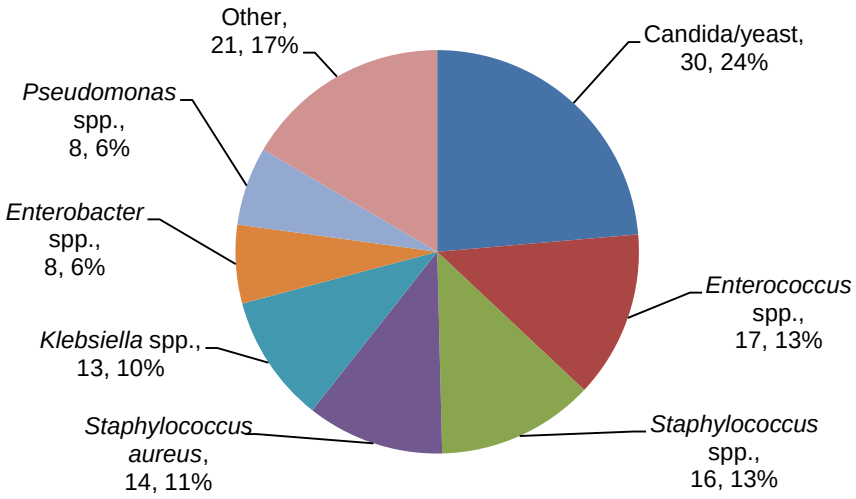
Central Line-Associated Bloodstream Infection (CLABSI)

Agent: Bacteria, virus, or fungus
Mode of transmission: A CLABSI is a central line-associated bloodstream infection. A central line is a flexible tube that is inserted near the patient's heart or into one of the large veins or arteries that can be used to give fluids or medications or measure the amount of fluid in the body. Because a central line is located in a blood vessel, any introduction of an infectious agent during central line insertion, maintenance, or removal may lead to a bloodstream infection.
Signs/symptoms: A positive blood culture and fever, chills, low blood pressure, and/or redness or tenderness at the central line insertion site. For patients less than one year of age, symptoms may also include fever, hypothermia, apnea (suspension of breathing), and/or bradycardia (slow heart rate).
Prevention: To prevent CLABSIs, healthcare providers should follow CDC infection prevention guidelines, including removal of unnecessary central lines and compliance with recommended practices for hand hygiene, central line insertion, and central line maintenance.
Other important information: Hospitals are required to provide information on CLABSIs occurring in adult intensive care units to the Virginia Department of Health (VDH) via the Centers for Disease Control and Prevention's online surveillance system, the National Healthcare Safety Network (NHSN). Hospitals have reported these data since July 2008. In 2014, 78 hospitals reported CLABSI data to VDH. Reports of hospital-specific CLABSI data are available from the VDH Healthcare-Associated Infections Program upon request.

In 2014, 127 central line-associated bloodstream infections occurred among 195,716 central line days in Virginia hospital adult intensive care units (ICUs), yielding a standardized infection ratio (SIR) of 0.34. When compared with the U.S. reference value of 1, the SIR value of 0.34 indicates that 66% fewer CLABSIs were observed in Virginia adult ICUs than were predicted based on the experience of adult ICUs in United States hospitals during the baseline period (2006-2008). The 2014 SIR value of 0.34 in 2014 is less than the 0.52 SIR value observed in 2013, in which there were 183 CLABSIs among 187,156 central line days. Unlike past years, where nearly one-third of persons with CLABSI died, during 2014, approximately one in four persons with CLABSI died (27%, 34 fatalities), and the infection was noted as contributing to the death in 11 (32%) of the fatalities.

Figure 7. Proportion of Central Line-Associated Bloodstream Infections by Primary Pathogen Identified, Virginia, 2014



The mean age of persons with CLABSI in 2014 was 61 years (range: 24-91 years) and 53% of CLABSI cases occurred in males. The largest proportion of CLABSIs occurred in medical/surgical intensive care units (24%), followed by cardiothoracic intensive care units (18%), cardiac and medical intensive care units (15% each), and surgical intensive care units (14%). Multiple pathogens can be present in a CLABSI. However, the pathogen of greatest interest is the primary pathogen, the one noted as being the most responsible for causing the infection. In 2014, seven primary pathogens were responsible for 83% of all CLABSIs. They included Candida/yeast, *Enterococcus* species, *Staphylococcus* species (excluding *S. aureus), Staphylococcus aureus*, *Klebsiella* species, *Enterobacter* species, and *Pseudomonas* species (Figure 7). Other primary pathogens that caused multiple CLABSIs included bacteria such as *E. coli* (7 cases), *Serratia* species (5 cases), and *Clostridium* species and *Stenotrophomonas* species (2 cases, respectively).

In 2014, 50% of *S. aureus* CLABSIs were methicillin-resistant (MRSA) and 29% of *Enterococcus* species CLABSIs were vancomycin-resistant (VRE). Compared to the prior year, the percentage of *S. aureus* CLABSIs in 2014 that were methicillin-resistant increased (32% in 2013) while the percentage of vancomycin-resistant *Enterococcus* CLABSIs decreased (54% in 2013). Of the 8 CLABSIs where the primary pathogen was identified as *Klebsiella pneumoniae*, one (13%) was carbapenem-resistant. A total of nine carbapenem-resistant *K. pneumoniae* CLABSIs and zero carbapenem-resistant *E. coli* CLABSIs have been reported to VDH through NHSN since CLABSI reporting began in July 2008.