Infection Prevention and Control during a Pandemic Outbreak

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Pandemic challenges unraveled U.S. progress on AR.

The data:

⚠ Alarming increases in resistant infections starting during hospitalization—deaths and infections increasing at least 15% each (2019 to 2020)

⚠ After years of steady reductions in healthcare-associated infections (HAIs), U.S. hospitals saw significantly higher rates for four out of six types of HAIs in 2020[1]

⚠ Acute care hospitals also saw more *Candida auris* cases, including in COVID-19 units[2]

- ESBL-producing Enterobacterales (⬆32%)
- Vancomycin-resistant Enterococcus (⬆14%)
- Multidrug-resistant *P. aeruginosa* (⬆32%)
- Methicillin-resistant *Staphylococcus aureus* (⬆13%)
- Carbapenem-resistant *Acinetobacter* (⬆78%)
- Antifungal-resistant *Candida auris* (⬆60%)
- Carbapenem-resistant Enterobacterales (⬆35%)
- Antifungal-resistant *Candida* (⬆26%)

1. Weiner-Lastinger, L.M., et al. (2022). doi:10.1017/ice.2021.362
2. Prestel, C., et al. (2021). doi:10.15585/mmwr. mm7002e3

COVID-19 demonstrated the many AR challenges pandemics pose.

⚠ Sicker inpatient population

⚠ Extended lengths of stay

⚠ Increased device use, such as catheters and ventilators

⚠ More transfers between hospitals and nursing homes, making residents more vulnerable

⚠ Infrastructure issues resulted in infection prevention and control breakdowns:

- PPE, disinfectant and laboratory supply challenges

- Staffing shortages due to illness and burnout

- Overburdened and overcrowded facilities
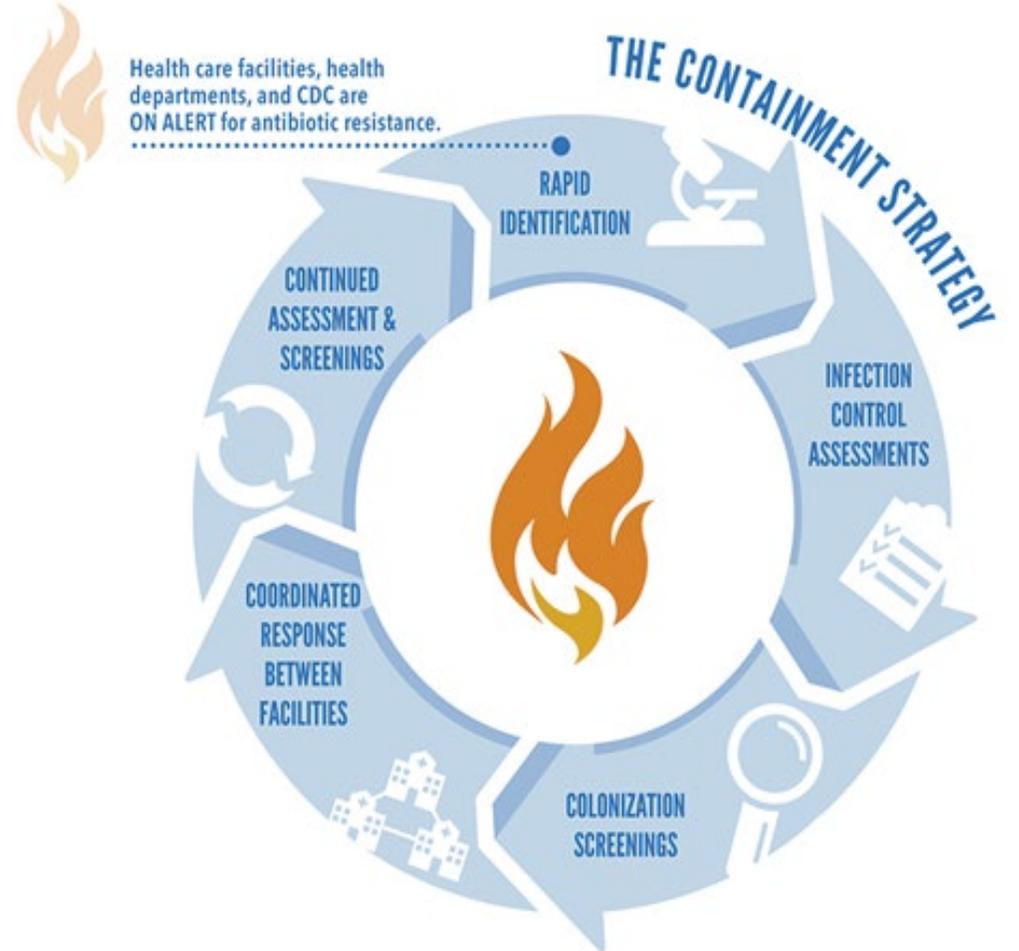
More HAIs

More AR

More deaths
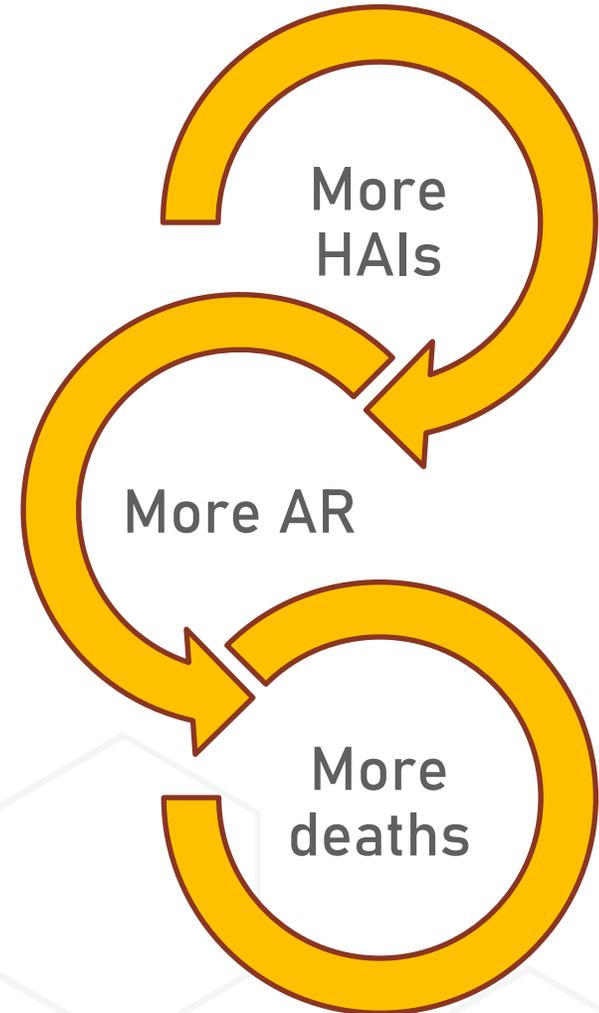
COVID-19 also demonstrated the primacy of infection prevention and control in pandemic response.

Infection prevention and control is the first tool available in any response

Keep it out, detect it fast, stop the spread.

- Rapid identification of suspect cases

- Immediate isolation and referral for testing

- Adherence to IPC practices

- Safe clinical management, supporting staff

THE CONTAINMENT STRATEGY

Health care facilities, health departments, and CDC are ON ALERT for antibiotic resistance.

RAPID IDENTIFICATION

INFECTION CONTROL ASSESSMENTS

CONTINUED ASSESSMENT & SCREENINGS

COLONIZATION SCREENINGS

COORDINATED RESPONSE BETWEEN FACILITIES

We are better positioned now than pre-pandemic: Healthcare-public health collaboration for IPC

- Stronger connections between healthcare + public health via state and local HAI/AR programs.
  - State HAI/AR programs have developed expertise in supporting facilities, especially nursing homes, with infection prevention and control.

- For example, Infection Control Assessment & Responses:
  - State programs did more than 58K infection prevention consultations/responses during the pandemic (Jan. 2020–July 2021)
  - This supportive work is continuing via $500 million in nursing home strike funding to states

Assessments During the Pandemic Identified Infection Control Gaps
From January 2020 through July 2021:

HAI/AR programs conducted

58,807
Consultations

in response to potential COVID-19 healthcare outbreaks

Using CDC's Infection Control Assessment and Response tools in

8,827
Online assessments

13,185
Remote assessments

Most assessments in nursing homes or assisted living facilities

Assessments reduced the spread of threats

We are better positioned now than pre-pandemic: Data for action

Soon after the start of the pandemic, CDC's National Healthcare Safety Network stood up COVID-19 reporting modules for facilities across the healthcare continuum: hospitals, nursing homes, dialysis facilities.

That data has been used in real time to:

- Direct PPE supplies to facilities with needs

- Identify facilities with large outbreaks for targeted outreach and support

- Identify facilities with low vaccination rates for targeted outreach and support

- Assess the effectiveness of infection control recommendations

- Assess the effectiveness of vaccines, including boosters

https://covid.cdc.gov/covid-data-tracker/#vaccinations-nursing-homes
https://covid.cdc.gov/covid-data-tracker/#nursing-home-residents

We are better positioned now than pre-pandemic: Expanded and just-in-time training for all HCWs

- Healthcare personnel needed training throughout the pandemic:
  - Wanted basic refresher training on infection prevention, e.g., isolation precautions, and using PPE
  - Infection prevention staff spent significant time training, limiting their time on other important work
- To fill this gap, CDC launched Project Firstline:
  - A new program intended to provide tailored education to ALL healthcare personnel and designed to incorporate best practices in adult learning and health equity.

Gaps still exist in the "new normal"

The funding for many of our gains is time limited.

- Without continued funding support, e.g. for state HAI/AR programs, we will lose the valuable infrastructure that's helped us respond to COVID-19.

There were staffing challenges in many facilities before the pandemic.

- In addition to having too few, the healthcare workforce is now exhausted, burned out and demoralized

- We must support healthcare personnel as they struggle to return to a new normal

- What are structural improvements that will make a meaningful difference ("We don't need more muffins and pizza")?

- What are strategies that will attract more people to healthcare, especially nursing and nursing assistants?

There are also other innovations that could transform our abilities to address AR threats in future pandemics.

Influenza Pandemic Response Components

NPI Interventions to prevent disease transmission

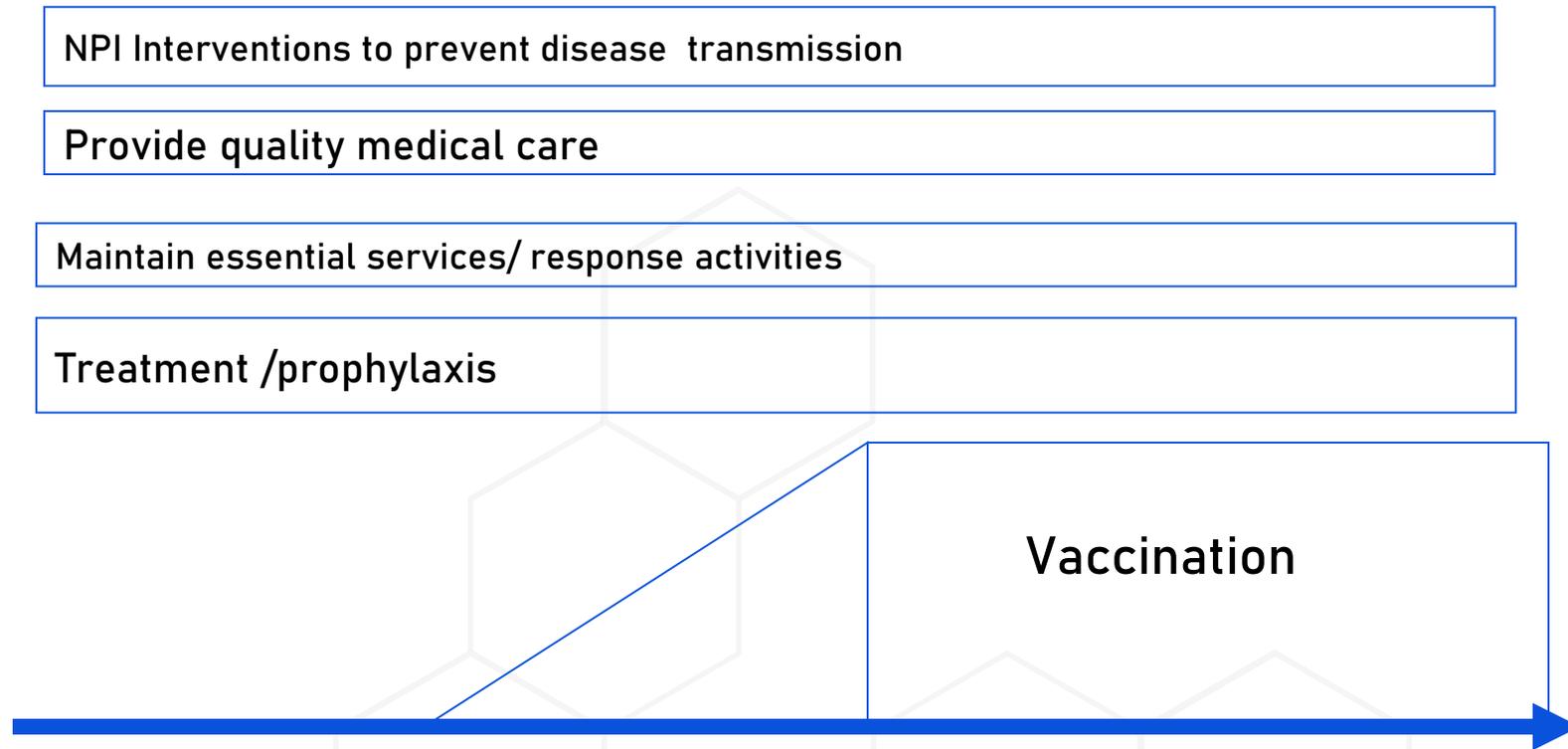Provide quality medical care

Maintain essential services/ response activities

Treatment /prophylaxis

Vaccination

Time

NPI (nonpharmaceutical intervention)

Invest in innovations now to prevent infections: Vaccines.

Vaccines hold great promise as a key implement in the toolkit to reduce AR

- Real-world evidence already exists for vaccines directed against community-associated pathogens

- More work needed to develop vaccines against healthcare-associated pathogens

- Only have 3 vaccines licensed for the 18 AR threats (*Strep pneumo, Salmonella* Typhi, TB)

Vaccines can reduce antibiotic use and potentially reduce antibiotic pressure

- To realize full potential, need better coverage for existing vaccines (influenza, pneumococcus, rotavirus, others)

- Need to understand effect of COVID-19 vaccines

Critical to have systems in place to track the impact of vaccines on AR and antibiotic use in populations

Increases in influenza vaccination associated with significant reductions in antibiotic prescribing

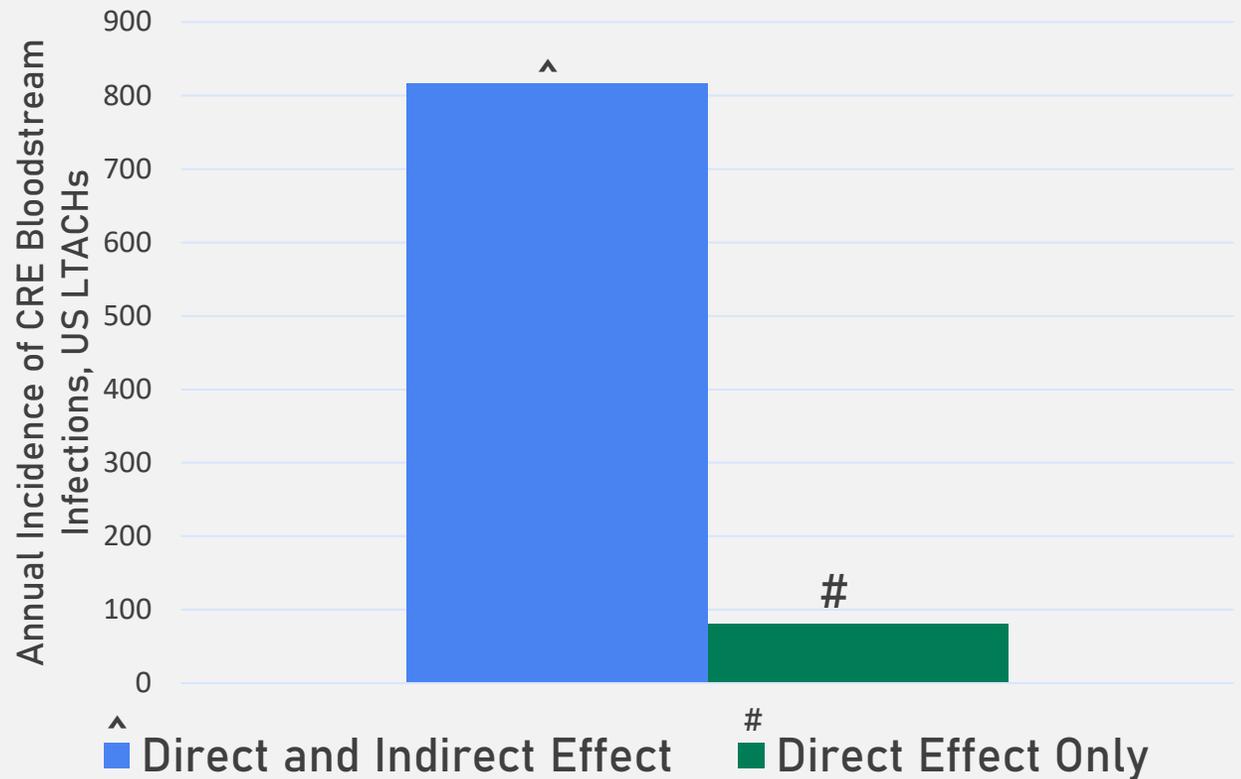Klein E., et al. (2020). https://doi.org/10.1093/ofid/ofaa223.

Invest in innovations now to prevent infections: Decolonizing agents.

Colonization drives transmission of resistant organisms in healthcare settings.

We need more research and development for agents that reduce or eliminate the burden of colonizing pathogens to:

1. Prevent recurrence and do more than "decontaminate," such as protecting and/or restoring the microbiome

2. Reduce pathogen burden (load) and/or eliminate pathogens completely, even better if it has a targeted application (body site, pathogen). Products that will not drive or increase AR should be prioritized.

3. Benefit individuals (the "source") and populations

CRE Decolonization Prevents Infections from Known Carriers in All U.S. Long Term Acute Care Hospitals*

Chart: Annual Incidence of CRE Bloodstream Infections, US LTACHs

- Direct and Indirect Effect: ~820 ^
- Direct Effect Only: ~80 #

Legend:
- ^ Direct and Indirect Effect
- # Direct Effect Only

*Damon Toth, unpublished adaptation of model published in Toth et al. Clinical Infectious Diseases 2021;72(S1):S34–41

Invest in innovations now to prevent infections: Better device technologies.

- Device safety currently relies almost entirely on HCP technique; any breach can lead to infections.

- Device-associated infections are common and are often caused by AR pathogens—not only harming that patient but creating a reservoir for spread to others.

- COVID-19 resulted in increased device use and we would expect the same in any future pandemic (see figure).

We need better device technologies to support safer patient care:
- Devices that are easier to maintain
- Devices that are resistant to microbial colonization

Legend:
- * VAE
- \+ LabID MRSA bacteremia
- ^ CLABSI
- @ CAUTI
- & 2015 Baseline

CDC - HAI Data
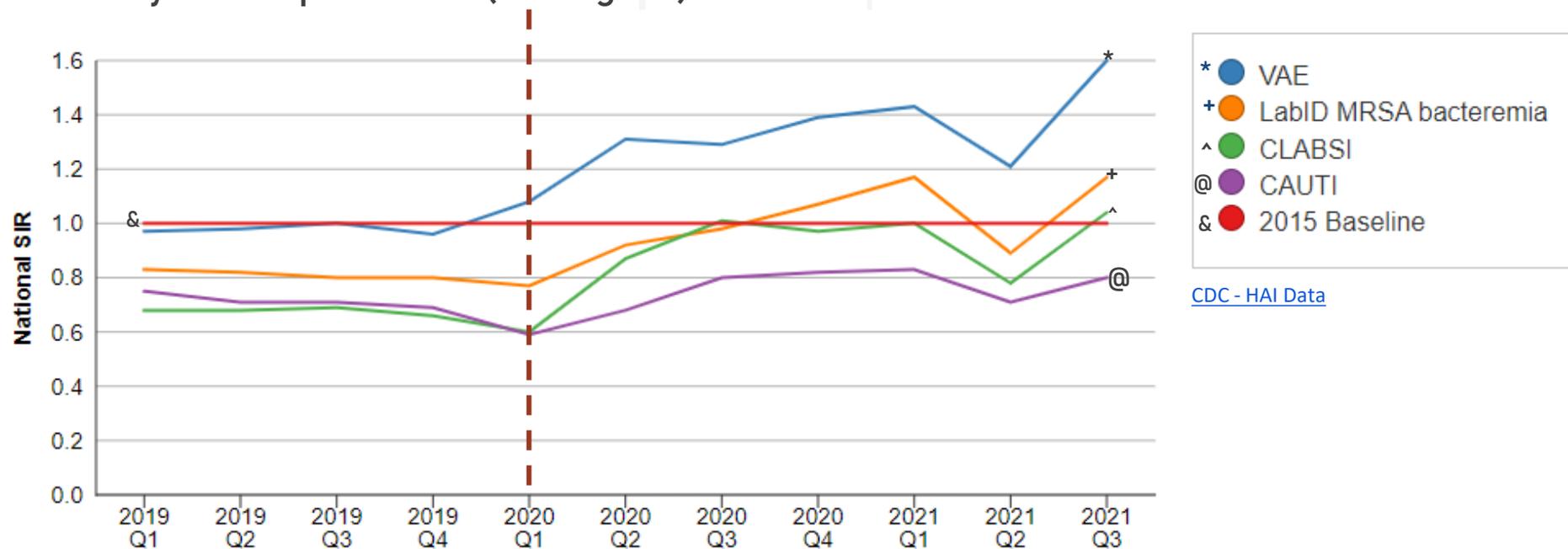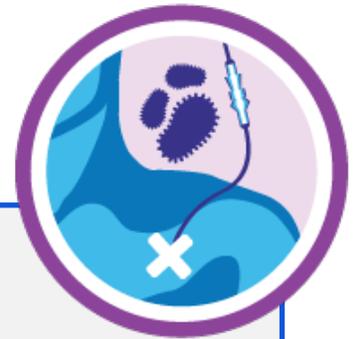
Invest in innovations now to prevent infections: Prevention-focused policies & practices.

- Healthcare system preparedness
  - Tiered facility prioritization
  - Remote and on-site support, including telehealth
  - Collaboration with health departments and QIOs
  - Convening external partners regularly
  - Building on years of CDC, CMS collaboration
- Post-acute care gaps for vulnerable populations
  - >15,400 long-term care facilities in the U.S.
  - ~1.3 million residents each day
  - ~29,000 assisted-living communities with ~1 million total licensed beds and >800,000 residents
- Health equity and access
  - Tailored approaches
  - Access to quality care
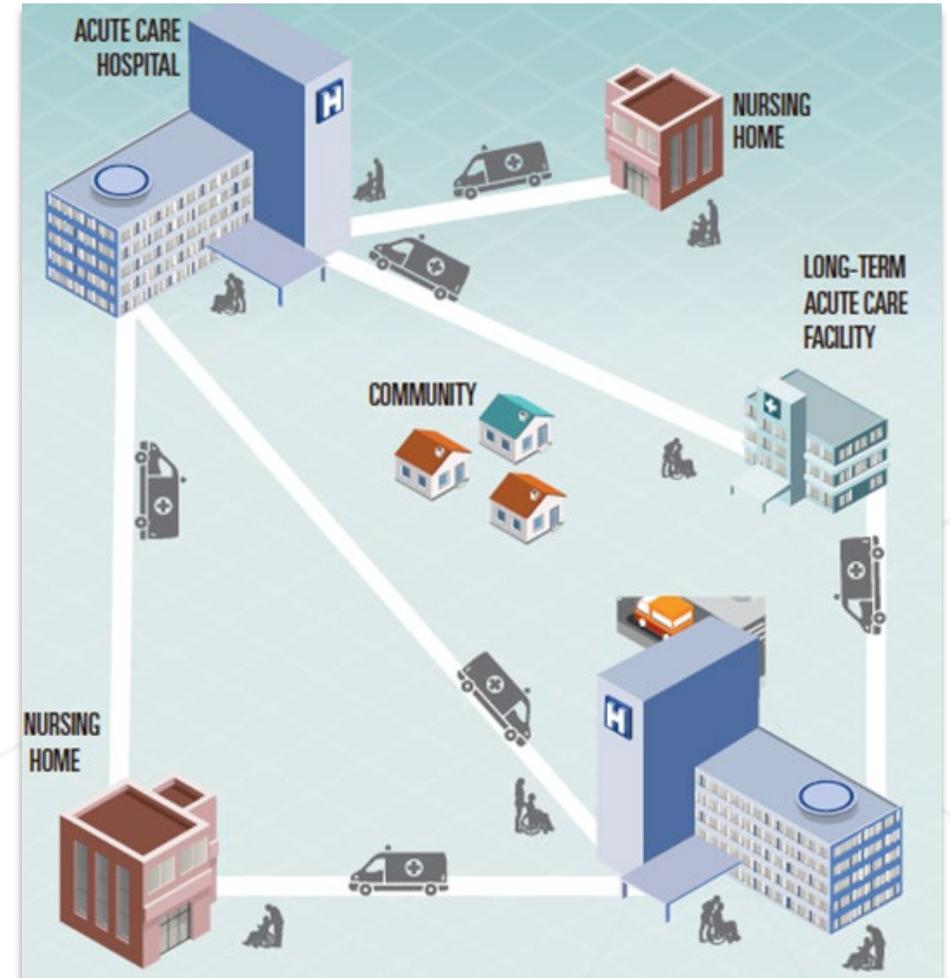
Emerging Diseases Follow a Consistent Pattern

What's Needed

- Sustainability of critical AR programs that turn data into prevention:
  - HAI/AR Programs
  - National Healthcare Safety Network (NHSN)
  - Project Firstline (PFL)

- Continued and expanded data collection from nursing homes and outpatient facilities

- Sustained efforts to ensure surge capacity for PPE supplies

- Innovations to address gaps that emerged during COVID-19:
  - Healthcare personnel support and staffing
  - Vaccines
  - Decolonizing agents
  - Better device technologies

Thank you

📧 @CDC_AR

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For more information, contact CDC
1-800-CDC-INFO (232-4636)
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