1.3 Cellulitis

Context

This data item examines hospitalisations for cellulitis in people of all ages based on their place of residence. Cellulitis is an infection of the subcutaneous tissues. Cellulitis accounted for 250,554 hospital bed days, and 11% of all potentially preventable hospitalisations, in Australia in 2013–14.¹ International rates for comparison are not readily available.

Cellulitis occurs in a range of different conditions and circumstances, with different causes and management – for example, penetrating injuries, insect bites, scabies, furunculosis and wounds.^{2,3} Risk factors for cellulitis include diabetes, lymphoedema, poor blood flow, immunosuppression and obesity.² Distinguishing cellulitis from other conditions can be challenging; for example, chronic venous insufficiency and erythema around venous ulcers are commonly misdiagnosed as cellulitis.

Cellulitis is caused by a variety of pathogens. Spontaneous, rapidly spreading cellulitis is most commonly caused by *Streptococcus pyogenes* or other streptococci; cellulitis caused by *Staphylococcus aureus* is less common, and is often associated with ulceration or penetrating injury.³ Some community-acquired *S. aureus* infections in Australia are now due to methicillin-resistant *S. aureus* (MRSA).⁴

Recommended initial treatment for cellulitis is with oral antibiotics. In severe cases or if oral antibiotics are not available, intravenous antibiotics are recommended.³ Risk factors for complications of cellulitis include type 2 diabetes and delayed initiation of treatment.^{5,6}

Recent national data on the prevalence of cellulitis in the Australian community are not available.

About the data

Data are sourced from the National Hospital Morbidity Database, and include both public and private hospitals. Rates are based on the number of hospitalisations for cellulitis (based on the potentially preventable hospitalisation specification) per 100,000 people in 2014–15. Because a record is included for each hospitalisation, rather than for each patient, patients hospitalised more than once in the financial year will be counted more than once. The full data specification is available from the Australian Institute of Health and Welfare.⁷

The analysis and maps are based on the residential address of the patient and not the location of the hospital. Rates are age and sex standardised to allow comparison between populations with different age and sex structures. Data quality issues – for example, the recognition of Aboriginal and Torres Strait Islander status in datasets – could influence the variation seen.

What do the data show?

Magnitude of variation

In 2014–15, there were 59,466 hospitalisations for cellulitis, representing 237 hospitalisations per 100,000 people (the Australian rate).

The number of hospitalisations for cellulitis across 324⁺ local areas (Statistical Area 3 – SA3) ranged from 102 to 1,262 per 100,000 people. The rate was **12.4 times as high** in the area with the highest rate compared to the area with the lowest rate. The number of hospitalisations varied across states and territories, from 177 per 100,000 people in the Australian Capital Territory to 540 in the Northern Territory (Figures 1.14–1.17).

After the highest and lowest 10% of results were excluded and 261 SA3s remained, the number of hospitalisations per 100,000 people was 2.9 times as high in the area with the highest rate compared to the area with the lowest rate.

Rates by SA3 for two additional years, 2012–13 and 2013–14, are available online at www.safetyandquality.gov.au/atlas.

Analysis by remoteness and socioeconomic status

Two SA3s in remote areas of Australia (Far North and Kimberley) had markedly higher hospitalisation rates than other SA3s, at 4.8 and 5.3 times the national rate, respectively. Four further SA3s in outer regional and remote areas (Tablelands [East] – Kuranda, Innisfail – Cassowary Coast, Outback – South, and Alice Springs) had hospitalisation rates that were at least 3 times the national rate.

† There are 333 SA3s. For this item, data were suppressed for nine SA3s due to a small number of hospitalisations and/or population in an area. Some of the published SA3 rates were considered more volatile than others. These rates are excluded from the calculation of the difference between the highest and lowest SA3 rates in Australia.

For further detail about the methods used, please refer to the Technical Supplement.

Rates of hospitalisations for cellulitis were markedly higher in outer regional and remote areas than in other areas. Rates increased with socioeconomic disadvantage regardless of remoteness category, except in major cities (Figure 1.18).

Analysis by Aboriginal and Torres Strait Islander status

The rate for Aboriginal and Torres Strait Islander Australians (679 per 100,000 people) was 3 times as high as the rate for other Australians (226 per 100,00 people). Rates were higher among Aboriginal and Torres Strait Islander Australians than other Australians in all states and territories, except in Tasmania (Figure 1.13).

Figure 1.13: Number of potentially preventable hospitalisations – cellulitis per 100,000 people, age and sex standardised, by state and territory and Indigenous status, 2014–15



www.safetyandquality.gov.au/atlas.

Interpretation

Potential reasons for the variation include differences in:

- The prevalence of diabetes, which increases the risk of skin disease; diabetes is more prevalent among Aboriginal and Torres Strait Islander Australians
- The prevalence of streptococcal infections, which is higher in some Aboriginal and Torres Strait Islander communities than in the general population
- The prevalence of community-acquired MRSA, which is higher in local areas with a high proportion of Aboriginal and Torres Strait Islander Australians
- The prevalence of overcrowded housing
- Occupational risk factors for skin injury, which may be higher among socioeconomically disadvantaged people
- Delayed or inadequate access to health care; poor health literacy may contribute to delays in seeking health care, resulting in increased need for hospitalisation
- The quality, efficiency and effectiveness of primary health care these may be lower for Aboriginal and Torres Strait Islander Australians
- Clustering of populations with a high risk of cellulitis, such as residents of nursing homes⁸
- Prevalence of other risk factors for cellulitis, such as lymphoedema and obesity
- Temperature and humidity, and associated effects (for example, open footwear, tinea, insect bites)
- Diagnostic error.

Notes:

Rates are age and sex standardised to the Australian population in 2001.

Rates are based on the number of hospitalisations in public and private hospitals (numerator) and people in the geographic area (denominator).

Analysis is based on the patient's area of usual residence, not the place of hospitalisation.

Data for ACT (Aboriginal and Torres Strait Islander Australians) have been suppressed. Data by Indigenous status should be interpreted with caution as hospitalisations for Aboriginal and Torres Strait Islander patients are under-enumerated and

there is variation in the under-enumeration among states and territories.

For further detail about the methods used, please refer to the Technical Supplement.

Sources: AIHW analysis of National Hospital Morbidity Database 2014–15 and ABS Estimated Resident Population 30 June 2014.

Variations between areas may not directly reflect the practices of the clinicians who are based in these areas. Area boundaries reflect where people live, rather than where they obtain their health care. Patients may travel outside their local area to receive care.

Recent research in Aboriginal and Torres Strait Islander communities in north Queensland has shown that an extremely high background rate of community-acquired infection, plus high prevalence of type 2 diabetes, leads to high rates of hospitalisation for infections, including cellulitis.⁹ The risk of skin infections is increased by poor housing conditions, including overcrowding.¹⁰ Aboriginal and Torres Strait Islander households are three times as likely to be overcrowded as other Australian households, and remote Aboriginal and Torres Strait Islander communities have higher rates of inadequate facilities to support healthy living practices, such as washing.¹¹

Addressing variation

Suitable strategies to reduce potentially preventable hospitalisations for cellulitis will depend on the specific underlying causes in local areas and their accurate diagnosis. More effective prevention and management of type 2 diabetes may reduce this important risk factor for cellulitis. Increased availability of podiatry services that specialise in care of diabetic and ischaemic foot ulcers may help prevent infections and hospitalisations, particularly in rural and remote areas. Similarly, increasing the availability of lymphoedema services and specific compression stockings may reduce rates of cellulitis in patients with chronic oedema.

Using better-tolerated treatments for impetigo in primary care may encourage people to present earlier for treatment. Delays in presentation due to the pain of treatment with bicillin injection, or experience of previous ineffective treatment for MRSA infections – for example, with flucloxacillin or other ß-lactam antibiotics – may be a reason for treatment failure in the primary healthcare setting.¹³ Children in remote Aboriginal and Torres Strait Islander communities in northern Australia have the highest rates of impetigo in the world, as well as high rates of scabies and tinea.^{14,15} Prevention programs for skin infections can reduce predisposing factors for cellulitis in these settings.^{15,16} Public swimming pools have also been associated with a lower prevalence and severity of skin sores in remote Aboriginal and Torres Strait Islander communities, and may decrease the burden of infections, particularly staphylococcal diseases.^{17,18}

Case study: Housing improvements to reduce skin infections in Aboriginal and Torres Strait Islander Australians

The risk of skin infections is increased by poor housing conditions, including inadequate facilities for healthy living practices.¹⁰ A program that repairs and maintains housing items required for healthy living practices has shown a significant reduction in the rate of hospitalisation for skin infections, and other benefits for people living in Aboriginal community housing.¹²

Over the 10-year evaluation period, repairs were made to 2,230 houses; these included fixing hot water systems, showers, washing machines, toilets and insect screens. Repairs were also made to improve safety, temperature control, and the ability to store and prepare food. The proportion of houses with adequate facilities for residents to wash themselves, their clothes and their bedding doubled after the intervention. The rate of hospitalisations for skin infections was 19% lower in the intervention group than in the non-intervention group. Hospitalisations were also reduced by 42% for respiratory conditions and by 43% for intestinal infections. The program had broader benefits in building goodwill through timely repairs (either the same day as, or the day after, houses were surveyed), and through employing local Aboriginal and Torres Strait Islander tradespeople to carry out the repairs, where possible.12





Notes:

Rates are age and sex standardised to the Australian population in 2001.

Rates are based on the number of hospitalisations in public and private hospitals (numerator) and people in the geographic area (denominator).

Analysis is based on the patient's area of usual residence, not the place of hospitalisation.

Crosses and asterisks indicate rates that are considered more volatile than other published rates and should be interpreted with caution. These rates are excluded from the calculation of the difference between the highest and lowest SA3 rates in Australia.

For further detail about the methods used, please refer to the Technical Supplement.

Figure 1.15: Number of potentially preventable hospitalisations – cellulitis per 100,000 people, age and sex standardised, by Statistical Area Level 3 (SA3), 2014–15: Australia map



Notes:

Rates are age and sex standardised to the Australian population in 2001.

Rates are based on the number of hospitalisations in public and private hospitals (numerator) and people in the geographic area (denominator).

Analysis is based on the patient's area of usual residence, not the place of hospitalisation. Hatching indicates a rate that is considered more volatile than other published rates and should be interpreted with caution.

For further detail about the methods used, please refer to the Technical Supplement.

Figure 1.16: Number of potentially preventable hospitalisations – cellulitis per 100,000 people, age and sex standardised, by Statistical Area Level 3 (SA3), 2014–15: capital city area maps



Notes:

Rates are age and sex standardised to the Australian population in 2001.

Rates are based on the number of hospitalisations in public and private hospitals (numerator) and people in the geographic area (denominator). Analysis is based on the patient's area of usual residence, not the place of hospitalisation.

Hatching indicates a rate that is considered more volatile than other published rates and should be interpreted with caution.

For further detail about the methods used, please refer to the Technical Supplement.

Figure 1.17: Number of potentially preventable hospitalisations – cellulitis per 100,000 people, age and sex standardised, by Statistical Area Level 3 (SA3), state and territory, 2014–15



Notes:

Rates are age and sex standardised to the Australian population in 2001.

Rates are based on the number of hospitalisations in public and private hospitals (numerator) and people in the geographic area (denominator). Analysis is based on the patient's area of usual residence, not the place of hospitalisation.

Crosses and asterisks indicate rates that are considered more volatile than other published rates and should be interpreted with caution. These rates are excluded from the calculation of the difference between the highest and lowest SA3 rates in Australia.

For further detail about the methods used, please refer to the Technical Supplement.

Figure 1.18: Number of potentially preventable hospitalisations – cellulitis per 100,000 people, age and sex standardised, by Statistical Area Level 3 (SA3), remoteness and socioeconomic status, 2014–15



Notes:

Rates are age and sex standardised to the Australian population in 2001.

Rates are based on the number of hospitalisations in public and private hospitals (numerator) and people in the geographic area (denominator).

Analysis is based on the patient's area of usual residence, not the place of hospitalisation. Crosses indicate rates that are considered more volatile than other published rates and should be interpreted with caution.

For further detail about the methods used, please refer to the Technical Supplement.

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Australian initiatives

The information in this chapter will complement work already under way to reduce the rate of hospitalisations for cellulitis in Australia. At a national level, this work includes:

 National Partnership Agreement on Remote Indigenous Housing, Council of Australian Governments.

Many states and territory initiatives are also in place, including:

• Housing for Health in Aboriginal communities of New South Wales.

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