

Michigan Department of Health and Human Services

CRE Surveillance & Prevention Initiative Educational Conference

June 20, 2017



Healthcare-Associated Infections and Antimicrobial Resistance in MI

- Michigan Department of Health and Human Services (MDHHS)
- Bureau of Epidemiology and Population Health
- Communicable Disease Division
- HAI / Viral Hepatitis / TB Section
 - Surveillance for Healthcare-Associated and Resistant Pathogens (SHARP) Unit

SHARP Unit

- Allie Murad, MPH
 - NHSN Epidemiologist and Antimicrobial Stewardship Coordinator
- Noreen Mollon, MS, CIC
 - Infection Prevention Consultant
- Sara McNamara, MPH, MT(ASCP)
 - Antimicrobial Resistance Epidemiologist
- Brenda Brennan, MSPH
 - HAI Coordinator and CRE Prevention Coordinator

SHARP Unit Mission

- Coordinate activities related to Healthcare-Associated Infections (HAI) surveillance and prevention in Michigan
- Describe the epidemiology of CRE
- Improve surveillance and detection of antimicrobial-resistance and HAIs
- Identify and respond to disease outbreaks
- Support the implementation of best-practice infection prevention recommendations across the healthcare continuum

Infection Control Assessment and Response (ICAR)

Evaluate your infection control program!

- Collaborative NOT regulatory
- Focus on quality improvement
- Free consultation
- Strengthen your program
- Add another tool to your resources
- Chance to help guide national training efforts

Contact Noreen Mollon

MollonN@Michigan.gov

CRE Surveillance & Prevention Initiative

Our History

- Began initiative 2012 – 21 facilities (Phase 1)
- 9 facilities joined in 2014 (Phase 2)
- 10 facilities joined in 2016 (Phase 3)
- Demonstrated statistically significant reductions in CRE incidence

CRE Incidence – by Phase

	No. of cases (inpatients)	Total no. of patient-days	Crude incidence rate	p-value
Phase 1 Facilities (n=21)	564	8,833,583	0.64	0.0004
Baseline	89	959,063	0.93	***
Intervention	475	7,874,520	0.60	***
Phase 2 Facilities (n=9)	106	1,705,877	0.62	0.0164
Baseline	26	265,350	0.98	***
Intervention	80	1,440,527	0.56	***
Phase 3 Facilities (n=10)	21	469,635	0.45	0.1425
Baseline	10	150,522	0.66	***
Intervention	11	319,113	0.34	***

CRE Prevention Plans

All Phases

- **40 facilities**
 - 28 acute care facilities
 - 10 LTAC facilities
 - 2 LTCs/SNFs
- **53 different interventions**
 - Procedures (27)
 - Education (15)
 - Compliance (5)
 - Communication (4)
 - Pilot project (1)
 - System analysis (1)

Infections Prevented

Infections Prevented	All Facilities	LTACs/LTC	Acute Care Facilities
Phase 1	256	40	216
Phase 2	61	16	45
Phase 3	10	9	2
All Phases	327	64	263

CRE Surveillance & Prevention Initiative

Our Future

- September 2017
 - Combine all facilities into one cohort
 - Add *Enterobacter* spp. to surveillance definition
 - Expand to *Klebsiella* spp.
 - Rebaseline September 2017 - February 2018

CRE Surveillance & Prevention Initiative

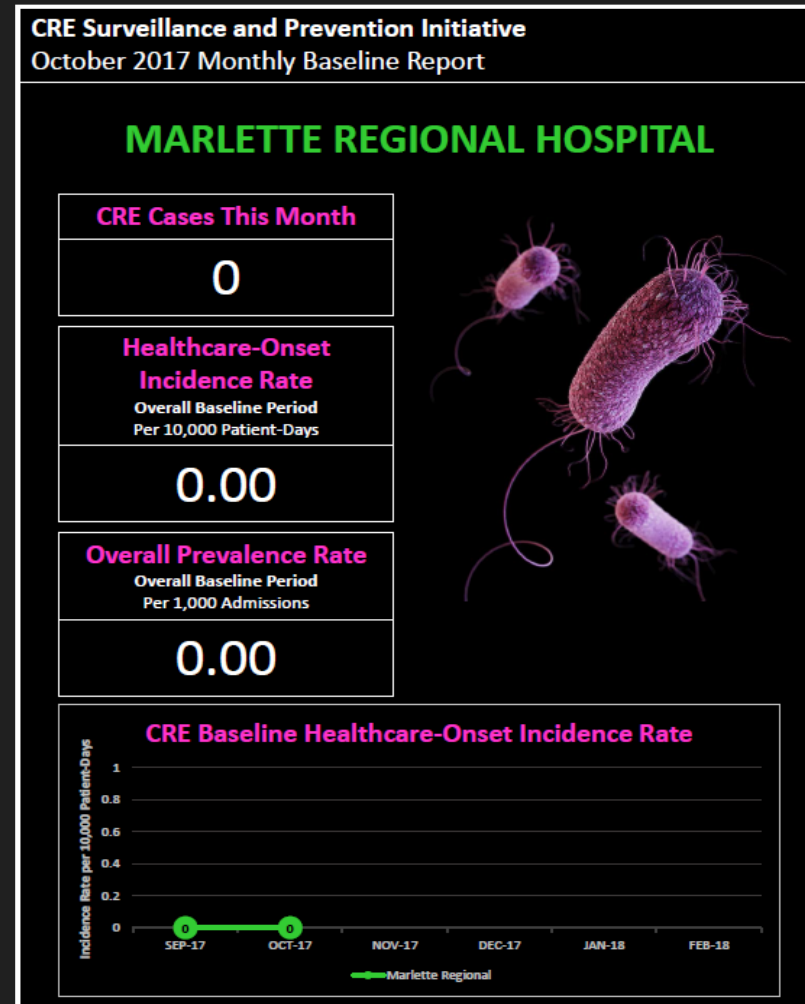
Our Future

- September 2017 (continued)
 - Updated data collection form (acute and LTAC)
 - CRE Prevention Plans implemented March 2018
 - Keep existing... but re-create, re-energize, re-educate
 - Implement new!
 - Updated baseline and intervention reports

CRE Surveillance & Prevention Initiative

Our Future

- Updated Reports
 - Baseline
 - 1 page



CRE Surveillance & Prevention Initiative

Our Future

- Updated Reports
 - Intervention
 - 12 pages

CRE Surveillance and Prevention Initiative May 2018 Monthly Intervention Report

MARLETTE REGIONAL HOSPITAL

CRE Cases This Month

0

Total Intervention Period Cases: 3

Healthcare-onset Incidence Rate

Overall Intervention Period
Per 10,000 Patient-Days

0.00

Overall Prevalence Rate

Overall Intervention Period
Per 1,000 Admissions

0.00

CRE Cases Prevented or Need to Prevent

Intervention Period compared to Baseline

Prevented 0.5 Cases

CRE Prevention Plan

- An educational pamphlet will be developed to educate patients and visitors about CRE Policy/Procedure
- In-house laboratory will be performing MHT to confirm carbapenemase production in isolates of Enterobacteriaceae



CRE Healthcare-Onset Incidence Rate



CRE Surveillance & Prevention Initiative

Our Future

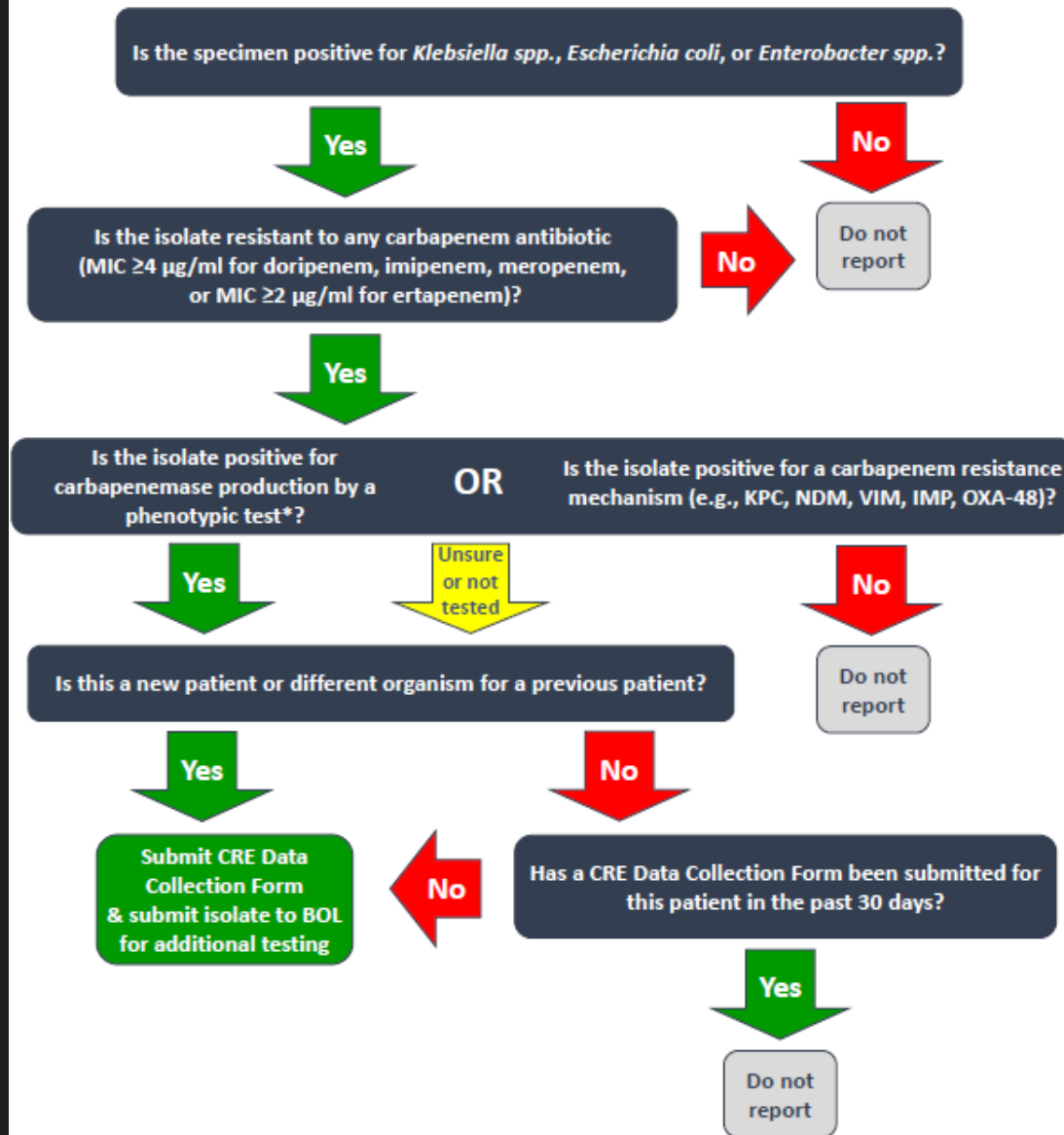
- Council of State and Territorial Epidemiologists (CSTE) Position Statement
 - Public Reporting and National Notification of Carbapenemase-producing CRE (CP-CRE)
 - *Enterobacter* spp, *E. coli*, or *Klebsiella* spp.
 - Positive for known carbapenemase resistance mechanism (KPC, NDM, VIM, IMP, OXA-48)
 - Positive on a phenotypic test for carbapenemase production (Modified Hodge Test, metallo- β -lactamase test, Carba NP, Carbapenem Inactivation Method (CIM) or modified CIM)

CRE Surveillance & Prevention Initiative

Our Future

- If unable to detect CP-CRE
 - *Enterobacter* spp, *E. coli*, or *Klebsiella* spp.
 - Resistant to any carbapenem
 - MIC ≥ 4 mcg/ml for meropenem, imipenem, and doripenem
 - MIC ≥ 2 mcg/ml for ertapenem

Carbapenem-Resistant *Enterobacteriaceae* (CRE) Surveillance and Prevention Initiative Surveillance Algorithm



CRE Surveillance & Prevention Initiative

On the Horizon

- CP-CRE added to the reportable disease list
 - Effective January 2018
 - Physicians, laboratories, and LHDs
 - Reporting through Michigan Disease Surveillance System (MDSS) and/or direct submission to MDHHS (for LTACs/LTCs)
- Guidance on reporting and investigation of CP-CRE cases
 - Distributed late Fall 2017
 - Tiered approach

CRE Surveillance & Prevention Initiative

Recent CDC Guidance for MDROs

- General guidance for response for the containment of novel or targeted MDROs or resistance mechanisms
 - Initial actions
 - Healthcare investigation
 - Contact investigation
 - Ensure adherence to infection control measures

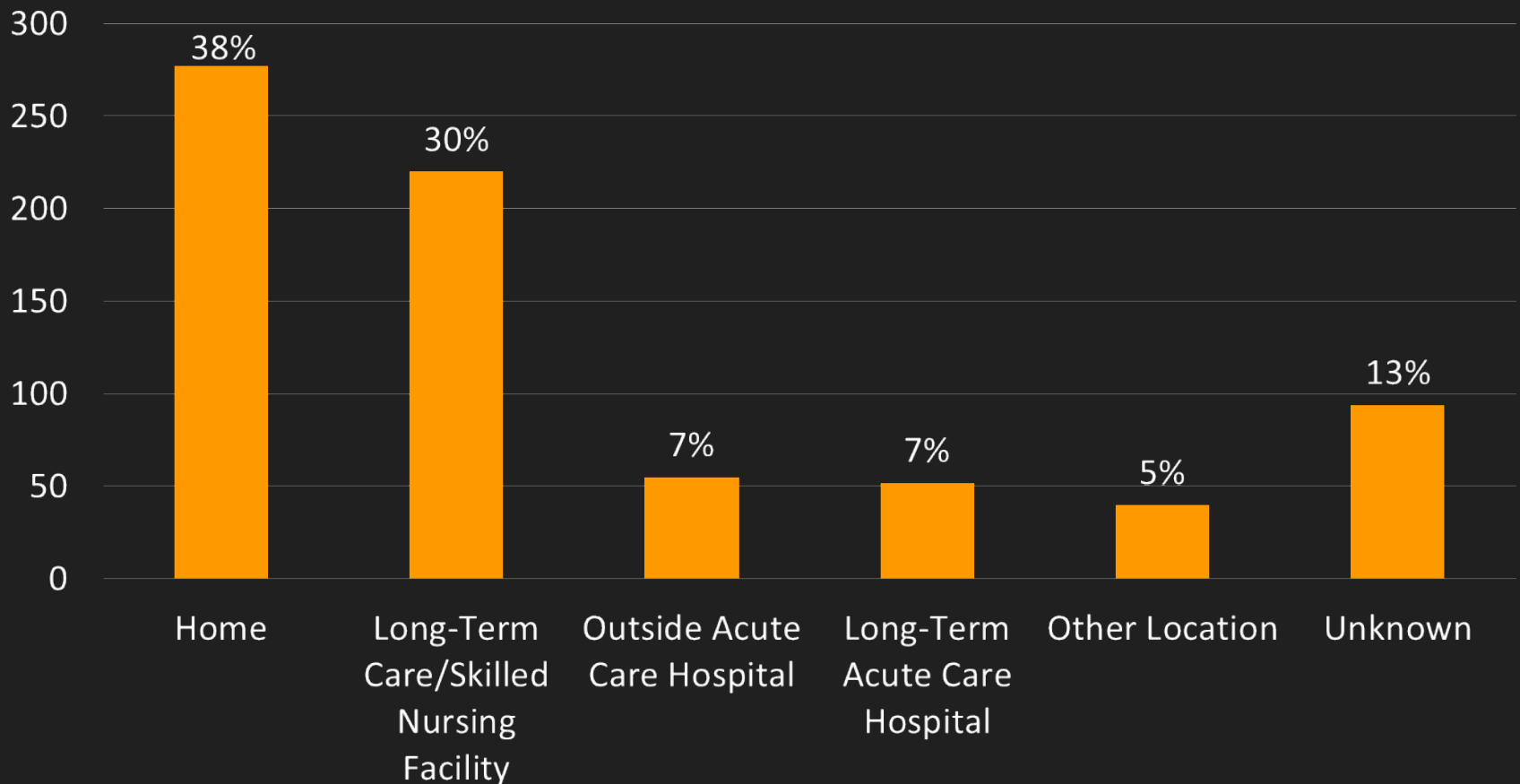


Data Highlights

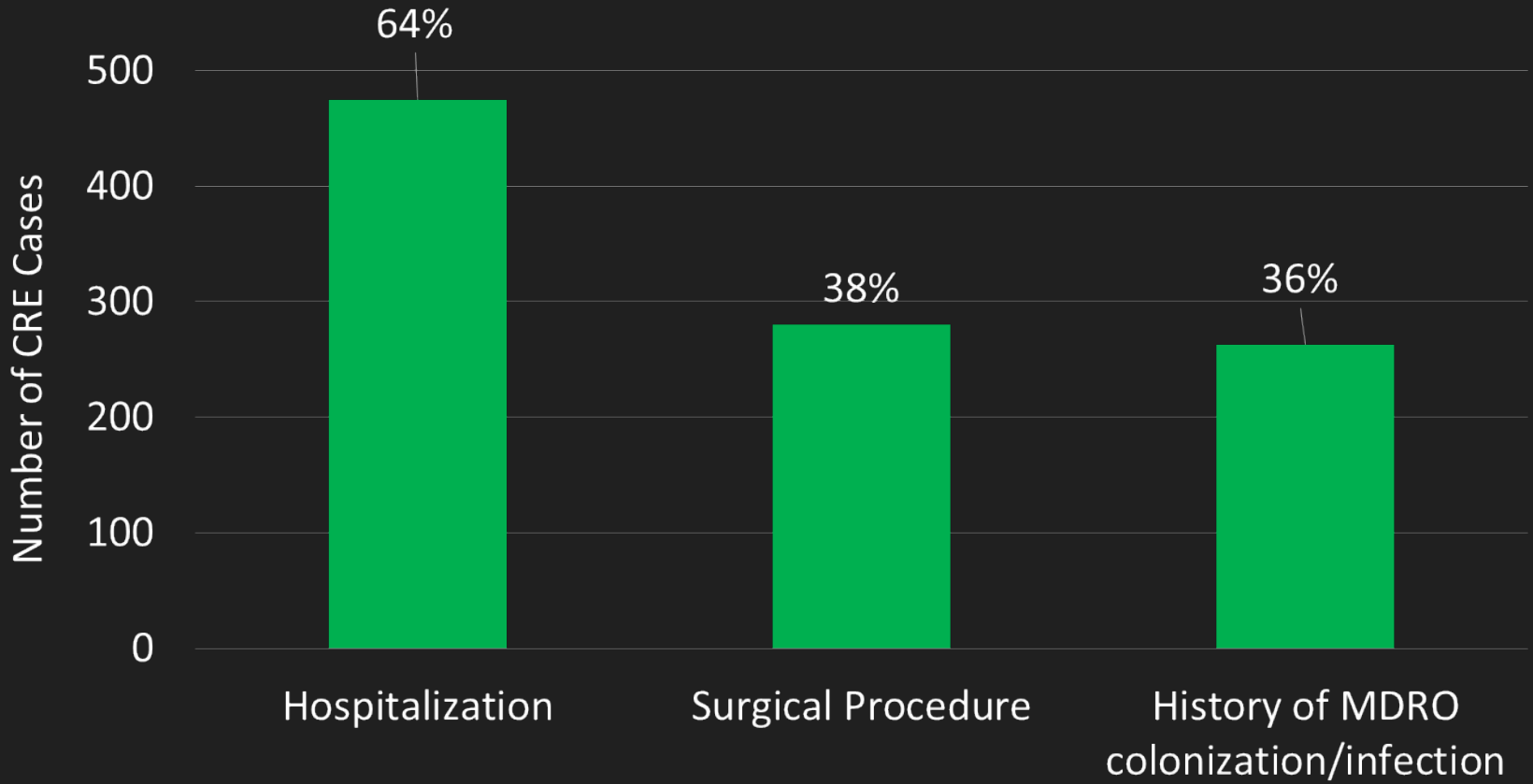
CRE Case Demographics

- **Total of 792 cases reported**
- Mean age 64 yrs
- Female: 51%
- Patient Location
 - Inpatient Non-ICU: 46%
 - Inpatient ICU: 35%
 - Outpatient: 16%
 - Referral: 2%

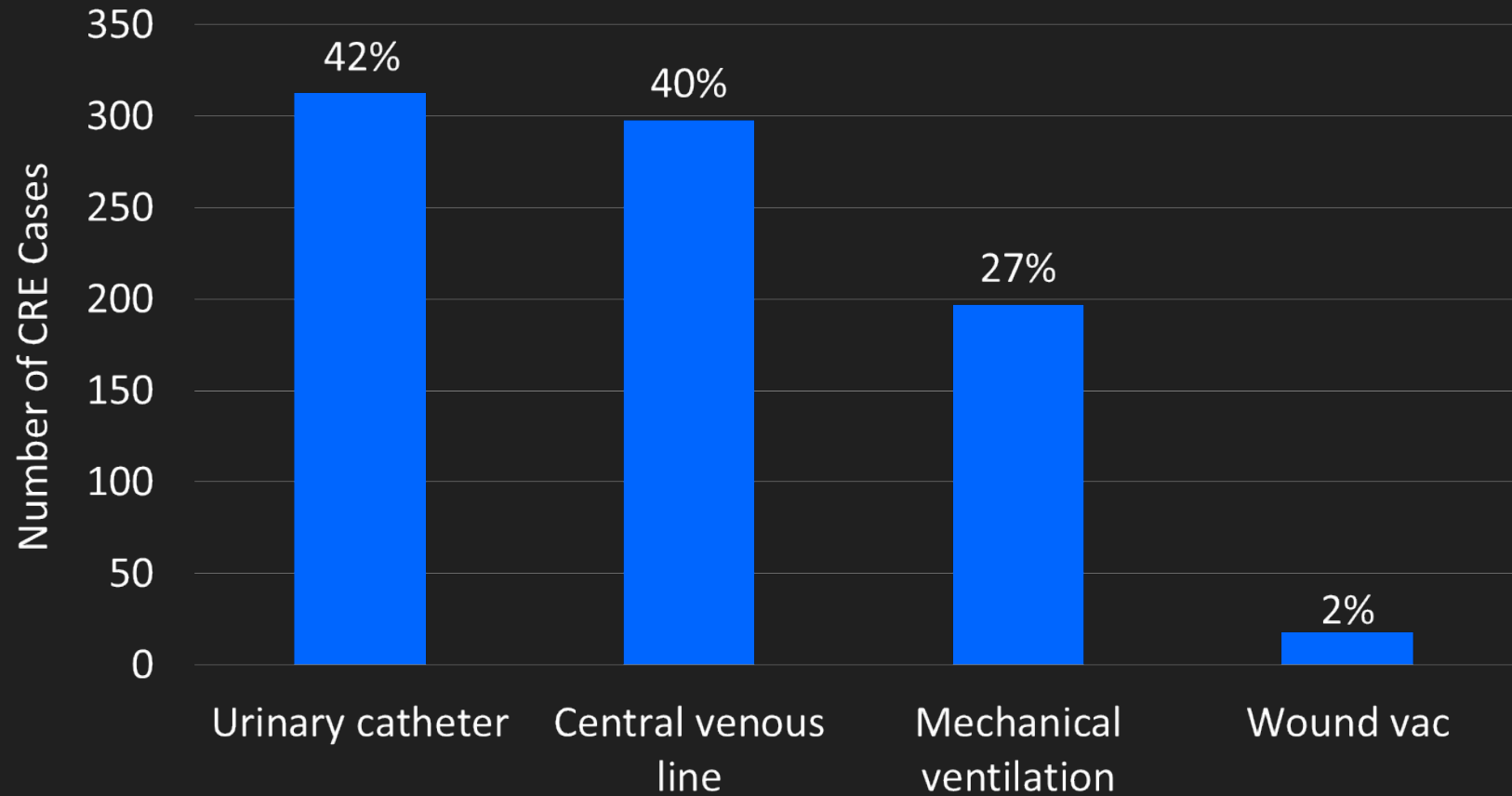
Location Admitted From



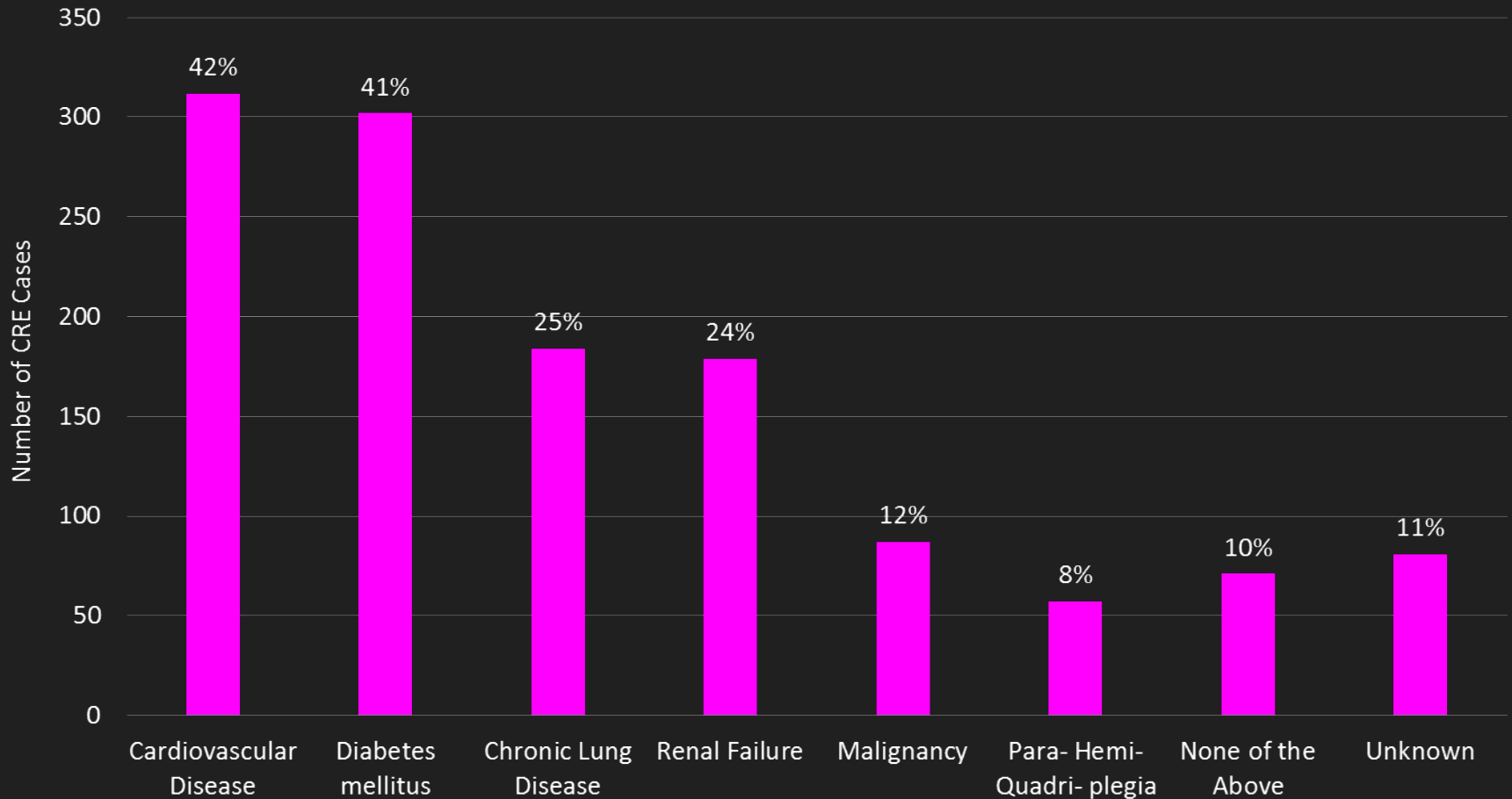
Known Risk Factors last 90 days



Device Use

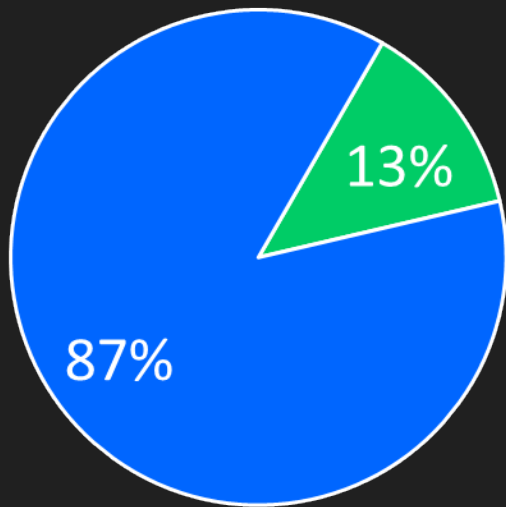


Comorbidities



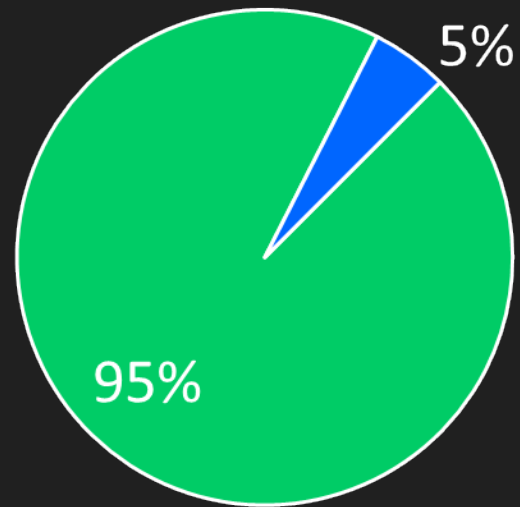
Laboratory Testing

Species



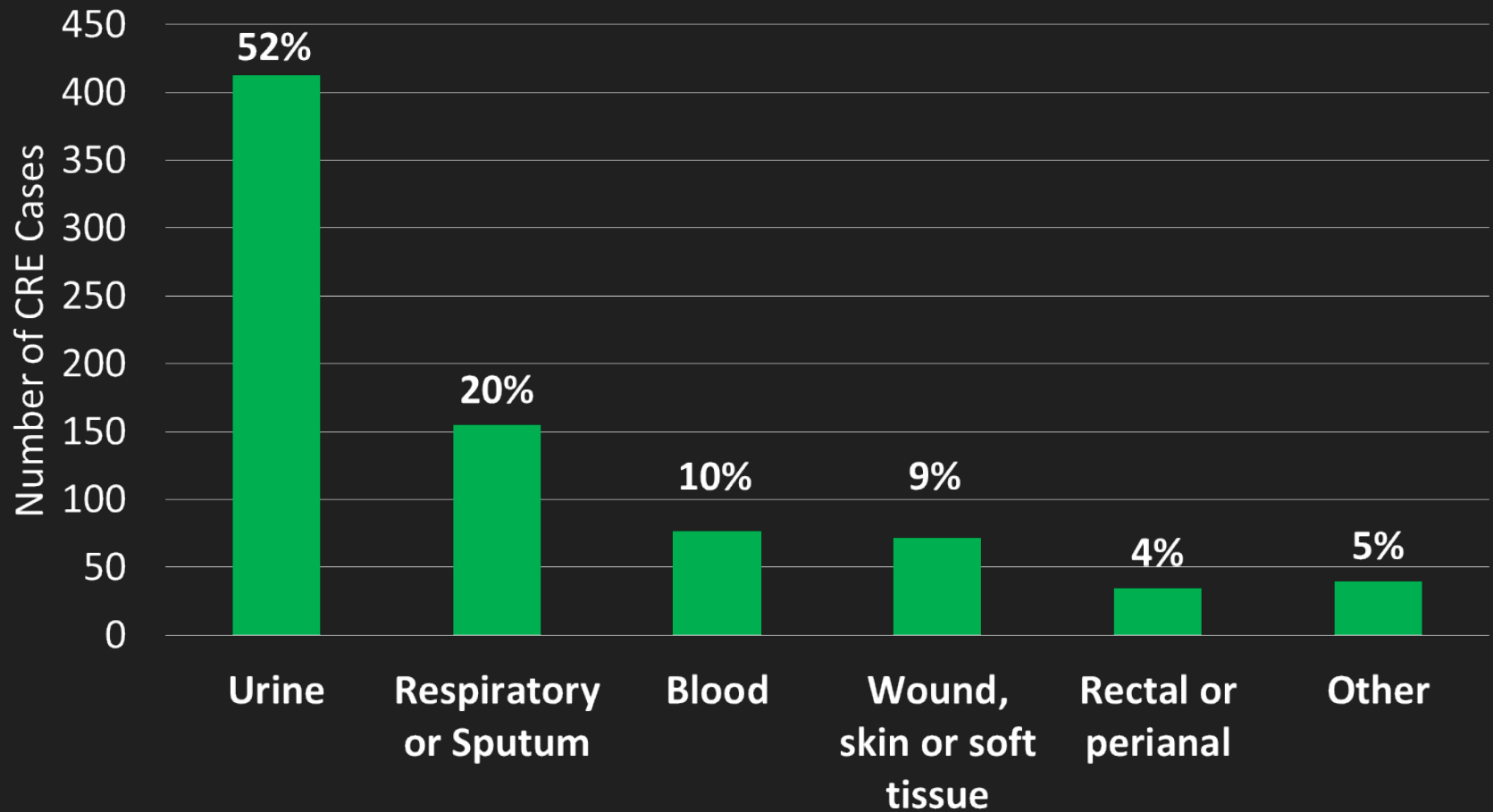
- Escherichia coli
- Klebsiella pneumoniae

Culture Type

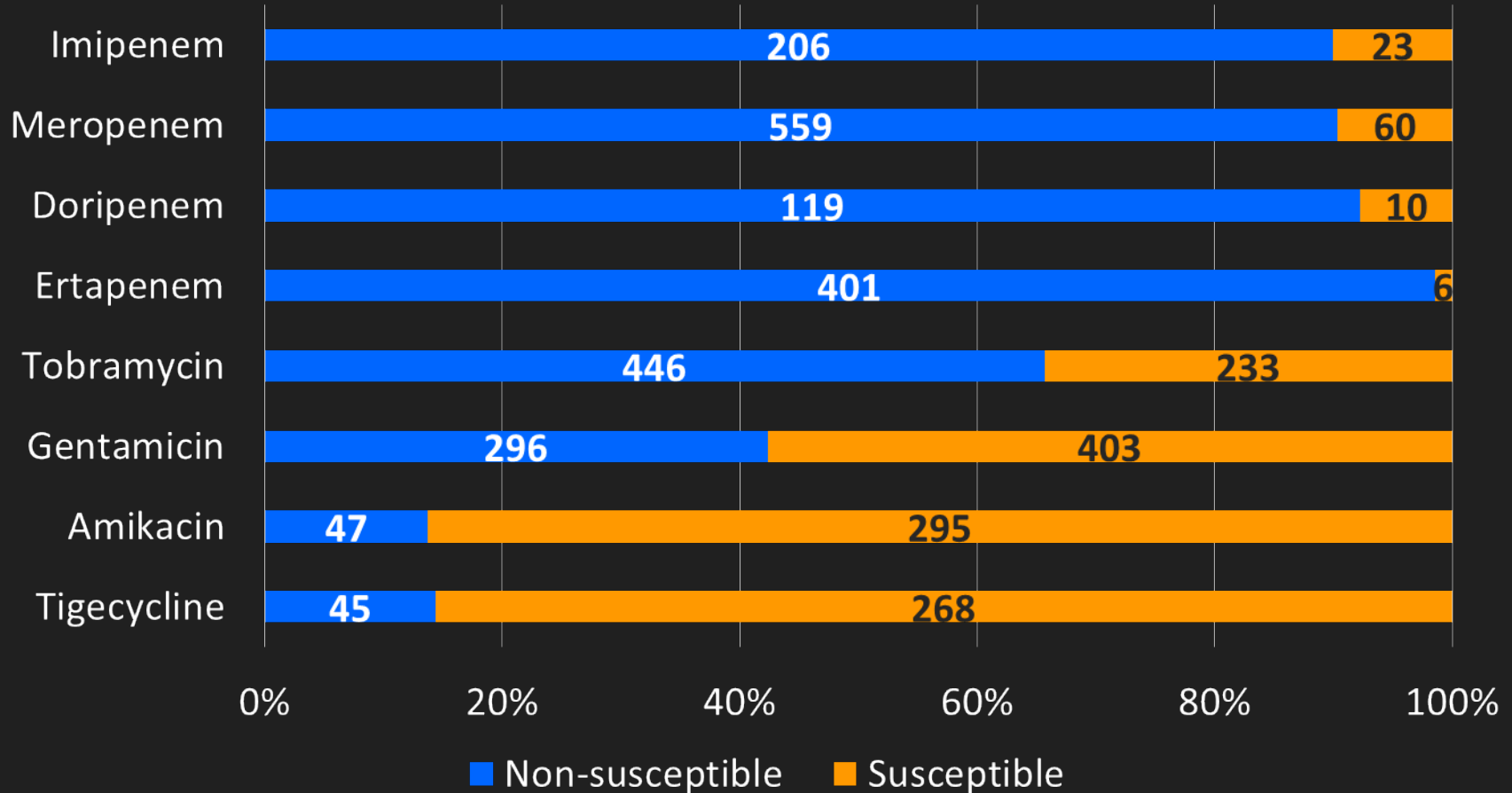


- Clinical Culture
- Surveillance Culture

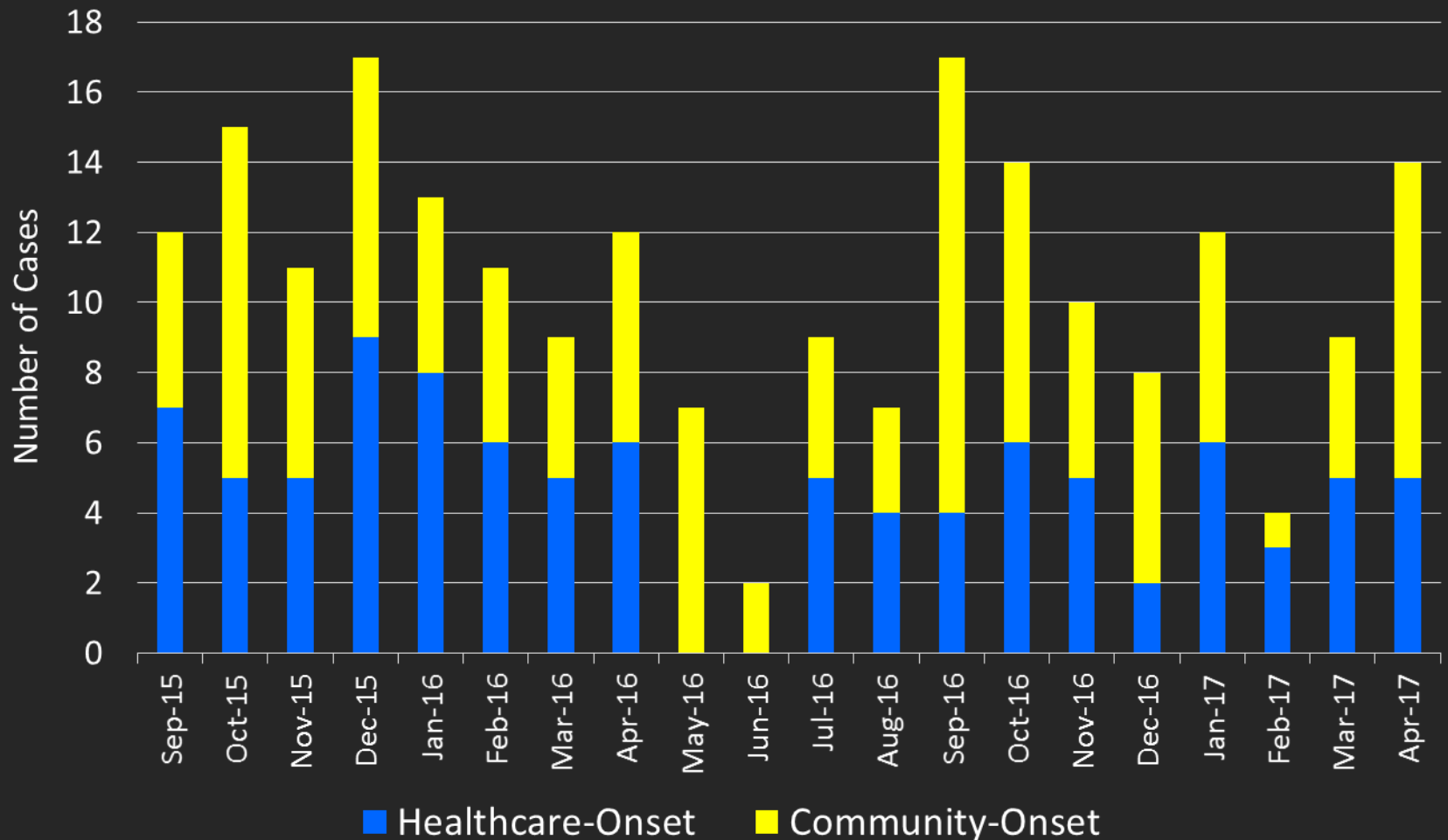
Specimen Source



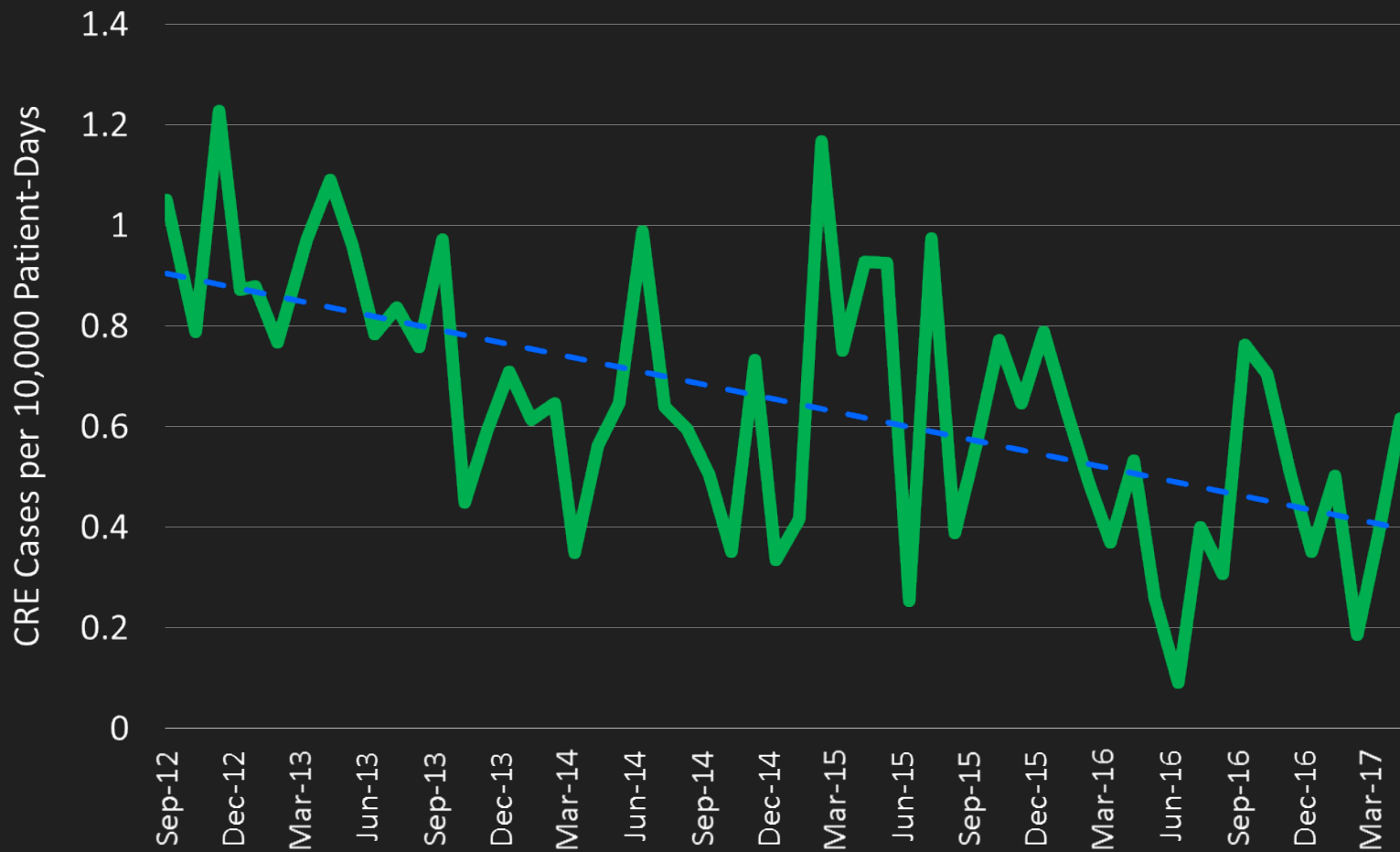
Antimicrobial Susceptibility Testing



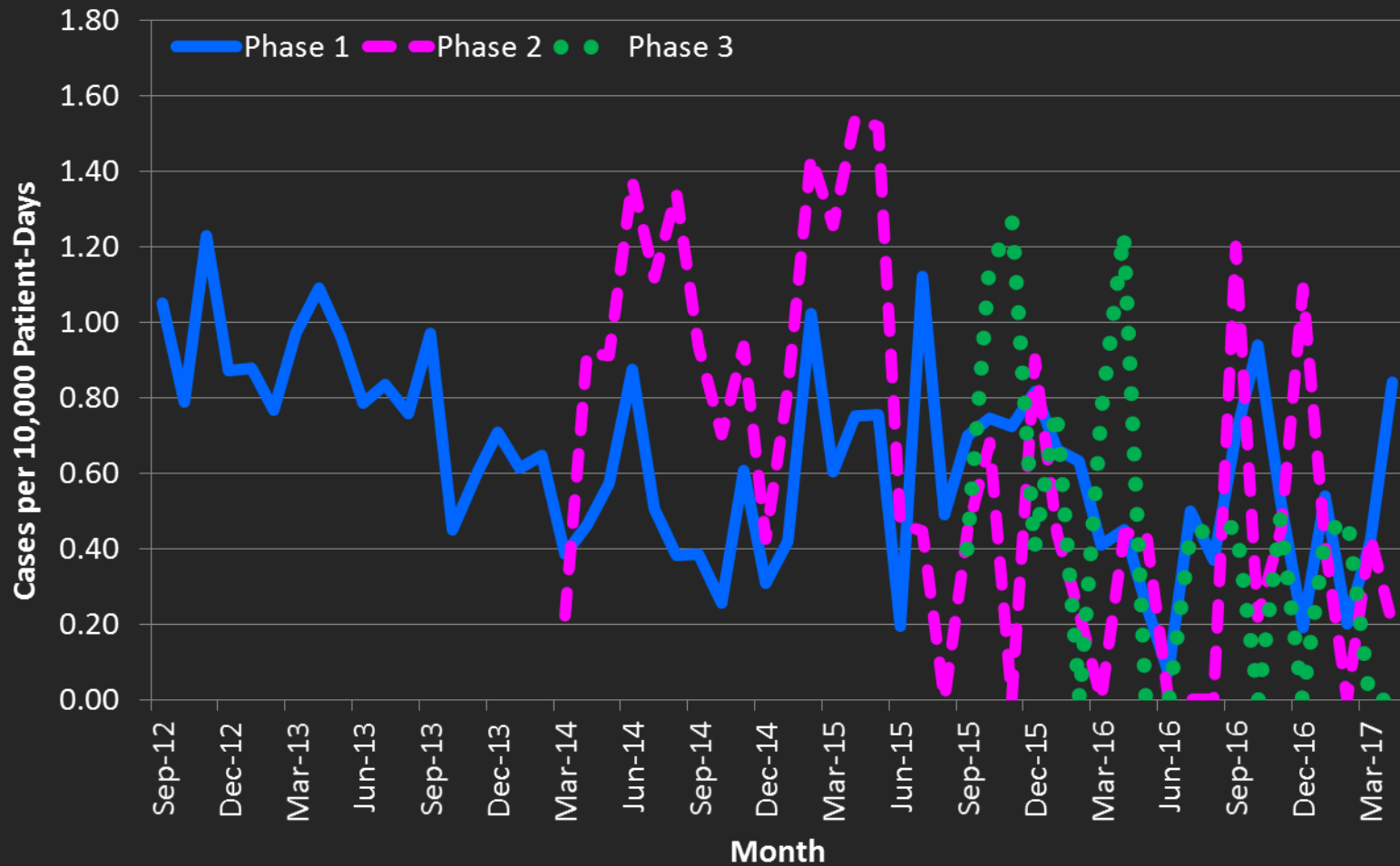
Case Distribution by Onset



CRE Incidence – Inpatients



CRE Incidence – by Phase

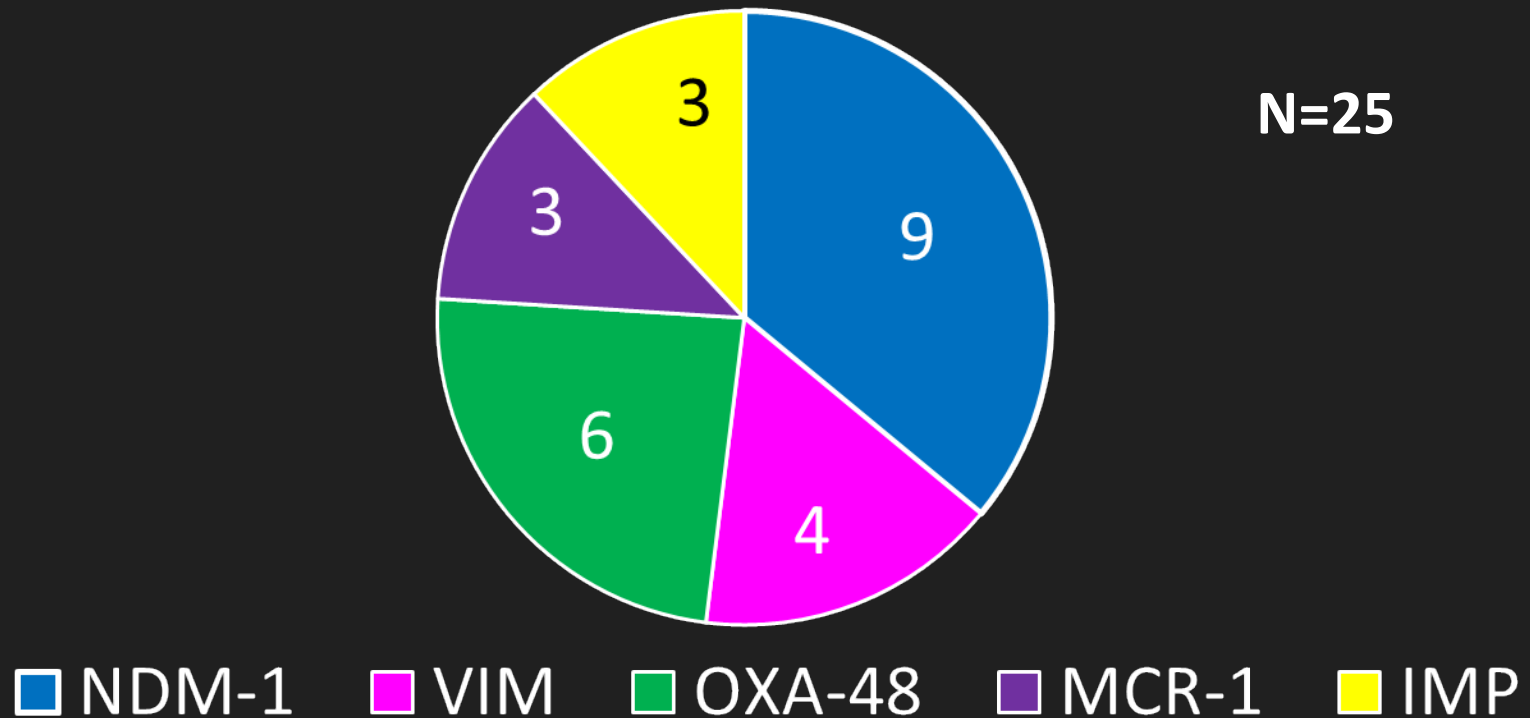


Novel Resistance Activity

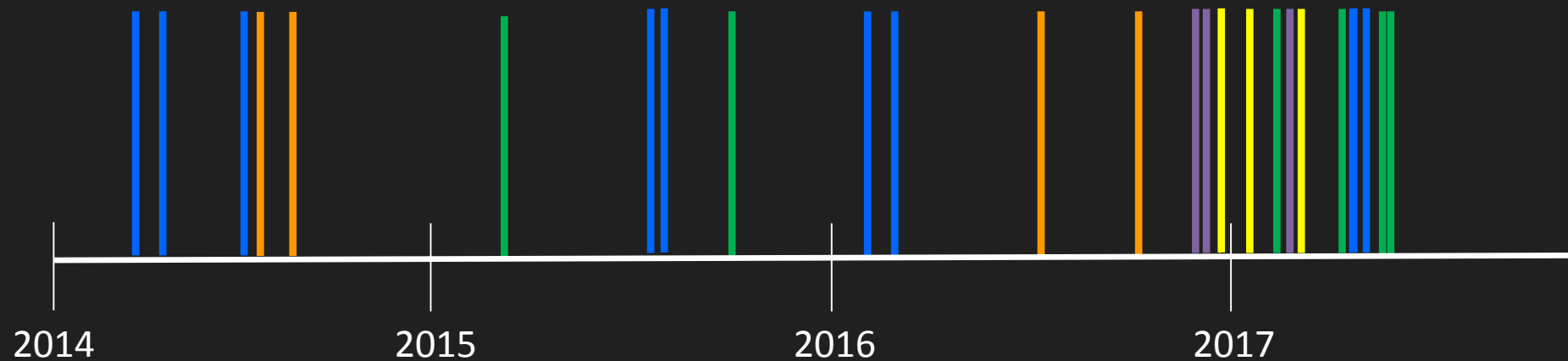
- Bureau of Laboratories has expanded test offerings:
 - Enterobacteriaceae, *Acinetobacter*, and *Pseudomonas aeruginosa*
 - Genetic markers for KPC, NDM, VIM, OXA-48, and MCR-1

Seek, and ye shall find...

Novel Resistance Mechanisms in MI 2014 - Present

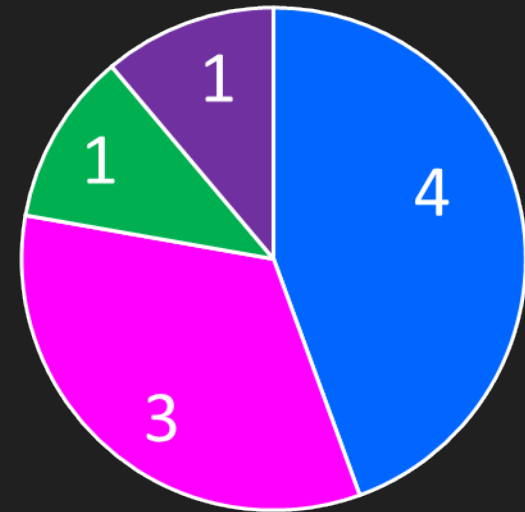


Timeline



NDM-1

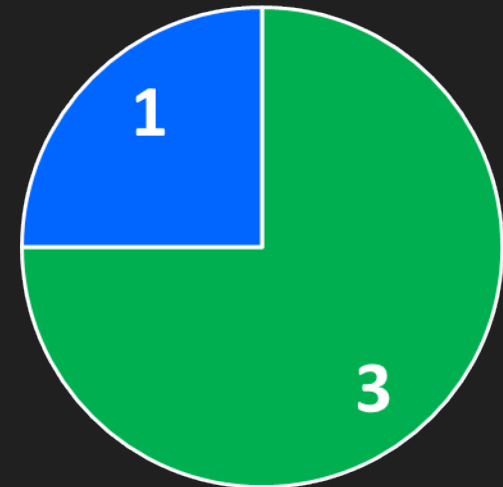
- 9 cases in MI
- International Travel: 6/9
 - 3 India, 1 Romania, 1 Philippines, 1 Ethiopia/Guatemala
- Recent healthcare exposures: 6/9
 - 3/6 primarily outpatient
 - 3/6 acute care inpatient
- Comorbidities: 6/9



- K. pneumoniae
- E. coli
- P. mirabilis
- M. morganelle

VIM

- 4 cases in MI
- International Travel: None
- Recent healthcare exposures: 3/4
 - 3 multiple inpatient admissions
 - 1 unknown
- Comorbidities: 4/4

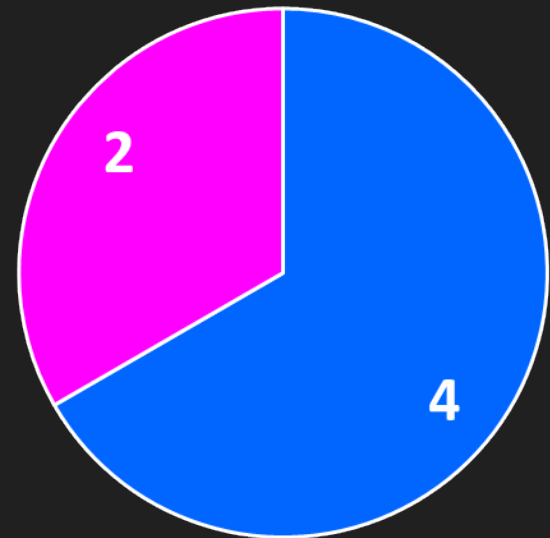


■ *P. aeruginosa*

■ *E. cloacae*

OXA-48

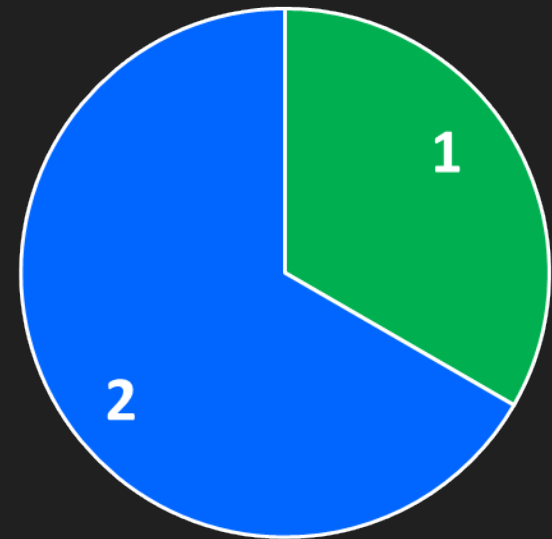
- 6 cases in MI
- International Travel: 4/6
 - India, Jordan, Canada, Egypt/Amsterdam/China
- Recent healthcare exposures: 5/6
 - 3 inpatient
 - 2 outpatient
- Comorbidities: 4/6



■ *K. pneumoniae* ■ *E. coli*

IMP

- 3 cases in MI
- International Travel: None
- Recent healthcare exposures: 3/3
 - Multiple inpatient hospitalizations
 - All had cystoscopy
- Comorbidities: 3/3



■ *M. morganella* ■ *E. cloacae*

MCR-1

- **3 cases in MI**
- All 3 *E. coli*
- International Travel: 3/3
 - China, Lebanon, Mexico
- Recent healthcare exposures: 3/3
 - 1 acute care inpatient
 - 2 outpatient
- Comorbidities: 2/3

Acknowledgements

- **All participating facilities**
 - CRE Prevention Teams and administration
- **Today's speakers**
 - Thank you for traveling and sharing your experiences with us!
- **Joe Coyle and Anurag Malani**
- **SHARP Unit**
- **Gina Moreno**

Materials for Today

- **Folder**
 - Agenda
 - Presentations will be available at
 - www.michigan.gov/hai
 - Available within 2 weeks
 - New Surveillance Algorithm
 - Effective September 2017
 - Evaluation Form
- Please set cell phones to silent / vibrate



Enjoy the conference!

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