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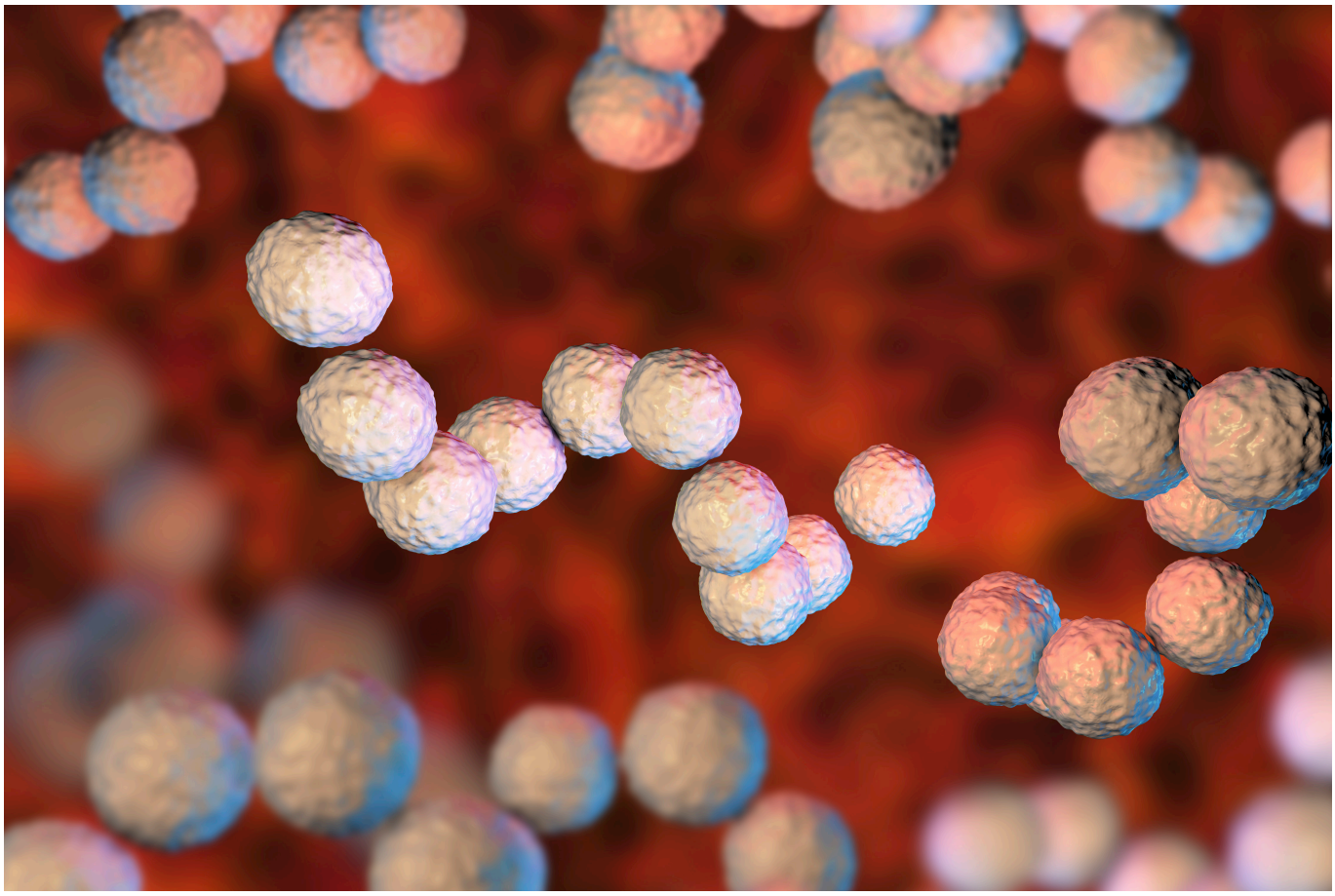

Likely rise in invasive strep infections in NZ requires a strategy

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Summary

Group A *streptococcus* (GAS) is a common cause of sore throats and skin infections in children. In rare cases the bacteria can invade deeper into the body, causing severe, life-threatening *invasive GAS* (iGAS). Since late 2022 the World Health Organization (WHO) has described numerous high-income countries reporting increases in cases of iGAS, with children under the age of 10 the most affected group. In Aotearoa New Zealand (NZ) a 2016 report noted that iGAS infections had increased over the previous decade.

Despite this emerging threat, and unlike other high-income countries, iGAS is not notifiable in NZ. Making iGAS notifiable would support immediate public health actions to control disease spread and provide a robust basis for effective surveillance to identify changes in iGAS incidence and distribution.

Group A *streptococcus* (GAS) is a bacterium traditionally thought to spread person-to-person through direct contact with nose, throat or wound secretions or respiratory droplets. While some people carry the bacteria in the throat with no symptoms, GAS can cause a range of diseases including: superficial infections (sore throats, skin infections), invasive disease (including blood poisoning; pneumonia; necrotizing fasciitis, AKA flesh-eating disease), toxin mediated diseases (scarlet fever, toxic shock syndrome), and immune-mediated diseases (rheumatic fever, some forms of kidney disease). Globally more than 18 million people suffer from serious GAS disease with an associated 500,000 deaths annually.[1 2]

The focus of this article is on invasive GAS disease (iGAS). These are the rare cases where the bacteria can invade sterile parts of the body (blood, deep tissue), causing severe, life-threatening infection.

Epidemiology and impact

During the first stages of the Covid-19 pandemic the number of children being infected with iGAS was lower than previous years.[3] This decline was likely due to steps taken to reduce the spread of respiratory diseases, such as school and work closures, border restrictions, masking, staying home when sick, and physical distancing.

However, during late 2022, multiple high-income countries saw iGAS cases jump to rates several times higher than pre-pandemic levels.[4] They included the US,[5] France, Netherlands,[6] Sweden, Spain,[7] Northern Ireland, Australia,[8] and the UK[9]. There has also been an increase in other GAS infections (Figure 1), including several scarlet fever outbreaks in early childhood education centres and schools overseas.

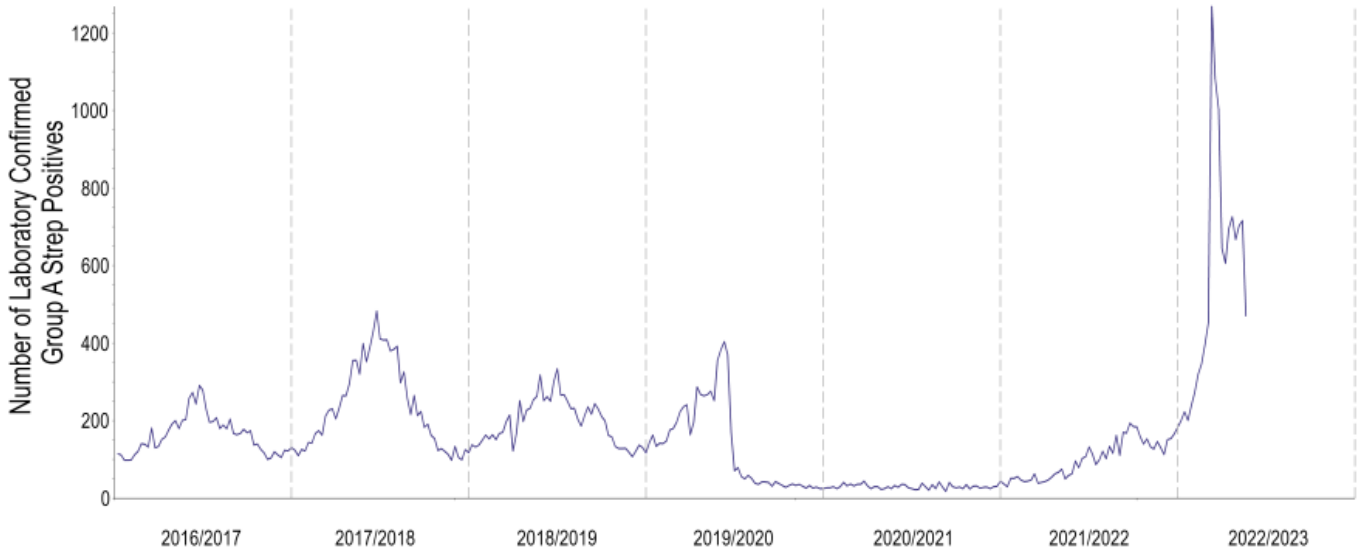

Figure 1. Number of laboratory reports of group A streptococcus (GAS), 2016/2017 to 12 February 2023, Scotland (Adapted from source: PHS-ECOSS)

iGAS in Aotearoa NZ

Invasive GAS is not currently a notifiable disease in NZ. As such, data on the epidemiology of infections is patchy. We do know from published laboratory-based studies that the incidence of iGAS more than doubled from about 4 infections per 100 000 people in 2002[10] to 9 per 100 000 in 2016.[11] The direct healthcare-associated costs of GAS-related disease in NZ have been estimated at almost 30 million NZD (2015 costs) per year.[12]

The burden of disease caused by GAS in NZ is not carried equally across the population; Māori and Pacific populations unfairly experience some of the highest rates in the world; between 4 and 7 times higher than NZ Europeans for GAS skin infections,[13] acute rheumatic fever,[14] and iGAS.[15] Infants and the elderly are at particularly high risk.[16] We provide a more detailed risk assessment as an appendix below.

NZ should make iGAS a notifiable disease

Notification supports the identification of iGAS cases, and any close contacts and associated bacterial isolates, so they can be managed, investigated, and reported to national health authorities in a timely manner. Australia made iGAS notifiable in July 2021[17,18] and iGAS is also notifiable in several other high-income countries including the United Kingdom and Canada. Notification is important as there is a public health response to each case (education and potential treatment of close contacts). Making iGAS notifiable would also support epidemiological surveillance by providing a more complete record of cases. In NZ, current surveillance is passive and relies on individual laboratories sending clinically relevant GAS isolates to the Institute of Environmental Science and Research (ESR) for further examination.

Mandatory reporting and genetic sequencing of iGAS-causing bacteria would help keep track of the strains circulating in the community and identify potential outbreaks. Recently Australia reported a new variant, $M1_{UK}$, circulating in their communities.[19] This variant was initially identified in the UK and has been linked to scarlet fever surges, and a marked

increase in invasive infections. It is likely this variant is also circulating in NZ.

Identifying cases needing control measures

Interventions aimed at cases are vital to decrease the impact of iGAS. The key measures are rapid recognition and effective treatment of cases and consideration of prophylactic treatment of close contacts. Penicillin is the drug of choice for treating both mild and severe GAS disease, while other treatments are recommended for selected cases of sepsis and toxic shock syndrome. Early recognition, diagnosis, and treatment can be lifesaving. Clinicians should be reminded that iGAS is an important cause of community-onset sepsis in Aotearoa New Zealand.

Implement population-level prevention measures

The NZ government has invested $10 million to facilitate the development of vaccine to prevent GAS-related diseases.[20] However, until a vaccine is available, the drop in cases from public health and social measures during the pandemic indicates that hand and respiratory hygiene and adequate indoor ventilation should be highlighted as important measures to consider for preventing spread of GAS and other respiratory viruses that often co-circulate with GAS. In addition, measures to reduce household crowding are also likely to be useful given this is a risk factor for rheumatic fever[21] and GAS skin infections.[22]

What's new in this article

- A number of countries have reported increasing incidence of invasive group A streptococcus (iGAS) and scarlet fever.
- To assist with surveillance and control iGAS is a notifiable condition in many countries.
- NZ needs to plan for an increase in iGAS but has limited surveillance and control measures in place.

Implications for public health

- NZ should make iGAS a notifiable disease to support effective control and surveillance.
- Clinicians should be reminded of the importance of early recognition and management of iGAS cases and their household contacts.

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Appendix

Risk assessment for iGAS

Transmissibility
GAS is highly infectious. NZ will likely see an increase in iGAS cases, as other high-income countries are experiencing. The lack of active surveillance combined with NZ's existing high rates of GAS-related diseases, put the NZ population at risk of iGAS outbreaks. GAS infection has been linked to the co-circulation of other respiratory viruses.

Severity
Most infected people carry the bacteria in the throat and nose, with some developing symptomatic sore throats, and skin infections. Invasive GAS infection is rare, but the rate appears to be increasing. Necrotizing fasciitis[23] and toxic shock syndrome are rare but particularly severe forms of iGAS— killing about 20–50% of patients.[24] In a recent Australian publication the case fatality risk for iGAS in children under 18 years of age was 2.7%.[17]

Controllability
There are known interventions, such as hand and respiratory hygiene that can reduce but not fully interrupt spread of GAS in households, classrooms, and communal settings. In a recent study of GAS transmissibility in UK schools, genome sequencing showed that there was rapid clonal spread within classes. It appears the bacteria is spread more through respiratory transmission than via surfaces.[25]

Certainty of knowledge
Virulence is relatively well-characterised, but there are still large gaps in knowledge about the pathophysiology of iGAS and risk factors for infection.[26]

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