

## Do not forget pregnant and post-partum women during group A streptococcal disease outbreaks



Group A streptococcal (GAS) infections typically affect young children, who develop tonsillitis or scarlet fever. Rarely, the infection can become severe, including pneumonia, toxic shock syndrome, or necrotising fasciitis.<sup>1,2</sup> The COVID-19 pandemic has been associated with reduced transmission of many infectious diseases, including GAS. However, with the easing of restrictions, these pathogens have re-emerged with higher seasonal and out-of-season incidence than before the COVID-19 pandemic.

In England, as elsewhere, GAS infections were rare during the first 2 years of the COVID-19 pandemic, but numbers began to rise in early 2022;<sup>1</sup> scarlet fever and invasive GAS cases increased rapidly and were associated with severe disease, hospitalisation, and death, especially in young children.<sup>3</sup> In the season from Sept 12, 2022, to Jan 8, 2023, there were 190 deaths, including 30 in children younger than 18 years, compared with 355 deaths overall and 27 deaths in children during the entire 2017–18 season in England.<sup>3</sup> This increase in deaths led to a national public health campaign in the UK to raise awareness of GAS (particularly among parents and clinicians), focusing on early antibiotic treatment for GAS tonsillitis and scarlet fever to reduce the risk of severe complications and prevent secondary transmission to contacts.<sup>4</sup>

Incidence is highest in young children, meaning recently pregnant mothers or pregnant mothers with other young children have increased exposure to GAS, which typically spreads through respiratory droplets and direct skin contact. The risk of secondary invasive GAS infection is elevated among close contacts of people with GAS, particularly for women in the post-partum period and neonates (attack rate 25 per 100 person-years at risk).<sup>5</sup> In pregnancy, invasive GAS has the potential to cause septic miscarriage, stillbirth, and preterm birth;<sup>6</sup> post-partum GAS (puerperal sepsis) can cause peritonitis, endometritis, and necrotising infections.<sup>7</sup> GAS can also cause cluster outbreaks in maternity and neonatal units.<sup>8</sup> Infected newborn babies can develop severe disease, which might lead to death or serious long-term sequelae.

In a US study, invasive GAS incidence was similar during pregnancy but significantly higher during the post-partum period (0.55 vs 0.02 per 1000 women) than in women who were not pregnant.<sup>7</sup> Only 23% of women in the post-partum period had an underlying condition, compared with 50% of women who were not pregnant, suggesting post-partum susceptibility.<sup>7</sup> However, during a national outbreak, the incidence can increase substantially, as in the Netherlands in 2018,<sup>9</sup> where detailed investigations concluded that contact with people with non-invasive GAS, including children and people in late pregnancy or in the post-partum period, increased the risk of puerperal GAS.<sup>9</sup>

In England, a review of maternal and neonatal invasive GAS infections in London and the southeast of England during 2010–16 identified 134 maternal cases, 116 (87%) of which occurred within 7 days, with 40 (30%) on the day of delivery.<sup>8</sup> The median onset time was 2 days (IQR 0–5) after delivery. The incidence within 28 days post partum was 109 (95% CI 90–127) per 100 000 person-years compared with 1.3 per 100 000 person-years in other women and girls aged 15–44 years.<sup>8</sup> Most maternal infections involved the genital (82 [61%] of 134) or urinary tract (four (3%) of 134) or a caesarean wound (two [1%] of 134); 40 (30%) had systemic infection, including three with septic shock. In total, ten (7%) of 134 infants whose mothers had invasive GAS developed GAS infection, including two with invasive GAS (1%). Overall, 21 neonatal invasive GAS infections were confirmed (incidence 1.5 [95% CI 0.9–2.3] per 100 000 person-years); of these, the mothers of 16 (76%) were clinically well, three (14%) had GAS, and two (10%) had invasive GAS.<sup>8</sup>

UK public health guidelines include pregnant women from 37 weeks of gestation or within 28 days of delivery and neonates among those requiring antibiotic prophylaxis after GAS exposure (defined as prolonged contact in a household-type setting during the 7 days before symptom onset until 24 h after initiating antibiotics in the index case).<sup>10</sup>

Although children remain the primary focus of antibiotic treatment, clinicians should enquire about close contacts and offer antibiotic prophylaxis to those

Lancet Microbe 2023

Published Online  
March 9, 2023  
[https://doi.org/10.1016/S2666-5247\(23\)00064-2](https://doi.org/10.1016/S2666-5247(23)00064-2)

considered at high risk of infection, including women who are pregnant or in the post-partum period and neonates.<sup>10</sup> Reassuringly, the London and southeast of England audit found that 110 (91%) of 122 eligible neonates of mothers with invasive GAS had received antibiotic chemoprophylaxis.<sup>8</sup> Similarly, 15 of 16 eligible asymptomatic mothers of neonates with confirmed invasive GAS received antibiotic chemoprophylaxis.<sup>8</sup>

Pregnant women should be encouraged to have routine antenatal immunisations and ensure that their children have up-to-date routine immunisations, especially the influenza vaccine, since GAS infections often occur after primary viral illnesses. Obstetricians and midwives should be aware of invasive GAS and its complications, including toxic shock syndrome and necrotising fasciitis, in women who are unwell and pregnant or in the post-partum period with suspected sepsis, because early antibiotics and supportive management might be lifesaving.

New mothers should be advised to seek medical help early if they, or their baby, become unwell, especially with GAS symptoms. So far, no severe or fatal invasive GAS infections have been reported in women who are pregnant or in the post-partum period or neonates in the UK.

We declare no competing interests.

Copyright © 2023 The Author(s). Published by Elsevier Ltd. This is an Open Access article under the CC BY-NC-ND 4.0 license.

\*Asma Khalil, Athina Samara, Pat O'Brien,  
Shamez N Ladhani  
akhalil@sgul.ac.uk

Fetal Medicine Unit, St George's Hospital (AK), Vascular Biology Research Centre, Molecular and Clinical Sciences Research Institute (AK), and Paediatric Infectious Diseases Research Group and Vaccine Institute, Institute of Infection and

Immunity (SNL), St George's University of London, London, SW17 0QT, UK; Department of Women's and Children's Health, Karolinska Institutet, Stockholm, Sweden (AS); Astrid Lindgren Children's Hospital, Karolinska University Hospital, Stockholm, Sweden (AS); FUTURE, Center for functional tissue reconstruction, University of Oslo, Oslo, Norway (AS); Department of Biomaterials, The Royal College of Obstetricians and Gynaecologists, London, UK (PO); Department of Women's Health, University College London Hospitals NHS Foundation Trust, London, UK (PO); Immunisation and Countermeasures Division, Public Health England, London, UK (SNL)

- 1 WHO. Increase in invasive group A streptococcal infections among children in Europe, including fatalities. Dec 12, 2022. <https://www.who.int/europe/news/item/12-12-2022-increase-in-invasive-group-a-streptococcal-infections-among-children-in-europe--including-fatalities> (accessed Jan 10, 2023).
- 2 Wise J. Strep A: GPs are put on alert as cases and deaths rise. *BMJ* 2022; **379**: o2941.
- 3 UK Health Security Agency. Group A streptococcal infections: sixth update on seasonal activity in England. Jan 19, 2023. <https://www.gov.uk/government/publications/group-a-streptococcal-infections-activity-during-the-2022-to-2023-season/group-a-streptococcal-infections-sixth-update-on-seasonal-activity-in-england> (accessed Jan 20, 2023).
- 4 Ladhani SN, Guy R, Bhopal SS, Brown CS, Lamagni T, Sharp A. Paediatric group A streptococcal disease in England from October to December, 2022. *Lancet Child Adolesc Health* 2023; **7**: e2-4.
- 5 Mearkle R, Saavedra-Campos M, Lamagni T, et al. Household transmission of invasive group A streptococcus infections in England: a population-based study, 2009, 2011 to 2013. *Euro Surveill* 2017; **22**: 30532.
- 6 Lawn JE, Bianchi-Jassir F, Russell NJ, et al. Group B streptococcal disease worldwide for pregnant women, stillbirths, and children: why, what, and how to undertake estimates? *Clin Infect Dis* 2017; **65** (suppl 2): S89-99.
- 7 Deutscher M, Lewis M, Zell ER, Taylor TH Jr, Van Beneden C, Schrag S. Incidence and severity of invasive *Streptococcus pneumoniae*, group A streptococcus, and group B streptococcus infections among pregnant and postpartum women. *Clin Infect Dis* 2011; **53**: 114-23.
- 8 Leonard A, Wright A, Saavedra-Campos M, et al. Severe group A streptococcal infections in mothers and their newborns in London and the South East, 2010-2016: assessment of risk and audit of public health management. *BJOG* 2019; **126**: 44-53.
- 9 van den Boogaard J, Hahné SJ, Te Wierik MJ, Knol MJ, Balasegaram S, de Gier B. Out-of-season increase of puerperal fever with group A streptococcus infection: a case-control study, Netherlands, July to August 2018. *Euro Surveill* 2020; **25**: 1900589.
- 10 UK National Health Service. Group A streptococcus interim clinical guidance. Jan 4, 2023. <https://www.england.nhs.uk/publication/group-a-streptococcus-communications-to-clinicians/> (accessed Jan 15, 2023).