Health-care-associated infection surveillance in India

See Articles page e1317

Health-care-associated infections (HAIs) are the infections acquired while patients receive treatment for medical or surgical conditions. HAIs are among the most common complications occurring during the health service delivery, often caused by endemic multidrug-resistant organisms on account of indiscriminate use of antibiotics.[1] HAIs are associated with increased morbidity and mortality, prolonged hospital stays, and health-care costs. Surveillance for endemic HAIs is important to measure their burden, identify high-risk populations and procedures, and guide efforts to reduce HAI incidence. HAI surveillance is a core component of infection prevention and control programmes worldwide. The reliability of HAI surveillance depends on the use of standardised definitions. The case definitions used in National Healthcare Safety Network (NHSN) or European Centre for Disease Prevention and Control (ECDC) HAI surveillance are complex, requiring dedicated human resources and funds and expertise in diagnostics, epidemiology, and infection control. Probably on account of this, only 16% of low-income and middle-income countries (LMICs) in 2010 had HAI surveillance at the national and sub-national level.[2]

The frequency of different HAIs varies between countries and according to economic conditions. The risk of acquiring HAI is up to 20 times higher in LMICs.[1] Surveillance from an International Nosocomial Infection Control Consortium comprising 45 LMICs, reported three to six times high pooled rates of catheter-associated urinary tract infection (CAUTI) and central line-associated bloodstream infections (CLABSI) compared with intensive care units (ICUs) in the USA.[3] Surveillance data from 2004 to 2013 from 40 hospitals in India reported a pooled prevalence of CLABSI to be 5·1 per 1000 central line days and of CAUTI to be 2·1 per 1000 catheter days.[4] A 2019, single-centre study in India reported a pooled CLABSI rate of 4·3 per 1000 central line days.[5] In a global survey, the prevalence of resistance to antibiotics including third-generation cephalosporins and carbapenems among Enterobacteriaceae, was significantly higher in LMICs.[6] High levels of resistance, including against carbapenems among *Acinetobacter* spp, *Pseudomonas* spp, and *Klebsiella* spp have been reported from India.[7]

In *The Lancet Global Health*, Purva Mathur and colleagues[8] report results of health-care-associated bloodstream and urinary tract infections in 89 intensive care units of 26 tertiary care hospitals in India.[8] The authors modified the NHSN and ECDC case definitions to facilitate standardised HAI surveillance, adjusting for the available resources in Indian hospitals. In adult and paediatric ICU types, the pooled rates of BSI ranged between 5·3–7·3 per 1000 patient days and CLABSI rates ranged between 8·3–12·1 per 1000 central line days. The pooled UTI and CAUTI rates in these ICUs ranged between 1·7–2·8 per 1000 patient days and 8·3–12·1 per 1000 catheter days, respectively. Neonatal ICUs had higher pooled BSI and CLABSI rates in all birthweight categories. The authors also report high levels of resistance to at least one carbapenem in HAIs caused by *Klebsiella* spp, *Escherichia coli*, *Acinetobacter* spp, and *Pseudomonas* spp. The rates of HAI and associated antibiotic resistance reported in this study are either similar to or higher than those from previous studies in India.

The HAI surveillance established by Mathur and colleagues[8] represents a well laid foundation that needs to be continued and expanded further as a national-level surveillance system for major HAI, including ventilator-associated pneumonia and surgical site infection. However, the modified case definitions used in the study need to be validated before its large-scale implementation. This platform will also enable early detection and containment of outbreaks caused by novel or emerging infectious diseases and multidrug resistant organisms. The antimicrobial resistance data will inform local, regional, and national antimicrobial resistance stewardship strategies and initiatives. Linkage to other global HAI or antimicrobial resistance surveillance platforms, such as the Global Antimicrobial Resistance and Use Surveillance System, will enable learning and sharing of the best practices of infection prevention and control.

In India, a large segment of the population seeks in-patient health-care at secondary or district-level health facilities in public and private sectors, many of which have inadequate infection prevention and control measures. The major barriers to infection prevention and control implementation are scarcity of dedicated and trained staff, availability and inappropriate use of PPE, and sanitary and hygiene measures, compounded

with patient overcrowding. The widespread transmission of infection in health facilities during the ongoing COVID-19 pandemic underscores the need for strengthening infection prevention and control practices.

In the past decade, there have been governmental initiatives, such as Kayakalp, aimed at improving and promoting the cleanliness, hygiene, waste management, and infection control practices in public health-care facilities in India.[9] Although it is desirable that the national HAI surveillance system is eventually extended to district-level hospitals, the immediate priority should be to ensure that the minimum requirements of infection prevention and control are in place in these hospitals.[10] The eventual outcomes of implementing evidence-based, best infection prevention and control practices will be a substantial reduction in HAIs and an improvement in the overall health-care quality.

We declare no competing interests.

*Manoj V Murhekar, CP Girish Kumar
mmurhekar@gmail.com

Indian Council of Medical Research—National Institute of Epidemiology, Chennai 600 077, India

1 WHO. Global report on infection prevention and control. Geneva: World Health Organization, 2022.
2 WHO. Report on the burden of endemic health care-associated infection worldwide. Geneva: World Health Organization, 2011.
3 Rosenthal VD, Bat-Erdene I, Gupta D, et al. International Nosocomial Infection Control Consortium (INICC) report, data summary of 45 countries for 2012–2017: device-associated module. *Am J Infect Control* 2020; **48:** 423–32.
4 Allegranzi B, Bagheri Nejad S, Combescure C, et al. Burden of endemic health-care-associated infection in developing countries: systematic review and meta-analysis. *Lancet* 2011; **377:** 228–41.
5 Singhal T, Shah S, Thakkar P, Naik R. The incidence, aetiology and antimicrobial susceptibility of central line-associated bloodstream infections in intensive care unit patients at a private tertiary care hospital in Mumbai, India. *Indian J Med Microbiol* 2019; **37:** 521–26.
6 WHO. Antimicrobial resistance: global report on surveillance. Geneva: World Health Organization, 2014.
7 Gandra S, Mojica N, Klein EY, et al. Trends in antibiotic resistance among major bacterial pathogens isolated from blood cultures tested at a large private laboratory network in India, 2008–2014. *Int J Infect Dis* 2016; **50:** 75–82.
8 Mathur P, Malpiedi P, Walia K, et al. Health-care-associated bloodstream and urinary tract infections in a network of hospitals in India: a multicentre, hospital-based, prospective surveillance study. *Lancet Glob Health* 2022; **10:** e1317–25.
9 Ministry of Health and Family Welfare. Guidelines for implementation of "kayakalp" initiative. New Delhi: Ministry of Health And Family Welfare, Government of India, 2018.
10 WHO. Minimum requirements for infection prevention and control programmes. Geneva: World Health Organization, 2019.