

PHILADELPHIA HEALTHCARE-ASSOCIATED INFECTIONS (HAI) PLAN

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List of Acronyms

Acronym	Full Name
AR	Antibiotic Resistance
ARLN	Antibiotic Resistance Laboratory Network
AS	Antibiotic Stewardship
AAW	Antibiotic Awareness Week
BSI	Bloodstream Infection
CAD	Cumulative Attributable Difference
CDC	Centers for Disease Control and Prevention
CDMS	Communicable Disease Management System
CRAB	Carbapenem-Resistant <i>Acinetobacter baumannii</i>
CRE	Carbapenem-Resistant <i>Enterobacterales</i>
CRPA	Carbapenem-Resistant <i>Pseudomonas aeruginosa</i>
DDC	Division of Disease Control
ESRD NW4	End Stage Renal Disease Network 4
FDAW	Fungal Disease Awareness Week
HAI	Healthcare-Associated Infection
HCP	Healthcare Professional
HIP	Health Information Portal
ICAR	Infection Control Assessment and Response
IPC	Infection Prevention and Control
LTCF	Long-Term Care Facility
LTC RISE	Long-Term Care Resiliency, Infrastructure Supports, and Empowerment
MDRO	Multi-Drug Resistant Organism
NHSN	National Healthcare Safety Network
PADOH	Pennsylvania Department of Health
PA-NEDSS	Pennsylvania's National Electronic Disease Surveillance System
PDPH	Philadelphia Department of Public Health
PDRO	Pandrug-Resistant Organism
SIR	Standardized Infection Ratio
SUR	Standardized Utilization Ratio
TAP	Targeted Assessment for Prevention

BACKGROUND

The Philadelphia Department of Public Health (PDPH) provides services, sets policies, and enforces laws relating to public health for the City and County of Philadelphia. The City of Philadelphia is the sixth largest City in the United States, with over 1.5 million residents and significant health disparities amongst its population. Out of the ten most populous cities in America, Philadelphia was named the poorest large city in the U.S. Census Bureau's report released in 2021, with a poverty rate that has consistently remained around 23.1 percent for the past 3 years. PDPH strives to protect and promote the health of all Philadelphians and to provide a safety net for the most vulnerable.

Philadelphia has a large and diverse medical environment, with both academic and community hospitals in the metropolitan area. As of June 2022, there were 31 hospitals, including adult, children's, psychiatric, rehabilitation and specialty hospitals. Philadelphia hospitals attract patients from the surrounding areas, other parts of the U.S. and internationally, leading to a potential influx of emerging organisms of public health interest. Philadelphia also has a large healthcare community of 47 skilled nursing facilities, 59 personal care homes/assisted living facilities, 53 outpatient hemodialysis clinics and 19 ambulatory surgery centers. Additionally, there are 7 medical, 15 nursing, 4 pharmacy and 4 public health schools in the city.

The Healthcare-Associated Infections/Antimicrobial Resistance (HAI/AR) Program, established in 2016 to protect the public's health when seeking or receiving medical care, is one of nine programs managed by PDPH's Division of Disease Control (DDC).

In this HAI plan, we outline various strategies to improve surveillance, containment, prevention, IPC capacity, and information sharing between healthcare facilities and public health.

HAI/AR Program Mission Statement

The HAI/AR Program is dedicated to the prevention and control of healthcare-associated infections and antimicrobial resistance by providing leadership, advocacy, and resources on best practices for infection prevention and control and antimicrobial stewardship in healthcare facilities. Our program serves as a resource to the Philadelphia healthcare community and public with the goal of improving healthcare safety and quality in the City of Philadelphia.

Goals:

- Strengthen surveillance of and response to healthcare-associated infections
- Prevent development and transmission of antimicrobial resistance in healthcare settings
- Coordinate efforts and facilitate communication between healthcare facilities & across public health agencies
- Act locally according to nationally identified priorities



USING DATA FOR ACTION

The HAI/AR Program focuses on all aspects of surveillance, prevention, and control of healthcare-associated and antimicrobial resistant infections, according to priorities established by The Centers for Disease Control and Prevention (CDC) in 2019 in the [Antibiotic Resistance Threats report](#) for targeted drug-resistant organisms and strategy for their [containment](#). In 2016, a Board of Health regulation granted PDPH access to all data submitted into the CDC's National Healthcare Safety Network (NHSN) database by healthcare facilities in its jurisdiction. Mandatory reporting requirements implemented at the federal level and by the State of Pennsylvania establish the specific NHSN elements that must be reported by healthcare facilities in Pennsylvania. In addition to the NHSN data, there are several other data sources that PDPH utilizes including the Communicable Disease Management System (CDMS) and Pennsylvania's version of the National Electronic Disease Surveillance System (PA-NEDSS), containing data on reportable drug-resistant organisms. The data collected through these sources is utilized to inform program priorities and activities. Additionally, data collected as part of outbreak responses and Infection Control Assessment and Response (ICAR) visits are utilized to inform infection prevention program priorities.



REPORTABLE MULTIDRUG-RESISTANT ORGANISMS

Mandatory reporting of Carbapenem-Resistant *Enterobacterales* (CRE), pandrug-resistant organisms (PDRO), and *Candida auris* was instituted by PDPH in April 2018 for Philadelphia facilities. As of August 2022, we have received reports of 1237 CRE cases since inception of reporting. We have tested over half of the CRE isolates for resistance mechanisms and learned that a high percentage (about 68%) are carbapenemase-producing, which are of highest concern to public health.

Since inception of reporting, we have identified a total of 12 pandrug-resistant isolates. PDPH was the first jurisdiction to forward some of these pandrug-resistant isolates to the AR Laboratory Network (ARLN) for expanded susceptibility testing and provided much needed information for clinicians responsible for treating the affected patients.

Prior to March 2020, no *Candida auris* cases had been detected in Philadelphia and Pennsylvania, however, *C. auris* cases have been increasing for several years in the U.S, including in Pennsylvania's neighboring states, New Jersey, New York, and Maryland. The first case of *C. auris* in Philadelphia was detected in March 2020 and since then, we have detected a total of 82 *C. auris* cases. Cases of both infection and colonization continue to increase in both Philadelphia healthcare facilities and facilities in surrounding counties. PDPH collaborates with the Pennsylvania Department of Health (PADOH) and other neighboring public health departments on multi-jurisdictional *C. auris* responses.



CONTAINMENT RESPONSE FOR TARGETED MULTIDRUG-RESISTANT ORGANISMS (MDROs)

As of July 2019, targeted MDROs are defined as CRE, carbapenem-resistant *Acinetobacter baumannii* (CRAB), carbapenem-resistant *Pseudomonas aeruginosa* (CRPA), *Candida auris* and PDROs. Immediately upon identification of the index patient with a targeted MDRO, we will conduct mechanism testing on all qualifying CRE and PDRO isolates, and select CRAB and CRPA isolates, in a public health laboratory to characterize the organism, resistance mechanism and susceptibility profile, which will guide control measures. The MDRO Prevention Epidemiologist, supported by the rest of the HAI/AR team, interacts directly with infection preventionists and clinical microbiology laboratories about our reportable targeted MDRO conditions and the associated testing available through the ARLN laboratories. See [Appendix A](#) and [Appendix B](#) for visual workflows of our carbapenem resistant organism and *C. auris* surveillance processes.

In addition to surveillance for targeted MDROs, containment responses by both public health and healthcare facilities are essential to limiting the spread of these organisms. Information sharing on patients' MDRO status when transferred from one healthcare facility to another or readmitted to a healthcare facility after discharge, is a recognized critical gap in containment efforts for these organisms. The HAI/AR Program has created various transfer forms to mitigate this gap.

The HAI/AR Program continues to work closely with any facility where *C. auris* cases are detected to improve infection prevention and control and by performing *C. auris* testing. PDPH also collaborates with additional high-risk facilities to perform *C. auris* testing, including long-term acute care hospitals and ventilator skilled nursing facilities, to evaluate how widespread this organism is in our region and to facilitate early identification of cases in these high-risk settings.



OTHER FUNGAL DISEASES OF CONCERN

HAI/AR Program promotes education on azole-resistant *Aspergillus fumigatus*, highlighting the risks of environmental azole use in agriculture and the resulting azole resistance to public health. Outside of fungal disease education, the HAI/AR Program engaged a microbiology laboratory at an academic medical center to conduct surveillance for azole resistance in *Aspergillus fumigatus* in collaboration with the CDC. This resulted in the first fatal case of azole-resistant *Aspergillus fumigatus* with a mutation linked to agricultural fungicide use being reported in the U.S.

The HAI/AR Program participates in national Fungal Disease Awareness Week (FDAW) every year and promotes various educational materials throughout the year with our healthcare partners. For FDAW, PDPH develops and disseminates a public campaign to raise awareness of fungal infections using PDPH social media channels and electronic display boards in downtown Philadelphia. Additionally, the program hosts webinars and creates educational and outbreak response materials for healthcare facilities on conditions such as *Candida auris*, and azole-resistant *Aspergillus*.



ANTIBIOTIC STEWARDSHIP

The HAI/AR Program supports Antibiotic Stewardship (AS) through its active participation in CDC's Antibiotic Awareness Week (AAW) and by promoting and sharing educational materials throughout Philadelphia. For AAW, PDPH designs a public campaign utilizing Link PHL electronic boards at bus stops and throughout the city, social media posts, the HIP HAI/AR website, and the quarterly HAI/AR newsletter. The HAI/AR Program sends out HAI/AR Quarterly Newsletters with Antibiotic Stewardship content to healthcare providers in the Philadelphia metropolitan area and has developed targeted resources such as, an [Outpatient Stewardship Toolkit](#) and a Skilled Nursing Facility Stewardship Toolkit.

The HAI/AR Program also supports AS by collaborating with external partners to improve stewardship practices in skilled nursing facilities, and by analyzing antibiotic prescribing patterns and identifying areas for targeted resources in other care settings including outpatient and dialysis clinics.

INFECTION PREVENTION AND CONTROL CONSULTATION AND EDUCATION ANTIBIOTIC STEWARDSHIP



The HAI/AR Program provides ongoing support to facilities for improving and sustaining IPC practices by offering remote and onsite consultations, including standardized infection control assessments as part of the CDC's Infection Control Assessment and Response (ICAR) Program, which were first launched in 2015. The HAI/AR Program also conducts onsite infection control visits in facilities where transmission of healthcare-associated infections is suspected or known to have occurred, with the goal of helping facilities to remedy any gaps that are identified, that might pose a health risk to the public.

Additionally, the Program develops IPC resources on specific infection control topics, informed by: gaps identified during site visits, interactions with facilities and frontline HCP, and a HCP learning needs assessment survey conducted in 2021. In the Fall of 2021, the HAI/AR Program launched an N95 respirator fit test train-the-trainer program and in the Spring of 2022, began onsite educational IPC in-services targeting frontline HCP as part of CDC's Project Firstline. Both programs are currently offered to long-term care facilities (LTCFs), with plans to expand to additional care settings.

The HAI/AR Program has also developed resources such as sample policies and procedures, audit tools, competency evaluations, and information sheets on targeted MDROs, COVID-19 and other infection prevention and control (IPC) topics. These resources are posted on the [PDPH's Health Information Portal](#) (HIP) website in the form of toolkits focusing on specific IPC topics and/or facility types and are frequently advertised in our newsletters and on monthly collaborative calls with long-term care facilities.

PHILADELPHIA HAI PLAN

Element	Implementation Activities
I. Sustain HAI/AR capacity to implement program	<ul style="list-style-type: none"> • PDPH will continue to support an HAI/AR Program within the DDC, co-led by a Program Manager, who serves as the HAI Coordinator for the jurisdiction, and a Medical Director, who serves as the AR/AS Expert. • The Program Manager oversees all HAI/AR Program activities and is responsible for the day-to-day operations of the program. • The Medical Director provides guidance on all HAI/AR Program functions and on the use of HAI/AR data to inform public health priorities and interventions. • The HAI/AR Program has built IPC expertise within the team by hiring an experienced, senior IP as the ICAR Coordinator and by training other program staff in IPC.
II. Convene HAI Advisory Committee	<ul style="list-style-type: none"> • The HAI/AR Program will continue to develop a new HAI Advisory Committee to improve our ability to target issues of greatest interest and address common gaps in our region. The Committee will also be engaged through review of different key activities such as our annual update to our HAI plan. • The HAI Advisory Committee will be convened at least annually.
III. Enhance epidemiology-laboratory coordination	<ul style="list-style-type: none"> • The HAI/AR Program will continue to test all qualifying MDRO isolates for resistance mechanisms in close collaboration with local, state, and regional ARLN laboratories. • The HAI/AR Program will continue to coordinate colonization screenings with the regional ARLN laboratory both as part of outbreak responses and as preventative point prevalence surveys in high-risk facilities. • The HAI/AR Program and the PDPH laboratory will collaborate on recruiting select clinical laboratories as sentinel surveillance sites for non-reportable targeted organisms (CRPA, CRAB, azole-resistant <i>Aspergillus</i>) in collaboration with CDC and the Regional ARLN Laboratory.

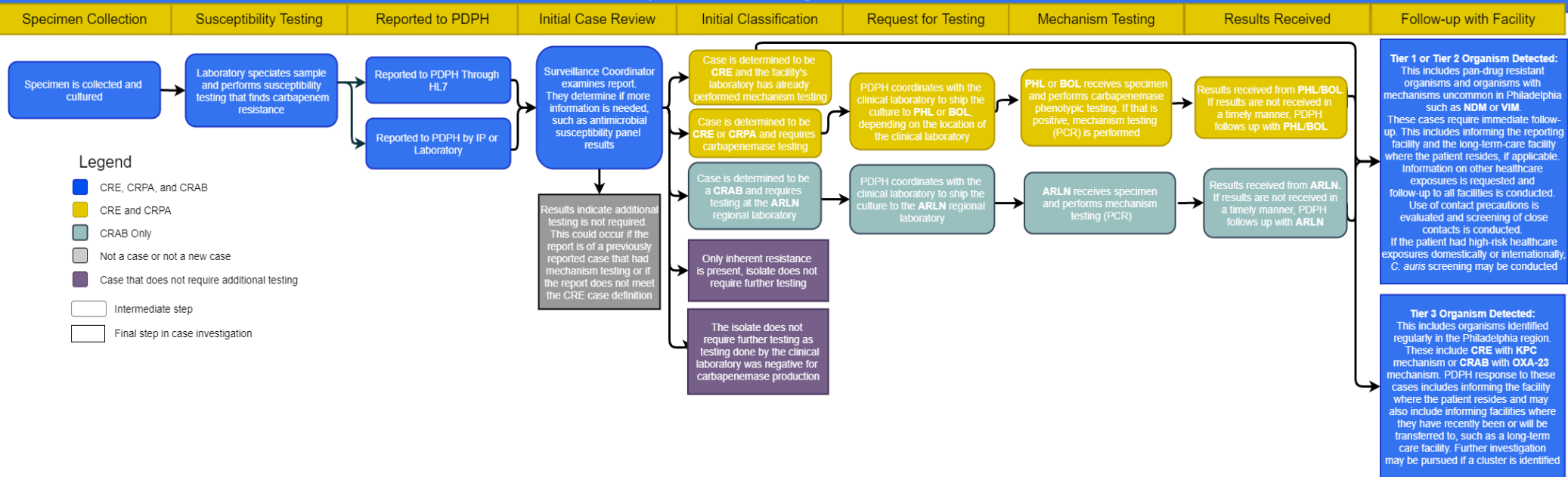
Element	Implementation Activities
IV. Implement data-driven prevention strategies	<ul style="list-style-type: none"> • The HAI/AR Program will continue to conduct preventative ICARs in all high-risk facilities located in Philadelphia. • The HAI/AR Program will continue our ongoing collaboration in outpatient hemodialysis settings with the End Stage Renal Disease Network 4 (ESRD NW4) and large dialysis organizations. • The HAI/AR Program will conduct onsite assessment visits in dialysis facilities with high blood-stream infection (BSI) rates and follow-up with repeat visits by invitation in facilities that need additional IPC support.
V. Use data for action	<ul style="list-style-type: none"> • The HAI/AR Program will continue to run our internal, NHSN-based, weekly reports on COVID-19 data reported by LTCFs and hemodialysis facilities, Quarterly Dialysis Event Surveillance Report, and Annual Healthcare Personnel Vaccination Coverage Report to identify areas of need for targeted prevention and outreach compared to peer facilities. • The HAI/AR Program will utilize existing NHSN SIR, SUR, and CAD tools to identify Philadelphia facilities with high rates of HAIs for targeted prevention and outreach efforts. • The HAI/AR Program will run annual Targeted Assessment for Prevention (TAP) reports for all settings and conditions to identify targeted areas for improvement. • The HAI/AR Program continues to collaborate closely with the PADOH on cross-jurisdictional <i>C. auris</i> responses and prevention efforts to define local and regional epidemiology and to limit transmission.
VI. Support rapid response to control newly identified HAIs and targeted MDROs.	<ul style="list-style-type: none"> • The HAI/AR Program has developed and shared resources on both targeted MDRO and COVID-19 related IPC topics with healthcare facilities throughout Philadelphia. Additionally, we have created various toolkits for facilities to utilize for infection control and training purposes. • Laboratory results will be shared in a timely manner with affected facilities along with IPC guidance appropriate for the organism.

Element	Implementation Activities
VII. Conduct response-driven onsite infection control assessments and evaluations	<ul style="list-style-type: none"> • The HAI/AR Program will conduct onsite ICARs in facilities where transmission of healthcare-associated infections is suspected or known to have occurred. • The HAI/AR Program will provide ongoing support to facilities for improving and sustaining IPC practices by offering consultations on specific infection control topics and by providing education and reference materials.
VIII. Support containment of novel or high-concern antibiotic-resistant organisms.	<ul style="list-style-type: none"> • The HAI/AR Program will improve the accuracy and timeliness of reporting and response utilizing the following strategies: Continuing our audits of microbiology data from facilities at risk of under-reporting and quarterly timeliness tracking reports (stratified by reporting facility). • The HAI/AR Program will conduct point prevalence surveys of <i>C. auris</i> in any facility where cases are detected and in all high-risk facilities at least annually. • The HAI/AR Program has developed a <i>C. auris</i> transfer form for facilities to support ongoing containment efforts. • The HAI/AR Program will establish criteria by which we will initiate a broader response for non KPC-CRE and non OXA23-CRAB, based on clinical and epidemiologic information specific to the case(s) and the infection control capacity of the facility/facilities where the patient receives care.
IX. Implement antibiotic stewardship efforts	<ul style="list-style-type: none"> • The HAI/AR Program will actively participate in CDC's Antibiotic Awareness Week and distribute Core Elements and "Be Antibiotics Aware: Smart Use, Best Care" materials year-round via our quarterly newsletter, meetings, and on-site assessments and site visits. • The AR/AS expert will provide education and expertise on antibiotic stewardship for lower resourced facilities to support them in implementing setting-specific AS activities. • The HAI/AR Program will collaborate with the LTC RISE program to develop an AS needs assessment for LTCFs and will use the data collected to inform the development of AS quality improvement activities, resources, and tools to address AS program gaps.

Element	Implementation Activities
X. Engage public health and healthcare providers with emphasis on health equity	<ul style="list-style-type: none"> • The HAI/AR Program will update an inventory of Philadelphia healthcare facilities regularly. • The HAI/AR Program will maintain resources on the PDPH HIP website and publish a quarterly newsletter to educate healthcare professionals (HCPs). • To address ICAR deficiencies, the HAI/AR Program will develop materials that will help facilities to mitigate these gaps, organized in toolkits and housed on the HIP website. • The HAI/AR Program will offer ICAR visits to outpatient facilities that serve immigrant, refugee, homeless and low-income persons. • The HAI/AR Program will host a virtual <i>C. auris</i>/MDRO Symposium jointly with PADOH to increase awareness targeted MDRO epidemiology and educate healthcare facilities on prevention measures to reduce transmission. • The HAI/AR Program will collaborate with local veterinary schools during the FDAW.
XI. Coordinate prevention activities with partners	<ul style="list-style-type: none"> • The HAI/AR Program will continue to co-host monthly collaboration calls with PADOH to coordinate work on outbreak responses and investigations as well as on programmatic activities. • The HAI/AR Program will collaborate with academic partners and local advocacy groups. • The HAI/AR Program will continue to collaborate with the ESRD NW4 on dialysis bloodstream infection (BSI) prevention work and on promoting COVID-19 vaccinations.
XII. Educational Activities	<ul style="list-style-type: none"> • The HAI/AR Program promotes and disseminates CDC's Project Firstline materials to all HCP and facility contacts. We have used data from our learning needs assessment survey to inform the educational resources that will be shared with the Philadelphia professional schools and LTCF communities. • The HAI/AR Program established an IPC onsite education program, focusing on interactive hand hygiene, environmental services, and PPE education, which is offered to Philadelphia LTCFs. • The HAI/AR Program established N-95 Respirator Fit Test Train-the Trainer program, which is currently offered to Philadelphia LTCFs with plans to expand to other care settings.

Appendix A: Carbapenem Resistant Organism Surveillance Workflow

Carbapenem Resistant Organism Surveillance Process



Appendix B: *Candida auris* Surveillance Workflow

