* blood culture was collected more than 48 hours after hospital admission, with no documented evidence that infection was present or was incubating on admission* **OR** was collected less than 48 hours after hospital discharge. A key-clinical criteria (KCC) may also be identified.

  ***** as determined by consultation with the patient's medical officer and/or a clinical microbiologist.

  OR

  Criterion B the patient's first positive SABSI blood culture was collected less than or equal to 48 hours after hospital admission and one or more of the following key clinical criteria was met for the patient-episode of SABSI.

  Key clinical criteria:

- A complication of the presence of an indwelling intravascular (IV) or a non-IV indwelling medical device.
- A complication of a surgical procedure.
- Within 48 hours of a related invasive instrumentation or incision.
- Associated with neutropenia caused by cytotoxic therapy and unrelated to the presence on an indwelling medical device.

Community associated SABSI - the SABSI does not meet either of the definitions of a healthcare associated SABSI.

Definitions for *Clostridioides difficile* infection (CDI)

TIPCU use the national surveillance definitions published by the ACSQHC to classify CDI. TIPCU reports on:

1. **Hospital identified CDI** is defined as a case diagnosed in a patient attending an acute care facility. This includes positive specimens obtained from admitted patients and those attending the emergency department and outpatient departments. This definition excludes patients younger than two years old and cases with a positive test within the previous eight weeks.
2. **Healthcare associated – healthcare facility onset CDI** (HCA-HCF CDI) is defined as a patient with CDI symptom onset (or date and time of stool specimen collection if a laboratory system is used) more than 48 hours after admission to a healthcare facility. This definition excludes patients younger than two years old and cases with a positive test within the previous eight weeks.

Definition for vancomycin resistant enterococci (VRE)

The definition for VRE is an isolate identified as VRE by an accredited laboratory.

TIPCU reports on the total number of people with new isolates of VRE identified in Tasmania per quarter and this number includes all people with new VRE isolates from public and private hospitals, district and rural hospitals, GP clinics and long term and residential care facilities.

Definition for carbapenemase-producing Enterobacterales (CPE)

The definition for CPE is an Enterobacterales isolate with a carbapenemase gene identified by an accredited laboratory.
TIPCU reports on the total number of people with new isolates of CPE identified in Tasmania per annum and this number includes all people with new CPE isolates from public and private hospitals, district and rural hospitals, GP clinics and long term and residential care facilities.

Patient days

Patient days is the term to explain the total days patients are in hospital. In Tasmania's four larger acute public hospitals there are around 330 000 patient care days a year.

When a rate is presented as a number per 10 000 patient days this presents the number of infections that occur for every 10 000 patient care days.

Comparing Tasmanian hospital infection rates

Each Tasmanian hospital provides different services and has patients with different levels of illness. For example, very sick immuno-compromised patients may be more likely to get infections, and this can affect infection rates.

Other reasons for caution when comparing hospitals include screening levels and laboratory testing methods.

Appendix 2

Healthcare associated *Staphylococcus aureus* bloodstream infection (HCA-SABSI)

Table 5 Tasmanian public hospital numbers and rate per 10 000 patient days of HCA-SABSI

Quarter	Number MSSA	Number MRSA	Total number HCA-SABSI	Rate/10,000 patient days
Q1 2021	12	0	12	1.2
Q2 2021	6	1	7	0.6
Q3 2021	15	0	15	1.3
Q4 2021	8	1	9	0.8
Q1 2022	9	1	10	1.0
Q2 2022	13	0	13	1.2
Q3 2022	13	1	14	1.1
Q4 2022	13	0	13	1.1
Q1 2023	11	0	11	0.9
Q2 2023	12	1	13	1.0
Q3 2023	14	3	17	1.3
Q4 2023	9	1	10	0.8

Table 6 Royal Hobart Hospital numbers and rates per 10 000 patient days of HCA-SABSI

Quarter	Number MSSA	Number MRSA	Total number HCA-SABSI	Rate/10,000 patient days
Q1 2021	4	0	4	0.8
Q2 2021	1	0	1	0.2
Q3 2021	11	0	11	2.0
Q4 2021	4	0	4	0.7
Q1 2022	4	1	5	1.0
Q2 2022	3	0	3	0.6
Q3 2022	3	1	4	0.7
Q4 2022	5	0	5	0.8
Q1 2023	3	0	3	0.5
Q2 2023	7	1	8	1.3
Q3 2023	7	2	9	1.4
Q4 2023	1	1	2	0.3

Table 7 Launceston General Hospital numbers and rates per 10 000 patient days of HCA-SABSI

Quarter	Number MSSA	Number MRSA	Total number HCA-SABSI	Rate/10,000 patient days
Q1 2021	5	0	5	1.4
Q2 2021	2	1	3	0.8
Q3 2021	2	0	2	0.5
Q4 2021	2	1	3	0.8
Q1 2022	4	0	4	1.1
Q2 2022	7	0	7	1.8
Q3 2022	8	0	8	2.0
Q4 2022	4	0	4	1.0
Q1 2023	6	0	6	1.5
Q2 2023	4	0	4	1.0
Q3 2023	6	0	6	1.5
Q4 2023	5	0	5	1.3

Table 8 Mersey Community Hospital numbers and rates per 10 000 patient days of HCA-SABSI

Quarter	Number MSSA	Number MRSA	Total number HCA-SABSI	Rate/10,000 patient days
Q1 2021	1	0	1	1.7
Q2 2021	1	0	1	1.3
Q3 2021	1	0	1	1.4
Q4 2021	2	0	2	2.9
Q1 2022	0	0	0	0.0
Q2 2022	0	0	0	0.0
Q3 2022	0	0	0	0.0
Q4 2022	2	0	2	3.0
Q1 2023	1	0	1	1.5
Q2 2023	0	0	0	0.0
Q3 2023	0	0	0	0.0
Q4 2023	1	0	1	1.5

Table 9 North West Regional Hospital numbers and rates per 10 000 patient days of HCA-SABSI

Quarter	Number MSSA	Number MRSA	Total number HCA-SABSI	Rate/10,000 patient days
Q1 2021	2	0	2	1.7
Q2 2021	2	0	2	1.5
Q3 2021	1	0	1	0.7
Q4 2021	0	0	0	0.0
Q1 2022	1	0	1	0.9
Q2 2022	3	0	3	2.3
Q3 2022	2	0	2	1.4
Q4 2022	2	0	2	1.4
Q1 2023	1	0	1	0.7
Q2 2023	1	0	1	0.7
Q3 2023	2	1	2	2.7
Q4 2023	2	0	2	1.5

Vancomycin resistant enterococci (VRE)

Table 10 First VRE isolates identified per quarter within larger acute public hospitals, and other healthcare settings (private hospitals, district and rural hospitals, GP clinics and long term and residential care facilities)

Quarter	RHH	LGH	MCH	NWRH	Other healthcare settings	Total number of newly identified VRE
Q1 2021	23	45	10	8	19	**105**
Q2 2021	16	84	26	13	16	**155**
Q3 2021	17	82	9	13	21	**142**
Q4 2021	22	80	15	23	18	**158**
Q1 2022	15	57	13	12	20	**117**
Q2 2022	19	86	12	23	15	**155**
Q3 2022	31	62	8	14	38	**153**
Q4 2022	19	34	11	12	36	**112**
Q1 2023	38	67	23	14	31	**173**
Q2 2023	11	90	13	16	34	**164**
Q3 2023	45	82	27	26	46	**226**
Q4 2023	57	71	13	23	46	**210**

Table 11 Classification of VRE isolates

Quarter	Newly identified screening	Newly identified clinical	Total number of newly identified VRE	Clinical specimen following initial screening specimen	Total number of clinical specimens	Total number of blood stream infections
Q1 2021	95	10	**105**	6	**16**	1
Q2 2021	140	15	**155**	11	**26**	2
Q3 2021	131	11	**142**	10	**21**	1
Q4 2021	150	8	**158**	7	**15**	2
Q1 2022	111	6	**117**	9	**15**	2
Q2 2022	142	13	**155**	12	**24**	3
Q3 2022	139	14	**153**	15	**27**	2
Q4 2022	101	11	**112**	5	**16**	0
Q1 2023	155	18	**173**	8	**26**	2
Q2 2023	152	12	**164**	8	**20**	1
Q3 2023	205	21	**226**	10	**31**	7
Q4 2023	190	20	**210**	16	**36**	4

Table 12 VRE isolates by genotype

Quarter	*vanB* number	*vanA* number	*vanA* and *vanB* number	Unknown number	Total
Q1 2021	80	24	1	0	105
Q2 2021	92	57	6	0	155
Q3 2021	99	38	4	1	142
Q4 2021	121	32	4	1	158
Q1 2022	71	40	5	1	117
Q2 2022	89	63	1	2	155
Q3 2022	112	29	6	6	153
Q4 2022	66	44	1	1	112
Q1 2023	98	71	4	0	173
Q2 2023	88	67	9	0	164
Q3 2023	105	112	9	0	226
Q4 2023	109	92	7	2	210

Clostridiodes difficile infection (CDI)

Table 13 CDI - Tasmanian larger public hospitals numbers and rates per 10 000 patient days

Quarter	Total hospital identified number	Total hospital identified rate	Total number HCA-HCF	HCA-HCF rate/10,000 patient days
Q1 2021	44	4.5	18	1.8
Q2 2021	48	4.6	22	2.1
Q3 2021	61	5.5	20	1.8
Q4 2021	53	5.0	29	2.7
Q1 2022	64	6.5	22	2.2
Q2 2022	73	6.9	37	3.5
Q3 2022	77	6.6	37	3.2
Q4 2022	73	6.0	25	2.0
Q1 2023	80	6.8	45	3.8
Q2 2023	51	4.3	27	2.3
Q3 2023	78	6.4	38	3.1
Q4 2023	84	7.2	34	2.9

Table 14 Hospital identified CDI – larger public hospital numbers and rates per 10 000 patient days

Quarter	RHH Total	RHH Rate	LGH Total	LGH Rate	MCH Total	MCH Rate	NWRH Total	NWRH Rate
Q1 2021	19	4.0	16	4.7	2	3.4	7	6.5
Q2 2021	22	4.5	13	3.6	6	8.0	7	5.6
Q3 2021	33	6.2	15	4.0	3	4.2	10	7.8
Q4 2021	22	4.3	19	5.2	0	0.0	12	9.9
Q1 2022	33	6.9	18	5.3	6	10.2	7	6.5
Q2 2022	37	7.5	18	5.0	6	8.0	12	9.6
Q3 2022	45	7.7	17	4.4	2	2.8	13	9.8
Q4 2022	33	5.4	25	6.2	7	10.5	8	5.6
Q1 2023	37	6.4	30	7.7	4	5.8	9	6.7
Q2 2023	17	2.8	20	5.3	2	2.9	12	8.3
Q3 2023	36	6.0	28	7.2	3	4.1	11	7.8
Q4 2023	32	5.4	31	8.2	8	11.8	13	10.1

Table 15 HCA-HCF CDI – larger hospital numbers and rates per 10 000 patient days

Quarter	RHH Total	RHH Rate	LGH Total	LGH Rate	MCH Total	MCH Rate	NWRH Total	NWRH Rate
Q1 2021	9	1.9	6	1.8	0	0.0	3	2.8
Q2 2021	12	2.4	6	1.7	1	1.3	3	2.4
Q3 2021	9	1.7	9	2.4	0	0.0	2	1.6
Q4 2021	11	2.2	14	3.8	0	0.0	4	3.3
Q1 2022	14	2.9	5	1.5	3	5.1	0	0.0
Q2 2022	20	4.0	12	3.3	0	0.0	5	4.0
Q3 2022	25	4.3	9	2.3	1	1.4	2	1.5
Q4 2022	12	2.0	11	2.7	0	0.0	2	1.4
Q1 2023	17	2.9	22	5.6	2	2.9	4	3.0
Q2 2023	11	1.8	11	2.9	0	0.0	5	3.4
Q3 2023	15	2.5	21	5.4	0	0.0	2	1.4
Q4 2023	14	2.4	16	4.5	2	3.0	2	1.6

Appendix 3

AUTasDH 2023 results

Table 16 Comparison of Tasmanian district and rural facility NAPS data 2016 - 2023

	2016	2017	2018	2019	2020	2021	2022	2023	NAPS 2021 AURA 2023
Appropriate	62%	74%	62%	64%	70%	82%	63%	70%	74.5%
Optimal	40%	41%	37%	47%	47%	49%	33%	42%	-
Adequate	22%	33%	26%	17%	24%	33%	31%	28%	-
Inappropriate	23%	17%	30%	32%	29%	13%	26%	26%	17%
Suboptimal	19%	16%	23%	30%	25%	11%	25%	21%	-
Inadequate	4%	2%	8%	2%	4%	3%	1%	5%	-
Not assessable	15%	9%	7%	4%	1%	5%	11%	4%	-
Indication documented	90%	88%	93%	96%	99%	96%	98%	97%	85.7%
Total antimicrobials	225	244	199	181	142	161	98	170	-

Table 17 Indications for use

Site	2016	2017	2018	2019	2020	2021	2022	2023
Respiratory tract	45%	43%	40%	38%	22%	36%	26%	48%
Skin/soft tissue	12%	19%	14%	26%	37%	15%	19%	18%
Urinary tract	12%	14%	13%	13%	11%	20%	21%	10%
Miscellaneous	31%	24%	33%	23%	30%	8%	34%	24%

Table 18 Commonest antimicrobials prescribed

Rank	2016 n=225	2017 n=244	2018 n=199	2019 n=181	2020 n=142	2021 n=161	2022 n=98	2023 n=170
1st	Cefalexin (36)	Cefalexin (34) Doxycycline (34)	Doxycycline (29)	Flucloxacillin (25)	Cefalexin (20)	Amoxicillin-clavulanate (18) Ceftriaxone (18)	Amoxicillin-clavulanate (14) Ceftriaxone (14)	Ceftriaxone (27)
2nd	Ceftriaxone (30)	Amoxicillin (24)	Amoxicillin (19)	Cefalexin (21)	Amoxicillin-clavulanate (16)	Doxycycline (16)	Doxycycline (9)	Doxycycline (24)
3rd	Doxycycline (25)	Ceftriaxone (23)	Cefalexin (18) Ceftriaxone (18)	Amoxicillin (20) Doxycycline (20)	Flucloxacillin (14)	Amoxicillin (15) Cephalexin (15)	Flucloxacillin (8)	Amoxicillin-clavulanate (13)
4th	Amoxicillin-clavulanate (20)	Amoxicillin-clavulanate (17) Flucloxacillin (17)	Amoxicillin-clavulanate (16)	Ceftriaxone (17)	Ceftriaxone (13)	Flucloxacillin (12)	Cefalexin (7)	Cefalexin (11)
5th	Amoxicillin (13)	Metronidazole (11)	Flucloxacillin (13)	Ciprofloxacin (9)	Amoxicillin (8)	Gentamicin (7)	Trimethoprim (6)	Amoxicillin (9)

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