



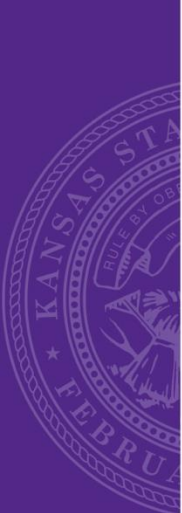
Development and Implementation of a Tracer Tool for Infection Prevention in Clinical Laboratory Settings

Kira Higgins, MLS (ASCP)^{CM}
MPH Candidate

About Me

- Overland Park, KS
- B.S. in Clinical Laboratory Sciences from the University of Kansas in 2023
- Anticipated Master of Public Health from Kansas State University in 2025
 - Area of Emphasis: Infectious Disease and Zoonosis
- Board certified Medical Laboratory Scientist by the American Society for Clinical Pathology
- Professional Experience:
 - Alzheimer's Disease Research Center, Research Assistant
 - JayDoc Clinic, Medical Laboratory Scientist
 - The University of Kansas Health System, Medical Laboratory Scientist
 - The University of Kansas Health System, Infection Prevention and Control Intern





Outline

- Applied Practice Experience (APE) Site
- Background
- APE Objectives
- APE Project & Products
- MPH Competencies
- Emphasis Area Competencies
- Conclusion
- Acknowledgements

Applied Practice Experience (APE)

- APE Site: The University of Kansas Health System
 - Infection Prevention and Control (IPAC) Department
- August 1, 2024 – November 1, 2025
- Preceptor: Maggie Reavis
 - MPH, BSN, RN, CIC, CPHQ, FAPIC
 - Infection Preventionist III



THE UNIVERSITY OF
KANSAS HEALTH SYSTEM

Cancer Centers

THE UNIVERSITY OF KANSAS
CANCER CENTER

- Nine cancer center locations
 - Each has its own laboratory
- Vulnerable population



Green Hills



Olathe



Clinical Research Center

Public Health Application

- Clinical labs are an essential part of clinical decision-making and public health infrastructure
 - 70% of clinical decisions rely on lab data (CDC, 2020)
- The health system is part of the larger community *and* a community in itself
- Infection prevention and control lapses in the lab put workers, patients, and public health at risk
 - 309 lab-acquired infections worldwide (2000-2021); 8 fatal; 16 accidental pathogen escape from laboratory settings (Blacksell et al., 2025)





Regulatory Oversight

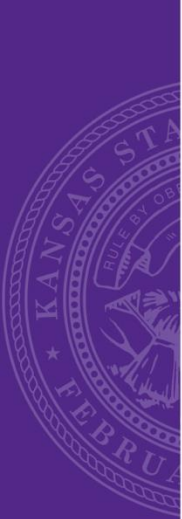
Oversight is fragmented, leading to inconsistent IPC practices

Occupational Safety and Health
Administration (OSHA)

Clinical Laboratory Improvement Amendments
(CLIA)
&
College of American Pathologists (CAP)

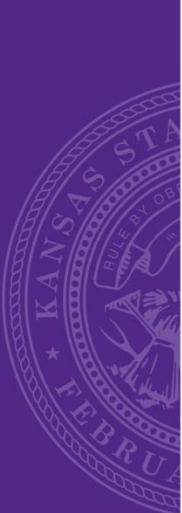
Centers for Disease Control and Prevention
(CDC)
&
Association for Professionals in Infection Control
and Epidemiology (APIC)

The Joint Commission (TJC)



Tracer Methodology

- Tracer methodology = real-time observational audits
- Widely used by TJC
- Reveals gaps not seen in policy reviews
- IPC teams use tracers routinely



APE Objectives

1

Develop and pilot a laboratory-specific infection prevention tracer tool

2

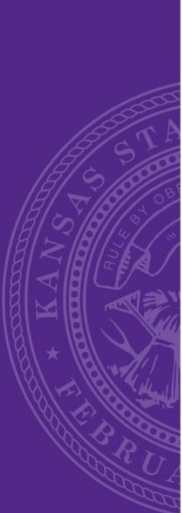
Compile findings and communicate results

3

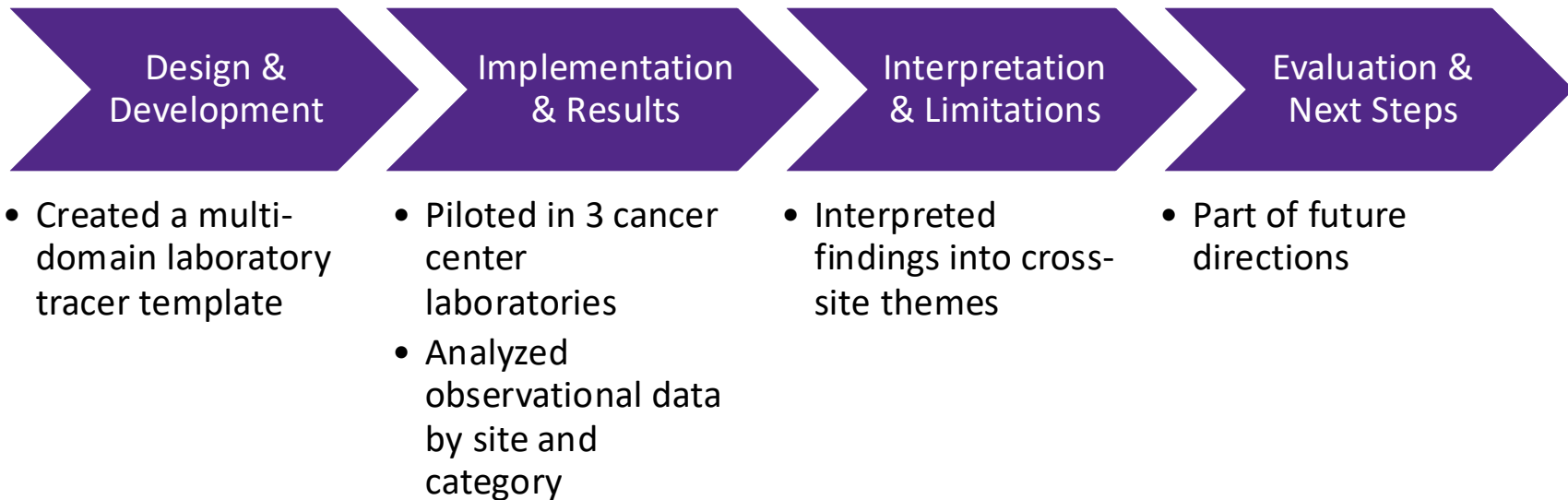
Conduct a summary analysis of tracer data

4

Create a standardized tracer tool template



APE Project Overview





Design & Development

Implementation
& Results

Interpretation &
Limitations

Evaluation &
Next Steps

- Developed a laboratory-specific tracer tool
- Grounded in CDC, APIC, and TJC guidelines
- 45 questions
- Six domains
 - hand hygiene, PPE/staff safety, clean supply, soiled items, general environment, and cleaning/disinfection

Clean Supply/Items

1. There are no expired or compromised supplies.

	Num:	Den:	Comp%:	
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2. Bottom shelves are solid or have a liner.

	Num:	Den:	Comp%:	
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Product A: Laboratory Tracer Tool Template

Tracer Observation Detail Report 2025 IPAC Laboratory Environmental Tracer

Site: The University of Kansas Health System
Program: Hospital

*Compliance percentage and totals display data from all questions in the observation.

Total Numerator: Total Denominator: Not Applicable Count: Total Question Count:

Observation Header

Observation Title:	Location:
Observation Status:	Department:
Observation Date:	
Total Completed Observations:	
Note:	

Clean Supply/Items

1. There are no expired or compromised supplies.	Num:	Den:	Comp%:
2. Bottom shelves are solid or have a liner.	Num:	Den:	Comp%:
3. Only clean supplies are found in clean utility area.	Num:	Den:	Comp%:
4. Primary shipping containers and corrugated cardboard are not used to store clean supplies.	Num:	Den:	Comp%:
5. All items are stored at least 18 inches below the ceiling.	Num:	Den:	Comp%:
6. No clean supplies are stored directly on the floor.	Num:	Den:	Comp%:
7. No clean supplies are stored in biohazard bags.	Num:	Den:	Comp%:
8. Open control solution bottles are labeled with open date and a discard date according to manufacturer's recommendation or per policy and are not expired or beyond the discard date.	Num:	Den:	Comp%:

PPE/Staff Safety

9. Reusable lab coats are processed by an accredited healthcare linen company.	Num:	Den:	Comp%:
10. Staff have access to personal protective equipment for standard and BSL guidelines.	Num:	Den:	Comp%:
11. Staff are wearing and utilizing appropriate PPE to prevent exposure. a. Gloves are worn when handling specimens and changed when contaminated, integrity has been compromised, or when otherwise necessary. b. Lab coats are worn and closed while handling hazardous materials.	Num:	Den:	Comp%:
12. Lab coats are not worn in clean spaces. PPE is not worn outside of the laboratory space.	Num:	Den:	Comp%:
13. No food, drinks, or personal items in areas where body fluids could be located. Such items are stored in appropriate, designated locations.	Num:	Den:	Comp%:

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14. Emergency eyewash solutions/plumbed eyewash station are readily available. Solution is not expired and/or plumbed stations are checked weekly by department and annually by maintenance.	Num:	Den:	Comp%:
15. Eye and face protection (goggles, mask, face shield or splatter guard) is used for anticipated splashes or sprays of infectious or biohazardous material when handled outside the BSC.	Num:	Den:	Comp%:
16. No mouth pipetting is performed. All pipetting is done via mechanical methods.	Num:	Den:	Comp%:
17. Phlebotomy procedures are exclusively performed using safety devices.	Num:	Den:	Comp%:
18. Biological Safety Cabinets are functioning properly, and HEPA filters are not expired.	Num:	Den:	Comp%:
19. All procedures involving the manipulation of infectious materials that may generate an aerosol are conducted within a BSC.	Num:	Den:	Comp%:

Soiled Items

20. Reagent and Specimen refrigerators: a. Refrigerators or freezers containing blood, body fluids, or other potentially infectious materials are marked with biohazard sticker. b. No food, drink, medication, or clean items stored in same refrigerator or freezer as specimens and/or reagents. c. Inside of the reagent/specimen refrigerator is clean and defrosted. d. Reagent/specimen refrigerator is within temperature range and recorded on log if indicated.	Num:	Den:	Comp%:
21. Sharps containers are readily available and used. Containers are puncture resistant, not overfilled, labeled with a biohazard label, and are secured to wall or in a caddy.	Num:	Den:	Comp%:
22. Biohazardous material is disposed of in appropriate containers (red bags in solid, red containers with tight fitting lid).	Num:	Den:	Comp%:
23. No biohazardous material is stored in break rooms.	Num:	Den:	Comp%:
24. Manual differential droppers are properly disposed of after single use.	Num:	Den:	Comp%:
25. All completed samples are capped and properly stored.	Num:	Den:	Comp%:

Hand Hygiene

26. No items are stored in sink "splash zone" (18" from either side of faucet), or a splash guard is in place.	Num:	Den:	Comp%:
27. Supplies needed for hand hygiene are readily available. Includes soap and water, alcohol-based hand rub, and paper towels. Access is unimpeded.	Num:	Den:	Comp%:
28. Paper towels and other paper hygiene products are stored in a manner that prevents contamination.	Num:	Den:	Comp%:
29. Sinks are clearly designated as "clean" and "dirty" sinks.	Num:	Den:	Comp%:
30. Nothing is stored under sinks.	Num:	Den:	Comp%:
31. Artificial nails are not worn by direct care providers as defined in Hand Hygiene policy.	Num:	Den:	Comp%:

Page: 2 of 3

32. Phlebotomists don new gloves for each patient after performing hand hygiene.	Num:	Den:	Comp%:
General Environment	Num:	Den:	Comp%:
33. Area is free from visible leaks, stains, cracks, visible moisture, or evidence of mold growth.	Num:	Den:	Comp%:
34. Area is free of dust, dirt, soil, trash, clutter, and hazards (fixtures, walls, ceilings, floor).	Num:	Den:	Comp%:
35. Ceiling tiles are not stained; walls and paint are in good condition.	Num:	Den:	Comp%:
36. Chairs and other furniture are free of tears and in good condition.	Num:	Den:	Comp%:
37. No carpet or rugs are present in the laboratory space.	Num:	Den:	Comp%:
Cleaning/Disinfection	Num:	Den:	Comp%:
38. Hospital approved disinfectants are readily available, appropriately labeled, and not expired.	Num:	Den:	Comp%:
39. Other disinfectants are formulated and utilized per the manufacturer's instructions. Disinfectants are readily available, appropriately labeled, and not expired.	Num:	Den:	Comp%:
40. Environmental surfaces are cleaned between patients.	Num:	Den:	Comp%:
41. Staff can speak to contact time of disinfectants being used.	Num:	Den:	Comp%:
42. Laboratory spaces have surfaces that are easily cleanable.	Num:	Den:	Comp%:
43. All analyzers, including Point of Care instruments (unit and base), are clean and free of dust and stains.	Num:	Den:	Comp%:
44. Point of care instrument control solutions and test strips are dated and not expired.	Num:	Den:	Comp%:
45. Centrifuges are free of visible contamination by blood or body fluids. Specimens are capped while centrifuging.	Num:	Den:	Comp%:

Page: 3 of 3

Note: This slide is intended as a visual reference to illustrate the tracer tool format and structure. The text is not meant to be read in detail.

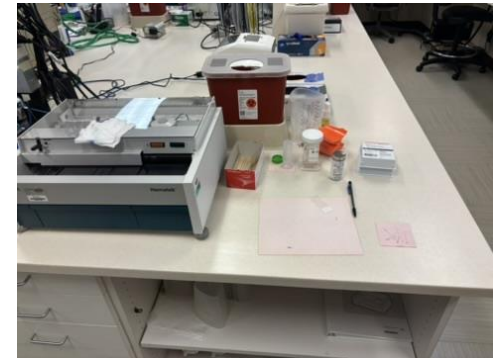
Design &
Development

Implementation
& Results

Interpretation &
Limitations

Evaluation &
Next Steps

- **Introduction and explanation:** met with the laboratory manager to explain the purpose of the tracer and the scope of the project
- **Tracer completion:** conducted a walkthrough of the laboratory
 - Observations, comments, and photographs recorded in real time
 - Each tracer took approximately one hour
- **Debrief with leadership:** met immediately with the laboratory manager to review findings
 - Constructive communication structure



Product B: Completed Laboratory Tracers

Tracer Observation Detail Report
2025 IPAC Laboratory Environmental Tracer

07/28/2025

Site: The University of Kansas Health System
Program: Hospital

*Compliance percentage and totals display data from all questions in the observation.

62.50% 37.50%

Total Numerator: 25 Total Denominator: 40 Not Applicable Count: 5 Total Question Count: 45

Observation Header

Observation Title: 2025 IPAC Laboratory Environmental Tracer – Higgins, Kira – 07/28/2025	Location: Laboratory Locations
Observation Status: Complete	Department: Green Hills Cancer Center
Observation Date: 07/28/2025	
Total Completed Observations: 1	

Note:

Clean Supply/Items

1. There are no expired or compromised supplies.	Num: 1	Den: 1	Comp%: 100.00
Compliant			
2. Bottom shelves are solid or have a liner.	Num: 0	Den: 1	Comp%: 0.00
Noncompliant			
 — No liner on bottom shelves in clean supply area			
3. Only clean supplies are found in clean utility area.	Num: 0	Den: 1	Comp%: 0.00
Noncompliant			
 — personal cups stored amidst clean supplies			
4. Primary shipping containers and corrugated cardboard are not used to store clean supplies.	Num: 0	Den: 1	Comp%: 0.00
Noncompliant			
 — primary shipping boxes in clean supply area			
5. All items are stored at least 18 inches below the ceiling.	Num: 1	Den: 1	Comp%: 100.00
Compliant			
6. No clean supplies are stored directly on the floor.	Num: 1	Den: 1	Comp%: 100.00
Compliant			

Page: 1 of 5

Tracer Observation Detail Report
2025 IPAC Laboratory Environmental Tracer

09/02/2025

Site: The University of Kansas Health System
Program: Hospital

*Compliance percentage and totals display data from all questions in the observation.

76.19% 23.81%

Total Numerator: 32 Total Denominator: 42 Not Applicable Count: 3 Total Question Count: 45

Observation Header

Observation Title: 2025 IPAC Laboratory Environmental Tracer – Higgins, Kira – 09/02/2025	Location: Laboratory Locations
Observation Status: Complete	Department: Clinical Research Center (CRC)
Observation Date: 09/02/2025	
Total Completed Observations: 1	

Note:

Clean Supply/Items

1. There are no expired or compromised supplies.	Num: 1	Den: 1	Comp%: 100.00
Compliant			
2. Bottom shelves are solid or have a liner.	Num: 0	Den: 1	Comp%: 0.00
Noncompliant			
 — clean supply storage area			
3. Only clean supplies are found in clean utility area.	Num: 0	Den: 1	Comp%: 0.00
Noncompliant			
 — boxes of sharps and biohazard trash near clean supplies			
4. Primary shipping containers and corrugated cardboard are not used to store clean supplies.	Num: 0	Den: 1	Comp%: 0.00
Noncompliant			
 — primary shipping boxes in clean supply area			
5. All items are stored at least 18 inches below the ceiling.	Num: 1	Den: 1	Comp%: 100.00
Compliant			
6. No clean supplies are stored directly on the floor.	Num: 1	Den: 1	Comp%: 100.00
Compliant			
7. No clean supplies are stored in biohazard bags.	Num: 0	Den: 1	Comp%: 0.00
Noncompliant			

Page: 1 of 4

Tracer Observation Detail Report
2025 IPAC Laboratory Environmental Tracer

05/20/2025

Site: The University of Kansas Health System
Program: Hospital

*Compliance percentage and totals display data from all questions in the observation.

63.72% 36.28%

Total Numerator: 36 Total Denominator: 43 Not Applicable Count: 2 Total Question Count: 45

Observation Header

Observation Title: 2025 IPAC Laboratory Environmental Tracer – Higgins, Kira – 05/29/2025	Location: Laboratory Locations
Observation Status: Complete	Department: Olathe Cancer Center
Observation Date: 05/29/2025	
Total Completed Observations: 1	

Note:

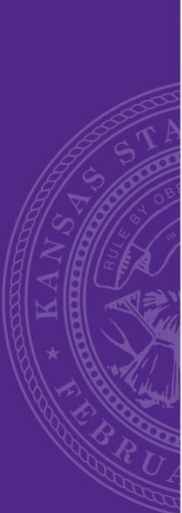
Clean Supply/Items

1. There are no expired or compromised supplies.	Num: 1	Den: 1	Comp%: 100.00
Compliant			
2. Bottom shelves are solid or have a liner.	Num: 1	Den: 1	Comp%: 100.00
Compliant			
3. Only clean supplies are found in clean utility area.	Num: 0	Den: 1	Comp%: 0.00
Noncompliant			
 — personal items stored with clean supplies			
4. Primary shipping containers and corrugated cardboard are not used to store clean supplies.	Num: 1	Den: 1	Comp%: 100.00
Compliant			
5. All items are stored at least 18 inches below the ceiling.	Num: 1	Den: 1	Comp%: 100.00
Compliant			
6. No clean supplies are stored directly on the floor.	Num: 1	Den: 1	Comp%: 100.00
Compliant			
7. No clean supplies are stored in biohazard bags.	Num: 0	Den: 1	Comp%: 0.00
Noncompliant			
 — biohazard bags			
8. Open control solution bottles are labeled with open date and a discard date according to manufacturer's recommendation or per policy and are not expired or beyond the discard date.	Num: 1	Den: 1	Comp%: 100.00
Compliant			

PPE/Staff Safety

Page: 1 of 4

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Design &
Development

**Implementation
& Results**

Interpretation &
Limitations

Evaluation &
Next Steps

Common deficiencies:

- “Staff are wearing and utilizing appropriate PPE to prevent exposure”
- “Sinks are clearly designated as “clean” and “dirty” sinks”

Consistent strengths:

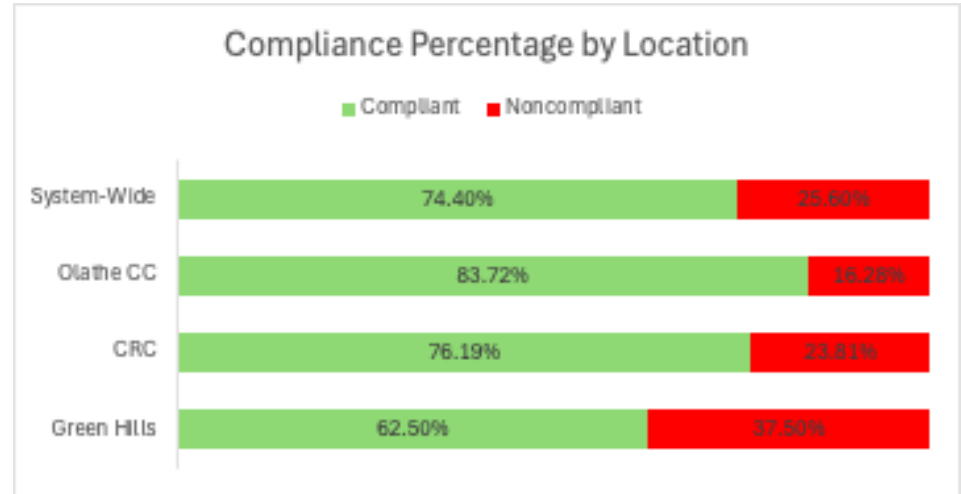
- “Staff have access to PPE for standard and BSL guidelines”
- “Chairs and other furniture are free of tears and in good condition”

Category	Question	Location			NC Count
		GH	CRC	OCC	
Clean supply/items	There are no expired or compromised supplies.	C	C	C	0
	Bottom shelves are solid or have a liner.	NC	NC	C	2
	Only clean supplies are found in clean utility area.	NC	NC	NC	3
	Primary shipping containers and corrugated cardboard are not used to store clean supplies.	NC	NC	C	2
	All items are stored at least 18 inches below the ceiling.	C	C	C	0
	No clean supplies are stored directly on the floor.	C	C	C	0
	No clean supplies are stored in biohazard bags.	NC	NC	NC	3
	Open control solution bottles are labeled with open date and a discard date according to manufacturer's recommendation or per policy and are not expired or beyond the discard date.	NC	NC	C	2

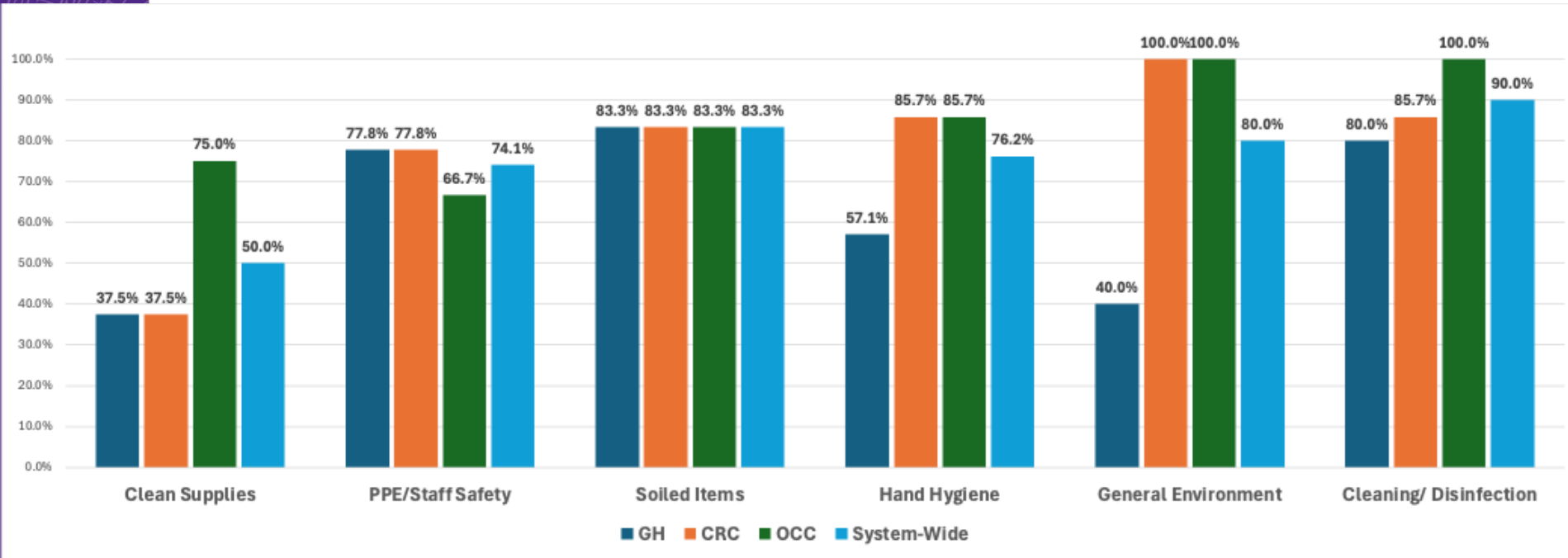
Green Hills = GH
Clinical Research Center = CRC
Olathe Cancer Center = OCC

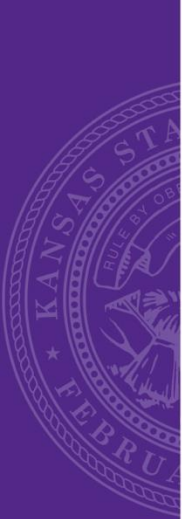
Compliance by Location

Compliance by Location		
	Compliant	Noncompliant
Green Hills	62.50%	37.50%
CRC	76.19%	23.81%
Olathe CC	83.72%	16.28%
System-Wide	74.40%	25.60%



Compliance by Category





Design &
Development

Implementation
& Results

**Interpretation
& Limitations**

Evaluation &
Next Steps

- Cross-Site Themes
 - **Clean supplies:** storage and labeling are systemic challenges
 - **PPE compliance:** reflects behavior/training gaps more than resource gaps
 - **Hand hygiene sinks:** universal infrastructure/policy gap



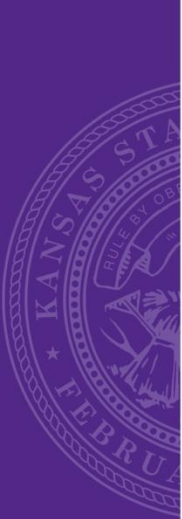
Design &
Development

Implementation
& Results

**Interpretation
& Limitations**

Evaluation &
Next Steps

- Limitations
 - Small sample size
 - Not generalizable to specialized areas
 - No long-term evaluation period or follow-up
 - Deterrence



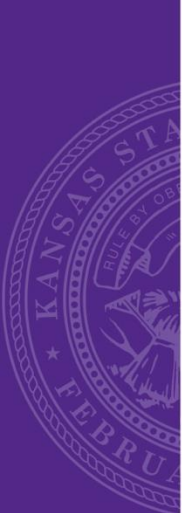
Design &
Development

Implementation
& Results

Interpretation &
Limitations

**Evaluation &
Next Steps**

- Evaluation of tracer effectiveness
- Necessary part of process not done due to time constraints



Design &
Development

Implementation
& Results

Interpretation &
Limitations

**Evaluation &
Next Steps**

- **Next Steps**
 - Sustainability
 - Scalable and adaptable
 - Implementation of annual tracers conducted in each laboratory space

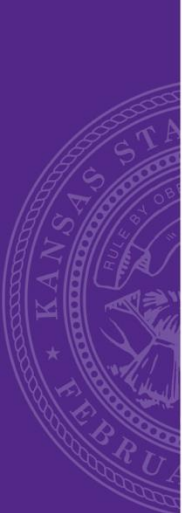
MPH Foundational Competencies



- **Competency 4:** Interpret results of data analysis for public health research, policy, or practice
- **Competency 9:** Design a population-based policy, program, project, or intervention
- **Competency 11:** Select methods to evaluate public health programs
- **Competency 16:** Apply leadership and/or management principles to address a relevant issue
- **Competency 18:** Select communication strategies for different audiences and sectors

Emphasis Area Competencies

MPH Emphasis Area: Infectious Disease and Zoonoses		
Number and Competency		Description
1	Pathogens/pathogenic mechanisms	Evaluate modes of disease causation of infectious agents
2	Host response to pathogens/immunology	Investigate the host immune response to infection
3	Environmental/ecological influences	Examine the influence of environmental and ecological forces on infectious diseases
4	Disease surveillance	Analyze disease risk factors and select appropriate surveillance
5	Disease vectors	Investigate the role of vectors, toxic plants, and other toxins in infectious disease



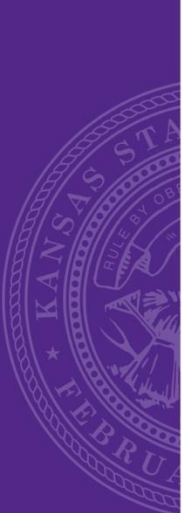
Conclusion

- Created and piloted a standardized laboratory tracer to identify real-time infection prevention gaps.
- Strengthened collaboration between IPAC and laboratory teams to improve safety practices.
- Advanced system-wide infection prevention efforts that protect healthcare workers, patients, and the broader community.

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Questions?

