

Active surveillance for C. diff, CRE, (and Candida auris) in Houston

If your name starts with a “C”, we are looking for you!!



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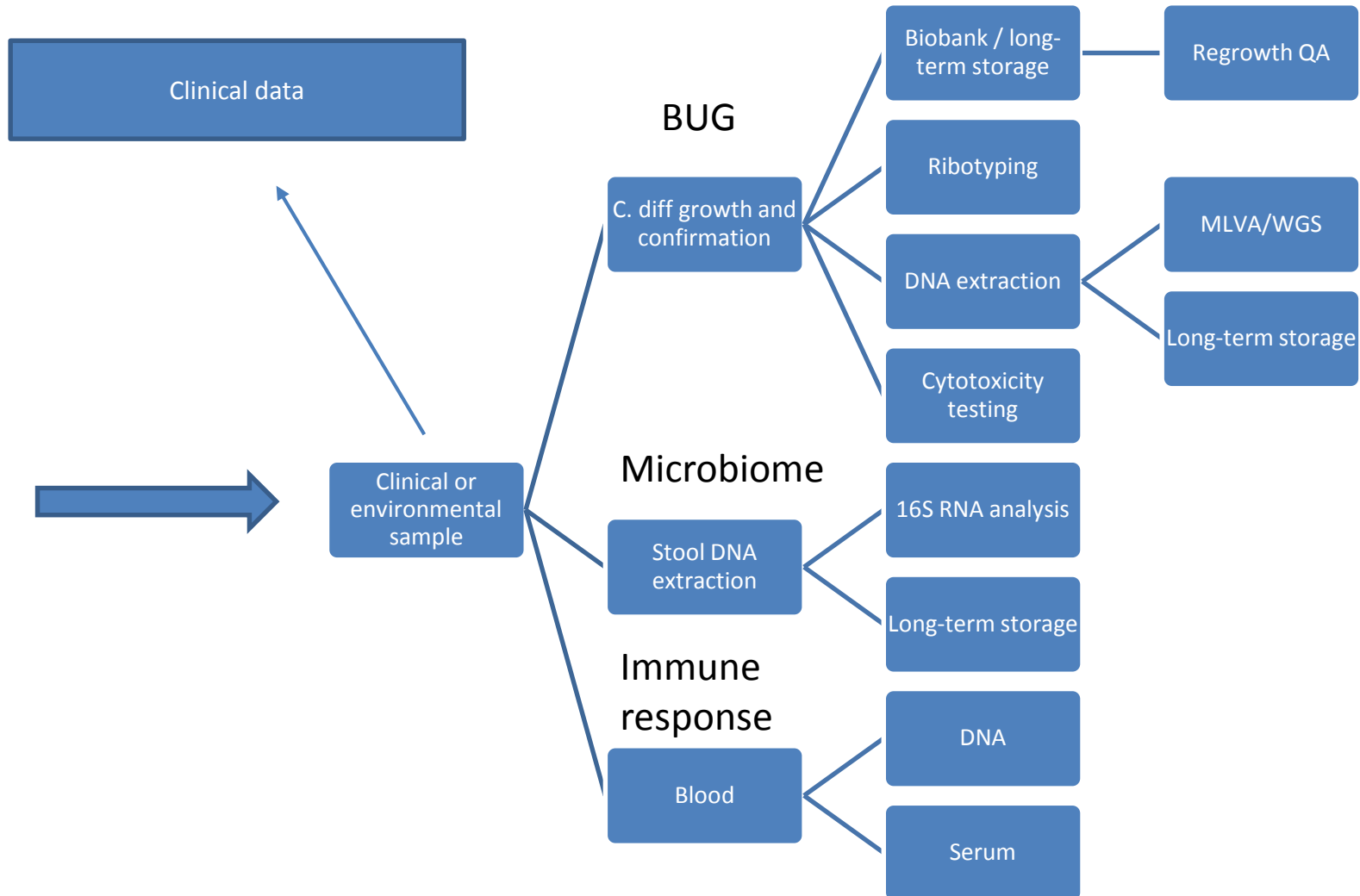
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Update on progress of city-wide surveillance projects

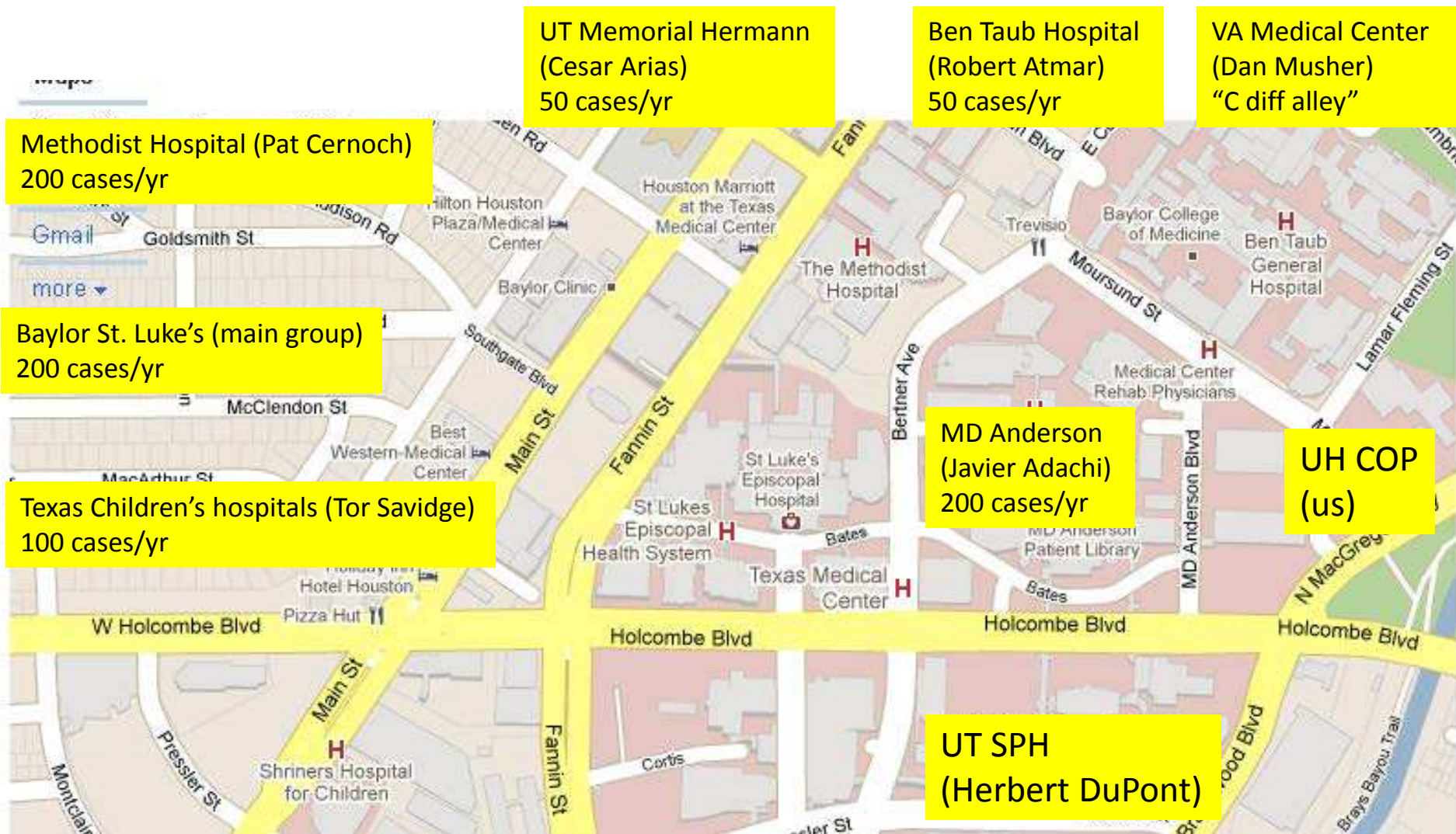
- We are leading the nation in active surveillance of MDRO pathogens
 - CRE:
 - characterize resistance mechanisms of CRE from at least 10 hospitals in the Houston area
 - Initial hospitals recruited (St. Luke's and Memorial Hermann)
 - If anyone wants to participate (aka, send samples), let me know!
 - *C difficile* infection (CDI):
 - Active, state-wide surveillance system to detect emerging epidemics of CDI
 - Houston-wide outbreak investigations of CDI
 - Lots of data to present!
 - Still looking for more sites, let me know!
 - *Candida auris*:
 - Newest surveillance effort supported by TMC Public Policy Institute
 - Surveillance to start at 10 hospitals (guess which ones)
 - Will have the capability to expand
 - XDRO protocol:
 - Future work to mimic work done in Illinois (Bob Weinstein)
 - Reporting network to alert patients admitted with a past history of select MDRO organisms
 - Will present protocol, some results, and brainstorm on potentials

Components of an active surveillance system:

C difficile

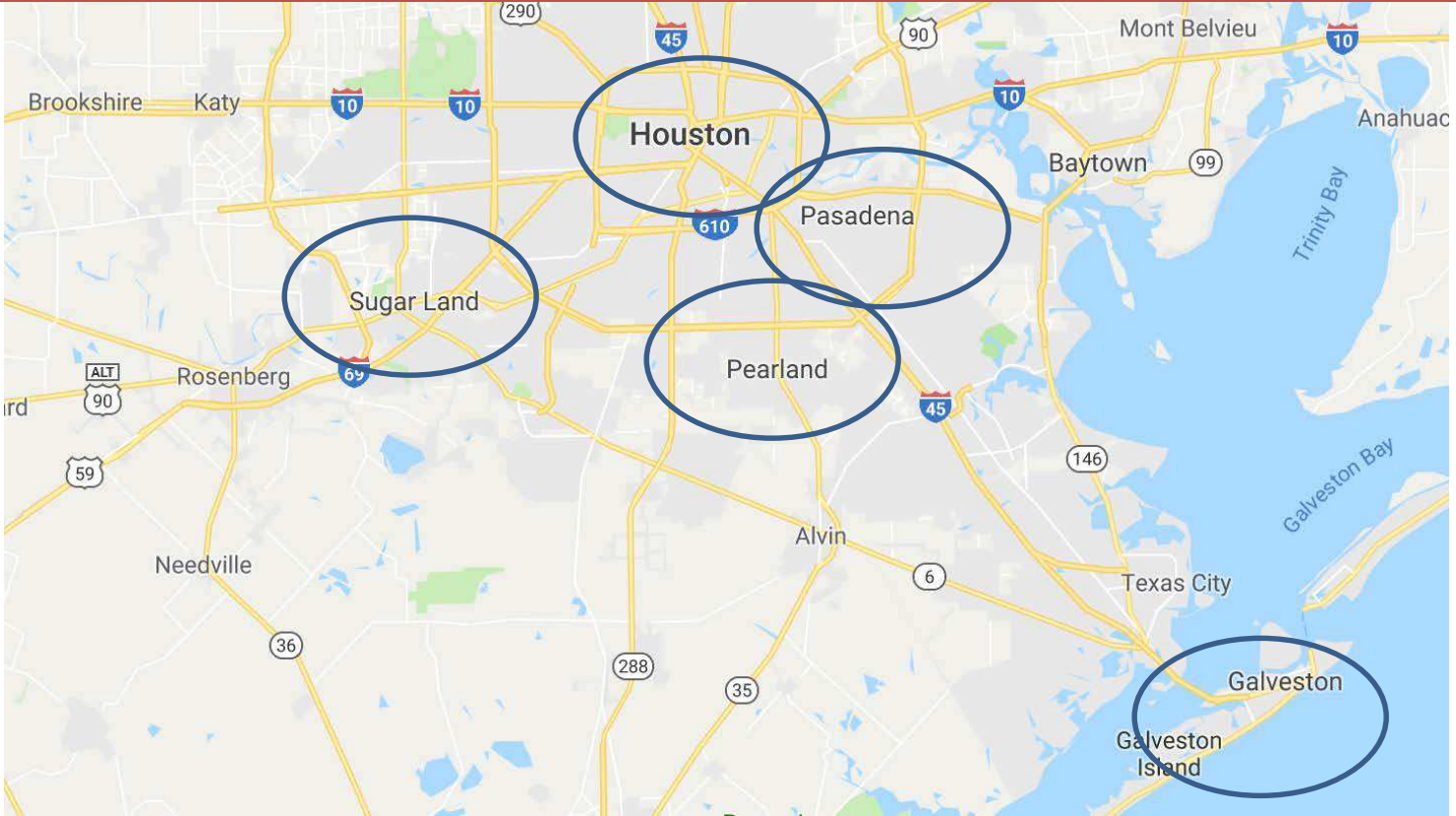


TMC C. diff surveillance network

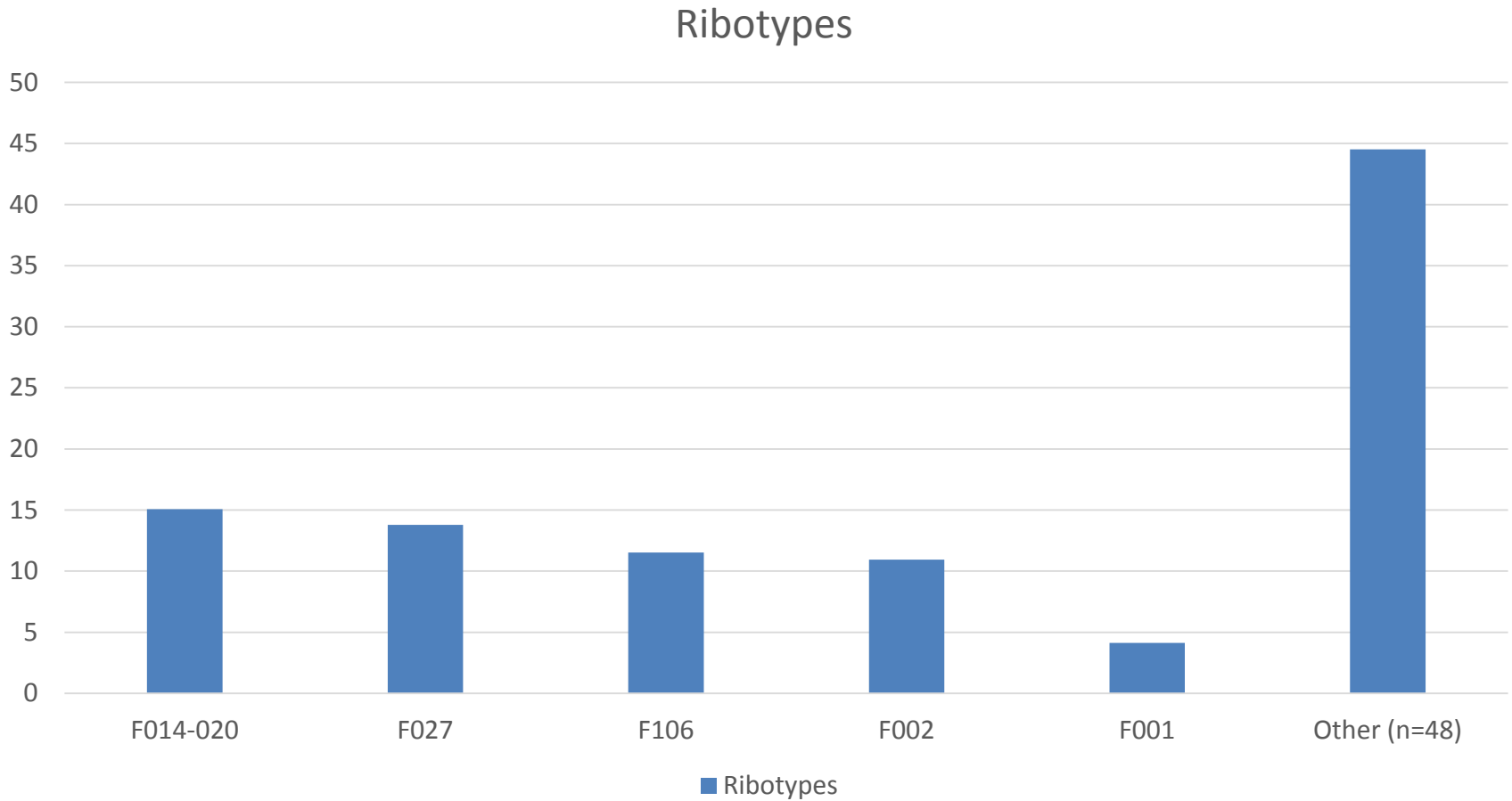




Thanks to the systemization of health-systems, HCA, and some buddies, we have an active surveillance system that covers Houston



Active surveillance of C. diff in Houston



PCR ribotyping is commonly used worldwide

Ribotype	Houston	Australia	Belgium	Europe
014/020	15%	26%	20%	12%
002	11%	11%	8%	3%
106	12%	NR	6%	2.5%
027	14%	1.6%	4.2%	12%
001	4%	NR	NR	9%

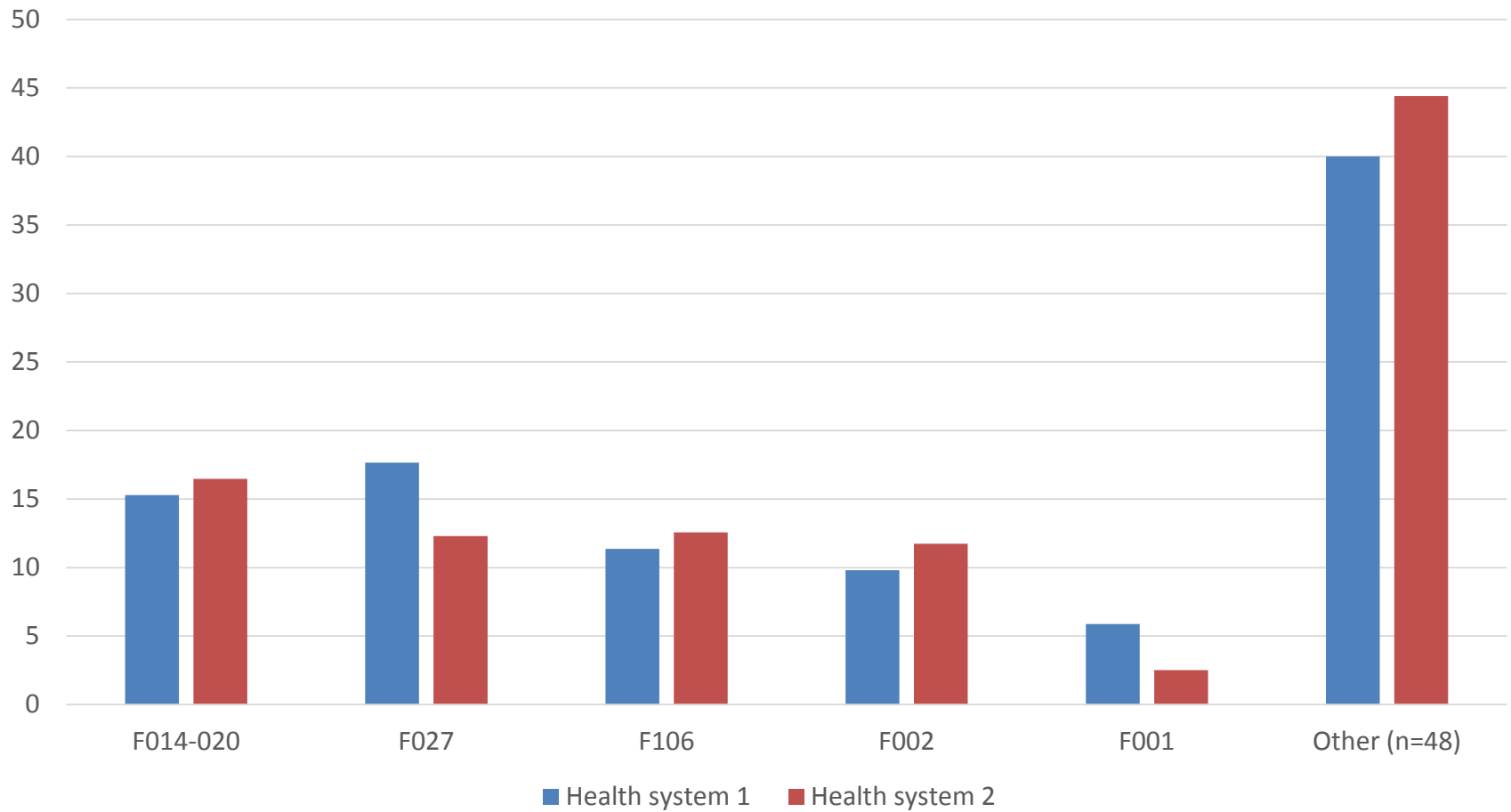
Congratulations, Houston! We have our own unique *C. difficile* ribotype!!

Collins et al. Pathology 2017:309-13

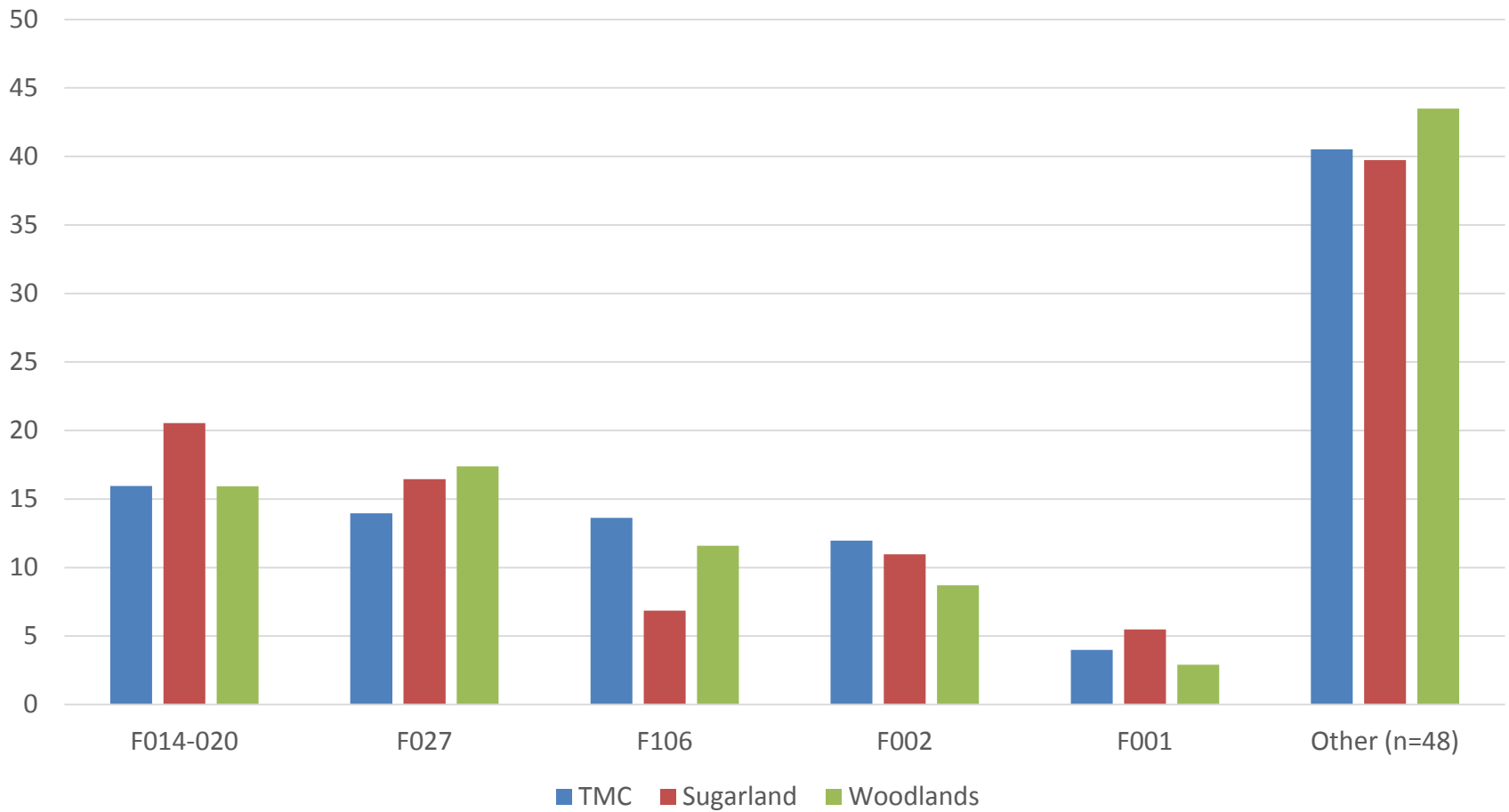
Neely et al. J Hosp Infect 2017; 394-9

Freeman et al. Clin Microbiol Infect 2015:248e9-e16

Ribotype distribution looks pretty similar within our health systems



Where we live may be more important than what health-system we go to!



One Health meets *C. diff*



Fig. 1: Isolation of *Clostridium difficile* from park tree leaves

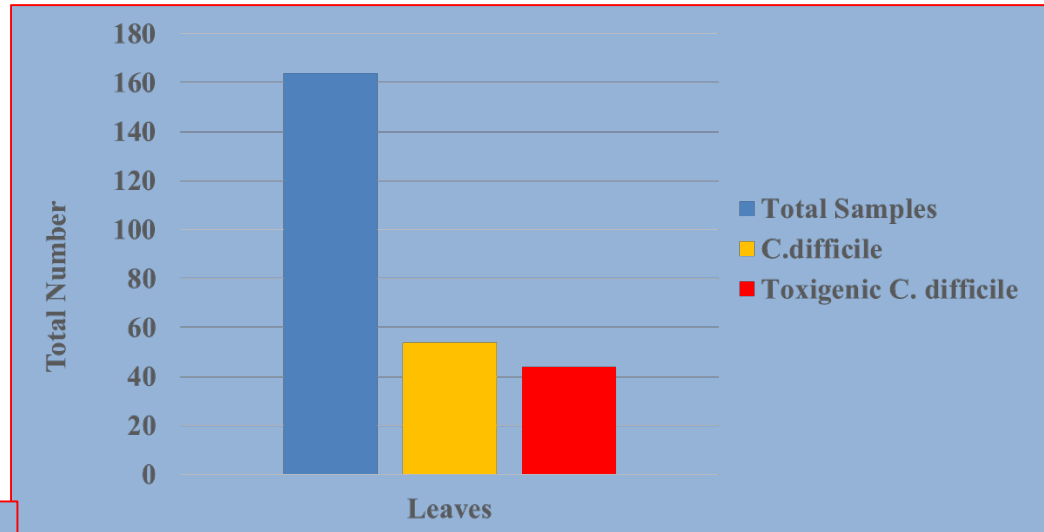
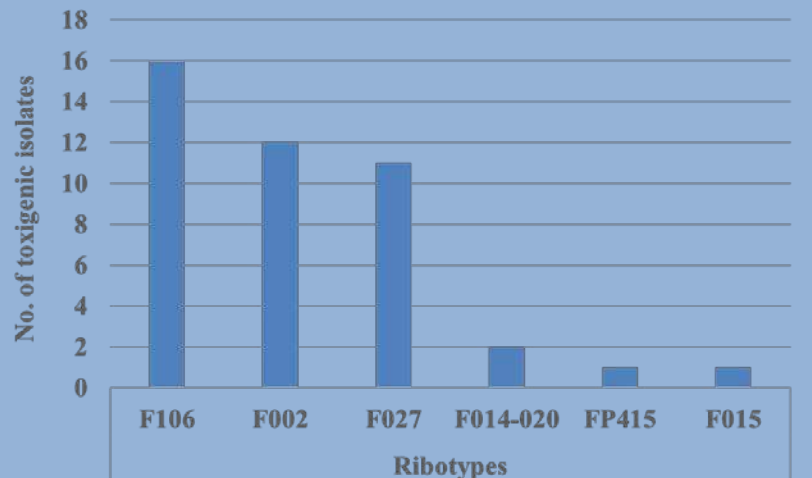
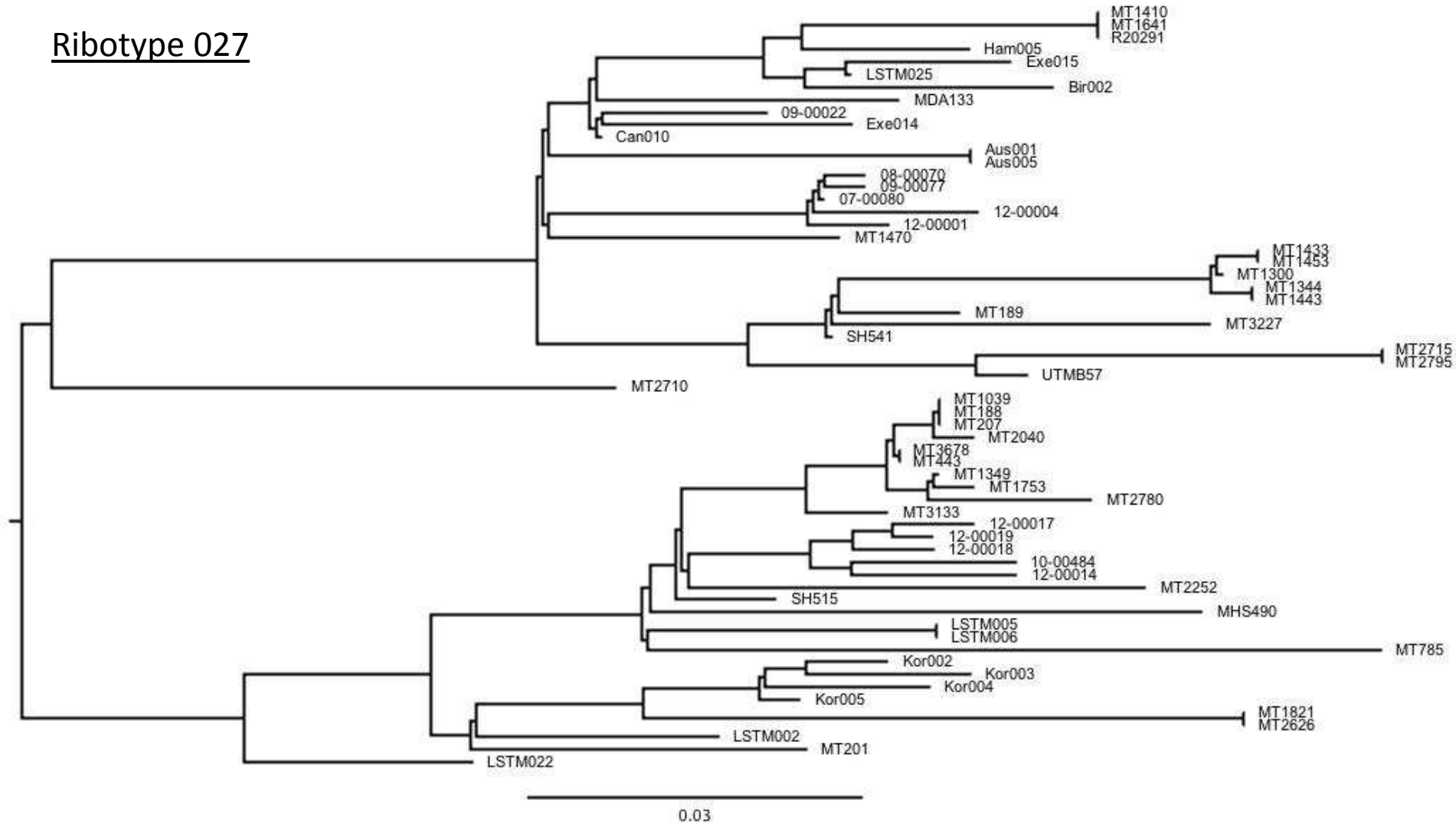


Fig. 2: Ribotypes of *Clostridium difficile* from park tree leaves



Going a little deeper: We can start to see how our C diff compares to the rest of the world

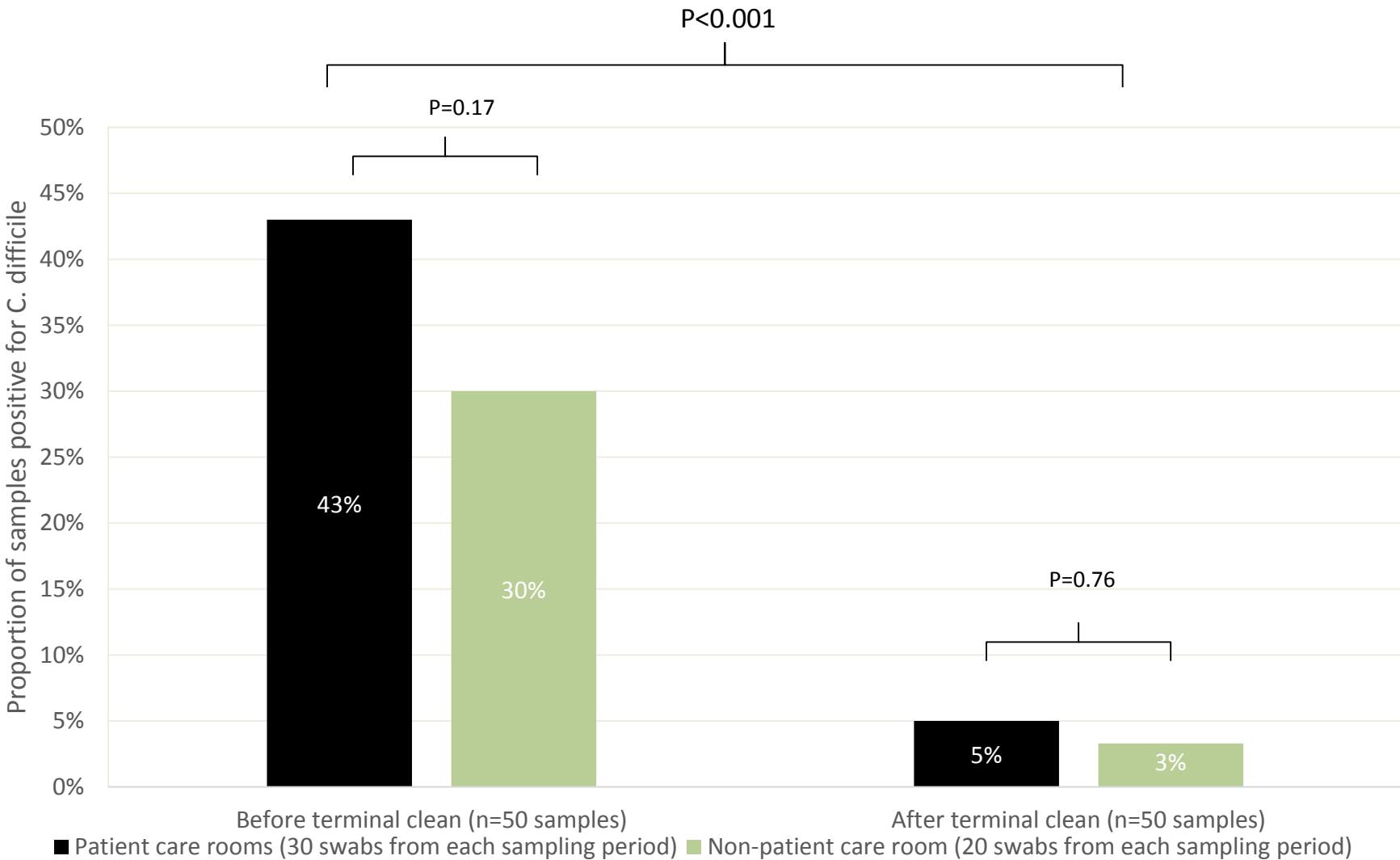
Ribotype 027



We can also use these tool to impact patient care

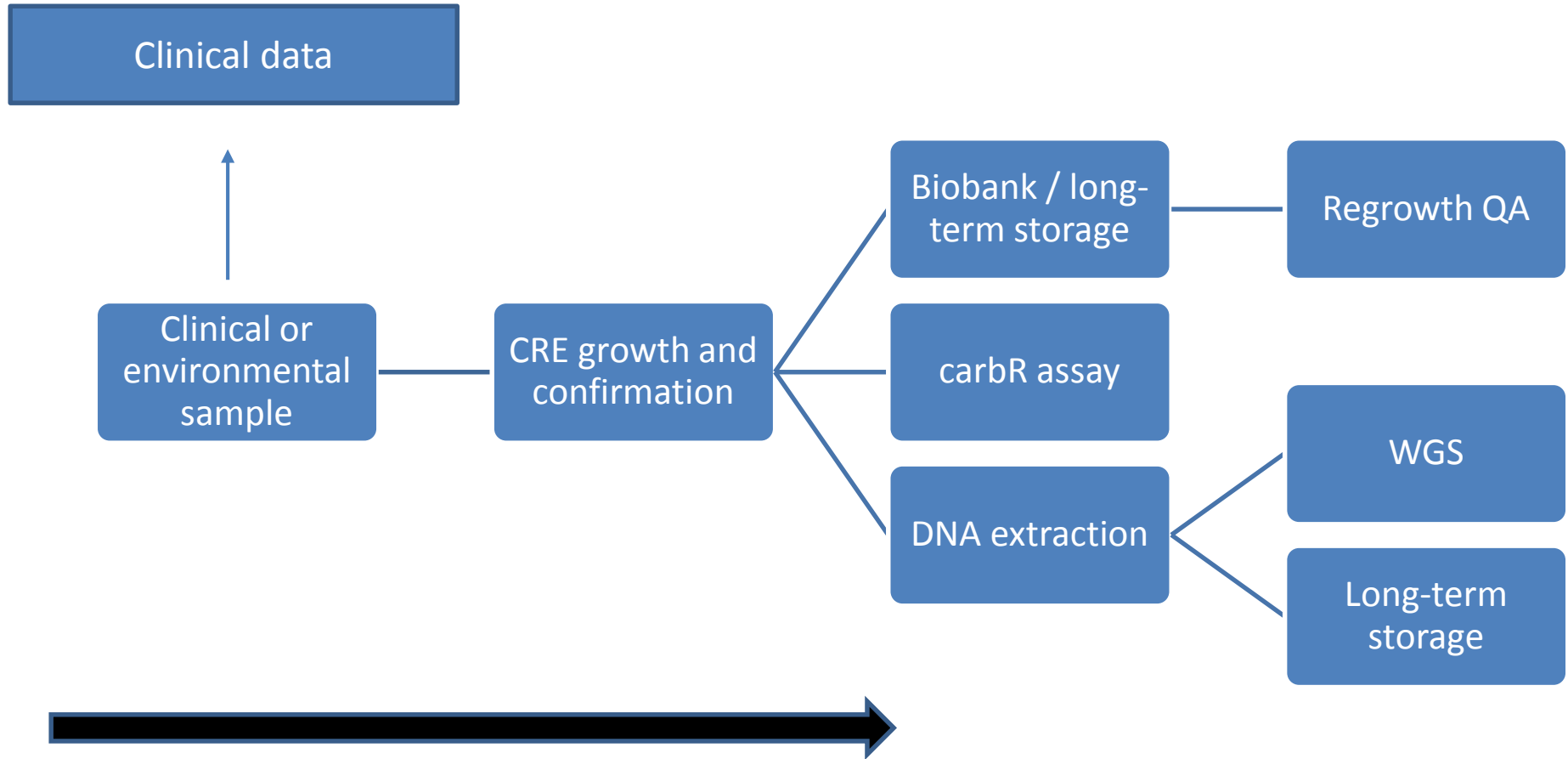
- In 2016, we were consulted on an increased number of CDI cases at a nursing home (n=4). One patients was originally symptomatic with three subsequent cases developing over the next month. This was the first case of CDI occurring at this nursing home ever!
- ALL STOOL SAMPLES WERE POSITIVE FOR RIBOTYPE 027
- Environmental samples also positive to ribotype 027
- Based on these results, the nursing home underwent an institution-wide terminal clean
- We then performed a follow-up environmental sampling study

Proportion of positive environmental samples before and after facility-wide terminal clean with 10% bleach solution



Components of an active surveillance system:

CRE



City of Houston Health Dept has validated the Cepheid Xpert carba-R assay in their labs

Targets for carba-R assay

- KPC
 - USA
- IMP
 - Europe, Latin America
- VIM
 - Greece, Italy, Turkey, Spain
- NDM
 - India – emerging globally
- OXA-48
 - Europe, Latin America

Houston: We have an active CRE surveillance system!!

Approximately, 50 samples have been sent to the health department for testing
Clinical and microbiology data available for the first 11

All 11 samples positive for blaKPC!

Age (range)	35-73
Gender	6 male; 5 female
Race	6 Caucasian; 3 Black; 2 not reportedNR
Source	Blood: 3; Urine: 3; Respiratory: 3; Abdominal: 1; Other: 1
Antibiotics at day 7:	Ceftaz-avi: 5; Meropenem: 1; Polymixin B: 1; Aminoglycoside: 1

Candida auris



In its pursuit of better, more effective health policy, the Health Policy Institute will continue its funding program for 2018 to support TMC collaborations devoted to policy impact through research. The Institute will award a total of \$750,000 in November of 2017 for innovative, one-year projects. A Letter of Intent is required, through on-line submittal, by **June 15, 2017**. Applications, by invitation, will be accepted on-line **until August 15, 2017 at 5pm**.

The TMC Funding Program in Collaborative Health Policy Research

Eligibility

Letters of Intent and applications are strictly limited to Texas Medical Center member organizations. Collaboration and funding may include 501(c)(3) organizations with permission.

Award Criteria

- New, significant collaboration among 3 or more TMC member organizations.
- Innovative, 12-month project.
- Assurance of impact on public policy at the state or federal level in 3-5 years.
- Explicit link to health.
- Financially prudent budget.

Letter of Intent

Funding

A total of \$750,000 will be awarded for projects that can demonstrate **significant policy impact**. Pilot projects intended to support competitive applications for national funders are welcome.

We expect proposals in the range of \$100,000 to \$250,000 with compelling budget justifications.

Each collaborating TMC organization will be funded separately through a gift arrangement with their respective Development/Philanthropy/Donor Office. Details will be provided with invitations to submit.

Funding is through a designated-gift mechanism and no indirect costs will be covered.



Fungal Diseases

Fungal Diseases	
Types of Fungal Diseases	+
Who Gets Fungal Infections?	+
Outbreaks	+
CDC at Work	
Global Fungal Diseases	+
Antifungal Resistance	
Think Fungus: Fungal Disease Awareness Week	+

[CDC](#)

Candida auris

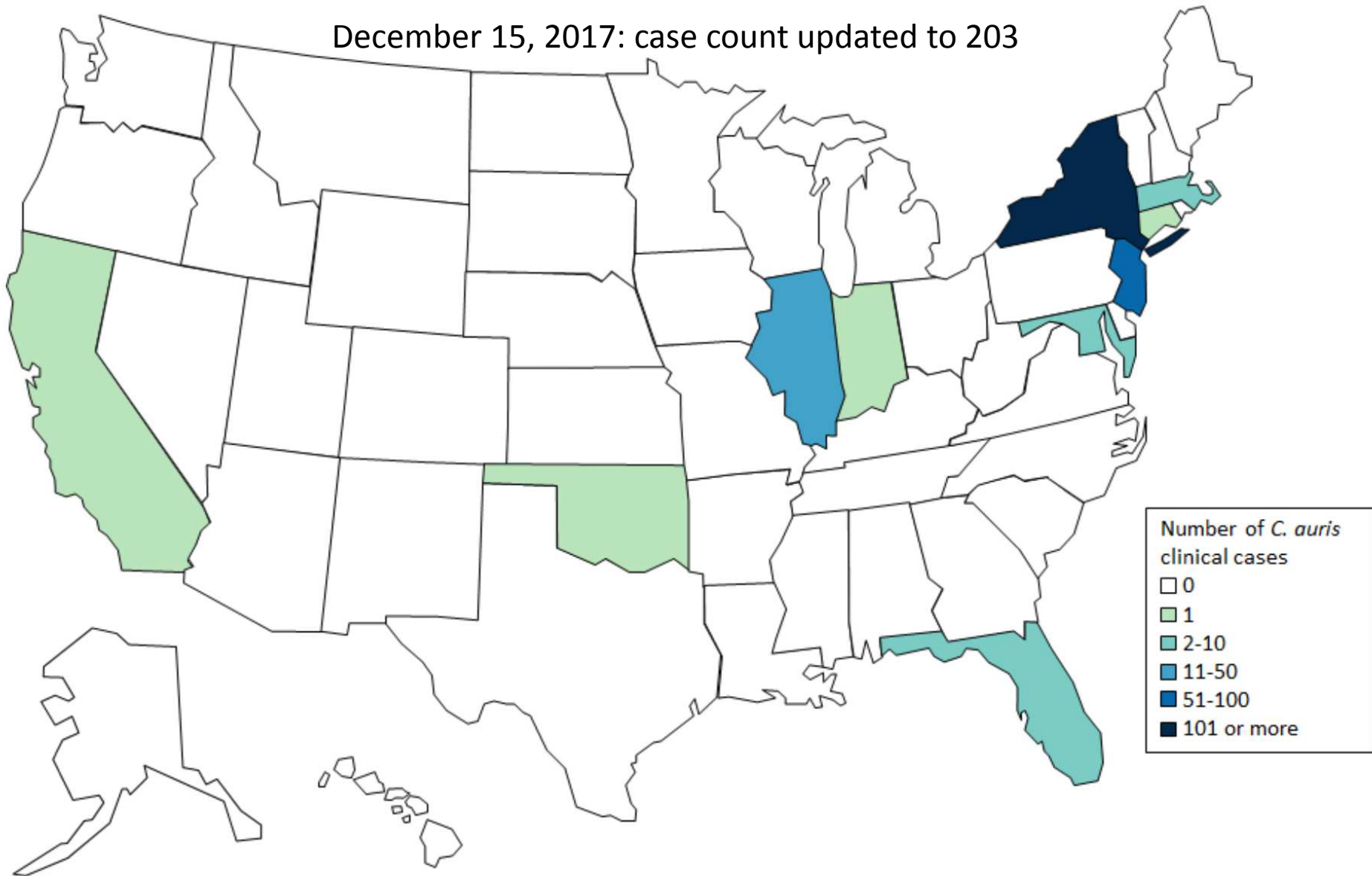


Candida auris is an emerging fungus that presents a serious global health threat. CDC is concerned about *C. auris* for three main reasons:

1. It is often multidrug-resistant, meaning that it is resistant to multiple antifungal drugs commonly used to treat *Candida* infections.
2. It is difficult to identify with standard laboratory methods, and it can be misidentified in labs without specific technology. Misidentification may lead to inappropriate management.

U.S. Map: Clinical cases of *Candida auris* reported by state, United States, as of November 30, 2017

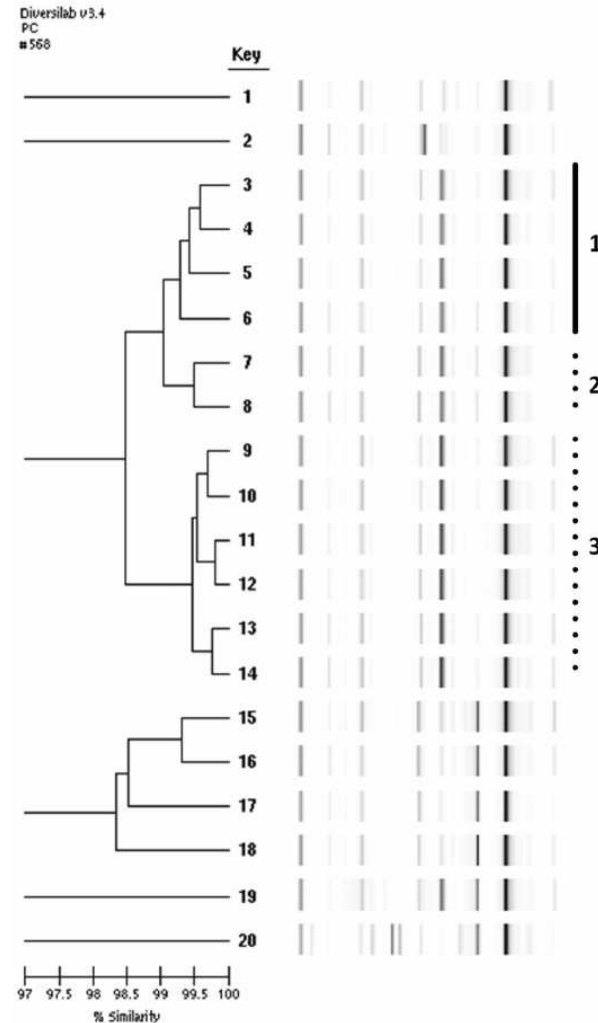
December 15, 2017: case count updated to 203



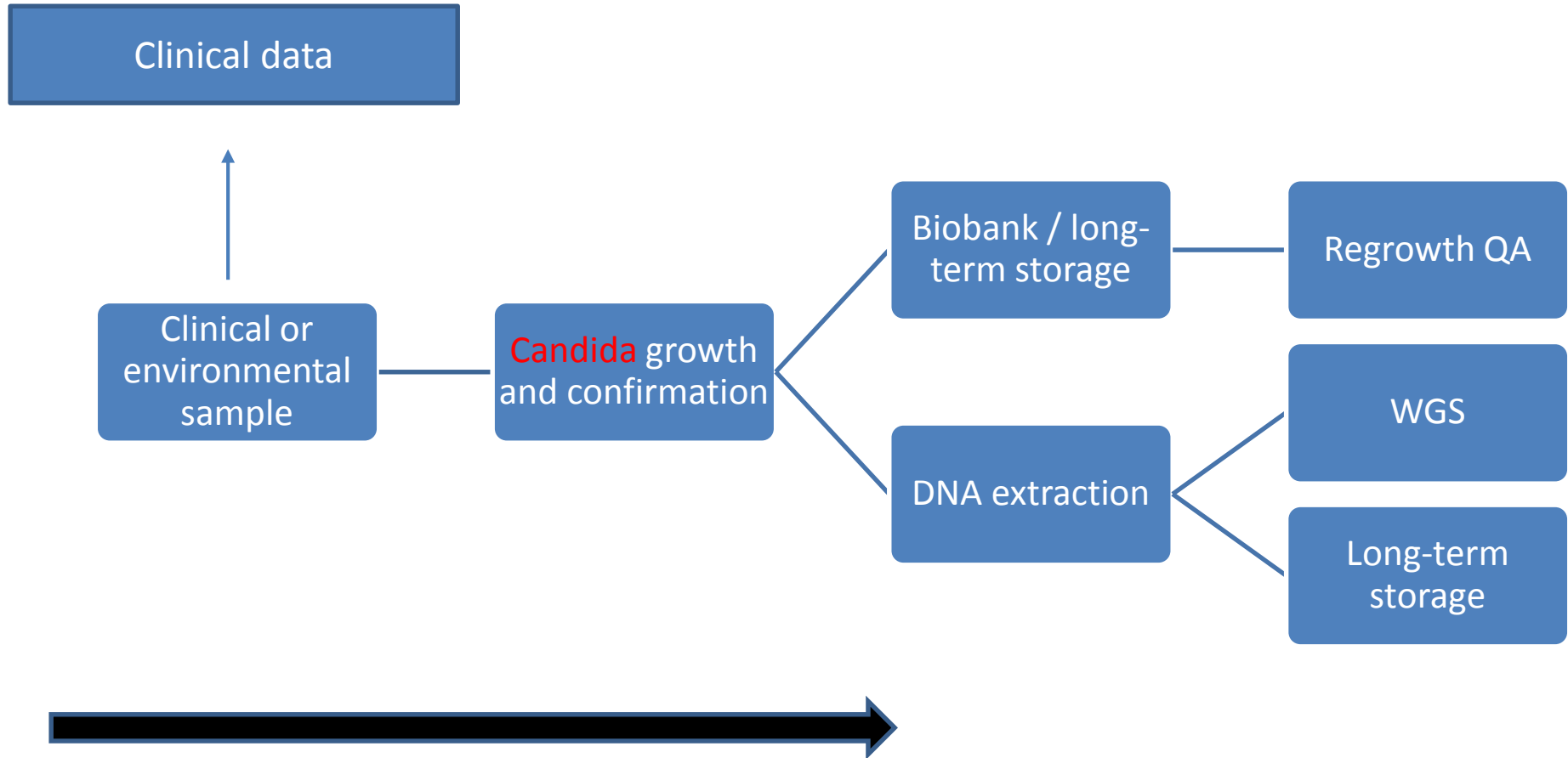
Cases are categorized by the state where the specimen was collected. Most [probable cases](#) were identified when laboratories with current cases of *C. auris* reviewed past microbiology records for *C. auris*. Isolates were not available for confirmation. Early detection of *C. auris* is essential for containing its spread in healthcare facilities.

We have experience looking at clonality of *Candida*

Fig. 1 Clonal uniqueness of the *C. albicans* isolates. rep-PCR based dendrogram and virtual gel image fingerprints showing DiversiLab software analysis of twenty *C. albicans* isolates. Pearson's correlation coefficient was used to generate a pairwise percentage similarity matrix, and the tree was created using UPGMA. Group 1 indicates an indistinguishable strain was found between 4 patients; groups 2 and 3 had similar strains between the respective patients. Key number is an independent patient ID; bar, percentage similarity among strains



Components of an active surveillance system: C. auris



Candida auris surveillance

- Details
 - 1-2 year evaluation of *Candida* bloodstream isolates from 2 health systems
 - WGS for clonal relatedness and identification of *C. auris* (if it is present in Houston)
 - Outreach to the Houston medical community for evaluation of *Candida* outbreaks or difficult to identify isolates

Future: XDRO registry

Facilities work together to protect patients.

Common Approach *(Not enough)*

- Patients can be transferred back and forth from facilities for treatment without all the communication and necessary infection control actions in place.

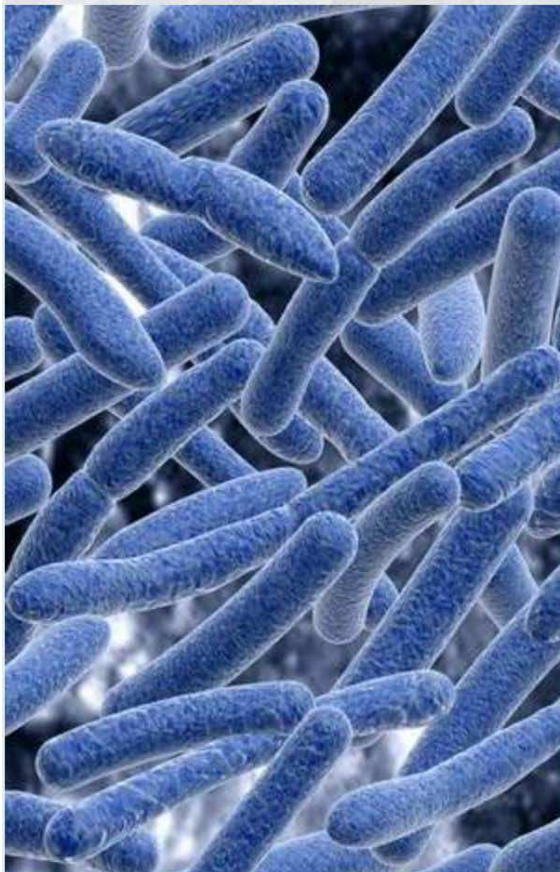
Independent Efforts *(Still not enough)*

- Some facilities work independently to enhance infection control but are not often alerted to antibiotic-resistant or *C. difficile* germs coming from other facilities or outbreaks in the area.
- Lack of shared information from other facilities means that necessary infection control actions are not always taken and germs are spread to other patients.

Coordinated Approach *(Needed)*

- Public health departments track and **alert** health care facilities to antibiotic-resistant or *C. difficile* germs coming from other facilities and outbreaks in the area.
- Facilities and public health authorities share information and implement shared infection control actions to stop spread of germs from facility to facility.





The XDRO registry is a product of collaboration between IDPH, Medical Research Analytics and Informatics Alliance (MRAIA), and the Chicago CDC Prevention Epicenter.

Carbapenem-resistant Enterobacteriaceae (CRE) are extensively drug resistant organisms (XDROs) that have few treatment options and high mortality rates. CRE are increasingly detected among patients in Illinois, including in acute and long term care healthcare facilities.

In response to the CRE public health threat, the Illinois Department of Public Health (IDPH) has guided development of an infection control tool called the XDRO registry. The purpose of the XDRO registry is two-fold:

1. **Improve CRE surveillance:** The first CRE-positive culture per patient stay must be reported to the XDRO registry.
2. **Improve inter-facility communication:** Healthcare facilities can query the XDRO registry to see whether a patient has been previously reported as CRE-positive.

[For access to the XDRO registry, click here](#)

UPDATES

As of April 2017, IDPH is entering carbapenemase-producing *Pseudomonas aeruginosa* cases into the XDRO registry. Link: [[CDC Pseudomonas aeruginosa in Healthcare Settings](#)]

As of January 2017, IDPH is entering *Candida auris* cases into the XDRO registry. Links: [[CDC C. auris Questions and Answers](#)][[CDC Interim Recommendations](#)]

IL CRE Detect and Protect Campaign. [More...](#)

CRE are reportable to IDPH via the XDRO registry. Links: [[IDPH letter to facilities, September 2013](#)][[Reporting rule](#)]

Electronic Public Health Registry of Extensively Drug-Resistant Organisms, Illinois, USA

William E. Trick, Michael Y. Lin, Robynn Cheng-Leidig, Mary Driscoll, Angela S. Tang, Wei Gao, Erica Runningdeer, M. Allison Arwady, Robert A. Weinstein

XDRO registry
ROBYNN LEIDIG

Illinois Department Of Public Health [change facility](#)

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XDRO Report

XDRO culture information

* **Organism name (genus/species)**
Please Select Organism:

* **Specimen source**
Please Select Specimen:

* **XDRO criteria** (select all that apply)
[Reporting rule](#)

Molecular test (e.g. PCR) specific for carbapenemase

Phenotypic test (e.g. Modified Hodge) specific for carbapenemase production

For E. coli and Klebsiella spp. only: Resistant to ALL 3rd gen cephalosporins tested and non-susceptible (intermediate or resistant) to one carbapenem. Ignore ertapenem.

* **Date (culture acquisition)**
 / /

* **Mechanism of resistance**
Please Select Mechanism:
(molecular test required)

Facility information

Facility name

* **Patient MRN**

* **Date of admission/Encounter Date**
 / /

Culture obtained as outpatient

Patient demographics

* **First name**

Middle name(if applicable)

* **Last name**

* **Gender**
 Male Female

* **Date of birth(mm/dd/yyyy)**
 / /

Social Security Number(last4)

Race
Please Select One:

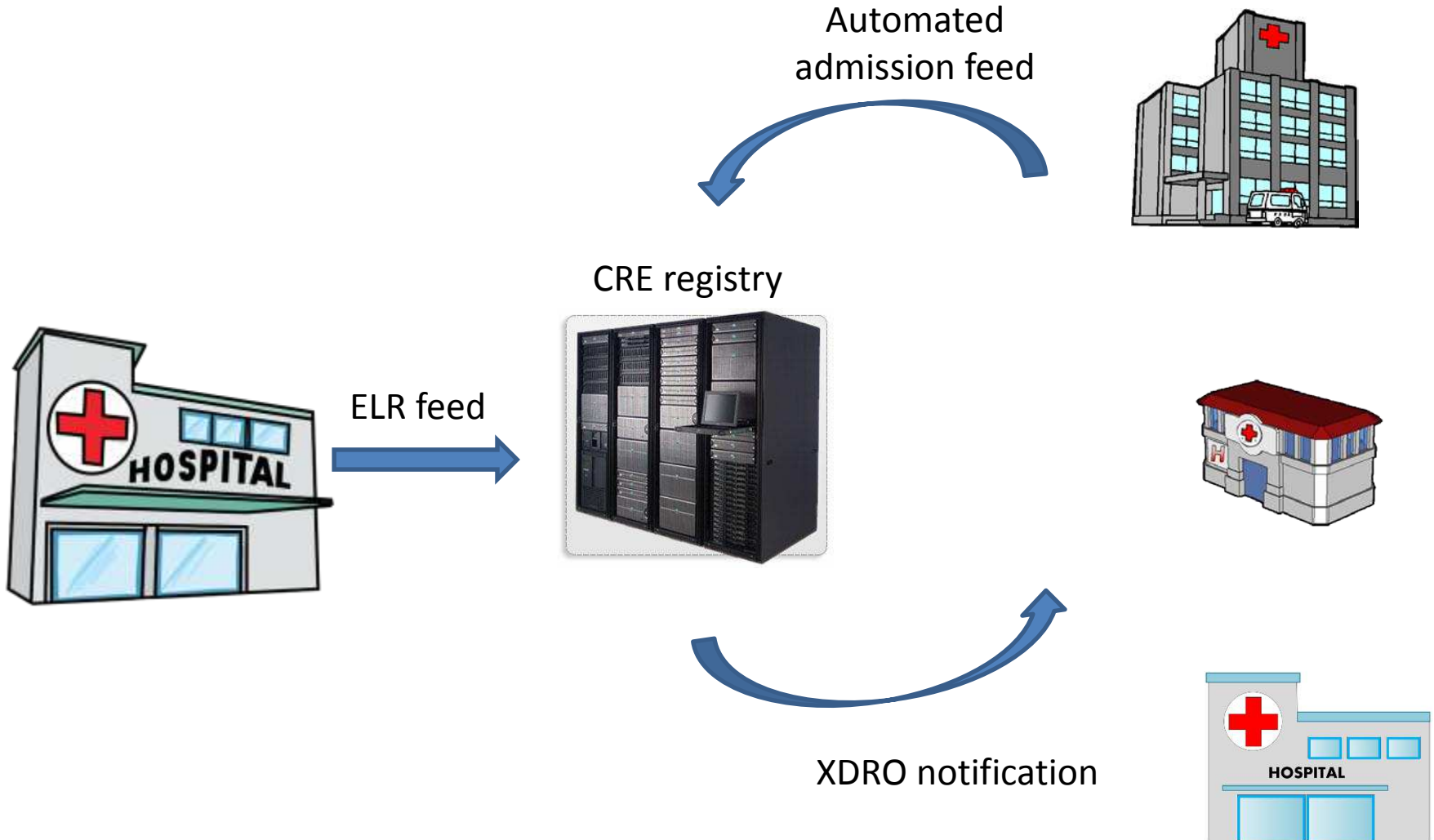
Ethnicity
 Hispanic or Latino
 Not Hispanic or Latino

* **Street address**

* **City** * **County**

* **State** * **Zip code**

XDRO registry: Texas style!



Summary of Houston-based surveillance systems

Surveillance	Strength	Weakness / growth
C diff	Largest (and only) active, culture-based surveillance system in the country	Needs to expand state-wide and nationally
CRE	Clinical data capture with WGS capabilities	Needs to grow
C. auris	Only active, culture-based system in the country	Needs to start
XDRO registry	Conversations have already started at the Houston and state level	Needs \$\$

My questions for you: kgarey@uh.edu

- What other organisms should we target for active surveillance, why?
- What other clinical uses would you like us to do with these surveillance mechanisms?
- Provide suggestions on what is needed to get the XDRO registry established
- Anything else profound you want to add!

Acknowledgements



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