

6 MYCOLOGY**a Outbreaks of neonatal candidaemia detected through NICD surveillance at a single tertiary healthcare institution, 2014-2016**

Cases of candidaemia are monitored through NICD/GERMS-SA active, laboratory-based surveillance at a number of sentinel sites across South Africa. Candidaemia is defined as a blood specimen from which *Candida* species is cultured; multiple isolates cultured within 30 days of the first positive specimen are included within a single case. Confirmation of isolate identification to species-level and antifungal susceptibility is performed at NICD's Centre for Opportunistic, Tropical and Hospital Infections.

Over the past two years (January 2014 through February 2016), a total of 255 cases of candidaemia was detected at Hospital A, a sentinel surveillance site in the GERMS-SA programme. Amongst these 255 cases, 180 cases (71%) occurred in the neonatal intensive care unit (NICU). Seven different species of *Candida* were identified; the most common species was *Candida krusei* (90/180; 50%), followed by *Candida albicans* (44/180; 24.4%) and *Candida glabrata* (20/180; 11.1%) (Figure 7).

At least three outbreaks of candidaemia were detected in Hospital A's NICU since July 2014. The first of these was due to *C. krusei*. A total of 48 cases of candidaemia was detected over a four-month period, July through October 2014. A formal outbreak investigation, including an infection prevention and control (IPC) audit, was performed. Hand hygiene practices, knowledge and perceptions were assessed using a standardised World Health Organization tool¹. Targeted environmental sampling was also performed; however, *C. krusei* was not isolated from the environment. Staff shortages, overcrowding of the ward, poor ventilation and periods of interrupted water supply were among the main problems identified in the observational audit. Healthcare workers had 76% compliance with hand hygiene practices. Although the source of the outbreak could not definitively be established, we hypothesised that person-to-person transmission likely occurred, influenced by sub-optimal IPC practices in the NICU.

From April 2015 through July 2015, another outbreak due to *C. krusei* occurred, with 41 identified cases. Focus on IPC was re-emphasised and measures to improve the staff-to-patient ratio and to minimise overcrowding were instituted.

In February 2016, seven cases of candidaemia due to *Candida (Cyberlindnera) fabianii*, an uncommon species detected for the first time since the start of surveillance at Hospital A, were detected. As these seven cases were caused by a rare pathogen clustered in the NICU of Hospital A over a short time period, this again constitutes an outbreak. IPC practices have been intensified to prevent further cases and the NICD is currently working with the hospital and provincial department of health to initiate a formal outbreak investigation.

Candida bloodstream infections result in long-term morbidity and mortality among hospitalised patients. *C. albicans*, *C. parapsilosis*, *C. glabrata*, *C. tropicalis* and *C. krusei* are the most common species implicated in bloodstream infections. Known risk factors for candidaemia include very low birth weight, gestational age of less than 30 weeks, necrotizing enterocolitis (NEC), central venous catheter use, parenteral nutrition, prior antibiotic use and mechanical ventilation. In several outbreaks of neonatal candidaemia, often caused by *C. parapsilosis*, the outbreak was presumed to be propagated person-to-person owing to inadequate IPC measures. Healthcare associated infections (HAIs) such as candidaemia are largely preventable and affect vulnerable populations already compromised by underlying illness. Outbreaks of HAIs should be promptly investigated to identify the cause, mode of transmission and propagating factors, in order to reduce unnecessary morbidity, mortality and costs.

Well-functioning disease surveillance systems have the ability to detect outbreaks and set in motion the necessary steps to contain outbreaks and perform formal outbreak investigations. Continued focus on hand hygiene and innovative measures to encourage compliance with IPC should be emphasised to prevent and control HAIs.

Reference

1. World Health Organization (WHO) hand hygiene observation tool (Available from http://www.who.int/gpsc/5may/tools/evaluation_feedback/en/)

Source: Centre for Opportunistic, Tropical and Hospital Infections, NICD-NHLS (neleshg@nicd.ac.za)

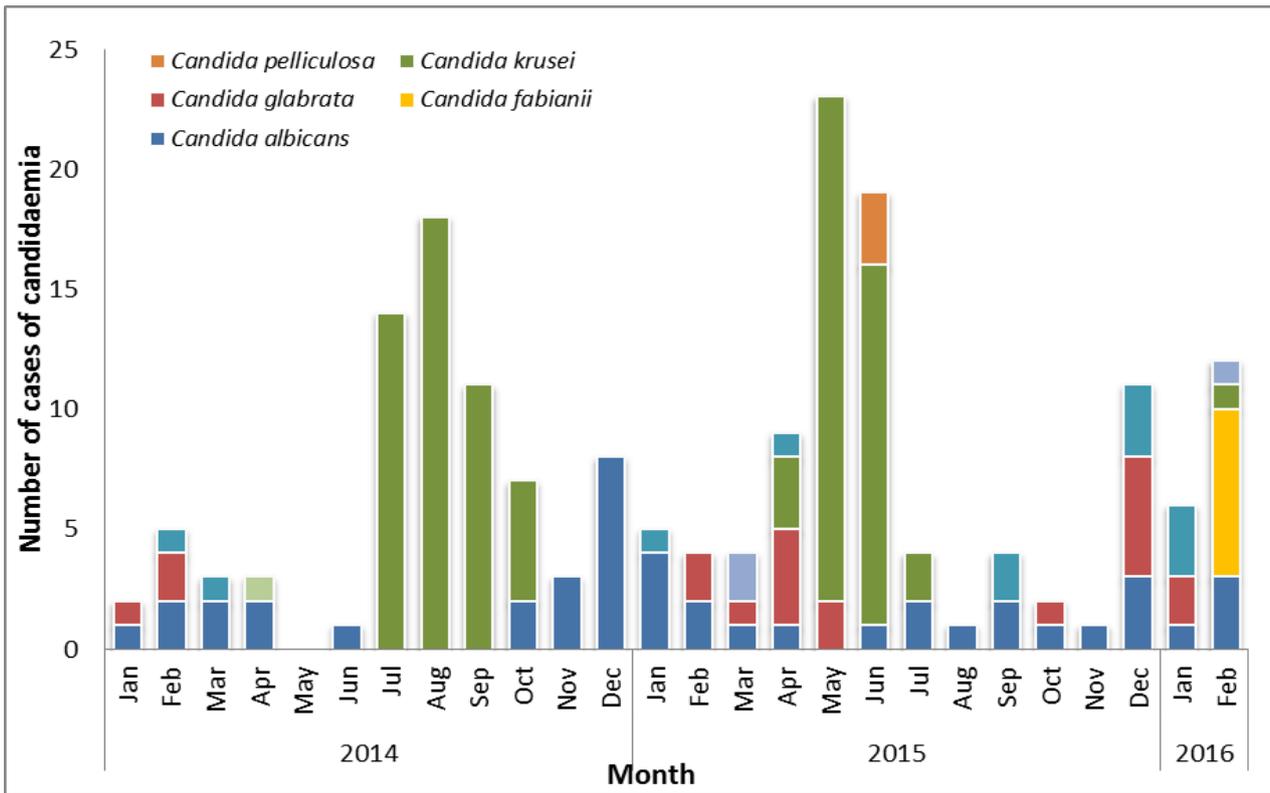


Figure 7: Number of cases of candidaemia (n=180) by *Candida* species at a local tertiary hospital Neonatal Intensive Care Unit, January 2014 to February 2016.