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Healthcare Antibiotic Resistance Prevalence – DC (HARP - DC)
Measuring the Prevalence of *van*A genes in Healthcare Facilities (HCFs) in Washington DC

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ABSTRACT

Background: Infection and colonization with vancomycin-resistant *Enterococci* (VRE) are common in HCFs. Approximately 40% of Enterococcal healthcare-associated infections (HAIs) reported to the National Healthcare Safety Network from DC are resistant to vancomycin; however, VRE colonization prevalence rates are unknown. Contact Precautions (CP) for VRE, recommended by the Centers for Disease Control and Prevention, are increasingly controversial because of relatively low pathogenicity, growing prevalence, negative effects of isolation, and conflicting evidence about isolation effectiveness.

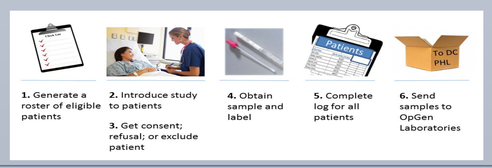
Methods: The HARP-DC study measured the prevalence of carbapenem-resistant Enterobacteriaceae in DC HCFs; samples were also evaluated for the *van*A gene associated with VRE using the Acuitas® MDRO Gene Test (OpGen, Gaithersburg MD). We assessed 2,217 patients from 16 HCFs (all 8 acute care hospitals (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 agreed to participate.

Results: Overall VRE point prevalence was 26.4%. Prevalence rates (PR) for AHs, LTCFs, and the IRH were 26.7, 29.5, and 7.7, respectively. The PR for the IRH was significantly lower than other HCFs, and lower than expected based on the vancomycin resistance rate among HAIs in DC (p <0.01, <0.01 respectively).

Conclusion: Over a quarter of inpatients in DC HCFs were colonized with VRE, as measured by the prevalence of the *van*A gene. DC HCFs may now use these data to evaluate current prevention approaches, including the use of active surveillance and/or CP, and design a collaborative, regional framework for prevention that creates consistency across facilities with individualized implementation based on facility and patient type.

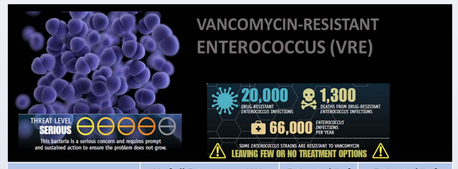
METHODS

- Prevalence period from Jan 11, 2016 to Apr 14, 2016
- Surveillance conducted over 1-3 days for each HCF
- 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

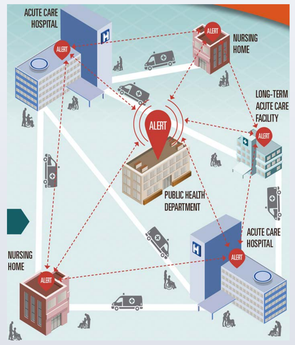


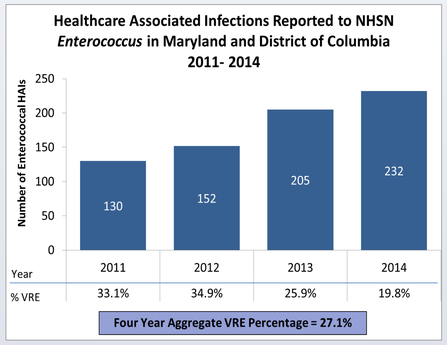
BACKGROUND

- VRE considered an urgent threat
- CDC recommends a "coordinated regional approach" to MDRO prevention
- Healthcare-associated VRE infection data available, but community rates and colonization rates unknown



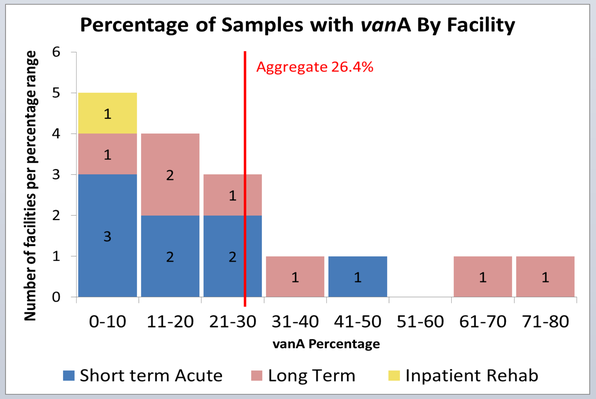
	% of all *Enterococcus* HAIs resistant to Vancomycin	Estimated # of infections	Estimated # of deaths attributed
Vancomycin-resistant *Enterococcus faecium*	77%	10,000	650
Vancomycin-resistant *Enterococcus faecalis*	9%	3,100	200
Vancomycin-resistant Enterococcus (species not determined	40%	6,900	450
Totals	--	20,000	1,300



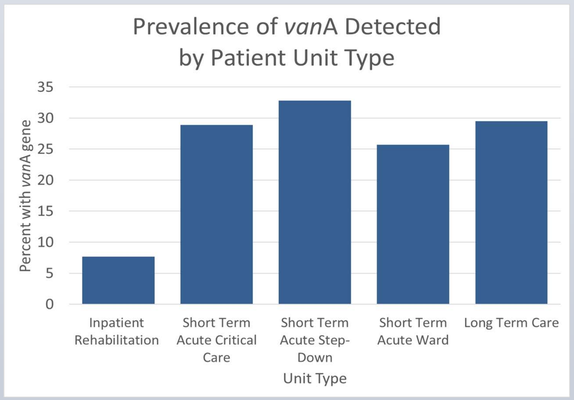


RESULTS

- 16 healthcare facilities voluntarily participated: all 8 acute care, 1 inpatient rehabilitation, and 7 long term care facilities
- 2,217 patients were screened, 1,036 patients met inclusion criteria and agreed to participate, and a total of 1,022 tests were completed (14 tests not performed/lost media)



- Aggregate prevalence of *van*A was 26.4%
- Prevalence rates varied significantly; range from 0.0% to 74.4%



- *van*A prevalence in LTCFs not statistically different than rate in short term acute care facilities

Difference by Unit Type

Patient Care Type (n HCFs or units)	n Tested	*van*A present n (%)	Median % (Range)	PR*	Confidence Interval (p value)
Inpatient Rehab (1)	52	4 (7.7)	--	0.0	0.1-0.7 (0.005)
Long Term Care Facility (7)	244	72 (29.5)	29.4 (0.0-74.4)	1.2	0.9-1.5 (0.1)
Short Term Acute (8)	726	194 (26.7)	17.6 (0.0-45.6)	1.0	0.8-1.3 (0.1)
– Critical Care (8)	90	26 (28.9)	27.1 (0.0-52.6)	1.1	0.8-1.5 (0.3)
– Step down (4)	61	20 (32.8)	31.1 (0.0-48.0)	1.3	0.9-1.8 (0.1)
– Ward (8)	575	148 (25.7)	15.6 (0.0-44.6)	0.9	0.8-1.2 (0.3)
TOTAL (16)	1022	270 (26.4)	20.4 (0.0-74.4)	--	--

- *van*A prevalence in inpatient rehabilitation facility significantly lower than other unit or facility types

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

CONCLUSIONS

- Colonization rates provide an estimate of VRE percentage of HAIs.
- The Washington DC *van*A prevalence results, similar to national HAI data, reinforce a need for HCFs to reassess the use of Contact Precautions and/or active surveillance culture programs for VRE identification.
- Coordination of a city-wide prevalence study required substantial time and effort to establish agreement on methods and processes.
- Coordinated actions in response to these study results will take similar time and effort.

ACKNOWLEDGEMENTS

The HARP-DC Study was collaborative in concept and execution.

The following facilities participated:

- BridgePoint Capitol Hill
- BridgePoint National Harbor
- Childrens, National Medical Center
- George Washington University Hospital
- Howard University Hospital
- MedStar Georgetown University Hospital
- MedStar National Rehabilitation Hospital
- MedStar Washington Hospital Center
- Providence Hospital
- Sibley Memorial Hospital
- Sibley Renaissance
- Transitions Healthcare
- United Medical Center