



# Collaboration in Extending Respiratory Testing to the Emergency Department

W. Frank Peacock,  
MD, FACEP, FACC, FESC  
Professor,  
Emergency Medicine  
Vice Chair for Research  
Baylor College of Medicine  
Houston, Texas

Kimberly Evans,  
RN  
Emergency Department  
Unit Supervisor  
University of South Alabama  
Children's and Women's Hospital  
Mobile, Alabama

# Program Sponsors

*Hosted by*



# Joining the Teleconference

If you closed the 'Phone' call in box when you joined:



Click 'Webinar Info' for Dial-in information  
(top left of your screen)



# Webinar Communication Tools

Chat



Chat ✕

To:

Enter chat message here ➤

Type here



# Webinar Communication Tools

Chat



Chat

To:

Enter chat message here

Type here



Q&A



Q & A

All (0)

Select a question and then type your answer here. There's a 512-character limit.

Type here



# Webinar Communication Tools

Chat



Type here



Q&A



Type here



Closed  
Captioning



# Available CE Credit

P.A.C.E.<sup>®</sup>

Florida laboratory CE

Certificate of Attendance



# After today's webinar:

## A certificate of attendance is available for all attendees

- Evaluation form will appear automatically
- Must complete Eval to receive Certificate link via email
- **For groups:**  
Those logged in will receive Email from **messenger@webex.com** with link to evaluation. Forward email to colleagues who attended with you!!!
- Double-check email address





# Joined Using a Mobile Device?

Evaluation won't appear automatically, but...

**Watch for email with link to evaluation!**



# Recording: Within a few days following today's event, visit:

<https://www.whitehatcom.com/cardinalhealth>

<https://www.whitehatcom.com/abbott>

## Collaboration in Extending Respiratory Testing to the Emergency Department

Live Event: Tuesday, September 17, 2024 | 11:00 AM - 12:00 PM ET

P.A.C.E.® Credit available until March 17, 2025 | Florida Lab Credit available

[Register](#)

Join experts from the Emergency Department (ED) as they share real-world experience with clinical and operational examples of patients exhibiting symptoms related to respiratory illness. In this session, you will gain an exclusive perspective on respiratory testing in the ED. The webinar speakers will discuss strategies for influencing and implementing rapid testing at the point of care for respiratory infectious diseases, such as COVID-19, Influenza, RSV, and Group A Strep.

### This webinar will:

- Describe apparent (and less apparent) factors that affect care in the ED
- Analyze the role of timely diagnostic test results on patients, ED staff, and the healthcare system
- Examine approaches and evidence for delivering results to decrease time to targeted patient care and infection

### Presenters:



**Kimberly Evans, RN**  
Emergency Department Unit Supervisor  
University of South Alabama  
Children's and Women's Hospital  
Mobile, AL



**Frank Peacock, IV, MD, FACEP, FACC, FESC**  
Professor of Emergency Medicine  
Emergency Medicine Vice Chair for Research  
Baylor College of Medicine  
Houston, TX



COMPLIMENTARY WEBINAR

# Collaboration in Extending Respiratory Testing to the Emergency Department

Tuesday, September 17, 2024  
11:00 AM – 12:00 PM ET



**W. Frank Peacock,  
MD, FACEP, FACC, FESC**

Professor,  
Emergency Medicine  
Vice Chair for Research  
Baylor College of Medicine  
Houston, Texas



**Kimberly Evans,  
RN**

Emergency Department  
Unit Supervisor  
University of South Alabama  
Children's and Women's Hospital  
Mobile, Alabama

The speakers are presenting on behalf of Abbott.  
The information presented is consistent with applicable FDA guidelines.  
This program does not provide continuing medical education (CME) credits.  
© 2024 Abbott. All rights reserved. All trademarks referenced are trademarks of either the Abbott group of companies or their respective owners. With the exception of speaker photos, any images displayed are for illustrative purposes only. COL-25263 9/24



Sponsored by





**W. Frank Peacock IV**  
**MD, FACEP, FACC, FESC**

Professor, Emergency Medicine  
Vice Chair for Research  
Baylor College of Medicine



# Objectives

- Describe apparent (and less apparent) factors that affect care in the Emergency Department (ED)
- Analyze the role of timely diagnostic test results on patients, ED staff, and the healthcare system
- Examine approaches and evidence for delivering results in time for targeted patient care and infection control decisions
- Assess strategies where ED influence and laboratory collaboration helped facilitate the implementation of POC testing

---

# Saving Lives: Respiratory Point of Care Testing in the Emergency Department

W. Frank Peacock, MD, FACEP, FACC, FESC  
Vice Chair of Research, Baylor College of Medicine  
President, Comprehensive Research Associates, LLC

---

---

# W. F. Peacock, MD, FACEP, FACC, FESC

## Disclosures

### **Research Grants:**

Brainbox, Quidel

### **Consultant:**

Abbott, Brainbox, Instrument Labs, Janssen, Osler, Roche, Siemens, Spinchip, Vifor

### **Stock/Ownership Interests:**

AseptiScope Inc, Brainbox Inc, Braincheck Inc, Coagulo Inc, Comprehensive Research Associates LLC, Comprehensive Research Management Inc, Emergencies in Medicine LLC, Fast Inc, Forrest Devices, Ischemia DX LLC, Lucia Inc, Prevencio Inc, RCE Technologies, ROMTech, ScPharma, Trivirum Inc, Upstream Inc.

---

---

Is an hour important?

Some may say  
it is not.....

---



---

# Is an hour important?

BMJ

RESEARCH

---

Association between waiting times and short term mortality and hospital admission after departure from emergency department: population based cohort study from Ontario, Canada

Astrid Guttman, senior scientist,<sup>1,2,3,4</sup> Michael J Schull, senior scientist and 2010-11 Commonwealth Fund Harkness fellow,<sup>1,4,5,6,7</sup> Marian J Vermeulen, epidemiologist,<sup>1,6</sup> Therese A Stukel, senior scientist<sup>1,4,6</sup>

**N = 13,934,542**

Adverse events increase with mean LOS in similar patients in the same ED shift

OR for Death if LOS  $\geq 6$  v  $< 1$  hr cohorts

- Hi Acuity 1.79      Low Acuity 1.71

---

# Is an hour important?

## The association between hospital overcrowding and mortality among patients admitted via Western Australian emergency departments

Peter C Sprivulis, Julie-Ann Da Silva, Ian G Jacobs, Amanda RL Frazer and George A Jelinek

N= 62,495

Risk ratio for DEATH

- Per hour of ED stay = 1.1 ( $p < 0.001$ )
- Per hour of ED wait = 1.2 ( $p=0.01$ )

---

# Is an hour important?

HEALTH POLICY AND CLINICAL PRACTICE/ORIGINAL RESEARCH

---

## Prolonged Emergency Department Stays of Non–ST-Segment-Elevation Myocardial Infarction Patients Are Associated With Worse Adherence to the American College of Cardiology/American Heart Association Guidelines for Management and Increased Adverse Events

**Deborah B. Diercks, MD**

**Matthew T. Roe, MD, MHS**

**Anita Y. Chen, MS**

**W. Franklin Peacock, MD**

**J. Douglas Kirk, MD**

**Charles V. Pollack, Jr., MD, MA**

**W. Brian Gibler, MD**

**Sidney C. Smith, Jr., MDE**

**Magnus Ohman, MD**

**Eric D. Peterson, MD, MPH**

From the University of California, Davis, School of Medicine, Sacramento, CA (Diercks, Kirk); the Division of Cardiology and Duke Clinical Research Institute, Duke University Medical Center, Durham, NC (Roe, Chen, Ohman, Peterson); the Cleveland Clinic Foundation, Cleveland, OH (Peacock); the Pennsylvania Hospital, Philadelphia, PA (Pollack); the University of Cincinnati School of Medicine, Cincinnati, OH (Gibler); and the Department of Cardiology, University of North Carolina, Chapel Hill, NC (Smith).

**N=42,780**

**Long ED stays less often received guideline-recommended NSTEMI therapies**

---

# Is an hour important?

## The Impact of Emergency Department Crowding Measures on Time to Antibiotics for Patients With Community-Acquired Pneumonia

**Jesse M. Pines, MD, MBA,  
MSCE**

**A. Russell Localio, PhD**

**Judd E. Hollander, MD**

**William G. Baxt, MD**

**Hoi Lee, MD**

**Carolyn Phillips, MD**

**Joshua P. Metlay, MD, PhD**

From the Department of Emergency Medicine (Pines, Hollander, Baxt, Lee, Phillips) and Center for Clinical Epidemiology and Biostatistics (Pines, Localio, Metlay), University of Pennsylvania School of Medicine, Philadelphia, PA; the Department of Medicine (Metlay), Leonard Davis Institute of Health Economics (Pines), University of Pennsylvania, Philadelphia, PA; and the Center for Health Equity Research and Promotion, VA Medical Center, Philadelphia, PA (Metlay).

**N=694 patients**

**Delayed/No antibiotics**

- OR 1.05 for each additional WR patient
- OR 1.14 for each additional WR hour

---

# Is an hour important?

HEALTH POLICY AND CLINICAL PRACTICE/ORIGINAL RESEARCH

---

## Emergency Department Crowding Is Associated With Poor Care for Patients With Severe Pain

**Jesse M. Pines, MD, MBA,  
MSCE**

**Judd E. Hollander, MD**

From the Department of Emergency Medicine (Pines, Hollander), the Center for Clinical Epidemiology and Biostatistics (Pines), University of Pennsylvania School of Medicine, and the Leonard Davis Institute for Health Economics, University of Pennsylvania, Philadelphia, PA.

N=13,758

Non-treatment of pain associated with waiting room number

OR = 1.03 for each additional waiting patient

---

# Is an hour important?

## *A Pilot Study Examining Undesirable Events Among Emergency Department–Boarded Patients Awaiting Inpatient Beds*

Shan W. Liu, MD, MPH

Stephen H. Thomas, MD, MPH

James A. Gordon, MD, MPA

Azita G. Hamedani, MD, MPH

Joel S. Weissman, PhD

From the Department of Surgery (Liu, Thomas) and Department of Medicine (Gordon), Harvard Medical School, Boston, MA; the Department of Emergency Services, Massachusetts General Hospital, Boston, MA (Liu, Thomas, Gordon); the Division of Emergency Medicine, Department of Medicine, University of Wisconsin School of Medicine and Public Health, Madison, WI (Hamedani); and the Department of Family and Community Medicine, University of Massachusetts, Boston, MA (Weissman).

N=162 “boarded” patients (waiting for room)

Undesirable event

Missed meds, lab results, arrhythmias, or other adverse events

27.8% had an undesirable event

---

# Crowding and Death within 7 Days

- 2,146,605 people over 7 years (1<sup>st</sup> ED visit)
- Model to predict mortality based on:
  - Age, urgency, hospital, year, season, day of week, deprivation, ethnicity, degree of crowding at time of arrival
- **PURPOSE**: To see if coming to ED when it was crowded changed your risk of death





---

# Outcomes:

- Changes in death risk based on ED arrival events
- Death ↑
  - 6% if not meeting triage time targets
  - 7% if >90% not meeting a 4 hr ED LOS target
  - 10% if  $\geq 10\%$  of patients have Access Block
    - Access Block = admitted with ED LOS >8 h
- Death ↓
  - 9% if ED occupancy is <100%





---

16,201,036 patients

YES,  
AN HOUR  
IS IMPORTANT



---

What business intentionally kills its customers?

If you had a way of getting data quickly, wouldn't you?

He's one of the busiest men in town. While his door may say *Office Hours 2 to 4*, he's actually on call 24 hours a day.

The doctor is a scientist, a diplomat, and a friendly sympathetic human being all in one, no matter how long and hard his schedule.

*According to a recent Nationwide survey:*  
**MORE DOCTORS SMOKE CAMELS THAN ANY OTHER CIGARETTE**

DOCTORS in every branch of medicine—113,597 in all—were queried in this nationwide study of cigarette preference. Three leading research organizations made the survey. The gist of the query was—What cigarette do you smoke, Doctor?  
*The brand named most was Camel!*

The rich, full flavor and cool mildness of Camel's superb blend of costlier tobaccos seem to have the same appeal to the smoking tastes of doctors as to millions of other smokers. If you are a Camel smoker, this preference among doctors will hardly surprise you. If you're not—well, try Camels now.

Your "T-Zone" Will Tell You...  
**T for Taste . . .**  
**T for Throat . . .**  
that's your proving ground for any cigarette. See if Camels don't suit your "T-Zone" to a "T."

**CAMELS** Costlier Tobaccos

Source: Yale University Library

---

**FASTER IS IMPORTANT**

---





Image, W.F. Peacock

# What's the future look like?



Image WF Peacock: ER Inspector

---

How long would you wait for... ??



---

# ER Insights

## Vernacular

LWOBS

Elope

AMA



## What to do?

Admit?  
Absolutely no help.

Discharge?  
Fixes the problem

---

# 2006 Press Ganey

**1.5 million ER patients, >1,500 US hospitals**

**Mean ED LOS = 4h**

- LOS ↑ for all states, except Hawaii
- ED LOS increases 30 minutes for each 10,000 ↑ vol
- Patient satisfaction

Lowest 3:00-11:00 p.m. (busiest ED time)

Highest 7:00 AM – 3:00 p.m.

**Patient satisfaction a direct function of ED LOS**

89.3 if < 1 hour

77.7 if > 4 hours

---

# 2006 Press Ganey

**1.5 million ER patients, >1,500 US hospitals**

Mean E

- LOS
- ED
- Pati

Lo

Highest 7:00 AM – 3:00 p.m.

**22.3% Hated their  
ER Experience!!!**

**Patient satisfaction a direct function of ED LOS**

89.3 if < 1 hour

77.7 if > 4 hours

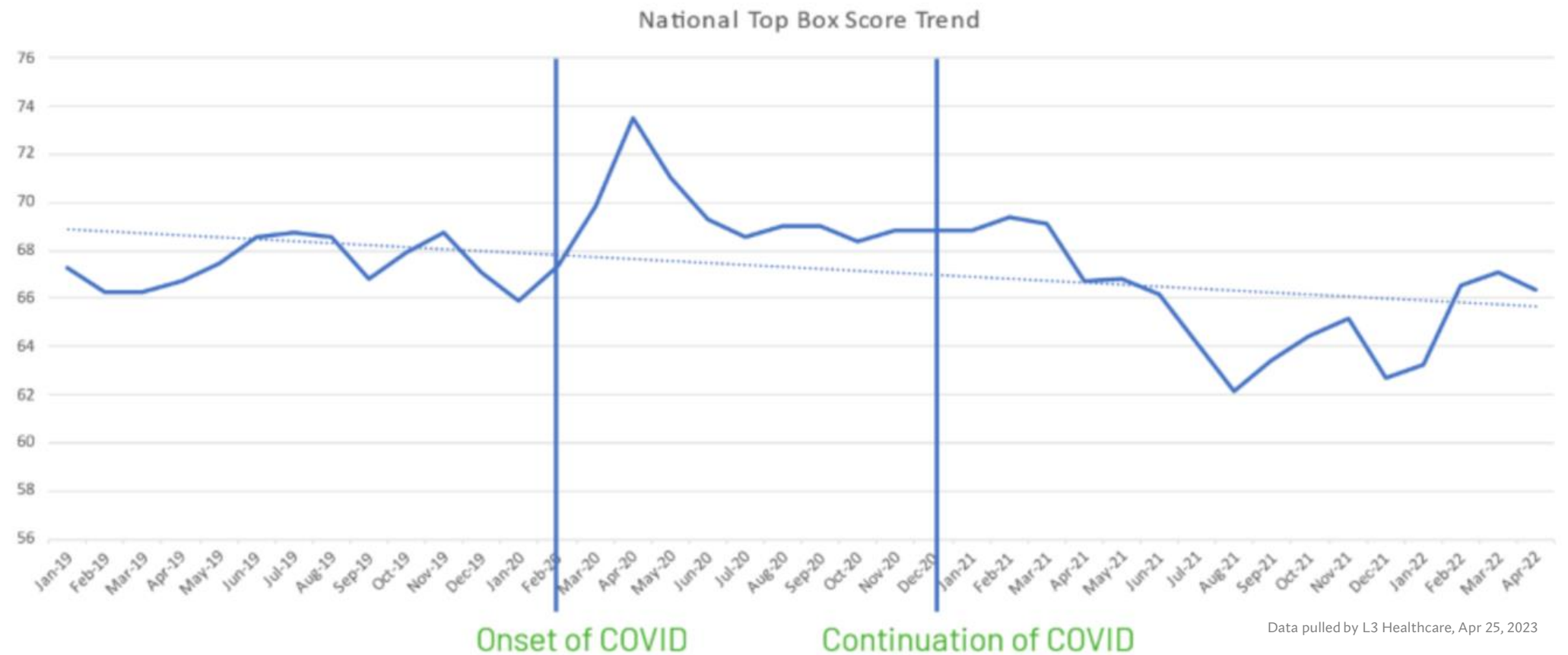


# 2022 Press Ganey

## COVID Impact on Patient Experience

PRESS GANEY EMERGENCY DEPARTMENT LIKELIHOOD TO RECOMMEND

National patient experience data reveals unprecedented drops in ED patient experience





---

# Financial Impact of ER crowding

How Frank got  
POCT in his ER

## 32 beds

- 18 critical care— Most get marker testing
- 14 fast track — Rare marker testing

LOS ~4 hours = can handle 152 pts/day

Decrease to LOS ~3 hours = can handle 228 pts/day

## An additional 76 pts/day

- @ mean billing of \$2,000/pt = ↑ in gross billables \$102K/day
  - If only an extra 30 pts/day (40% of 76) = \$60K/day
  - If only 30% (n=10) of these get marker testing = \$20K/day
  - If only 50% (n=5) of these discharged 1 hour earlier = \$10K/day
  - If collection rate is 30% = \$3K/day..... **~\$1.1 Mn/yr**
-

# What is POINT OF CARE?

**FAST**

- Turn around time (TAT)
- Door to Brain

**SMALL**

- Handheld or Compact

**EASY**

- For Nurse
- For Tech
- No centrifuge
- No pipette

**POC IS NOT**

- Cheap
- Inaccurate



POC  Central Lab

---

# Door to Brain Time

- **Prospectively collected Tn TAT data during all ED shifts**
- **From patient ED arrival until Emergency Physician aware of result**

Peacock WF et al. Acad Emerg Med.  
2004;11(5):569–570. (abstract)



Credit: W. Frank Peacock

**Direct correlation between better guideline adherence and fewer adverse outcomes**

Peterson ED et al. JACC. 2003;41:53A. (abstract)

# Results

25 participating hospitals

**N= 1,360 patients**

## Overall

Mean DTBT  $115.7 \pm 70.1$  minutes

Median 100; IQR = 73,138

## Central lab

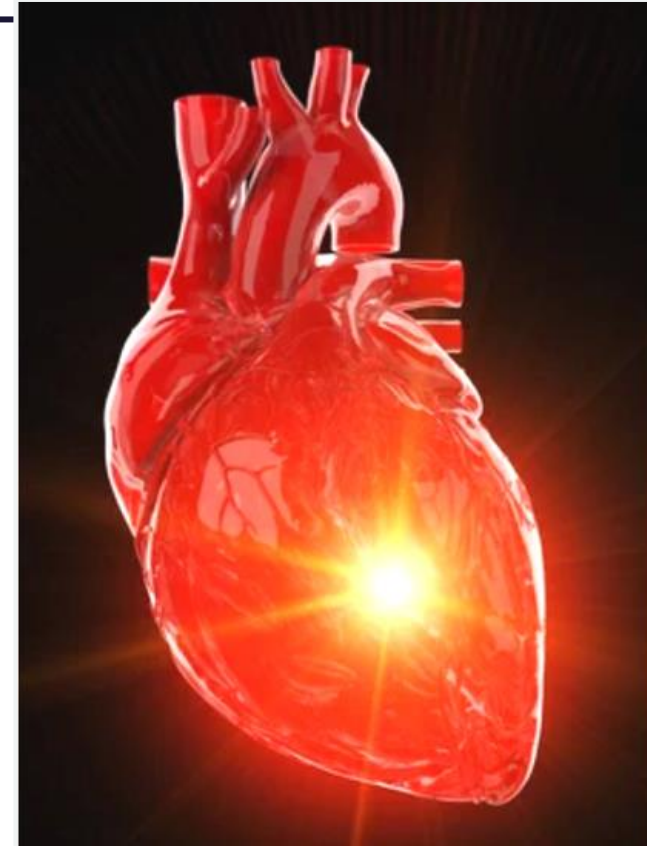
Mean DTBT  $119.2 \pm 70.5$  minutes

Median 103; IQR = 76,141

## Point of Care

Mean DTBT  $68.2 \pm 40.8$  minutes

Median 62.5, IQR = 43,83.5



**Saves about  
1 hour**

DTBT, door to brain time

---

# The Use of a Quantitative POC System Greatly Reduces the Turnaround Time of Cardiac Marker Determination

Gaze D, Collinson PO, Haass M, Derhaschnig U, Hirschl MM, Katus HA, et al.  
for the CARMYT Multicentre Study Group

- **5 hospitals**
- **4609 Tn T POC samples**
  - **3447 split and sent to lab for CKMB**

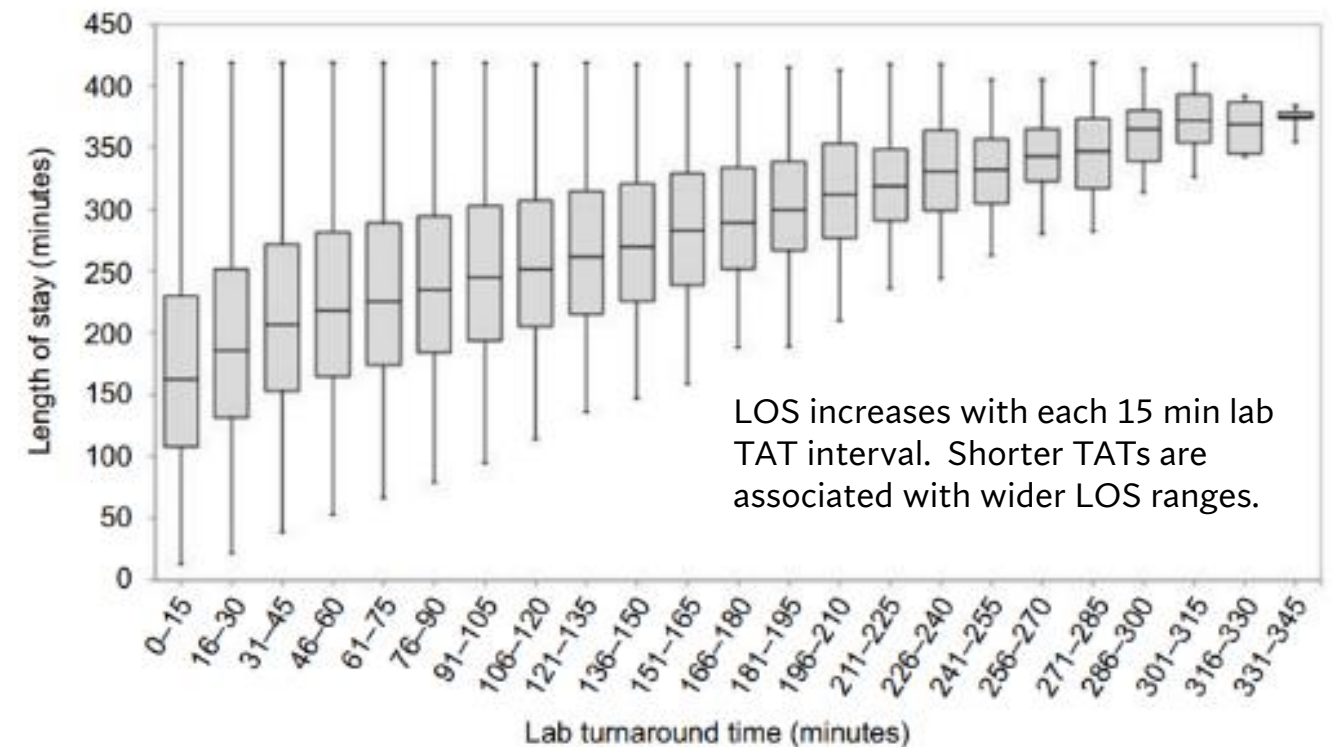
Locale	Hosp Type	Transp	POC TnT	CK CKMB	Diff (mins)
ED	Univ	Pneumo tube	21 ±0.2 (n=1879)	107±2.3 (n=1744)	86±2.3
ED	Univ	Courier	22±0.5 (n=855)	72±1.7 (n=689)	50±1.5
CCU	Rural	Nurses	12±0.5 (n=471)	147±64.1 (n=150)	135±64.1
ED	Muni	Pneumo tube	22±0.8 (n=706)	90±0.5 (n=185)	68±1.1
ED	Univ	Pneumo tube	18±0.5 (n=698)	52±1.4 (n=679)	34±1.4
<b>All</b>			<b>20±0.2</b> <b>(n=4609)</b>	<b>85±1.5</b> <b>(n=3447)</b>	<b>65±1.5</b>

POC saves 1 hour in the ER



# Reduction in lab TAT decreases ER LOS

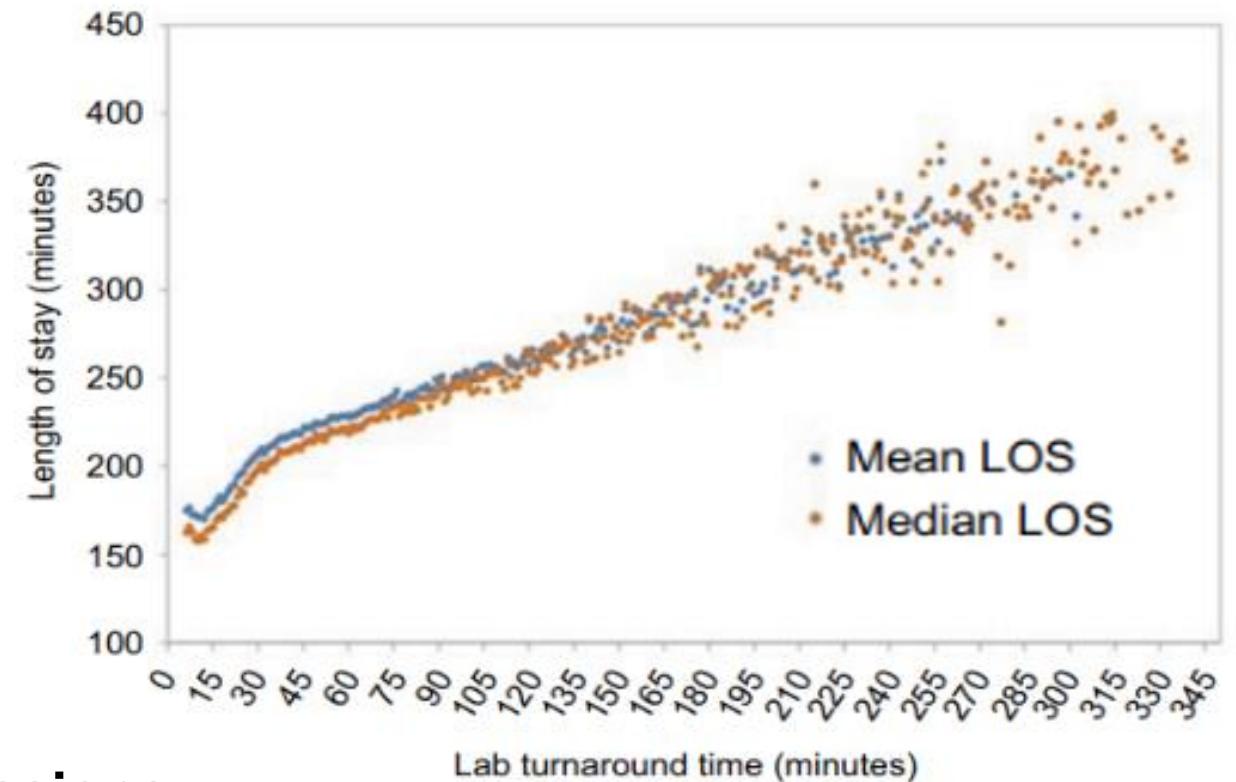
- Retrospective multivariate analysis
- Single and multisite ED EHR encounters at a tertiary hospital
- Multisite analysis:
  - **4,483,169** ED visits
  - **1-minute decrease in lab TAT, associated with 0.5 minute of decrease in LOS**
  - Consistent for all patient acuities
- Single-site analysis, Beth Israel Deaconess Medical Center ED
  - **52,080** visits on **36,570** unique patients:
  - **A 5-, 10- and 15-minute TAT reduction allowed an increase of 127, 256 and 386 additional annual admissions.**





# Reduction in lab TAT decreases ER LOS

- Retrospective multivariate analysis
- Single and multisite ED EHR encounters at a tertiary hospital
- Multisite analysis:
  - **4,483,169** ED visits
  - **1-minute decrease in lab TAT, associated with 0.5 minute of decrease in LOS**
  - Consistent for all patient acuities
- Single-site analysis, Beth Israel Deaconess Medical Center ED
  - **52,080** visits on **36,570** unique patients:
  - **A 5-, 10- and 15-minute TAT reduction allowed an increase of 127, 256 and 386 additional annual admissions.**



---

# Quality and Patient Satisfaction



**SPEED MATTERS**

---

---

# If you aren't increasing efficiency and quality...



**...there are penalties:**

**1/3 - Patient Satisfaction**

**2/3 - Quality measures**

Value-based purchasing (VBP)  
program reductions:

FY 2013: 1.0%

FY 2014: 1.25%

FY 2015: 1.5%

FY 2016: 1.75%

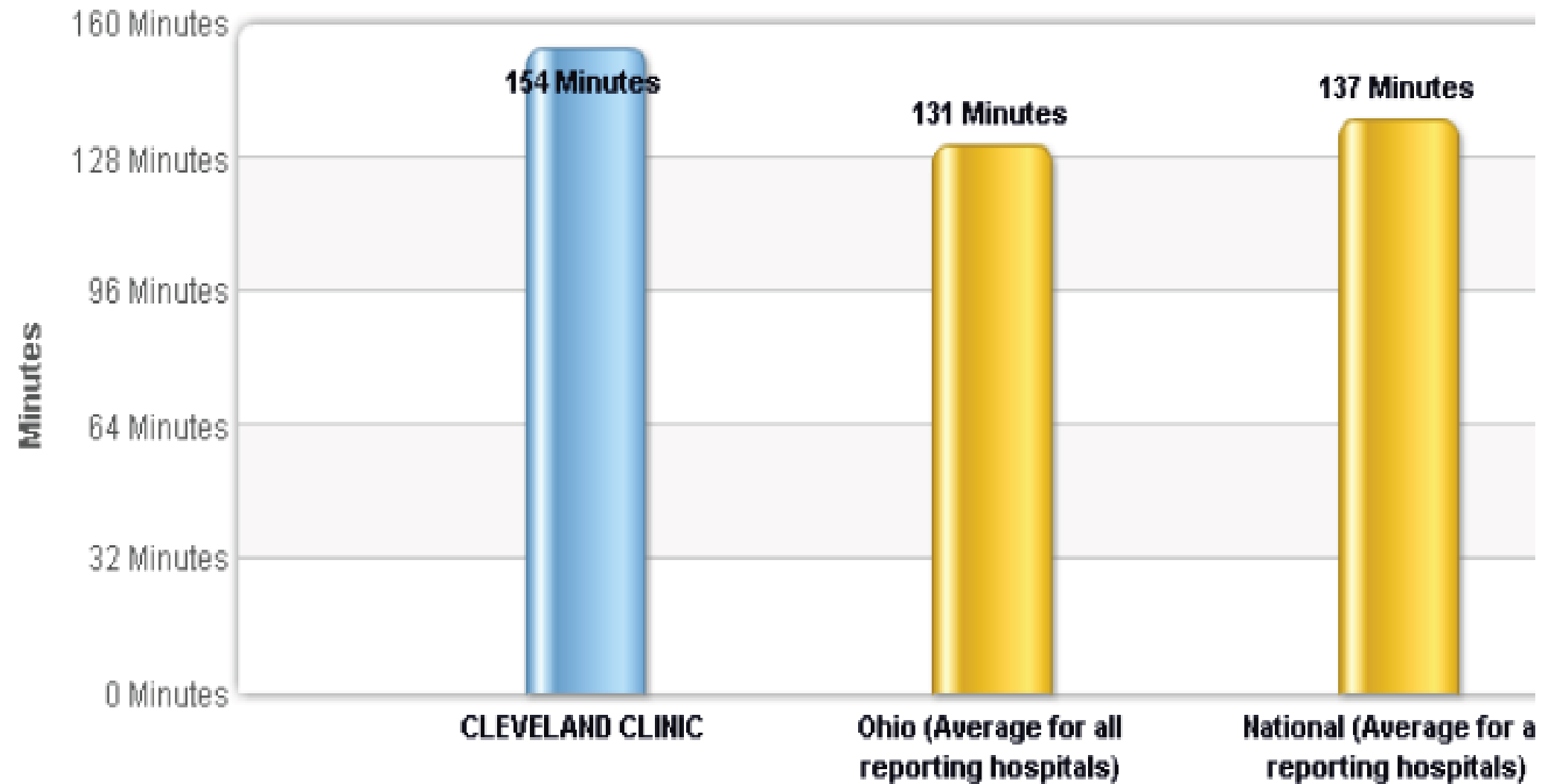
FY 2017/subsequent years: 2.0%



---

## Average time patients spent in the emergency department before being sent home

A lower number of minutes is better





---

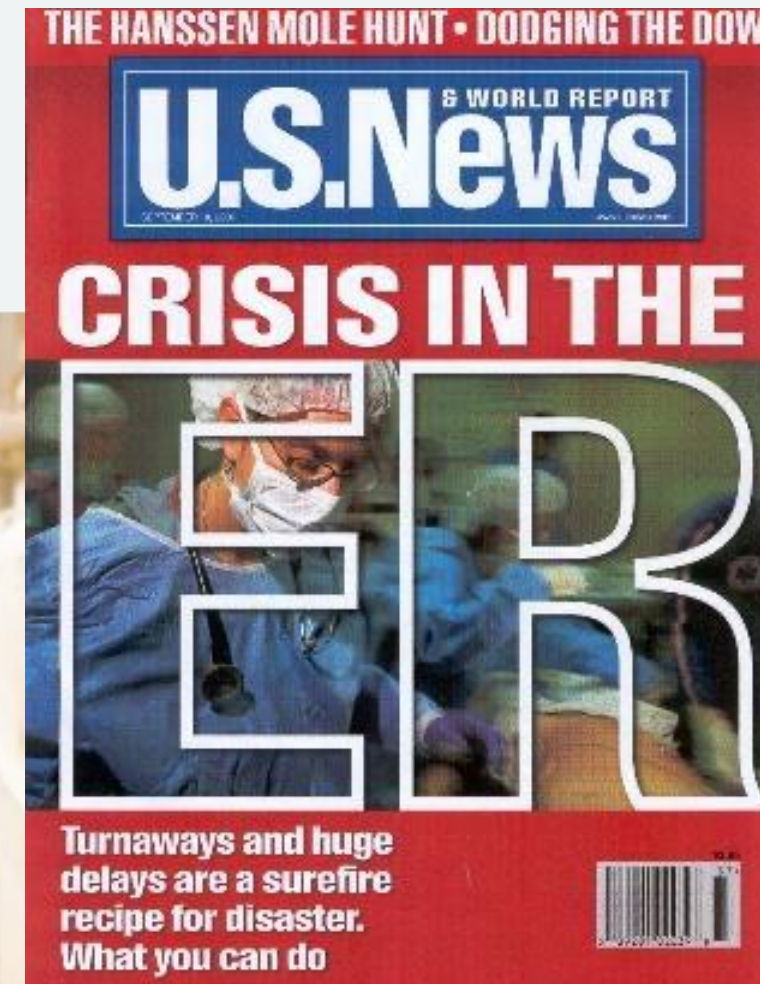
# Got a daughter?





---

# Sunday in the ER



U.S. News & World Report, cover story. Sept 10, 2001.

---

# Impact of Fast SARS-CoV-2 Molecular POCT on LOS in an ED

Saint-Louis Hospital, Paris, France

Adult patients, needing rapid diagnosis of SARS-CoV-2

**Period 1)** N=337 10/16 - 11/3, 2020

Lab-based NAAT (Cepheid Xpert<sup>®</sup> Xpress SARS-CoV-2) or  
Lab-based respiratory panel (Biofire FilmArray<sup>®</sup> RP2) **in virology lab**

**Period 2)** N=339 11/4 to 11/30, 2020

POC NAAT (Abbott ID NOW<sup>™</sup>) **in ED**



## POC NAAT (Period 2)

- **More patients spent less time (<4 h) in the ED**, 61.3% vs 38.3%,  $p < 0.0001$
- **Shorter ED LOS**, median 208 vs 276 min,  $p < 0.0001$ 
  - Univariate analysis factors: HTN, anosmia/ageusia, number of pts/day, rapid NAAT in the ED
  - By multivariate analysis, period of testing remained significantly associated with ED LOS

**Rapid POCT SARS-CoV-2 NAAT performed in ED associated with reduced ED LOS**



# Outcomes of POC testing for Flu in the ED of a tertiary referral hospital in Ireland

- 7,150 lab records
- 2017-2020, 4 Flu seasons
- POC NAAT (ID NOW™) vs. Lab-based NAAT Flu A/B/RSV (GeneXpert®)



- POC NAAT Influenza A
  - Sensitivity = 90.6% (95% CI = 78.6-96.5)
  - Specificity = 99.2% (95% CI = 95.2-100)
- **POCT NAAT:**
  - **Reduced HAI, 51.4% and 41.9%** (2 seasons using POCT)
  - **Admit rate ratio: 0.72** for Flu diagnosed by POCT (95% CI: 0.53-0.97),  $p = 0.031$



Flu vs ??

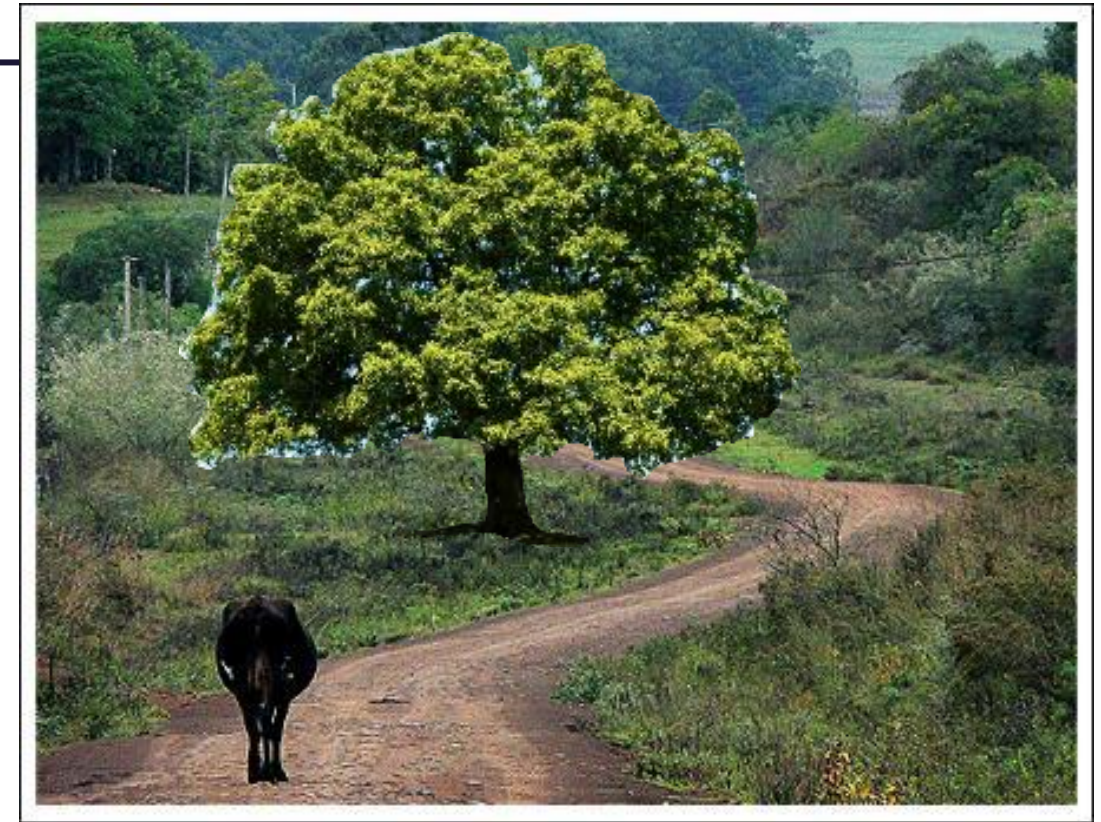
# Paving cowpaths?

Prospective, ED ordered flu test

Test: CLIA waived flu POC NAAT  
(Roche cobas<sup>®</sup> Liat<sup>®</sup>)

POCT (N = 100) vs lab test (N = 97)

Time to Disposition (TTD) = time of discharge order



[Photo credit: Gonzalo Viera Azpiroz]

## POC NAAT

- **Shorter TAT:** median (IQR) 30.5 (7.5) vs 106.0 (55) mins,  $p = 0.001$
- **More flu (+):** 51.0% vs. 33.0%,  $p = 0.01$
- No change in Pt Antibiotic Rx: 14.0% vs 14.4%,  $p = 0.93$
- No change in TTD: median (IQR) 146.5 (98.5) and 165.5 (127) mins,  $p = 0.26$

**POC flu test provided faster TAT than the lab, there was no difference in TTD or antibiotic use**



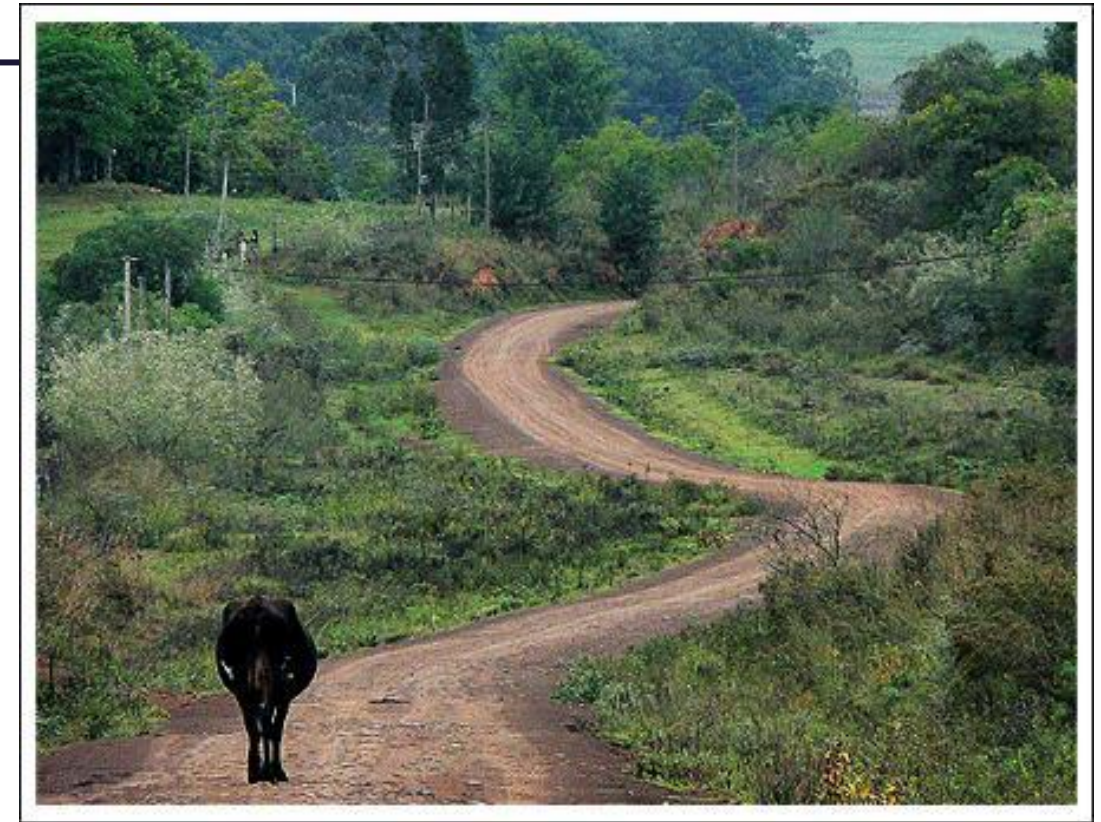
# Paving cowpaths?

Prospective, ED ordered flu test

Test: CLIA waived flu POC NAAT  
(Roche cobas<sup>®</sup> Liat<sup>®</sup>)

POCT (N = 100) vs lab test (N = 97)

Time to Disposition (TTD) = time of discharge order



[Photo credit: Gonzalo Viera Azpiroz]

## POC NAAT

- **Shorter TAT:** median (IQR) 30.5 (7.5) vs 106.0 (55) mins,  $p = 0.001$
- **More flu (+):** 51.0% vs. 33.0%,  $p = 0.01$
- No change in Pt Antibiotic Rx: 14.0% vs 14.4%,  $p = 0.93$
- No change in TTD: median (IQR) 146.5 (98.5) and 165.5 (127) mins,  $p = 0.26$

**POC flu test provided faster TAT than the lab, there was no difference in TTD or antibiotic use**

# Impact of Rapid Molecular Respiratory Virus Testing on Real-Time Decision Making in a Pediatric ED

- Prospective cohort study
- Consecutive peds pts, 9 weeks, peak flu season
- ED ordered respiratory NAATs (from lab)
- ED Drs interviewed to discern plans if given immediate flu/RSV results



- **Drs would change management** in 39 (64%) of 61 ED-ordered tests
- Drs actions would have:
  - **Decreased ED LOS**, 33 mins
  - **Ordered fewer tests**, 18%,  $p < 0.001$ ; mean **pt charge savings** of \$669
  - **Ordered fewer antibiotics** among discharged patients, 17%,  $p = 0.043$
  - **Increased appropriate antiviral use**, 13%,  $p = 0.023$



# Clinical and operational impact of POC SARS-CoV-2 detection in the ED



- Prospective, 'Before/After'
  - COVID-19 Rapid NAAT (Abbott ID NOW™)
  - Weeks 37 to 50, 2020
- N=3333 ED pts, 331 (9.9%) SARS-CoV-2 (+)
  - 136 (9.2%) before, 195 (10.5%) after POC

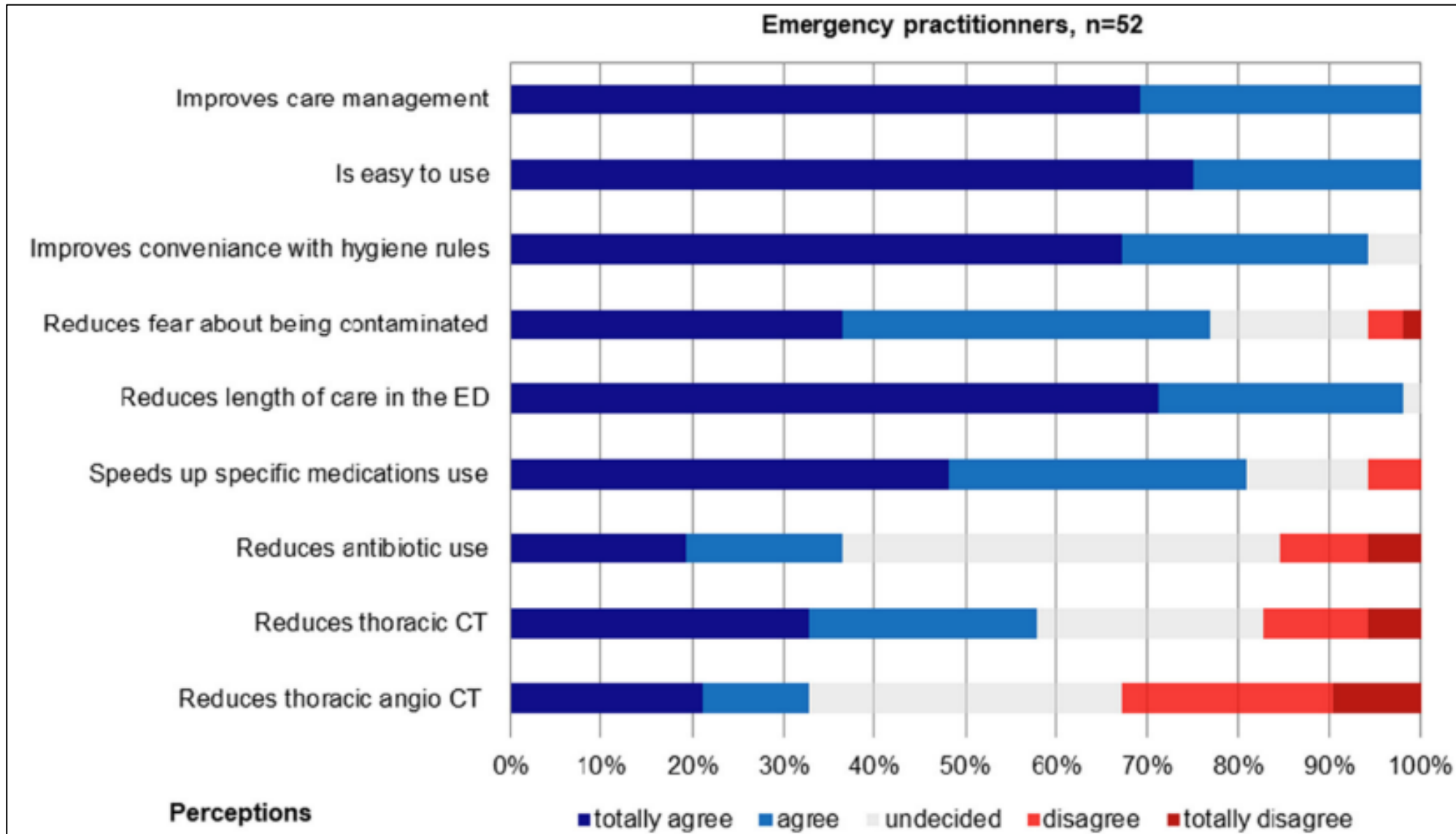
## POC NAAT

- In-hospital mortality similar, 8.2 vs 9.5%
- **Hospitalizations higher**, 81.6% vs. 65.4%,  $p < 0.001$
- **If (+), anticoagulants higher**, 40% vs. 24.2%,  $p < 0.003$ , antibx/steroids similar
- **More pts able to leave the ED within 6 h**

	Median (IQR) ED LOS (hrs)		P-value
	Before POC	After POC	
<b>Overall</b>	6.7 (4.6-9.2)	7.2 (4.4-9.5)	0.43
<b>&lt;3h, n (%)</b>	<b>8</b> <b>(5.6)</b>	<b>32</b> <b>(16.4)</b>	<b>0.003</b>
<b>3-6, n (%)</b>	<b>50</b> <b>(36.9)</b>	<b>39</b> <b>(20)</b>	<b>0.0009</b>
6-12, n (%)	66 (48.5)	104 (53.3)	0.34
>12, n (%)	12 (8.8)	20 (10.2)	0.85



# Clinical and operational impact of POC SARS-CoV-2 detection in the ED



# Positive Impact of an ED POC Flu Test During the 2017–2018 Epidemic

- Retrospective, observational study, adults
- 1200-bed hospital, northeastern France
- 2017–2018 flu epidemic, when ran out of reagents for POC testing
- Only pts (+) flu test included
  - 451 POC NAAT: (+) 119 (26.4%)      invalid 50 (11.1%)      (-) 282 (62.5%)
  - 365 Lab-based NAAT: (+) 128 (35.1%)      invalid 5 (1.3%)      (-) 232 (63.6%)



- 
- POC Flu NAAT
    - Similar Oseltamivir tx rate with lab-based NAAT
    - **Earlier tx with POC NAAT**; mean 9.5 vs 23.6 hrs
    - **Fewer antibiotics**, 38.9% vs 55.7%,  $p = 0.03$
    - **Shorter ED LOS**, 10.2 vs 12.9 hrs,  $p = 0.005$
    - **Lower hospitalization rate**, 38.9% vs 61.3%,  $p = 0.003$





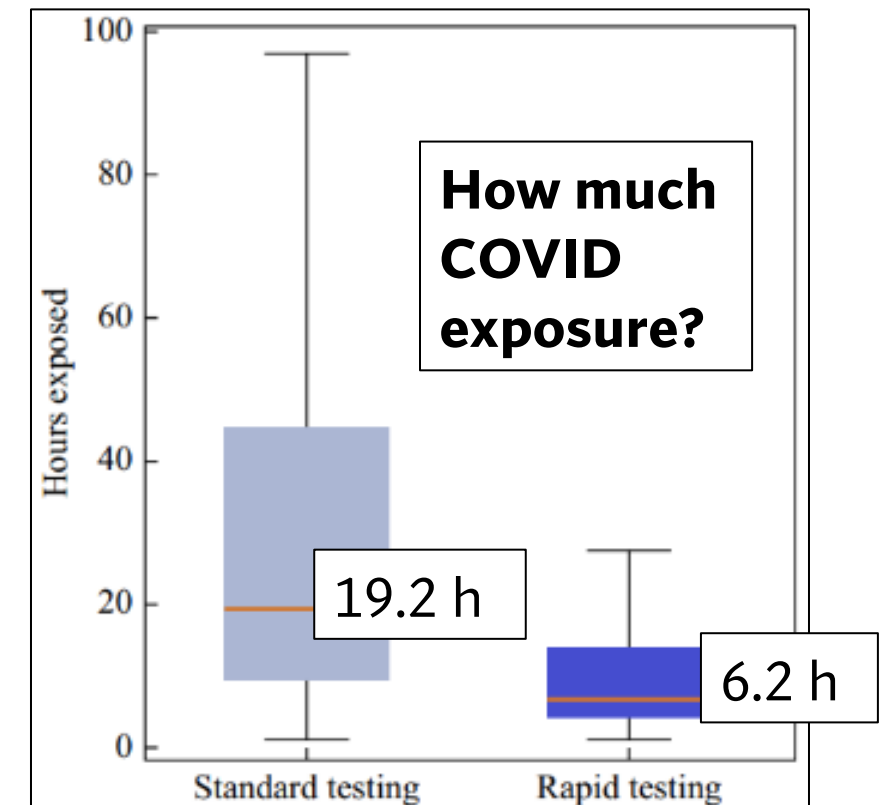
# Large Reductions in Uninfected Pt Exposure



- Retrospective, Adults in ED, 2 Academic, 1 Suburban (Johns Hopkins Health System)
- 12,263 tested (excluded d/c'd pts; isolation independent result)
- 9,018 pts remained in hospital (ED or inpatient) until results available (“exposed cohort”)
  - 3502 (38.8%) POC SARS-CoV-2 NAAT (Xpert Xpress), ~45 mins time to result
  - Remainder Lab-based SARS-CoV-2 NAAT
- 9.9% tested (+); most (60%) hospitalized

## POC SARS-CoV-2 NAAT

- **Shorter Median (IQR) hours to result**  
1.9 (1.4 - 2.8) vs 7.8 (3.7 - 11.7),  $p < 0.001$
- **Increased treatment capacity**  
3,028 more bed-hours per week
- **Fewer patient interactions requiring personal protective equipment**  
7,500 per week



# POC NAAT for Flu A/B on an acute medical unit in a large UK teaching hospital

- POC Influenza A/B NAAT (Cepheid GeneXpert<sup>®</sup>) in Acute Medical Unit, 12/17 – 3/18
- Any pt with Flu-like illness vs same time 1-yr prior
- Outcomes measured



---

## POC NAAT

- **Shorter LOS:** 2.4 vs 7.9 d
- **Shorter time to isolation:** 0.09 vs 1.26 d
- **Shorter time to antivirals:** 0.59 vs 1.1d
- **Confirmed flu:** 51 before POC, 666 after POC
- **Fewer flu cases identified 72 h after admission:** 9% vs 51%

# Implementation of Flu POCT and cohorting during a high-incidence season: the impact on infection prevention, control, and clinical outcomes

- 'Before/After' study
  - N = 654 inpatients (223 before, 431 after) with confirmed flu
- 



## Influenza POC NAAT in ED and pt cohorting on a flu ward:

- **Fewer cases of hospital-acquired/nosocomial flu** per day, 0.66 vs 0.95,  $p < 0.0001$
- **Shorter median LOS**, 5.5 vs 7.5 days,  $p = 0.005$
- **More antiviral prescriptions**, 80% vs 64.1%,  $p < 0.0001$
- **Improved bed management/patient flow**, 779 single rooms released for use elsewhere

Fixed probability of being PCR-negative by the next day (P) was 0.14 (95% CI = 0.12 - 0.16) for immunocompetent patients

- Implies half of immunocompetent pts are PCR-negative by 5-days post-diagnosis (95% CI = 5 - 6)

# Effect of POCT for Respiratory Pathogens on Antibiotic Use in Children: An RCT

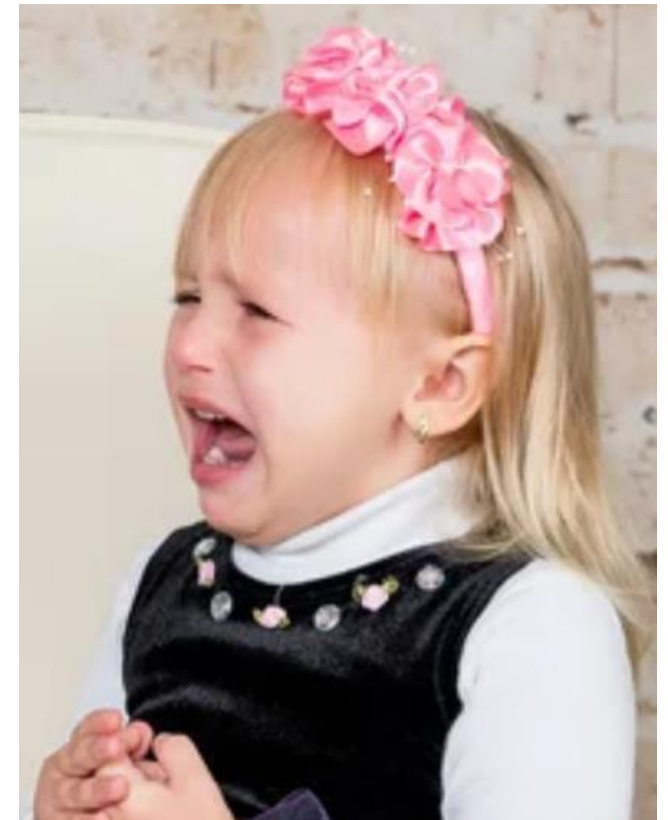
Unblinded, RCT

Pediatric ED, Oulu University Hospital, Finland

- 1243 children with fever and/or respiratory signs/symptoms
  - Randomized 2:1, Intervention (n=829) or controls (n=414)
    - Multiplex POCT NAAT (18 respiratory viruses and 3 bacteria), analysis time 70 mins
    - Routine care, included rapid lab-based flu/RSV NAAT, results in 2-3 hours
  - Mean (sd) age 3.0 (3.6) yrs

---

- POCT did not change
  - Antibiotics prescribing, POCT n=226 (27.3%) vs 118 (28.5%) controls
    - Risk ratio=0.96; 95% CI, 0.79-1.16
  - Diagnostic tests
  - Costs



# POCT for flu in a university ED: A prospective study

n=828 Adults, fever ( $\geq 38^{\circ}\text{C}$ ), respiratory symptoms

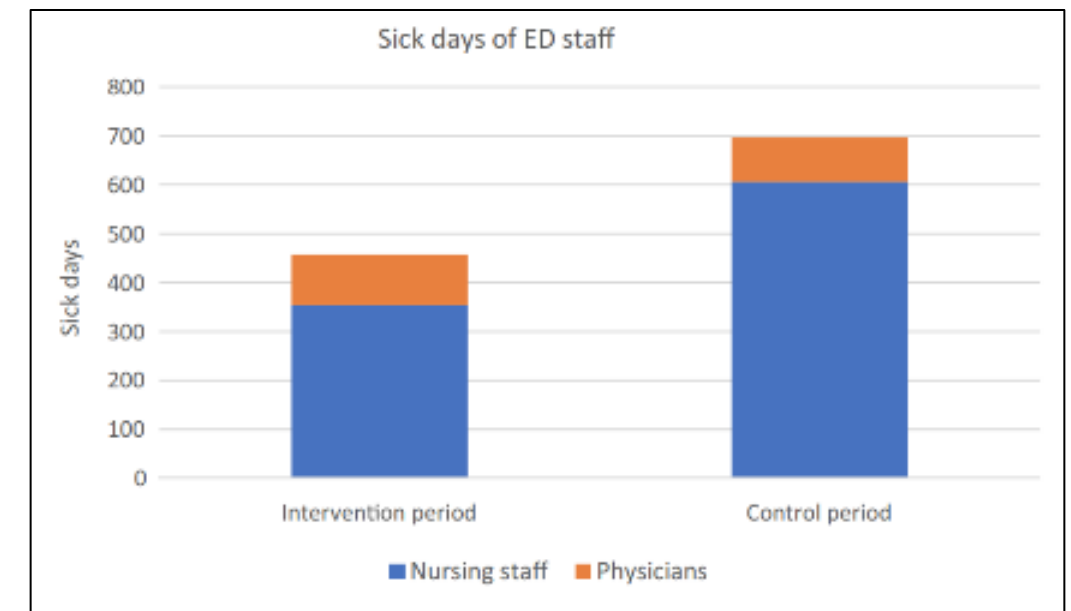
n=375 (intervention group) POC Influenza A/B NAAT (cobas<sup>®</sup> Liat<sup>®</sup>); 103 (27.6%) flu (+)



## Intervention, POCT

- **Fewer staff sick days**, reduced by 34.4%,  $p = 0.023$
- More patients received:
  - **Antivirals**, 7.2% vs 3.8%,  $p = 0.028$
  - **Antibiotics**, 40.0% vs 31.6%,  $p = 0.033$
- High rate of patients **transferred** to external hospitals, 5.6% vs 1.3%,  $p = 0.01$

## POC testing for influenza is useful in the ED





# The impact of rapid molecular diagnostic testing for respiratory viruses on outcomes for ED pts

- 'Before/After study, consecutive pts, 4 urban EDs, New South Wales
- 1491 multiplex NAAT (July–December 2016)
- 2250 rapid NAAT (July–December 2017)



## Rapid NAAT

- **Fewer hospital admissions**, 1649 (73.3%) v 1159 (77.7%),  $p < 0.001$
- **More results received before ED discharge**, 67.4% v 1.3%,  $p < 0.001$
- **Shorter median test TAT**, 2.4 h [IQR, 1.6–3.9 h] v 26.7 h [IQR, 21.2–37.8 h],  $p < 0.001$
- **Lower hospitalization rates**, if  $<18$  (50.6% v 66.6%;  $p < 0.001$ ) or  $>60$  years (84.3% v 91.8%),  $p < 0.001$
- **Diagnostic stewardship; fewer orders for blood cultures, sputum culture, ABG's, respiratory bacterial and viral serology**,  $p < 0.001$
- ED LOS similar for rapid (7.4 h; IQR, 5.0–12.9 h) and standard PCR (6.5 h; IQR, 4.2–11.9 h),  $p = 0.27$

# Using a novel rapid viral test to improve triage of ED patients with acute respiratory illness during flu season

- Prospective cohort, consecutive ED patients, ARI symptoms
    - POC Influenza A/B / RSV NAAT (Roche cobas<sup>®</sup> Liat<sup>®</sup>), physicians and patients blinded to results
    - Lab-based NAATs, standard of care
- 
- 52.9% POC NAAT (+)
    - ~70% put in rooms shared with non-ARI pts
    - 27.3% prescribed antibiotics
    - 77.8% of oseltamivir-eligible patients did not receive tx
  - **POC NAAT in ED triage**
    - Potential to:
      - Improve social distancing practices through better triage
      - Increase appropriate prescription of antimicrobials





# Systematic review of the impact of POCT for flu on the outcomes of pts with acute respiratory tract infection

- Systematic review
- Assess effect of POCT flu on 3 outcomes:  
(1) antiviral Rx, (2) antibiotic Rx, (3) ED LOS
- Searched Medline and Embase; MeSH terms/keywords:  
influenza, POCT, antivirals, antibiotics, and LOS
- 245 studies, 30 included



---

Most studies reporting antiviral Rxs found flu (+) POCT result:

**1) increased the use of antivirals**

**2) decreased antibiotic use**

Studies assessing effect of POCT on ED LOS were not definitive.

# What did you see today?

## An extra ER hour kills

16,201,036 patients

## A minute faster TAT shortens ER stay

4,483,169 ED visits

## Patient Satisfaction/Quality Measures

1 – 3% of reimbursement

## POCT for Respiratory Infectious Diseases Improves ER Patient Care

France	676	More ER discharges
Ireland	7,150	More ER discharges
USA	197	Faster TAT, no d/c speed change
USA	61	Faster discharge, fewer tests and antibx
France	3,333	Faster discharge
France	866	Faster discharges
USA	12,263	Less COVID-19 exposure
UK	717	Shorter LOS
Finland (peds)	1,243	No changes
Germany	828	Less sick staff
Australia	1,491	Fewer patients hospitalized
USA	119	Improved social distancing
Total	28,944	



*That's all Folks!*



## **Kimberly Evans, RN**

Emergency Department  
Unit Supervisor

University of South Alabama  
Children's and Women's Hospital



# Rapid Viral Testing in the Emergency Department

Why we changed

How we changed

Why we call it a success



KIMBERLY EVANS, RN

Emergency Department Unit Supervisor

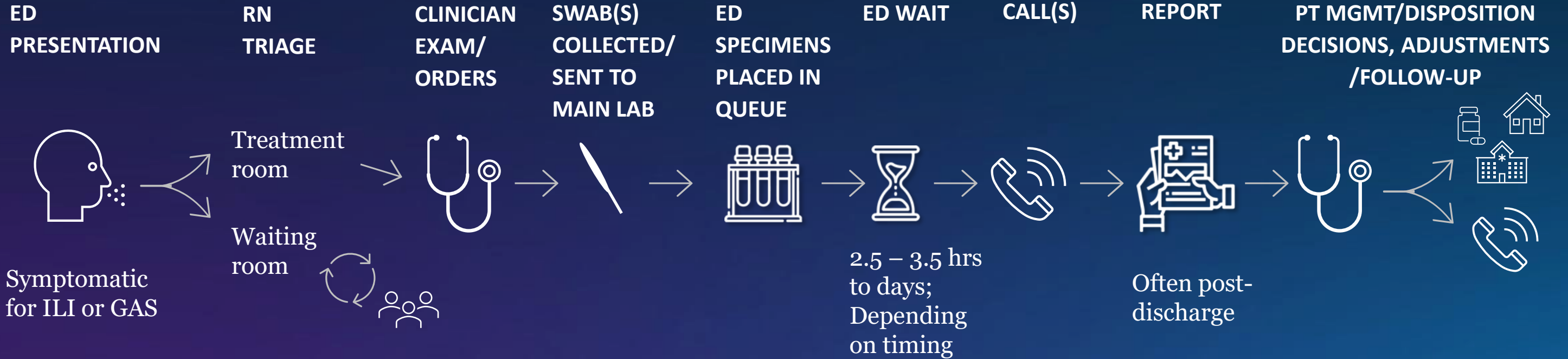
University of South Alabama  
Children's and Women's Hospital

# Disclosures

---

- Speaker honorarium, Abbott

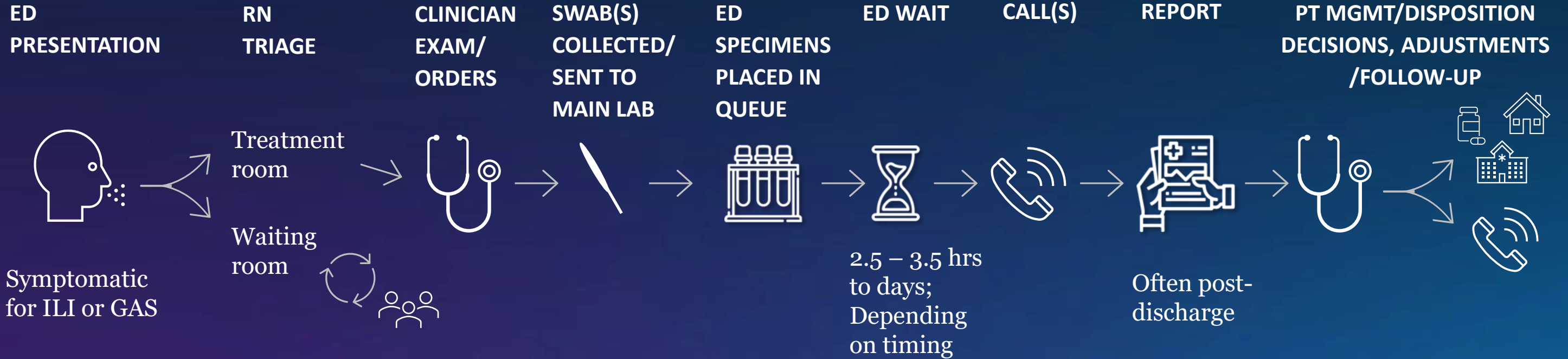
# In The Beginning - Physician-driven Respiratory Testing



ILI, influenza like illness; GAS, Group A Strep



# In The Beginning - Physician-driven Respiratory Testing



ILI, influenza like illness; GAS, Group A Strep



# Negative Factors Affecting the ED

---

- Patient **throughput** was at a standstill
- Average **LOS**, 3.5 to 5hrs and that was on a real good day
- Extended **wait times** for testing results lead to limited treatment rooms for arriving patients.
- Substantial **surges** of patients with mild symptoms or with recent exposure presenting out of fear of infection and they want answers, and they want them quick

# Negative Factors Affecting the ED

---

- Potential increased **exposure** for staff and visitors
- **Staffing** shortages
- Patient and family experience/**satisfaction** compromised
- **HCAP Scores** suffered.  
Unhappy angry patients and families = stressed staff

# Respiratory Testing in the ED

Our ED Journey

# A Better Process to Streamline Care

We built a small mini viral testing lab in the triage area

Patients who presented with respiratory symptoms or GAS symptoms were swabbed and placed in a Provider in Triage area to await results

Results were immediately available in the EMR using RALS interface

Provider had the result at front of visit, which allowed them to make a timely decision of additional treatment or disposition



# A New Operational Approach/ED workflow

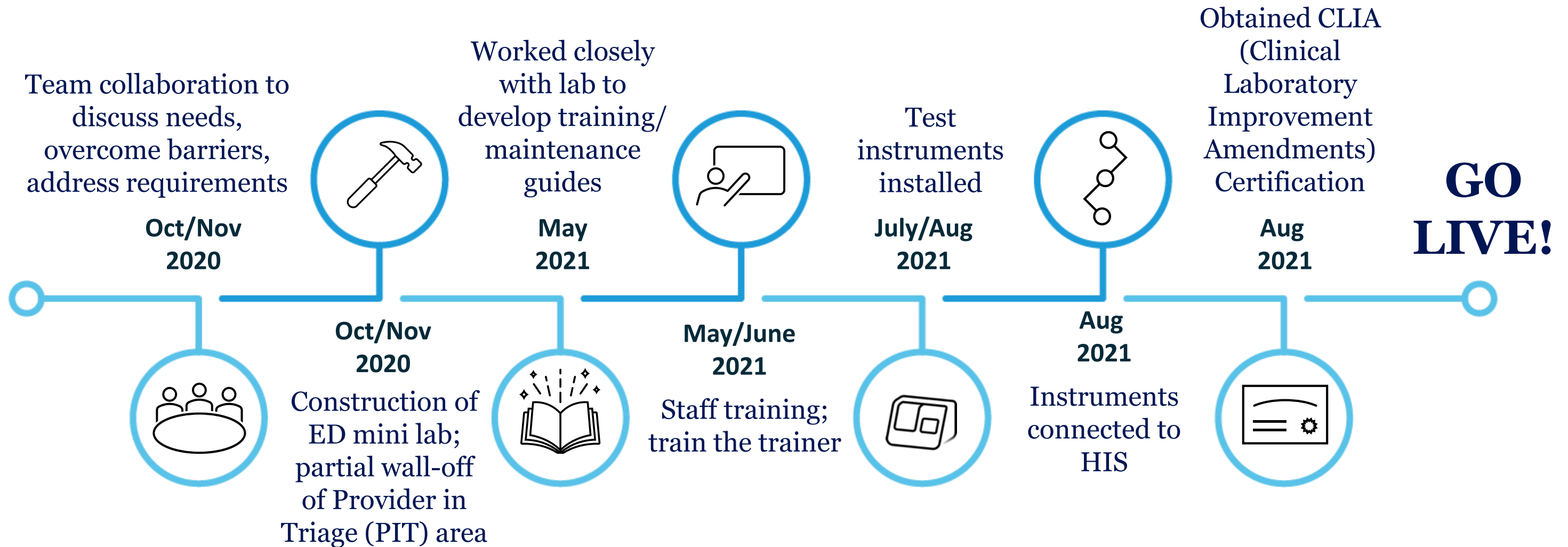


ILI, influenza like illness; GAS, Group A Strep

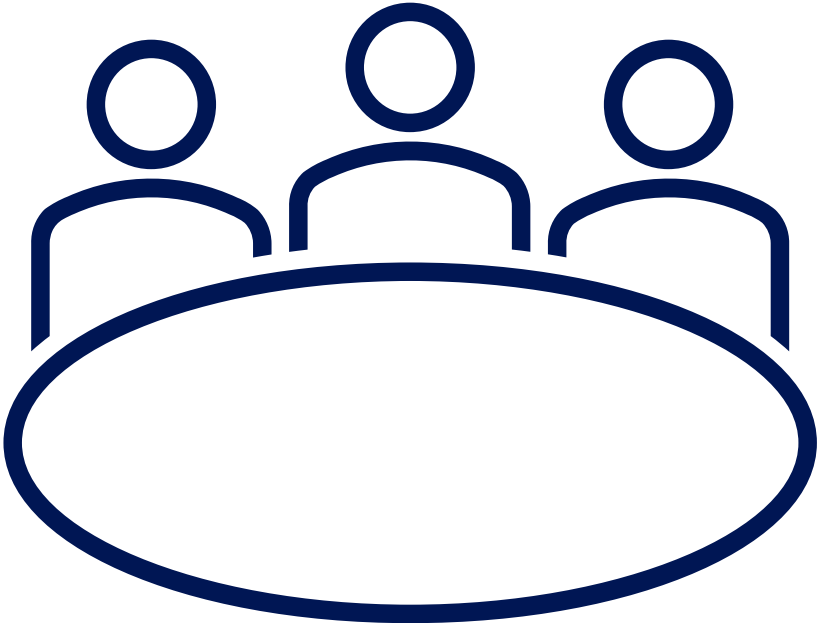
## TESTING PROTOCOL FOR ED MINI LAB BASED ON DIFFERENTIAL



# Steps to Establish a Better Process



HOW WE MADE THE CHANGE



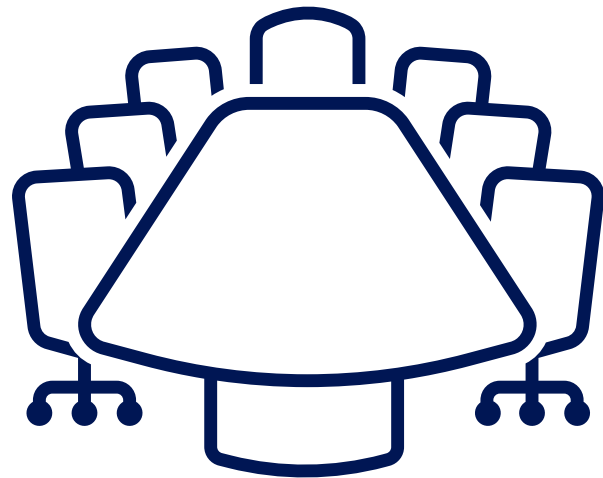
Brought team together including physicians, nursing, administration and lab leadership

All parties committed to improving the process

All members of the team presented what they needed and required

All members of the team came to the table with answers (not just questions) and solutions (not just issues)

# Administration Wants



✓ Improved patient satisfaction

✓ Results without budget sacrifice  
(staffing, space dedicated for  
testing area)

# Physician Wants



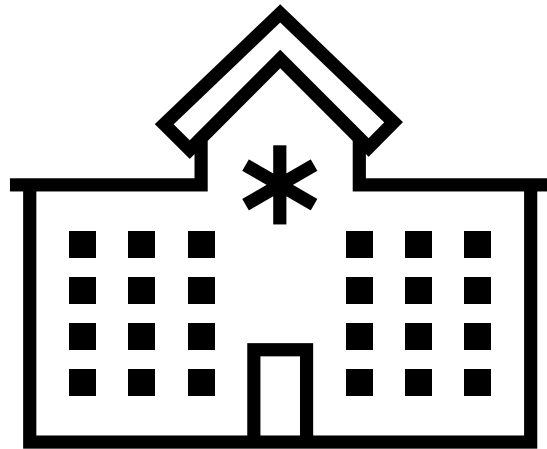
✓ Easy process that would not put increased demands on staff

✓ Efficient way to obtain timely results for a more rapid developing plan for treatment/disposition

✓ Method for mid-level practitioners to run a rapid treatment area for patients presenting with influenza type illness or GAS symptoms



# Lab Wants



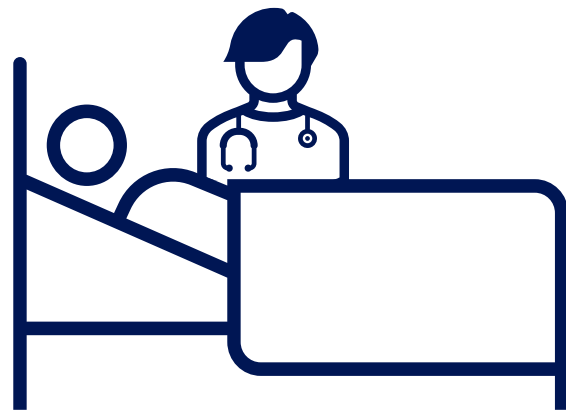
✓ Method to track education for personnel performing testing

✓ Method to track and confirm that proper quality controls were completed.

✓ Method to track appropriate cleaning of equipment

✓ Random audit review for invalid results

# Nursing Wants



✓ Process that would NOT create an increased burden on staff who felt they were already working stretched

✓ Protocol orders for who should be tested

✓ Decrease LOS for patients in the waiting room

✓ Method to easily identify patients who required isolation

# Clinical, Operational and Laboratory

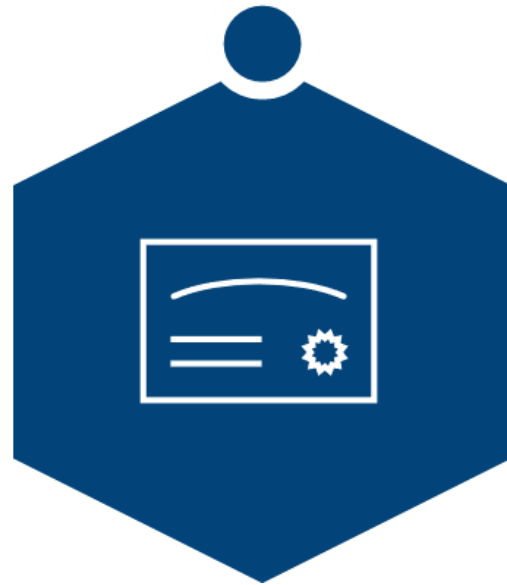
Concerns and Solutions

# Clinical and Operational

Test  
Sensitivity



Confirmation  
Testing



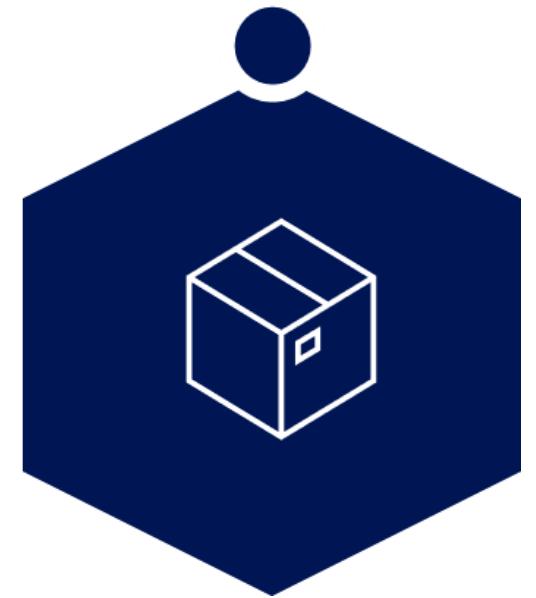
Staffing



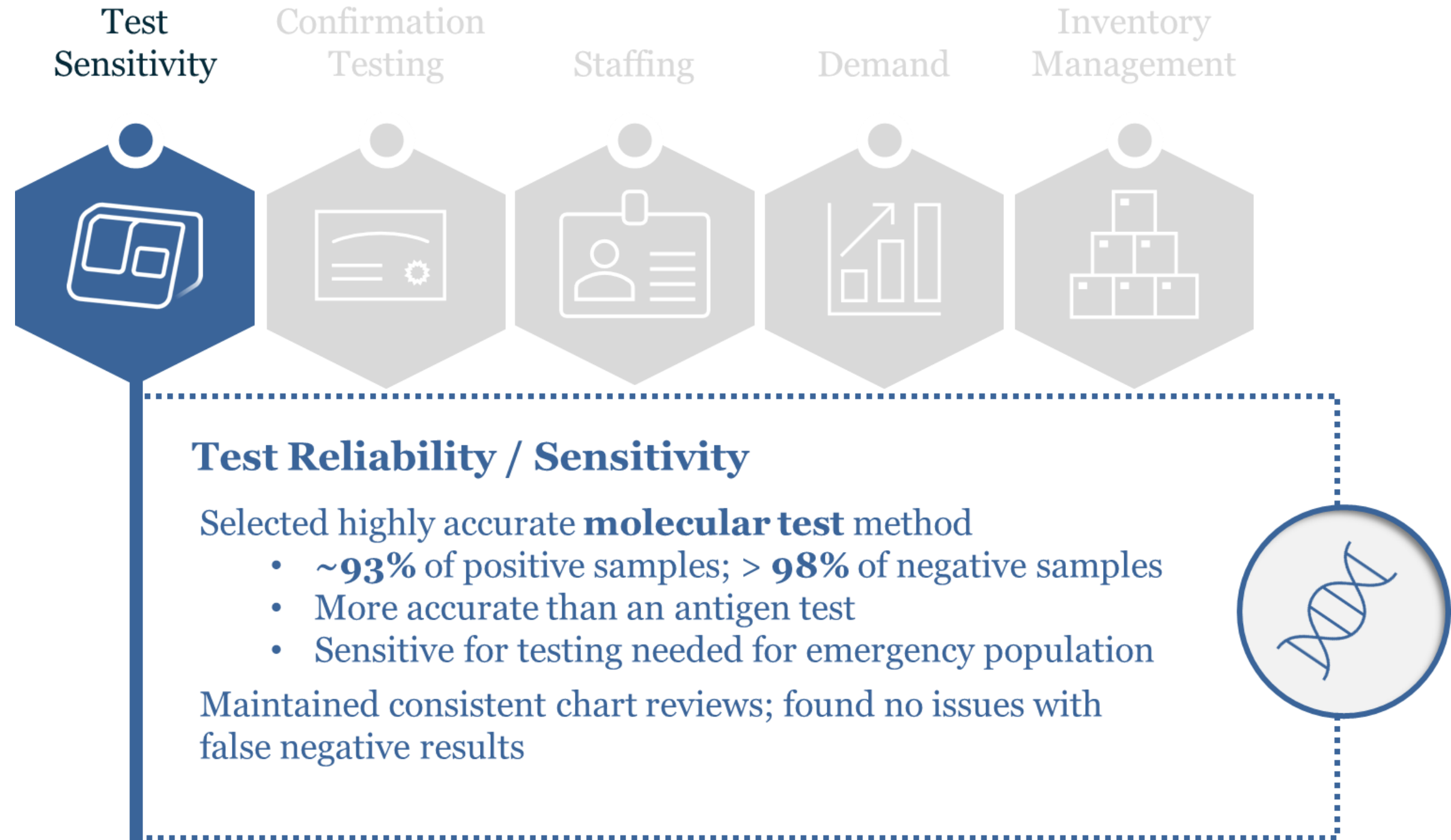
Demand



Inventory  
Management



# Solutions to Clinical and Operational Concerns





# Detection: Antigen vs Molecular

## Test Sensitivity



### ANTIGEN TESTS

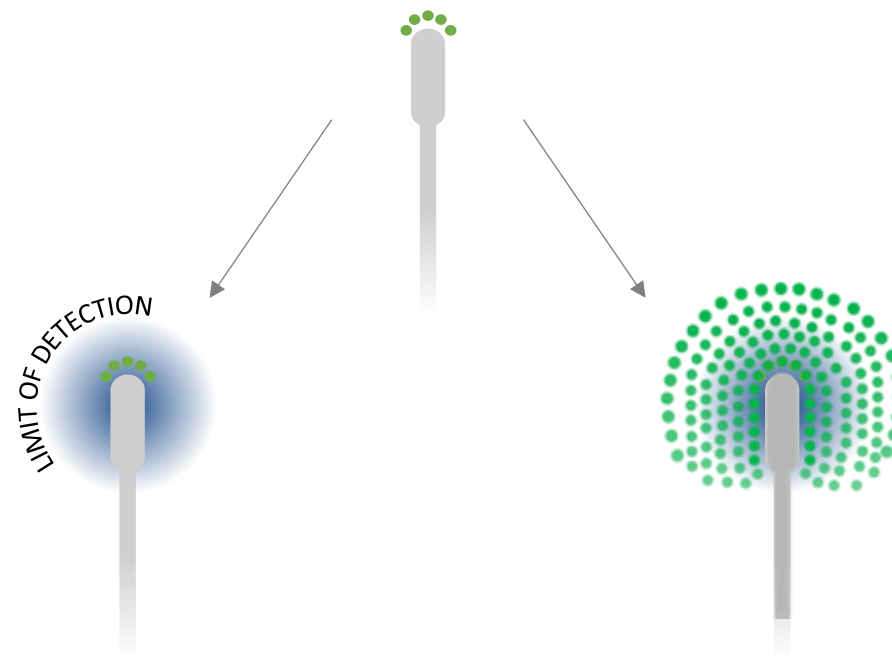
Rapid Antigen  
Detection Tests (RADTs)<sup>1</sup>

#### NO AMPLIFICATION

Detects the presence of  
available pathogens  
(virus or bacteria)

Lower levels of pathogen are  
**less likely to be detected**

POSITIVE PATIENT  
Sample Containing Antigen/RNA



### MOLECULAR TESTS

Nucleic Acid  
Amplification Tests (NAATs)<sup>2</sup>

#### AMPLIFICATION

Amplifies the sample  
millions of times for easier  
pathogen detection

Lower levels of pathogen are  
**more likely to be detected**

**SELECT TEST BASED ON HEALTHCARE NEEDS FOR RAPID RESULT AND TEST UTILITY**

1. Carter LJ, Garner LV, Smoot JW, et al. Assay Techniques and Test Development for COVID-19 Diagnosis. ACS Cent Sci. 2020;6(5):591-605.
2. CDC. Nucleic Acid Amplification Tests (NAATs). <https://www.cdc.gov/coronavirus/2019-ncov/lab/naats.html>, updated June 14, 2021.

# Molecular Amplification: 2 Approaches

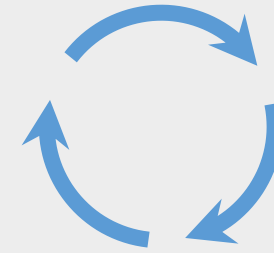
## Test Sensitivity



## THERMOCYCLING

### PCR

- Requires **temperature change** to amplify genetic material
- Each temperature cycle is a cycle threshold (Ct)



## ISOTHERMAL

### NEAR

### LAMP

### HDA

- Enzymes **DO NOT** require temperature change to amplify genetic material
- Reactions occur simultaneously, no cycling; may speed time to result

# Solutions to Clinical and Operational Concerns

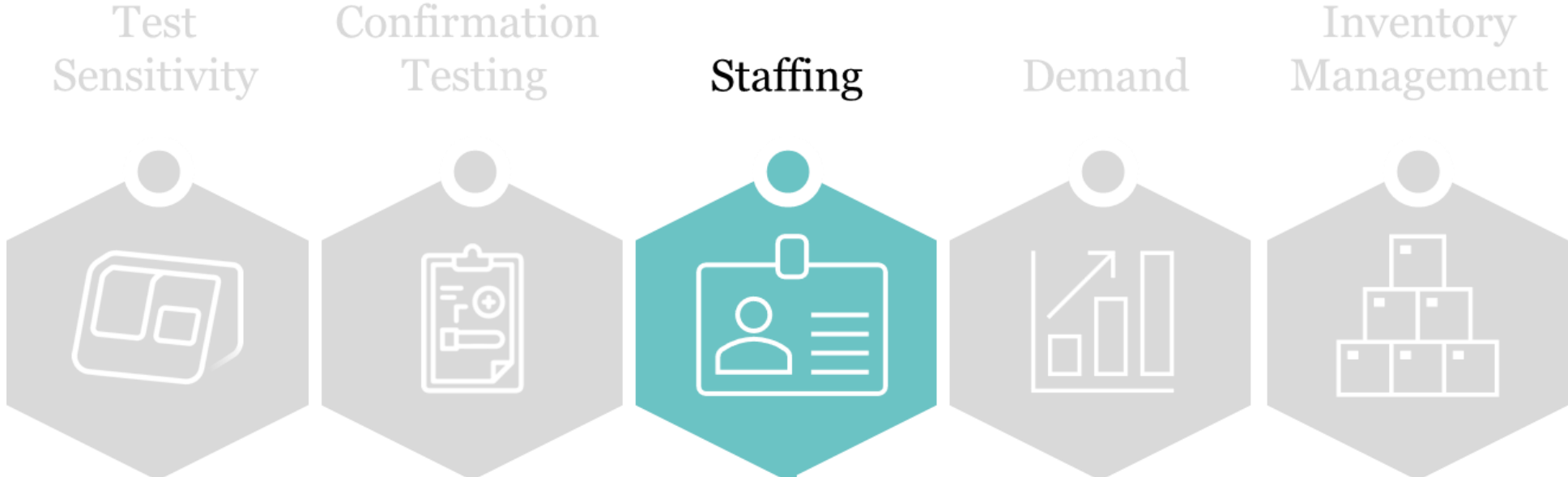


## Confirmation Testing

Negative tests with a strong exposure history received additional testing, using back-up PCR



# Solutions to Clinical and Operational Concerns



## Staffing

**New staffing strategy;** Redistribution of staff to run testing area; added RN, which was OK'd by admin; scheduling assignments coordinated for efficiency

RNs welcomed new process, remained supportive after implementation



# Solutions to Clinical and Operational Concerns



**Demand**

Pressure from community to be utilized as a testing center...

Resolved with community education





# Solutions to Clinical and Operational Concerns

Test  
Sensitivity

Confirmation  
Testing

Staffing

Demand

Inventory  
Management



## Inventory

Maintaining  
adequate stock of  
testing supplies  
New ordering  
processes  
implemented to  
keep stocked



# Laboratory

Meeting Test  
Quality Standards



Program  
Mgmt/Oversight



Licensure



Impact on  
Revenue



Impact  
on Lab Staffing



# Solutions to Address Laboratory Concerns

Meeting Test  
Quality Standards



Program  
Mgmt/Oversight



Licensure



Impact on  
Revenue



Impact on  
Lab Staffing



## Quality Standards

Compliance with testing regulations; training and competency checks for all operators

### CLIA waived test:

- Test and QC procedure feasible for non-lab personnel QC/Calibration per instructions; auto-lock if internal QC fails
- Logs and documentation, record of corrective actions



# Solutions to Address Laboratory Concerns

Meeting Test  
Quality Standards



Program  
Mgmt/Oversight



Licensure



Impact on  
Revenue



Impact on  
Lab Staffing



## Program Management and Oversight

- Documentation of all operations, testing, QC and measures to meet quality standards
- Quality Management reviews consistently performed to ensure reliability of test results
- Probation period of weekly logs to demonstrate following proper procedures
- On-going guidance and support from the Laboratory
- Streamlined program management with IT/connectivity



# Staff Training and Competency

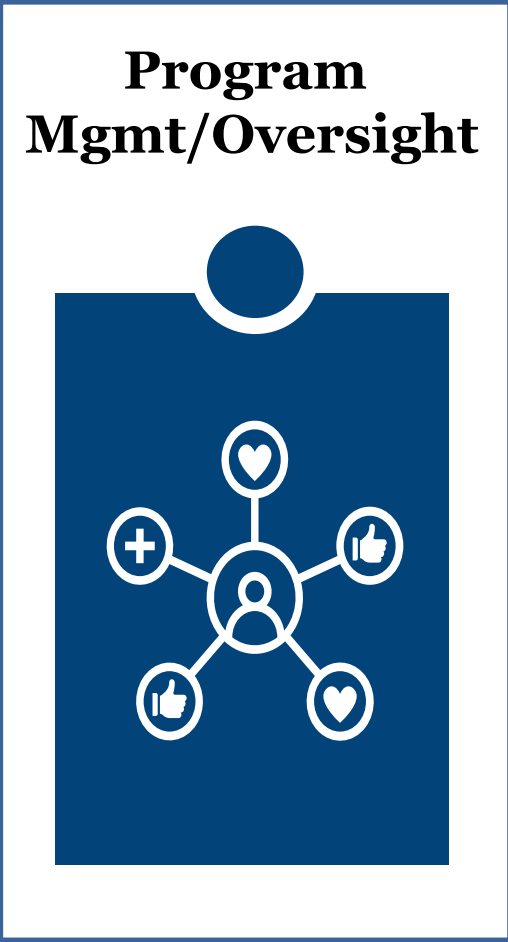
**Program  
Mgmt/Oversight**



## **ESTABLISH PROCEDURES**

- Staff Training
  - Authorized to perform POC respiratory tests (pre-analytic, analytic and post-analytic)
  - i.e., PCA's, paramedics
- Staff retraining, when problems identified
- Staff competency assessments, annually
- Documentation, retain records 2 years

# Consolidated Management and Ease of Documentation with Connectivity



## CONNECTIVITY

Track Staff Training/  
Retraining Needs

Test Results/  
Test Logs



QC Results/  
QC Logs

Maintenance/  
Corrective Action

Annual Staff  
Competency



# Solutions to Address Laboratory Concerns

Meeting Test  
Quality Standards



Program  
Mgmt/Oversight



Licensure



Impact on  
Revenue



Impact on  
Lab Staffing



## Licensure

Obtain testing license for the ED Mini Lab

Established ED Mini Lab as CLIA test site  
separate from the laboratory license



# Solutions to Address Laboratory Concerns

Meeting Test  
Quality Standards



Program  
Mgmt/Oversight



Licensure



Impact on  
Revenue



Impact on  
Lab Staffing



## Revenue

- Might reduce revenues for the laboratory
- Rapid tests had insignificant impact on the lab revenues



# Solutions to Address Laboratory Concerns

Meeting Test  
Quality Standards



Program  
Mgmt/Oversight



Licensure



Impact on  
Revenue



Impact on  
Lab Staffing



## Test Demand/ Lab Staffing

- Might reduce lab budget for staffing
- Testing remained high for other patient populations with less urgent testing needs



# What We Achieved

ED Mini Lab

# Results

Administration

Physicians

Lab

Nursing

- HCAP patient satisfaction scores improved greatly
- Only 2 FTE positions were added
- Space already existing was utilized for the designated testing lab

# Results

Administration

Physicians

Lab

Nursing

- Decrease in patient throughput opened treatment rooms for higher acuity patients
- Patients could be seen by the mid-level practitioner
- Results were available within 20 minutes of patient's arrival with interface connectivity
- Reduced time to appropriate patient care



# Results

Administration

Physicians

Lab

Nursing

- All employees were educated on performance of rapid testing lab on orientation to unit and complete annual competencies.
- QC is completed and logged and made available to Lab for review.
- Equipment is cleaned daily, and cleaning is recorded on daily log and available for Lab review.
- A daily report is done and reviewed for all invalid results with appropriate interventions such as staff counseled/re-educated documented as well
- CLIA certificate valid and renewed
- Added bonus: Fewer urgent tests from the ED; reduced calls requesting an update on wait time for a test result

# Results

Administration

Physicians

Lab

Nursing

- Assigned staffing responsibilities did not increase
- PCA's and Paramedics were included in education and training on testing which decreased nursing workload
- Standing protocol orders were built and approved by medical staff for use to determine testing parameters.
- The decreased in the patient throughput help to decrease the backup of patients waiting on a treatment room.
- Patients were quickly identified as needing isolation which lead to a decreased staff and visitor exposure.

# Achieved Goals

Testing and diagnosing  
questions at time of ED visit

-----  
Patients/families happier =  
happier employees

Fewer employees  
exposed and absent

Results available for provider  
as soon as patient placed  
in treatment area

Upstream efficiencies  
helped improve  
downstream throughput

All team member's support  
and are satisfied with process

# What Others Have Achieved with Rapid Respiratory Testing in the ED

---

- 63% reduction - **time to treatment** (7.9 to 2.9 hours) <sup>1</sup>
- 19.8% decrease - **ED LOS** (74 min reduction) <sup>1</sup>
- 66% reduction - **exposure time** of infected patients with uninfected patients <sup>2</sup>
- Up to 82% reduction - **hospital acquired infections** <sup>3,4</sup>
- Increase - **COVID-19 treatment capacity** (~1,009 hours/hospital/week) <sup>2</sup>
- Significant reduction - **unnecessary infection control measures** (isolation rooms and PPE) <sup>2</sup>

1. Peaper DR, et al. Clinical impact of rapid influenza PCR in the adult emergency department on patient management, ED length of stay, and nosocomial infection rate. *Influenza Other Respir Viruses*. 2021;15(2):254-261.  
2. Hinson JS, et al. Targeted rapid testing for SARS-CoV-2 in the emergency department is associated with large reductions in uninfected patient exposure time. *J Hosp Infect*. 2021;107:35-39.  
3. Teoh TK, et al. Outcomes of point-of-care testing for influenza in the emergency department of a tertiary referral hospital in Ireland. *J Hosp Infect*. 2021 Apr;110:45-51.  
4. Garvey MI, et al. Impact of a PCR point of care test for influenza A/B on an acute medical unit in a large UK teaching hospital: results of an observational, pre and post intervention study. *Antimicrob Resist Infect Control* 8, 120 (2019).

# Summary

---

- COVID-19 was game changer; increased need for rapid testing in the ED
- New operational protocol for triage; RN driven vs. physician driven testing
- Highly accurate, reliable and rapid testing was feasible using CLIA waived rapid molecular test
- Upstream efficiencies helped improve downstream throughput, reduce transmissions, improve staff safety, and increase patient satisfaction by giving patients the care they expected in a timeframe they demanded
- HCAHPS scores have motivated implementation of mini lab with RN-driven rapid respiratory testing in sister hospital





# Available CE Credit

P.A.C.E.<sup>®</sup>

Florida laboratory CE

Certificate of Attendance



# After today's webinar:

## A certificate of attendance is available for all attendees

- Evaluation form will appear automatically
- Must complete Eval to receive Certificate link via email
- **For groups:**  
Those logged in will receive Email from **messenger@webex.com** with link to evaluation. Forward email to colleagues who attended with you!!!
- Double-check email address



# Joined Using a Mobile Device?

Evaluation won't appear automatically, but...

**Watch for email with link to evaluation!**

