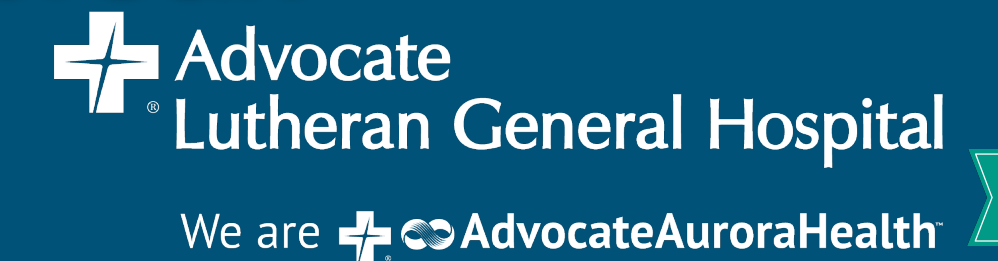


Outcomes of a Duodenoscope Surveillance Culture Protocol in Response to a *Carbapenem-Resistant Enterobacteriaceae* Outbreak

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Introduction

- In 2013, Advocate Lutheran General Hospital (ALGH) was one of many healthcare organizations worldwide that reported an outbreak of multi-drug resistant infections linked to duodenoscopes, specifically with carbapenem-resistant Enterobacteriaceae (CRE).
- In 2016, our institution transitioned to manual cleaning of each duodenoscope (Olympus TJF-Q180) followed by use of the manufacturer automated endoscope reprocessor (OER-PRO).
- Culture of the scope channel for CRE after reprocessing followed by temporary quarantine of the scope has been performed at ALGH since that time.
- The role of routine surveillance cultures in a non-outbreak setting is not well-defined.
- We proposed that routine culture of duodenoscopes for CRE in non-outbreak settings does not confer additional benefit following current duodenoscope reprocessing methods and results in excess cost.

Methods

- We performed a retrospective review of culture reports from scopes used during patient cases at ALGH between January 4, 2021 to December 31, 2021.
- All scopes that underwent the standardized reprocessing method and culture of channel for CRE were included.
- Culture reports of scopes from outside institutions or those that did not undergo our current reprocessing method were excluded.
- An electronic spreadsheet of culture results was provided by ACL Laboratories and indexed by scope serial number.
- We also reviewed costs of implementing scope quarantine after culture.

Culture Results From Processed Duodenoscopes Between January 2021 to December 2021

| Scope Serial Number | Total Number of Cultures | Number of Positive Cultures | Number of Negative Cultures |
|----------------------------|--------------------------|-----------------------------|-----------------------------|
| SCAA831 SC2506684 | 37 | 0 | 37 |
| SCAA831 SC2506690 | 31 | 0 | 31 |
| SCAA831 SC2506697 | 34 | 0 | 34 |
| SCAA831 SC2506775 | 31 | 0 | 31 |
| SCAA831 SC2506856 | 32 | 0 | 32 |
| SCAA831 SC2506885 | 35 | 0 | 35 |
| SCAA831 SC2506897 | 39 | 0 | 39 |
| SCAA831 SC2506932 | 34 | 0 | 34 |
| SCAA831 SC2507071 | 32 | 0 | 32 |
| SCAA831 SC2507075 | 36 | 0 | 36 |
| SCAA831 SC2507136 | 36 | 0 | 36 |
| SCAA831 SC2507300 | 35 | 0 | 35 |
| SCAA831 SC2507315 | 35 | 0 | 35 |
| SCAA831 SC2507334 | 35 | 0 | 35 |
| All Scopes Combined | 482 | 0 | 482 |

Table 1: Over a 1 year period, 482 ERCPs were performed. Culture of the scope channel after manual cleaning followed by high level disinfection using the manufacturer automated endoscope reprocessor yielded zero positive culture results for CRE.

Cost of Culture & Quarantine

| Factor | Cost |
|--|--------------|
| Duodenoscopes | |
| Additional scopes purchased (Olympus TJF-Q180) | 7 |
| Price per scope | \$42,000.00 |
| Total cost | \$294,000.00 |
| Cultures | |
| Price per culture | \$28.00 |
| Total cost of cultures from January to December 2021 | \$13,496.00 |

Table 2: Costs associated with implementation of scope quarantine, which required purchase of additional duodenoscopes, and culture of each scope after reprocessing.

Results

- 482 ERCPs were performed during this time period.
- All scopes were cultured after reprocessing.
- There were 0/482 (0%) positive culture results (Table 1).
- The average time to receive the culture result was 48 hours.
- Zero scopes required additional processing.
- The cost per culture was \$28, totaling \$13,496 for one year.
- Seven additional duodenoscopes were purchased to have 14 scopes in circulation.
- Each device cost \$42,000 for a one time total of \$294,000.
- The total costs are summarized in Table 2.

Discussion

- Based on our preliminary review of 1 year of culture results, following the manufacturer recommended process for disinfection of scopes has been successful at eliminating CRE, the organism identified during our initial outbreak.
- In a high volume ERCP center, the cost of implementing a culture and quarantine policy may be prohibitive.
- Our initial data support discontinuation of routine culture after reprocessing in a non-outbreak setting.
- Further investigation includes review of long-term data and benefit-cost analysis.