

Original Contributions

Outbreak of bacterial endocarditis associated with an oral surgery practice

New Jersey public health surveillance, 2013 to 2014

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ABSTRACT

Background. In October 2014, the New Jersey Department of Health received reports of 3 patients who developed *Enterococcus faecalis* endocarditis after undergoing surgical procedures at the same oral surgery practice in New Jersey. Bacterial endocarditis is an uncommon but life-threatening condition; 3 patients with enterococcal endocarditis associated with a single oral surgery practice is unusual. An investigation was initiated because of the potential ongoing public health risk.

Methods. Public health officials conducted retrospective surveillance to identify additional patients with endocarditis associated with the practice. They interviewed patients using a standardized questionnaire. An investigative public health team inspected the office environment, interviewed staff, and reviewed medical records.

Results. Public health officials identified 15 confirmed patients with enterococcal endocarditis of those patients who underwent procedures from December 2012 through August 2014. Among these patients, 12 (80%) underwent cardiac surgery. One (7%) patient died from complications of endocarditis and subsequent cardiac surgery. Breaches of recommended infection prevention practices were identified that might have resulted in transmission of enterococci during the administration of intravenous sedation, including failure to perform hand hygiene and failure to maintain aseptic technique when performing procedures and handling medications.

Conclusions. This investigation highlights the importance of adhering to infection prevention recommendations in dental care settings. No additional patients with endocarditis were identified after infection prevention and control recommendations were implemented.

Practical Implications. Infection prevention training should be emphasized at all levels of professional dental training. All dental health care personnel establishing intravenous treatment and administering intravenous medications should be trained in safe injection practices.

Key Words. Endocarditis; *Enterococcus faecalis*; health care—associated outbreak; infection control; injection safety.

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Bacterial endocarditis is an uncommon but life-threatening condition¹ that occurs when bacteria in the bloodstream colonize and infect heart valves or the endocardium.² Bacteria can enter the bloodstream through direct portals (for example, central venous catheters) or from infections at various anatomic locations (for example, skin and soft tissue, oral cavity, gastrointestinal tract, and urinary tract).³ In certain cases, bacterial endocarditis progresses slowly over months and can cause generalized symptoms, making the infection difficult to diagnose in some instances.³

Enterococci are part of the normal intestinal flora of humans and animals.³ The genus *Enterococcus* consists of 35 recognized species; one of the most common species cultured from humans is *Enterococcus faecalis*.^{3,4} Enterococci are a frequent cause of health care—associated infections. In US hospitals, enterococci are the second most common organism recovered from catheter-associated infections of the bloodstream and urinary tract, and from skin and soft-tissue infections.^{5,6} The bacteria are hardy and can survive for substantial periods on environmental surfaces, contributing to

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their transmission.^{3,7} Enterococci are usually spread by direct contact with hands, environmental surfaces, and medical equipment that have been contaminated by an infected or colonized person.⁸

The incidence rate of all patients with infective endocarditis in the United States is estimated to be 15 in 100,000 people per year; enterococci account for 5% to 15% of patients with endocarditis.^{9,10} Therefore, an expected incidence rate of enterococcal endocarditis would be 1.5 patients per 100,000 per year; the number of patients with *E. faecalis* endocarditis would be even fewer. Enterococcal endocarditis is usually associated with gastrointestinal or genitourinary disease or invasive procedures involving these systems. Patients often have underlying medical conditions (for example, indwelling vascular or urinary catheters, active gastrointestinal or genitourinary disease, cancer, or receipt of dialysis).^{9,11} Although *E. faecalis* has been implicated in endodontic infections, the organism is not a usual component of oral flora.^{12,13}

In October 2014, in accordance with the New Jersey Department of Health (NJDOH) communicable disease reporting regulations, a New Jersey (NJ) infectious disease physician notified the NJDOH Communicable Disease Service of a suspected health care–associated outbreak. Two people with no known risk factors received a diagnosis of *E. faecalis* endocarditis in October 2014 after undergoing oral surgical procedures at the same oral surgery practice in NJ in May and June 2014, respectively. NJDOH officials contacted representatives of the NJ Board of Dentistry (NJBOD), which regulates the practice of dentistry in the state, and investigators learned that NJBOD received an additional report of endocarditis associated with the same practice. The third patient had undergone an oral surgical procedure in December 2012 and received a diagnosis of *E. faecalis* endocarditis in January 2013.

Reports of these 3 patients prompted NJDOH to begin a public health investigation in conjunction with the local health department.

METHODS

Our investigation included assessing infection prevention practices and conducting surveillance to identify additional patients with enterococcal endocarditis of the patients treated at the oral surgery practice.

Infection control assessment: facility inspection and staff interviews

A multidisciplinary investigative team of medical and public health professionals was assembled, representing the local health department, NJDOH Communicable Disease Service, and the NJ Division of Consumer Affairs, representing NJBOD. Our team conducted 2 unannounced office inspections and environmental assessments in November 2014 and January 2015 that included inspecting medication and medical supply storage, medication preparation, and patient treatment areas; interviewing staff members about infection prevention practices; reviewing medical records and office documents; and examining regulated medical waste handling. We observed patient procedures and infection prevention practices during the initial site visit. We assessed infection prevention practices during the second site visit by observing staff members conducting mock procedures.

Surveillance: case finding, medical chart reviews, and patient interviews

To find additional patients with bacterial endocarditis, appointment records were initially obtained from the oral surgery practice to identify all patients who had visited the practice from January 1, 2013, through December 31, 2014. We chose this timeframe to include the calendar year of the site visit and the prior year. Appointment records before January 1, 2013, were unavailable.

Data from the NJ Discharge Data Collection System (NJDDCS), the state's electronic database for inpatient hospitalizations and emergency department visits, were matched with the appointment records by personally identifiable information (that is, name and date of birth) using a statistical software program (SAS 9.3, SAS). We identified patients of the oral surgery practice who were evaluated in an emergency department or hospitalized in NJ from January 1, 2013, through June 30, 2015. We chose this timeframe to capture any patients with procedure dates in 2014 who might not have developed symptoms until 2015.

We limited the list of patients generated by this matching process by selecting specific *International Classification of Diseases, Ninth Revision* (ICD-9)¹⁴ diagnostic billing codes used for the health care encounters that were possible indicators of an enterococcal infection or endocarditis. We

ABBREVIATION KEY

CDC:	Centers for Disease Control and Prevention.
ICD-9:	International Classification of Diseases, Ninth Revision.
NJ:	New Jersey.
NJBOD:	New Jersey Board of Dentistry.
NJDDCS:	New Jersey Discharge Data Collection System.
NJDOH:	New Jersey Department of Health.

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