

# National Healthcare Safety Network's Electronic Antimicrobial Use and Resistance Surveillance — first cohort of hospital reporters, 2011–2017

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## Key Points

- **Study question:** Which hospitals sought and successfully participated in electronic reporting to the National Healthcare Safety Network (NHSN)'s Antimicrobial Use and Resistance (AUR) Module in the early phase of the module's implementation?
- **Findings:** The early hospital adopters of NHSN's AUR Module were typically large teaching hospitals at which some antimicrobial stewardship (ASP) elements were in use, and many of these initial adopters were part of large healthcare systems.
- **Meaning:** Hospital size, teaching status, and other institutional factors provided an impetus for initial participation in NHSN AUR electronic surveillance.

## Background

- **Importance:** Antimicrobial overuse and antimicrobial resistance (AR) in hospitals leads to adverse healthcare outcomes. Electronically reporting data to NHSN's AUR Module is a way to provide key data for analysis and action.
- **Objective:** To understand the uptake of AUR electronic reporting, we characterized hospitals that voluntarily reported to AUR Module.

## Methods

- **Setting and design:** A comparison of the first hospital cohort that submitted data to the NHSN's AU and AR Options with hospitals that reported to NHSN's Healthcare Associated Infection (HAI) Modules but not the AUR Module from 2011 through 2017.
- **Data source:** Hospital characteristics were self-reported on the NHSN annual survey. Hospital membership in a large healthcare system ( $\geq 100$  hospitals) was determined by reviewing online information posted for large systems.

## Methods (cont.)

- **Definition of early AU and AR adopters:** Hospitals that reported to NHSN's AUR Module by November of the year when the total number of reporters for each option reached 100.
- **Comparison group:** Non-AU or Non-AR acute care hospitals that reported to NHSN HAI modules from 2011 through 2017.

## Results

- Each option accumulated  $\geq 100$  hospital adopters in the 5th year (AU, 2015) and 4th year (AR, 2017) of its availability.
- From 2011 through 2017, among 6037 facilities that reported to NHSN HAI modules, 5501 acute care hospitals were eligible for AUR reporting. Of which, we identified 119 and 126 early AU (2.2%) and AR (2.3%) adopters.
- Early AU and AR adopters have similarities in hospital bed size, teaching status, and healthcare system affiliation.
- Compared with 5382 HAI-only reporters, 119 early AU adopters were typically larger, teaching hospitals with leadership support for an ASP (table).
- Compared with 5375 HAI-only reporters, 126 early AR adopters were more likely to be larger, teaching hospitals that produced an antibiogram at least annually (table).
- A significant proportion of AU (42%) and AR (57%) early adopters belong to a large healthcare system.

## Discussion

- AUR is NHSN's first module in which all reporting is electronic. This requirement calls for hospitals to buy or build tools for automated data extraction and data submission.
- Hospitals with larger bed size, teaching hospital status, and/or membership in a large healthcare system were more likely than other hospitals to report to the AUR Module in its early phase.
- Factors that have driven participation in AUR electronic reporting likely include existing infrastructure, ASP engagement, and other internal resources.

Table. Characteristics of early AU and AR adopters in comparison with hospitals that reported to HAI Modules, 2011–2017, NHSN

	AU reporters (n = 119)	Non-AU reporters (n = 5382)	P value	AR reporters (n = 126)	Non-AR reporters (n = 5375)	P value
U.S. Regions			<0.0001			0.0003
Midwest	49 (41.2)	1474 (27.4)		28 (22.2)	1495 (27.8)	
Northeast	7 (5.9)	717 (13.3)		3 (2.4)	721 (13.4)	
South	19 (16.0)	2101 (39.0)		56 (44.4)	2064 (38.4)	
West	44 (37.0)	1039 (19.3)		38 (30.2)	1045 (19.4)	
Other	0 (0)	51 (1.0)		1 (0.8)	50 (0.9)	
Median bedsize (Interquartile range, IQR)	152 (71–297)	80 (15–201)	<0.0001	201 (94–307)	80 (25–199)	<0.0001
Facility type			<0.0001			<0.0001
General	59 (49.6)	3062 (66.9)		103 (81.8)	3558 (66.2)	
Veterans Affairs	49 (41.2)	45 (0.8)		0 (0)	94 (1.8)	
Critical access	8 (6.7)	1163 (21.6)		2 (1.6)	1169 (21.7)	
Children's	2 (1.7)	105 (2.0)		1 (0.8)	106 (2.0)	
Oncology	1 (0.8)	17 (0.3)		0 (0)	18 (0.3)	
Military	0 (0)	55 (1.0)		13 (10.3)	42 (0.8)	
Others	0 (0)	395 (7.3)		7 (5.6)	388 (7.2)	
Medical school affiliation	84 (70.6)	2205 (41.1)	<0.0001	87 (71.3)	2202 (41.0)	<0.0001
Have written statement of leadership support for antibiotic stewardship	116 (98.3)	4472 (85.9)	<0.0001	118 (96.7)	4470 (85.9)	0.0006
Produce antibiogram at least annually	116 (98.3)	4760 (91.4)	0.004	125 (99.2)	4751 (91.3)	0.0003

	AUR Module	HAI Modules
Incentives	None, voluntary	State and federal requirements
Reporting interface	Standard electronic messages	Web-based, manual key-in or electronic messages
Launch year	AU 2011 AR 2014	2005
System requirements	AU: eMAR/BCMA, ADT AR: LIS, EHRs, ADT	No specific system requirement

eMar: electronic medication administration record  
BCMA: barcoding medication record  
ADT: Admission/Discharge/Transfer system  
LIS: Laboratory Information System  
EHRs: Electronic Health Records

## Conclusions

- The early hospital adopters in NHSN's AUR Module were typically larger, teaching hospitals at which some ASP elements were in use, and many of these initial adopters were part of large healthcare systems.
- Internal organizational factors contribute substantially to hospitals' voluntary participation in AUR surveillance.

