

Staphylococcal Invasive Disease (MRSA)

Methicillin-resistant Staphylococcus aureus (MRSA) invasive disease is a reportable form of staphylococcal infection. This is a Class C Disease and must be reported to the state within five business days.

Staphylococcus aureus is a bacterium that causes a wide variety of localized and invasive infections as well as three toxin-mediated syndromes including food poisoning. In addition to the myriad of ways this bacteria manifests itself in disease, staphylococcus is extremely prevalent in the general population; about 30% of all healthy adults and children are colonized, usually in the nose. A colonized person is not infected with the bacteria but is carrying the bacteria. Methicillin-resistant strains of *S. aureus* (MRSA) are responsible for many hospital-acquired infections and community-associated infections. Every year, some staphylococcal infections result in death.

Due to the concern about antibiotic resistance in micro-organisms and the prevalence of staphylococcal infections, many requests for information about these organisms are addressed by the Louisiana Office of Public Health (OPH) - Infectious Disease Epidemiology Section (IDEpi).

Colonization by MRSA

Surveys carried in different populations not connected with health care settings have shown prevalence of colonization ranging from 1% to 6%. A prevalence study was carried out by OPH in Louisiana in 2004; a sample of 400 individuals from offices workers, college students and parents at well-baby clinics was selected. These individuals had no connection with health care settings (no recent or chronic disease, no family members with frequent contacts with medical care). Among this sample only **1% was found to be colonized with MRSA.**

MRSA infections

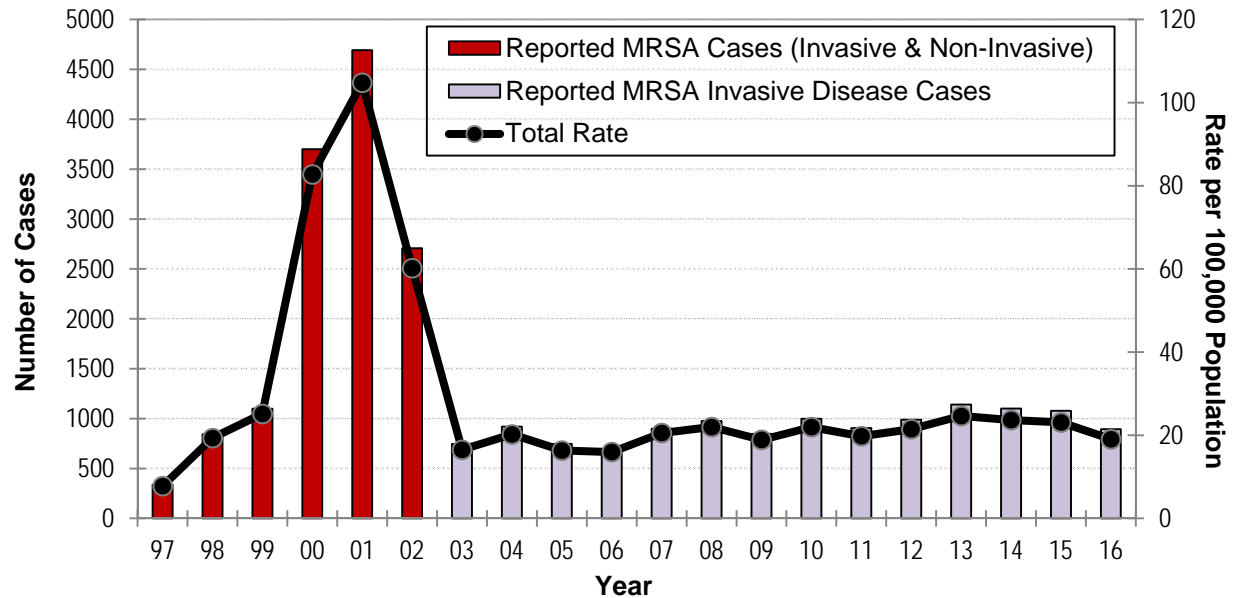
The actual incidence of hospital or community-associated MRSA infections cannot be accurately determined.

In 1998, MRSA infections became reportable to the OPH. Cases were reported mostly from hospitals among in- and out-patients. The numbers increased from 860 in 1998 to almost 5,000 in 2001. At that time it became obvious that MRSA infections were so frequent that reporting had become widely inaccurate. Reporting was then limited to 'invasive' MRSA infections (i.e. MRSA isolated from sterile sites, excluding MRSA skin infections and abscesses).

Blood and CSF are the most common sites for invasive MRSA infections. The number of invasive cases increased in 2003; this was the year the reporting criteria changed. Before 2003, approximately 400 cases of invasive MRSA were reported. After 2003, the numbers increased and have remained between 700 and 1200 cases. This sudden increase is most certainly an artifact. Hospitals that had many cases of MRSA (invasive and non-invasive) had stopped reporting. Restricting the reporting to invasive disease convinced these hospitals to start reporting again (Figure 1). It should be noted that Figure 1 gives the appearance that the total number of MRSA cases has decreased; however, this is due to the change in reporting which

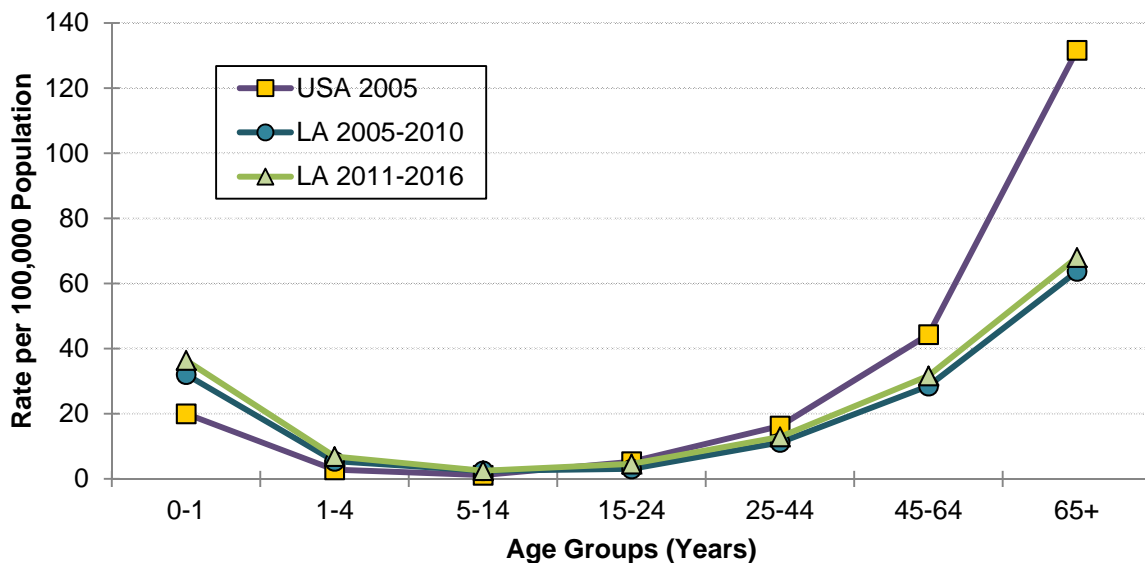
only requires the reporting of invasive disease cases. The number of non-invasive MRSA cases is not captured in this data from 2003 onwards.

Figure 1: Number of MRSA Invasive Diseases – Louisiana, 1999-2016



The age group distribution shows two peaks of incidence: one in the infants younger than one-year of age, then a progressive increase with age to reach a peak among the elderly older than 65-years of age. Comparison between the rates observed in Louisiana for the periods 2005 to 2010 and 2011 to 2016, and the U.S. estimates based on the Active Bacterial Core (ABC) program (*Klevens RM 2007. Invasive MRSA infections in the USA. JAMA 298 (15): 1763*) is presented in Figure 2.

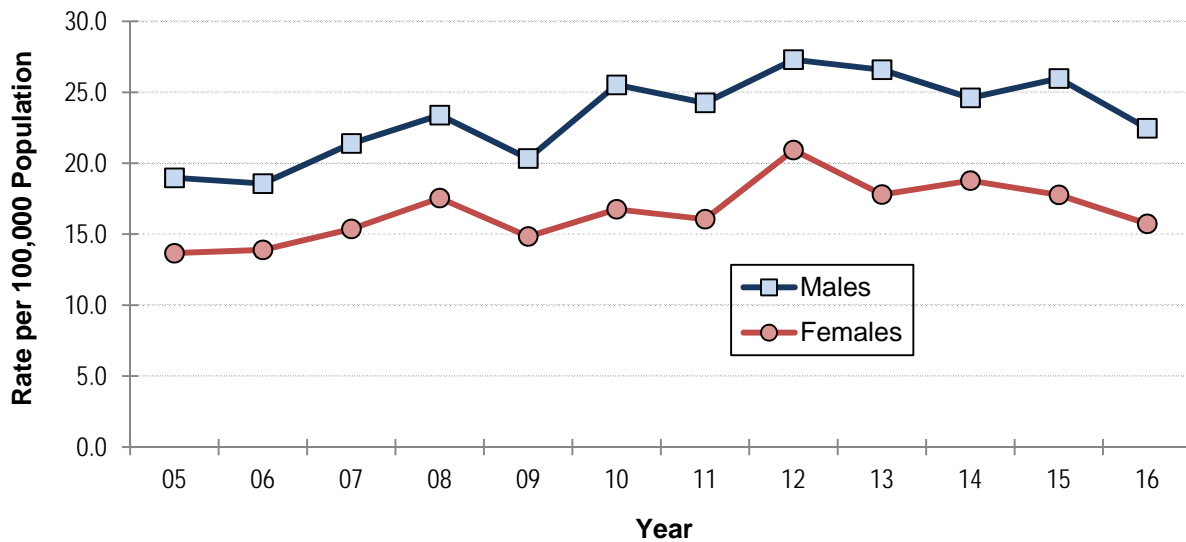
Figure 2: Age group distribution of cases – Louisiana and United States, 2005-2016



The distribution pattern is similar. The overall incidence for Louisiana was 19.1 per 100,000 population in 2016. The passive surveillance used in Louisiana is much less labor intensive than the one used in the ABC program.

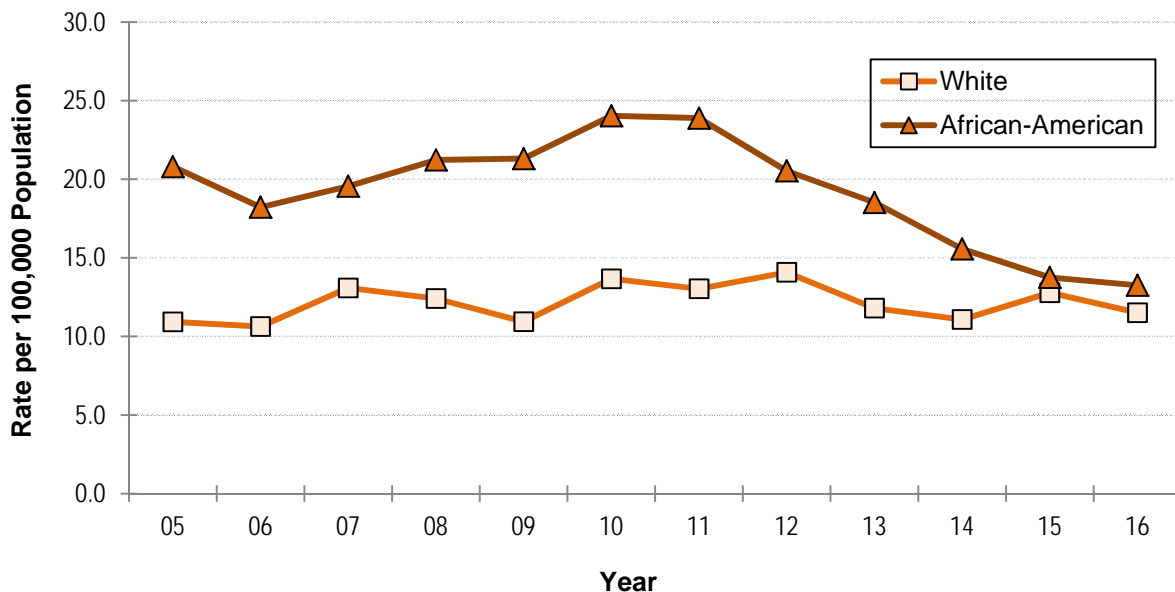
Gender distribution shows that both genders follow the same trend from year to year, but males have a higher overall rate (Figure 3).

Figure 3: Gender Distribution of MRSA – Louisiana, 2005-2016



Race distribution shows African-Americans with higher rates of MRSA for all years. Both races follow the same general trend over the years (Figure 4).

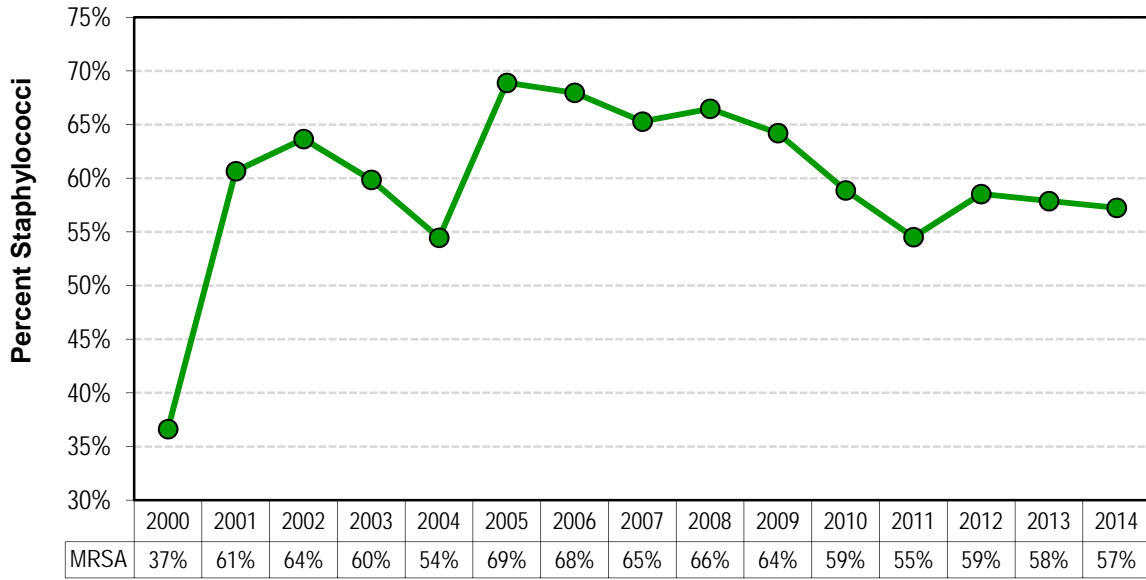
Figure 4: Race Distribution of MRSA - Louisiana, 2005-2016



MRSA Infections in Healthcare

In the past 30 years, MRSA has progressively become more and more common in health care facilities. Currently, MRSA is the predominant strain of *Staphylococcus aureus* isolated among hospital patients and among staphylococcal hospital acquired infections (Figure 5).

Figure 5: Proportion of MRSA among Staphylococci isolated in hospitals - Louisiana, 2000-2014



Risk factors for infection with MRSA in health-care settings include prolonged hospital stay, exposure to multiple or prolonged broad-spectrum antimicrobial therapy, stay in an intensive care or burn unit, proximity to patients colonized or infected with MRSA, use of invasive devices, surgical procedures, underlying illnesses and MRSA nasal carriage.