Assessment of Healthcare-Associated Infections & Antibiotic Resistance Outbreak Detection Data, Tools, and Barriers

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Council for Outbreak Response: Healthcare-Associated Infections & Antibiotic Resistant Pathogens (CORHA)
Website: corha.org

Background

- The *Council for Outbreak Response: Healthcare-Associated Infections (HAI) and Antibiotic Resistant Pathogens (AR)* (CORHA) is a multidisciplinary partnership consisting of public health and healthcare organizations charged with developing consistent and coordinated approaches to improve the detection, investigation, response, and prevention of HAI/AR outbreaks.
- Public Health and its healthcare partners share responsibilities for responding to HAI/AR outbreaks. This extends to outbreak detection and reporting. As a general rule, public health agencies prefer to learn about potential outbreaks early. Healthcare partners often serve as the "eyes and ears" that are able to alert public health to HAI/AR events that require their involvement (e.g., novel pathogens; contaminated medical products; other outbreaks).
- The CORHA Outbreak Detection and Reporting Workgroup developed an assessment to better understand how HAI programs at public health departments and healthcare organizations use technology to detect potential HAI/AR outbreaks.

Methods

- The assessment was launched in July 2017 and responses were collected electronically using Qualtrics.
- Recipients were asked to: 1) Describe their HAI/AR surveillance data sources and software tools used to detect outbreaks. 2) Describe any barriers they experienced using surveillance system data for outbreak detection.
- All public health jurisdictions received the assessment
- Healthcare partner organizations (SHEA & APIC) shared the assessment with their respective networks via email newsletter.

Results

Work Setting

Public Health (N = 96)*

Work Setting	No. (%)
State Health Department	52 (54)
No Response	25 (26)
Local Health Department	13 (14)
Large Local/Urban Health Department	3 (3)
District/Regional Health Department	2 (2)
Hybrid State/Local Health Department	1 (1)

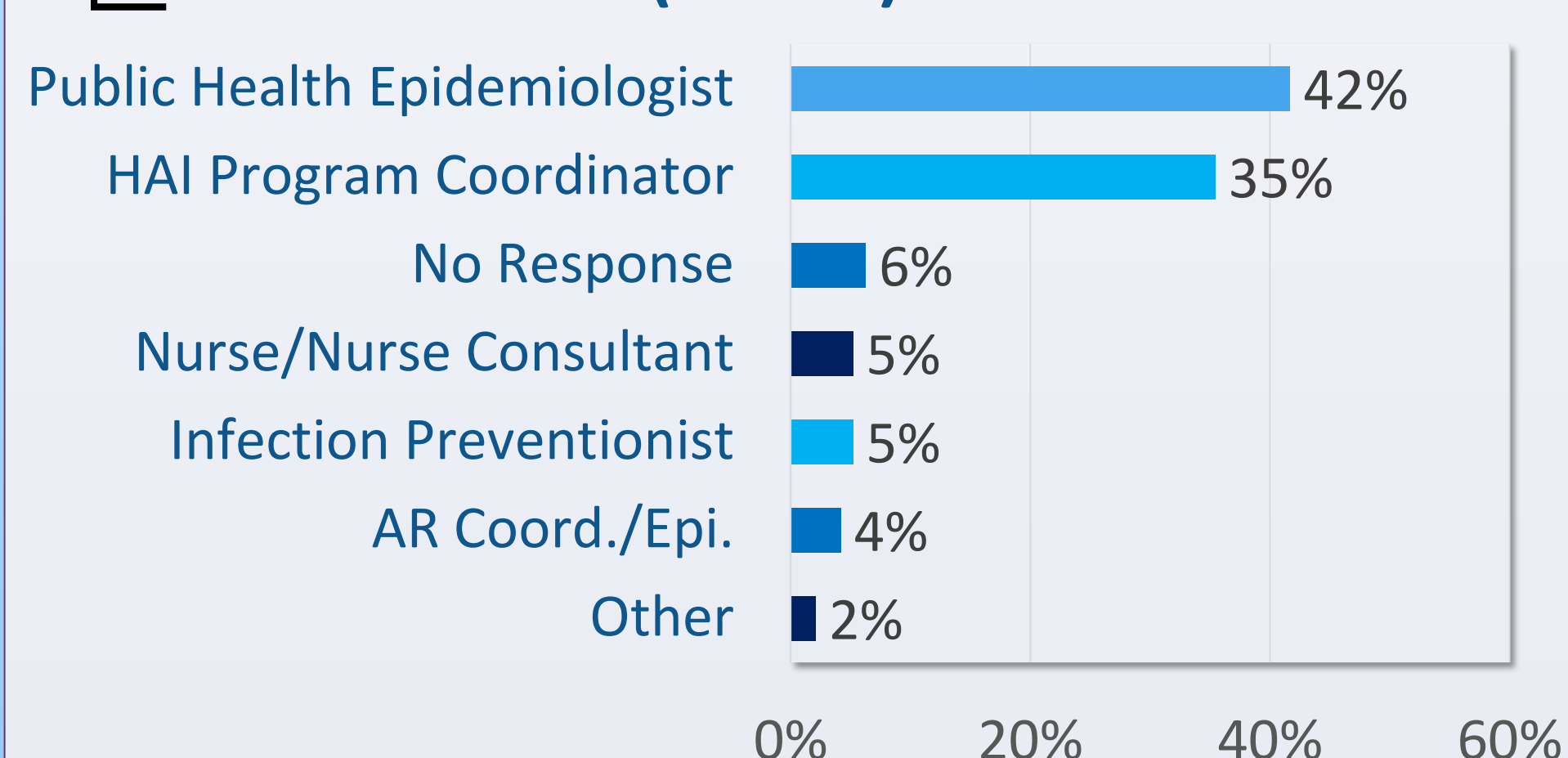*Limitation: 5 state jurisdictions had multiple respondents

Healthcare (N = 95)

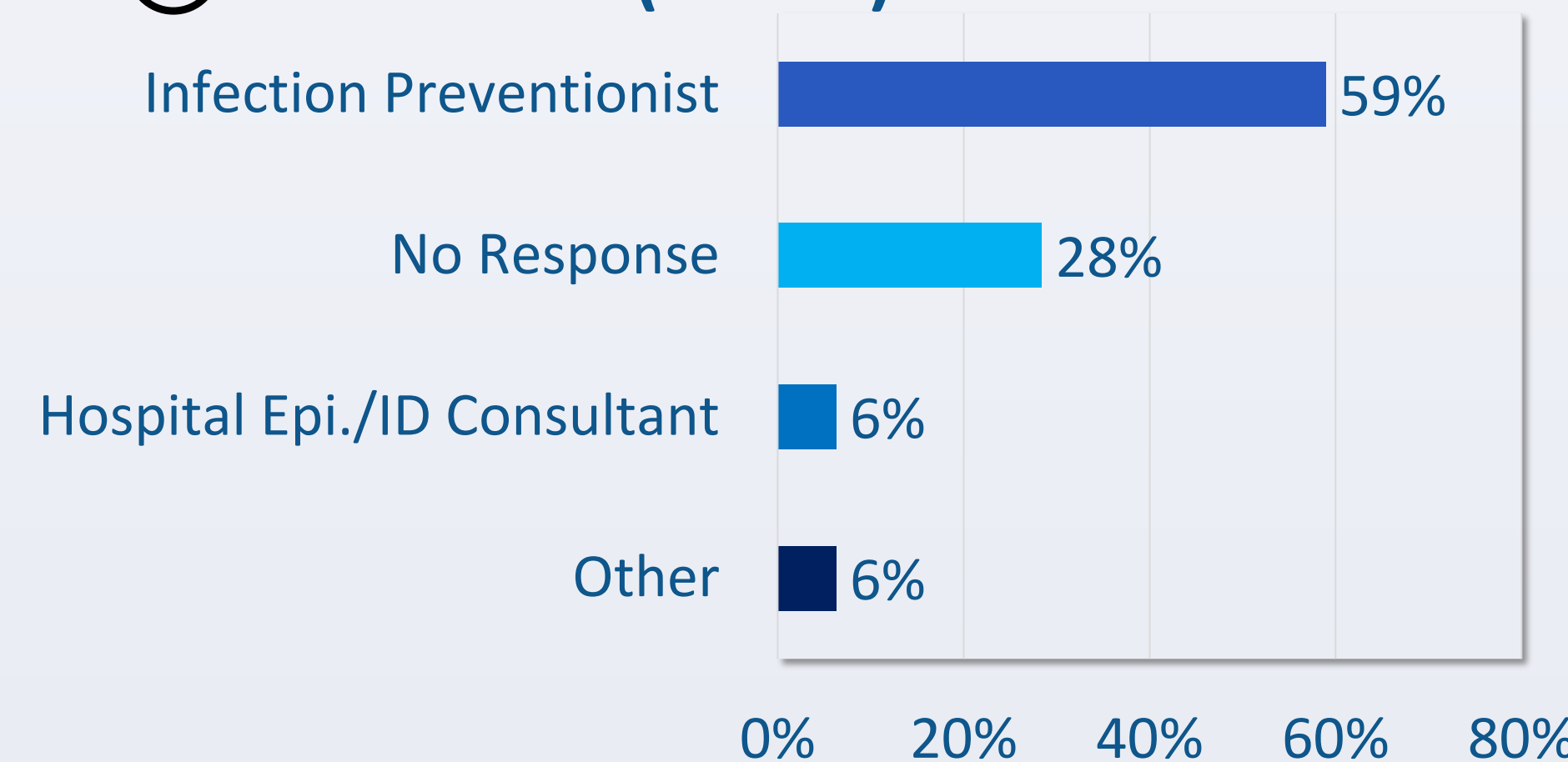| Work Setting	No. (%)
Hospital	47 (49)
No Response	25 (26)
Critical Access Hospital	7 (7)
Behavioral/Psychiatric Facility/Unit	6 (6)
Long-Term Care Facility	2 (2)
Outpatient Facility	2 (2)
Long-Term Acute Care Hospital	1 (1)
Other	5 (5)

Results

Occupation Distribution

Public Health (N = 96)

	%
Public Health Epidemiologist	42%
HAI Program Coordinator	35%
No Response	6%
Nurse/Nurse Consultant	5%
Infection Preventionist	5%
AR Coord./Epi.	4%
Other	2%

Healthcare (N = 95)

	%
Infection Preventionist	59%
No Response	28%
Hospital Epi./ID Consultant	6%
Other	6%

Data Sources Used for Outbreak Detection by Public Health and Healthcare

Public Health (N = 96)

Existing Data	No. (%)
CDSS†: CRE, VRE, other§	26 (20)
None	20 (15)
CDSS: HBV, HCV§	19 (15)
NHSN‡ HAIs (CLABSI, CAUTI, SSI, VAE, VAP) §	15 (12)
PH Laboratory Information Systems	15 (12)
NHSN LabID event module (CDI, MRSA, CRE, ESBL, VRE, MSSA) §	14 (11)
Syndromic surveillance data	14 (11)
Other	7 (5)

Healthcare (N = 95)

Existing Data	No. (%)
Microbiology laboratory data	29 (26)
Electronic health record data	22 (20)
NHSN HAIs (CLABSI, CAUTI, SSI)	19 (17)
NHSN LabID event module (CDI, MRSA, CRE, ESBL, VRE)	17 (15)
Pharmacy data	10 (9)
Billing/coding data	5 (5)
NHSN Dialysis event data	2 (2)
Other	6 (6)

†Communicable Disease Surveillance System (CDSS)
‡National Healthcare Safety Network (NHSN)

Software Tools Used by Public Health to Detect Outbreaks

Public Health (N = 96)*

Software Name	No. (%)
None	31 (36)
Statistical Analysis Software (SAS)	19 (22)
ESSENCE#	10 (12)
No Response	10 (12)
SATScan	7 (8)
R	6 (7)
Communicable Disease Surveillance System (CDSS)	4 (5)
WHONet	3 (3)
Microsoft Excel/Access	3 (3)
National Healthcare Safety Network (NHSN)	2 (2)
STATA	1 (1)
Research Electronic Data Capture (REDCap)	1 (1)

Public Health (N = 96)

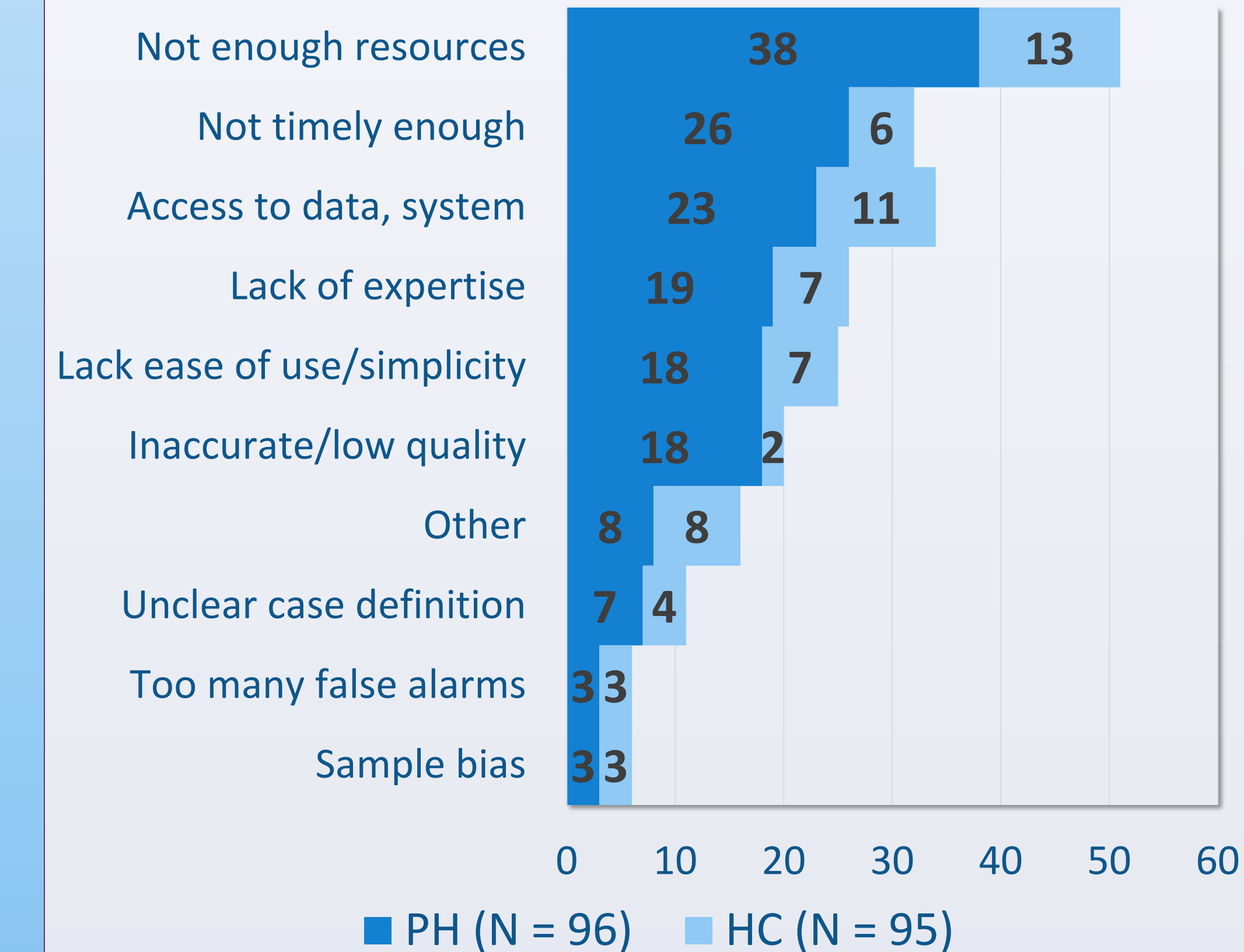| Software Tool Utilization, No.	SATScan	WHONet	SAS	R	ESSENCE
NHSN LabID	4	1	8	5	3
NHSN HAIs	5	1	8	4	4
CDSS: CRE, VRE§	5	2	12	4	7
CDSS: HBV, HCV§	4	1	10	4	6
Public Health Lab Information Systems	3	0	7	3	3
Syndromic Surveillance data	2	1	6	4	9
Totals	7	3	17	5	9

*Healthcare reported using software tools such as EPIC (11, 32%), Theradoc (4, 12%), MedMinded (3, 9%), Vigilanz (2, 6%), Other (9, 25%), & None (5, 15%) (N = 34)
#Electronic Surveillance System for the Early Notification of Community based Epidemics (ESSENCE)

Barriers to Surveillance

	PH (N = 96)	HC (N = 95)
Not enough resources	38	13
Not timely enough	26	6
Access to data, system	23	11
Lack of expertise	19	7
Lack ease of use/simplicity	18	7
Inaccurate/low quality	18	2
Other	8	8
Unclear case definition	7	4
Too many false alarms	3	3
Sample bias	3	3

■ PH (N = 96) ■ HC (N = 95)

Conclusions

- Public health and healthcare organizations have different data sources and tools available for assessing HAI/AR outbreaks, likely reflecting the different goals and access of organizations
- Public health tends to have access to more analytic software but not as many primary data sources
- Of public health respondents, 36% reported no use of software to detect outbreaks
- There is a wide variety of data sources and software tools used to detect healthcare-associated outbreaks among public health agencies and acute care facilities
- There is a need for more resources to support timely detection of HAI/AR outbreak events
- These results highlight data sources and will help improve data sharing & access between public health & healthcare

Resources

- CORHA is uniquely positioned to join critical stakeholders and develop guidance documents, tools, and recommendations to improve HAI/AR outbreak detection and response. One example product (available on corha.org) is the *CORHA HAI-AR Outbreak and Response Tracking System* which can be used by health departments and large healthcare systems to manage information related to investigations of possible HAI-AR outbreaks.

Acknowledgments

§Conditions: Central line-associated bloodstream infection (CLABSI), Catheter-associated urinary tract infection (CAUTI), surgical site infection (SSI), *Clostridium difficile* (CDI), Methicillin-resistant Staphylococcus aureus (MRSA), Carbapenem-resistant Enterobacteriaceae (CRE), Vancomycin-resistant Enterococcus (VRE), Hepatitis B virus (HBV), Hepatitis C virus (HCV), Methicillin-sensitive Staphylococcus aureus (MSSA), Extended Spectrum Beta-Lactamase (ESBL), Ventilator-Associated Events/pneumonia (VAE/VAP)