

# INVESTIGATING ELECTROCARDIOGRAPHY LEAD WIRES AS A RESERVOIR FOR ANTIBIOTIC-RESISTANT PATHOGENS



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## BACKGROUND

Nosocomial infections are by far one of the foremost threats to the healthcare system today, leading to increasing health-care costs, increased morbidity and mortality for the patients who acquire them, as well as being one of the principal factors contributing to the multi-drug resistant strain of pathogens which are currently on the rise (Table 1).<sup>1</sup> Steps of limiting the spread of infection have been under way for some time now, including proper hand washing techniques, using stronger cleansers and restricting potential carriers of infection. One thing that these measures may have overlooked as a source of drug-resistant bacteria is reusable electrocardiography wire. Bedside ECG lead wires have the potential to harbor organisms, leading to serious nosocomial infections in hospitalized patients.<sup>2,3</sup> This study investigates ECG lead wires as a reservoir for pathogens that are resistant to antibiotics.

TABLE 1. NOSOCOMIAL INFECTIONS AND ASSOCIATED "COSTS"

Attributable Mortality	4.31%
Mean Extension of Hospital Stay	9.5 days
Mean Cost of Excess Charges	\$38,656
Deaths	90,000
Yearly Economic Liability	\$5-10 Billion

\*\*Brown: EKG Wires: A Potential Source of Infection

## METHOD

- 35 EKG lead wires randomly selected from the Intensive Care Unit.
- EKG leads disinfected (using standard protocol), and cultured prior to patient use.
- The snaps at the end of the lead wires were dipped in a sterile cup broth for 15 seconds and cultured using a sterile container containing tryptic sory broth (TSB).
- Culture incubated for 12 – 24 hours.
- Culture medium separated into 2 Petri dishes: one with blood agar, the other with MacConkey medium.
- Samples monitored over 48 hours and organism growth was identified.

## REFERENCES

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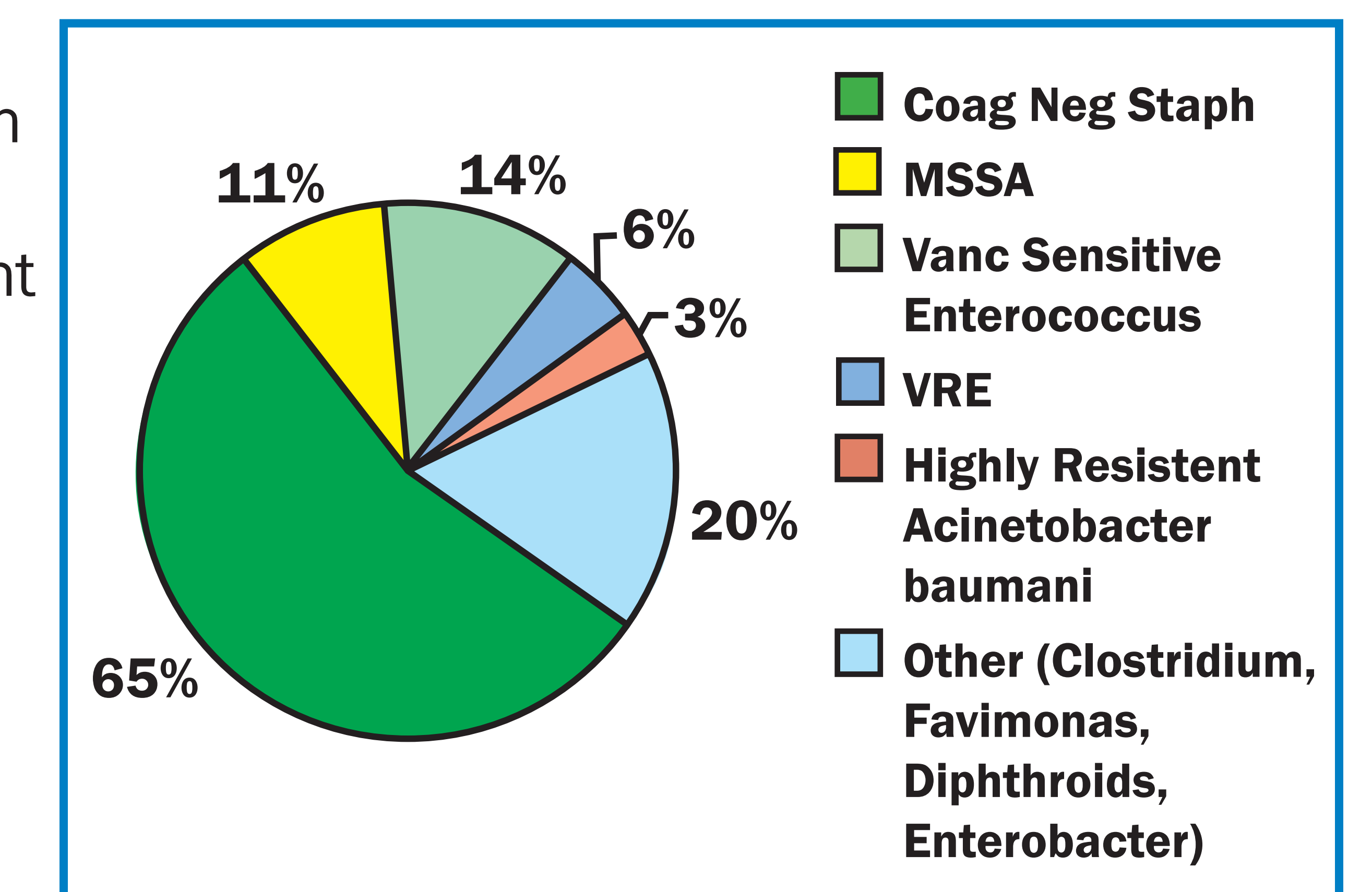
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## RESULTS

- Out of 35 cultures, 57 organisms were detected.
- Of these 35, 65% (n=23) were positive for Coagulase negative staphylococcus, 11% (n=4) were methicillin sensitive staphylococcus aureus (MSSA), 14% (n=5) were vancomycin sensitive enterococcus, 6% (n=2) were vancomycin resistant enterococcus (VRE), 3% (n=1) were found to be highly resistant acinetobacter baumannii, 20% (n=7) were other organisms including: Clostridium, Flavimonas, Diphtheroids, Enterobacter (Figure 1).
- Out of these isolates, 74% (n=42) of the organisms were found to be resistant to one or more antibiotics.

FIGURE 1. PERCENT OF ORGANISMS ISOLATED FROM ECG LEAD WIRES



## DISCUSSION

- Nosocomial infections pose a tremendous health hazard, not only to critically ill patients, but also to hospital staff.
- Over the years, measures have been taken to limit the spread of infection, such as proper hand-washing techniques, better cleansers, replacing reusable medical equipment, and the removal of certain reservoirs of infection.
- This Study illustrates that ECG lead wires are reservoir source for multdrug resistant organisms in intensive care unit.
- Failure to effectively decontaminate ECG leads wire can result in an invasive infection by multdrug resistant organisms.
- Decontamination methods applied to reusable leads have not been shown to be very effective in eliminating these organisms.
- Disposable ECG lead wires may reduce the risk of transmission of hospital infection and improve patient safety.