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# Measuring the Prevalence of Multidrug-Resistant *Acinetobacter* (MDRA) Using *OXA 23* and *OXA 51* Gene Identification in Healthcare Facilities (HCFs) in Washington DC


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## ABSTRACT


**Background:** Multidrug-resistance among *Acinetobacter* infections reported in healthcare-associated infections (HAIs) through the National Healthcare Safety Network (NHSN) decreased by 34% in the South Atlantic region between 2011 and 2014. NHSN data were largely from acute care hospitals and do not measure colonization rates, resistance in long term care facilities (LTCFs), nor infections that are not healthcare-associated. MDRA is classified as an urgent threat by the Centers for Disease Control and Prevention. A collaborative of HCFs conducted a point prevalence study to determine a baseline in Washington, DC.

**Methods:** The study was designed primarily to measure the prevalence of carbapenem-resistant Enterobacteriaceae in DC HCFs. Samples were also evaluated using the Acuitas® MDRO Gene Test (OpGen, Gaithersburg MD) that detects the *OXA 23* and *OXA 51* genes, commonly associated with MDRA. We assessed 2,217 patients from 16 HCFs (all 8 acute care hospitals (AH), 1 inpatient rehabilitation hospital (IRH), and 7 long term care facilities (LTCF). LTCFs included 5 skilled nursing facilities (SNF) and 2 long term acute care facilities (LTAC)). A total of 1,036 patients met inclusion criteria and consented to participate.

**Results:** The overall MDRA point prevalence rate (PR) was 6.6%. The PR for AHs, IRH, and LTCFs were 3.7, 0.0, and 16.4, respectively. *OXA 23*, a gene associated with carbapenem-resistance in *Acinetobacter,* was detected in 0.8% of samples from AHs (range: 0.0-2.0), and from 4.9% of samples from LTCFs (range: 0.0-15.4) [p<0.0001].

**Conclusion:** This study showed a significantly greater prevalence of MDRA in LTCFs in the setting of decreasing HAIs due to MDRA in AHs. Although the reason for the difference in PR is unknown, DC HCFs can use these data to collaborate for improved information on patients' resistance profiles as they traverse the continuum of care.


## METHODS

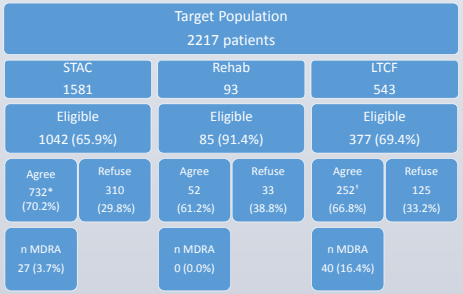
- Prevalence period from January 11, 2016 to April 14, 2016
- Surveillance conducted over a 1-3 day interval for each facility
- Individual facility principal investigators coordinated sample collection in respective facilities
- Exclusion criteria:
  - on psychiatric or obstetric-gynecological wards
  - unable to provide verbal consent (due to language barrier, cognitive inability, or emotional inappropriateness)
  - clinically inappropriate time for participation
- Written informed consent waived; verbal consent obtained
- Patient based variables collected: age, sex, and zip code
- Location variables: critical care, step-down units, wards, inpatient rehabilitation, and long term care (with long term care and long term acute care combined)
- Facility-based volunteers obtained samples from peri-anal site
- Peri-anal samples processed at OpGen laboratories (Gaithersburg, MD) using the Acuitas® MDRO Gene Test

## BACKGROUND

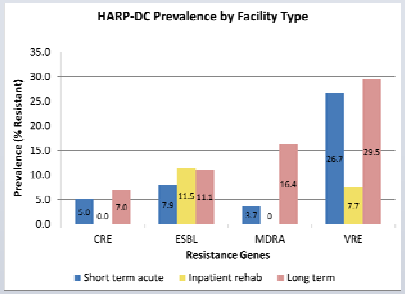


- *Acinetobacter* is considered a serious antibiotic resistant threat
- Increasingly recognized as significant cause of healthcare-associated infections due to increasing antibiotic resistance, prolonged survival on skin and in the healthcare environment, transmission by contact, and colonization potential
- Only 2% of all HAIs reported to NHSN are caused by *Acinetobacter*, but 63% of these infections resistant to at least three different classes of antibiotics
- NHSN data to date provides HAI incidence only for acute care; excludes infections outside of acute care hospitals (e.g. nursing homes) or infections not diagnosed until after discharge

## RESULTS




- 1,036 patients consented; acceptance rate of 68.9%
- Prevalence of MDRA by facility type ranged from 0.0% to 16.4%

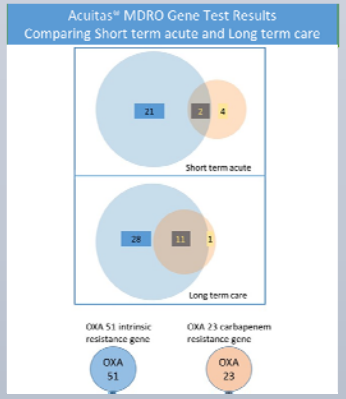



- Difference in MDRA prevalence between facility type more pronounced than other MDROs examined in study

| Patient Care Type | n Facilities | n sampled | n MDRA | % MDRA | Prevalence Ratio* (95% CI) |
|---|---|---|---|---|---|
| Inpatient Rehabilitation | 1 | 52 | 0 | 0.0 | - |
| Long Term Care Facility | 7 | 244 | 40 | 16.4 | 4.7 (3.0-7.5) |
| Subtotal Short Term Acute Care Facilities | 8 | 726 | 27 | 3.7 | 0.3 (0.2-0.4) |
| – Critical Care | 8 | 90 | 2 | 2.2 | 0.3 (0.1-1.3) |
| – Step down | 4 | 61 | 3 | 4.9 | 0.8 (0.2-2.3) |
| – Ward | 8 | 575† | 22 | 3.8 | 0.4 (0.2-0.6) |
| Total | 16 | 1022† | 67 | 6.6 | -- |

† 1 indeterminate test
* Prevalence ratio = % MDRA in patient care type/% MDRA for all other patient care types

- PCR testing indicated overall *Acinetobacter* prevalence of 6.6%
- Prevalence in long term care facilities 4.7 times greater than other facility types




- Higher percentage of both *Acinetobacter*-associated genes (*OXA 23)* and carbapenemase-producing genes *(OXA 51*) in LTCFs than short term acute care facilities

## LIMITATIONS

- Few patient variables collected; limited risk factor analysis
- Results de-identified; precluded from being used for clinical decisions or to isolate identified colonized patients
- Challenges obtaining consent for patients unable to verbally consent for themselves
- Difficult to sample patients who were obese, bed-bound, or situated upright in a chair
- Variability in sampling rate across facilities

## DISCUSSION and CONCLUSIONS

- Point-prevalence screening of both acute care and LTCFs in a region is important to understand the prevalence and distribution of MDRA infection and the potential for inter-facility spread.
- Using data from only acute care settings to assess MDRA infections in healthcare facilities most likely underestimates the overall prevalence.
- Facilities may consider periodic screening of high-risk patients, including those admitted from LTCFs.

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The following facilities participated:

- BridgePoint Capitol Hill
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- Children's National Medical Center
- George Washington University Hospital
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- MedStar Georgetown University Hospital
- MedStar National Rehabilitation Hospital
- MedStar Washington Hospital Center
- Providence Hospital
- Sibley Memorial Hospital
- Sibley Renaissance
- Transitions Healthcare
- United Medical Center