ASHP BEST PRACTICES AWARD

Pharmacy Driven Rapid Bacteremia Response Program

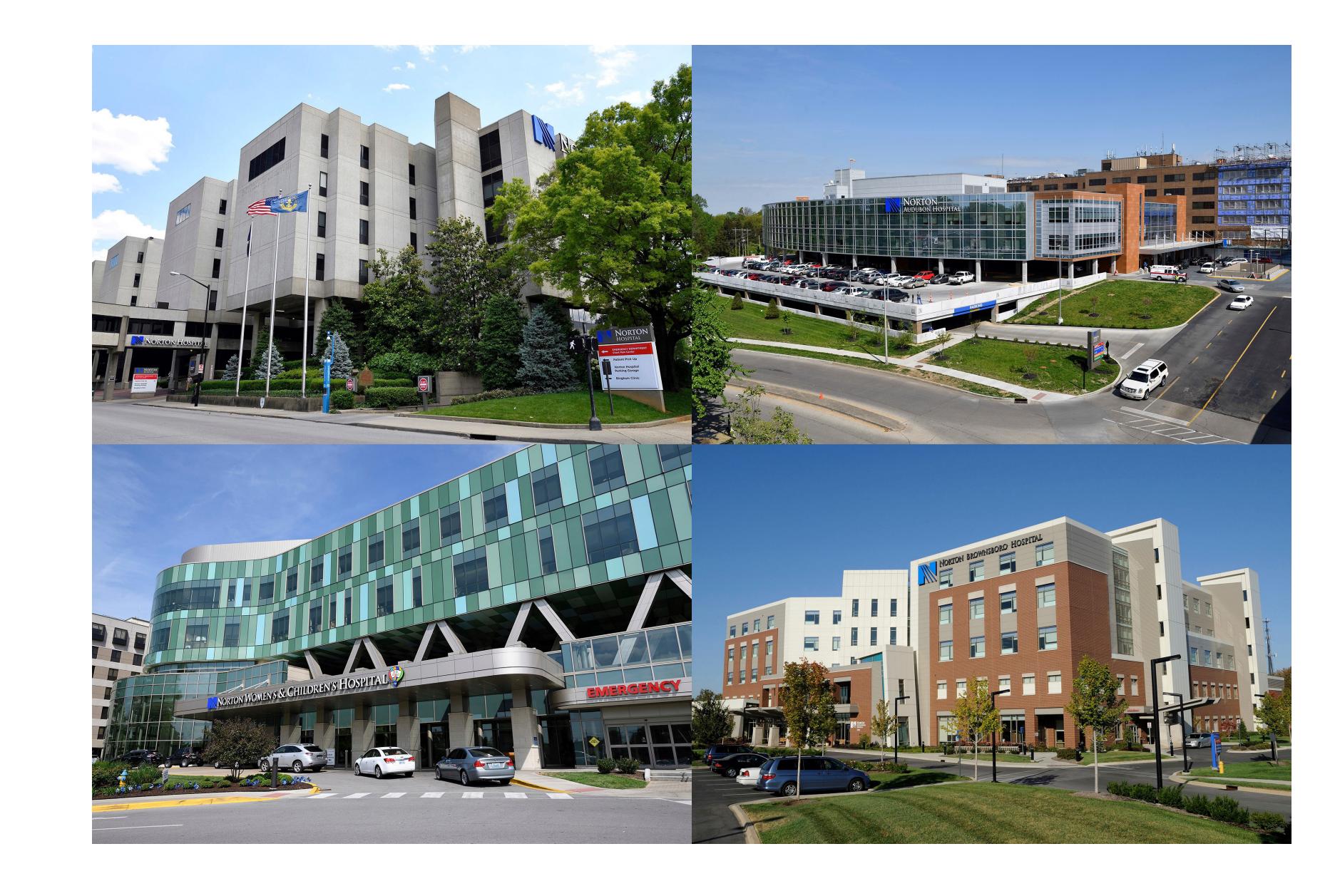
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Authors have nothing to disclose



Introduction

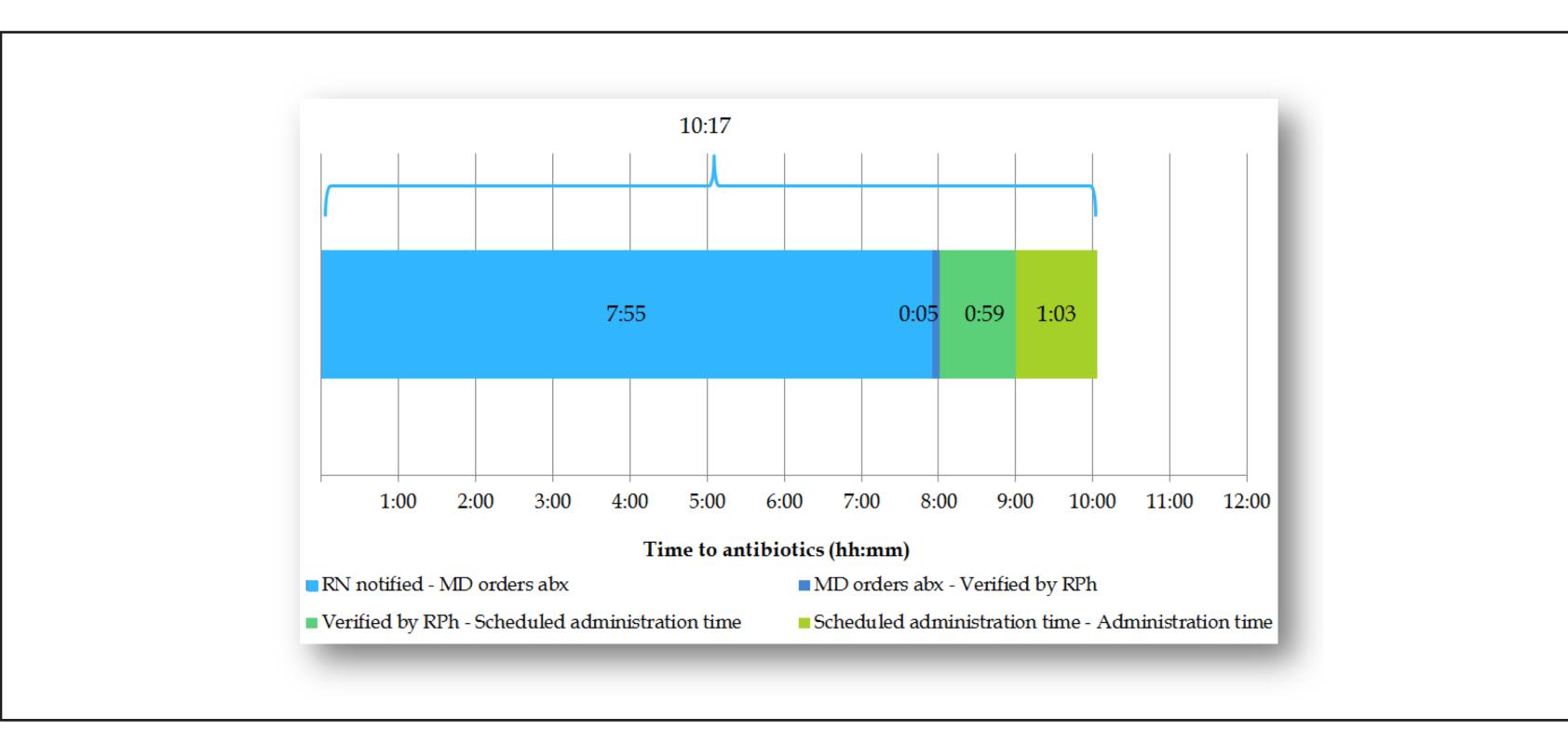
Healthcare Facility

- Not-for-profit health system
- 1500+ licensed adult beds across 4 hospitals
- 24 hour inpatient pharmacy services
- 72,000+ patient admissions annually

Background

- Rapid diagnostic technologies
- Reduce time to organism identification in bacteremic patients
- Must be tied to action to be effective
- Barriers to action include
- Lack of 24/7 clinical or infectious diseases services
- Delays in communication
- Difficulty in interpretation of results
- Prior to Rapid Bacteremia Response Program (RBRP), average time to therapy in patients not already on antibiotics was 10-12 hours

Pre-Rapid Bacteremia Response Program Time to Antibiotic Therapy



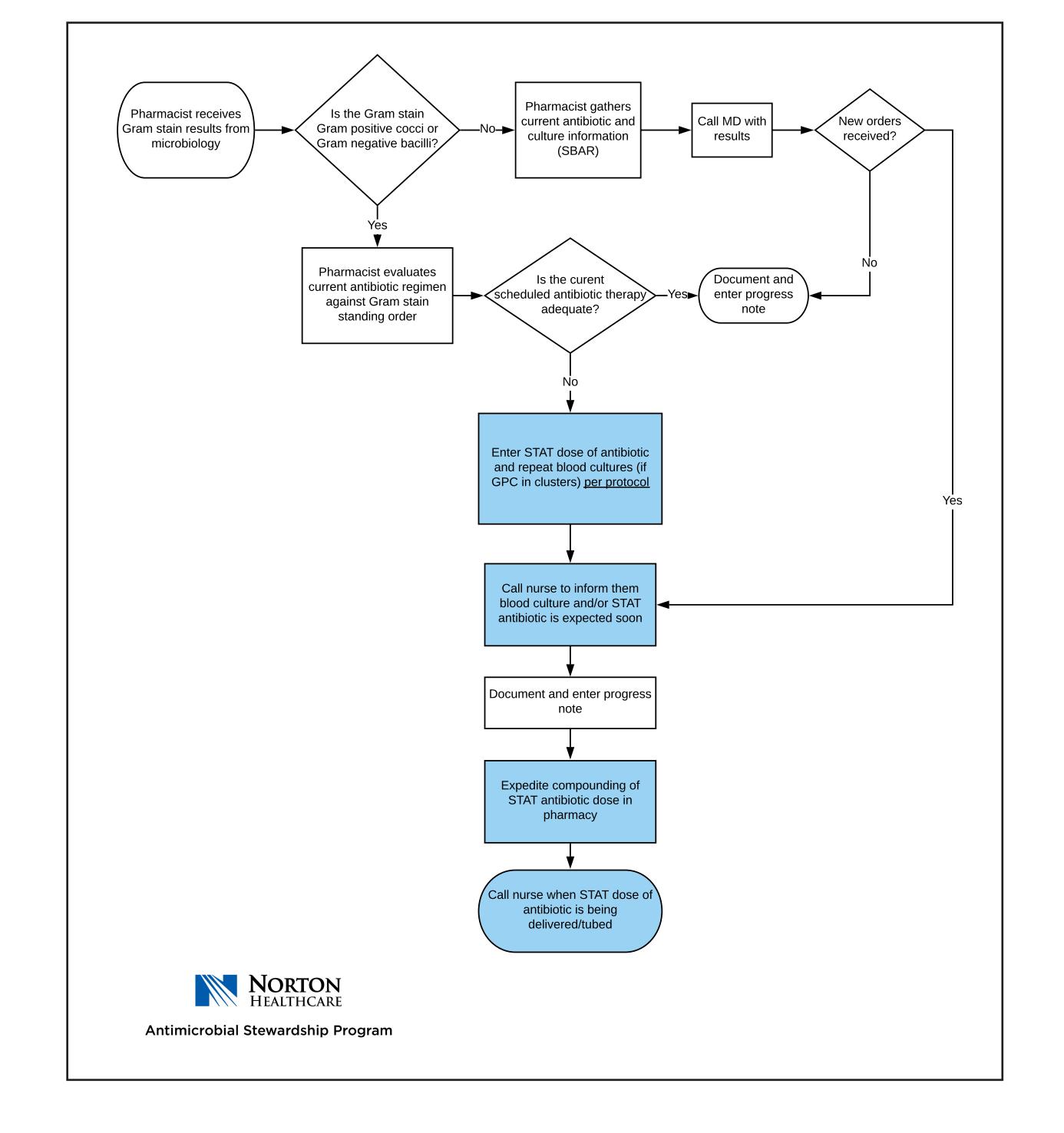
Purpose

- Create RBRP to position pharmacy to manage a comprehensive bacteremia response service
- Optimize time from Gram stain to adequate empiric therapy
- Increase rate of repeat blood cultures in gram-positive cocci
 (GPC) in clusters
- Maximize rapid diagnostic technology
- Escalate or de-escalate antimicrobial therapy in real time
- Expedite appropriate patient isolation
- Communicate results in clear and timely manner

Description of the Program

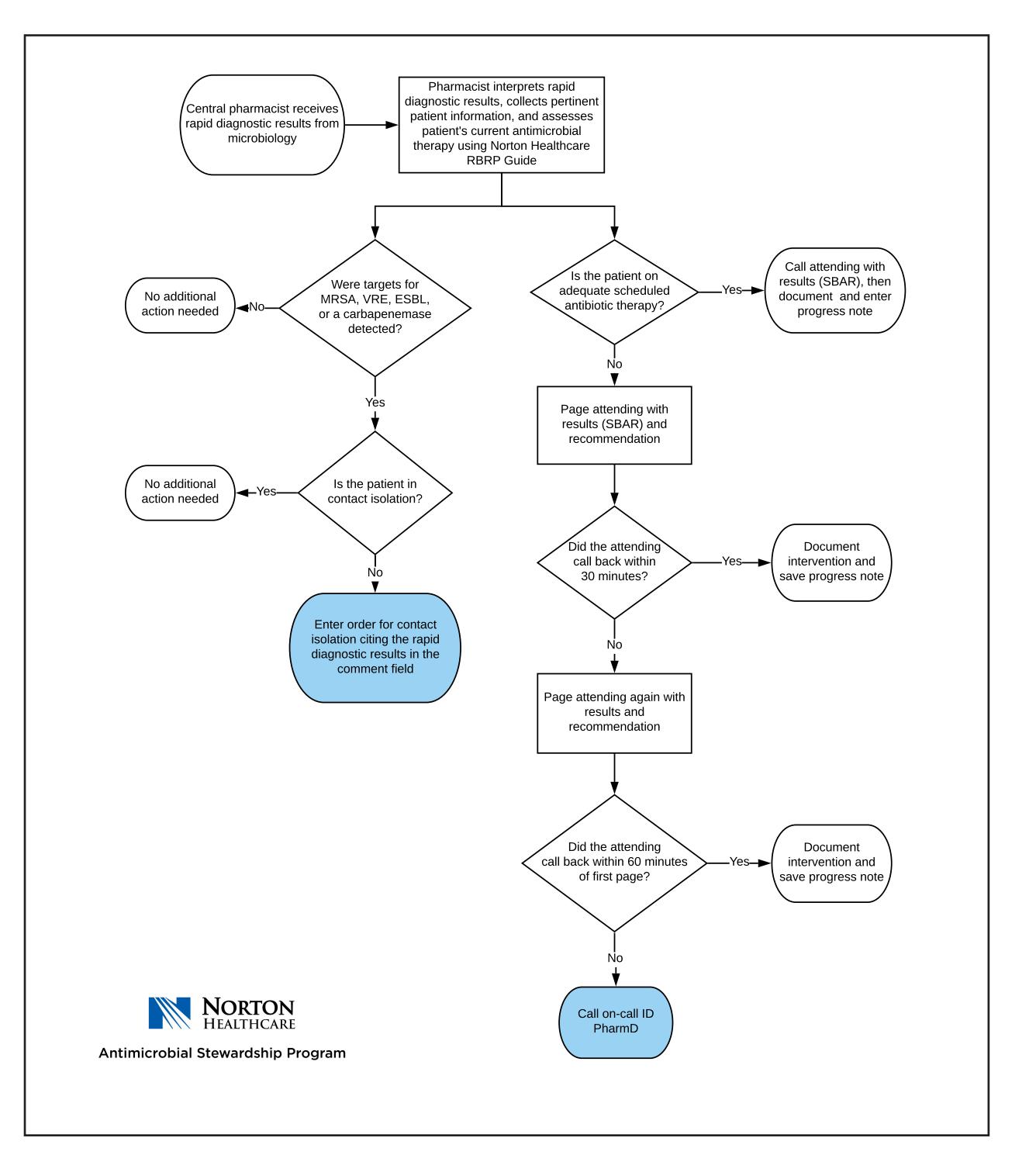
 Starting March 6, 2017, all inpatient blood culture Gram stains were called by microbiology lab to central pharmacists in real time

RBRP Gram Stain Response Algorithm



- Rapid diagnostic results were called by microbiology lab to
- > Infectious diseases pharmacist Monday-Friday, 7:00-3:30
- > Central pharmacists outside of those hours

RBRP Rapid Diagnostic Result Algorithm



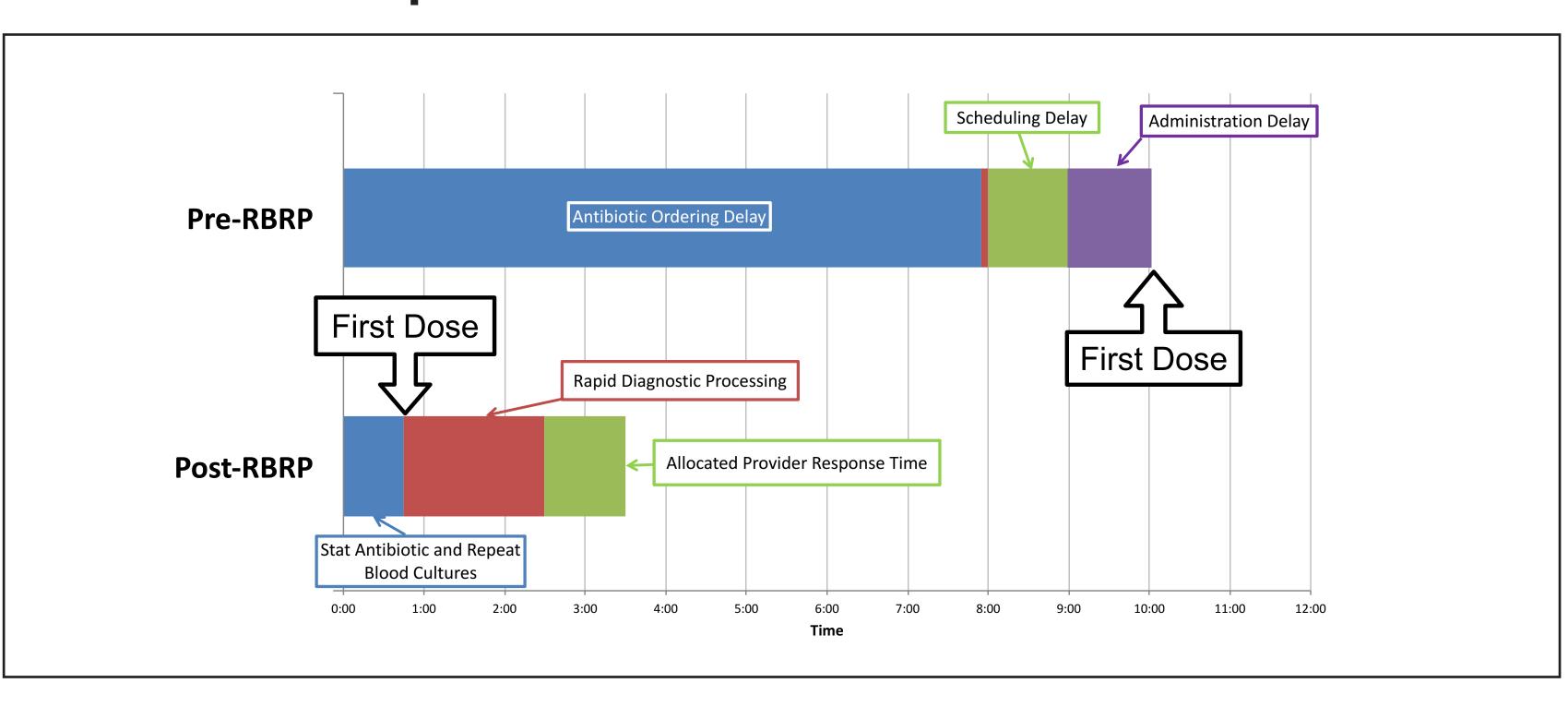
Experience with the Program

Pharmacy Interventions

Data collected March 2017 – February 2018

- Gram stain interventions
- > 2,282 blood culture Gram stains
- > 781 (34%) STAT antibiotics ordered
- Median time from Gram stain to administration:
 51 minutes (IQR 32-95 minutes)
- Fastest time recorded: 7 minutes

Impact of RBRP on Time To Antibiotic



- Repeat blood cultures
- 92% cases of GPC in clusters had repeat blood cultures ordered
- 2.4 fold increase in rate
- Rapid diagnostic results interventions
- > 2,046 rapid diagnostic results
- Antibiotic regimens adjusted in 56% of cases

Rapid Diagnostic Results Interventions

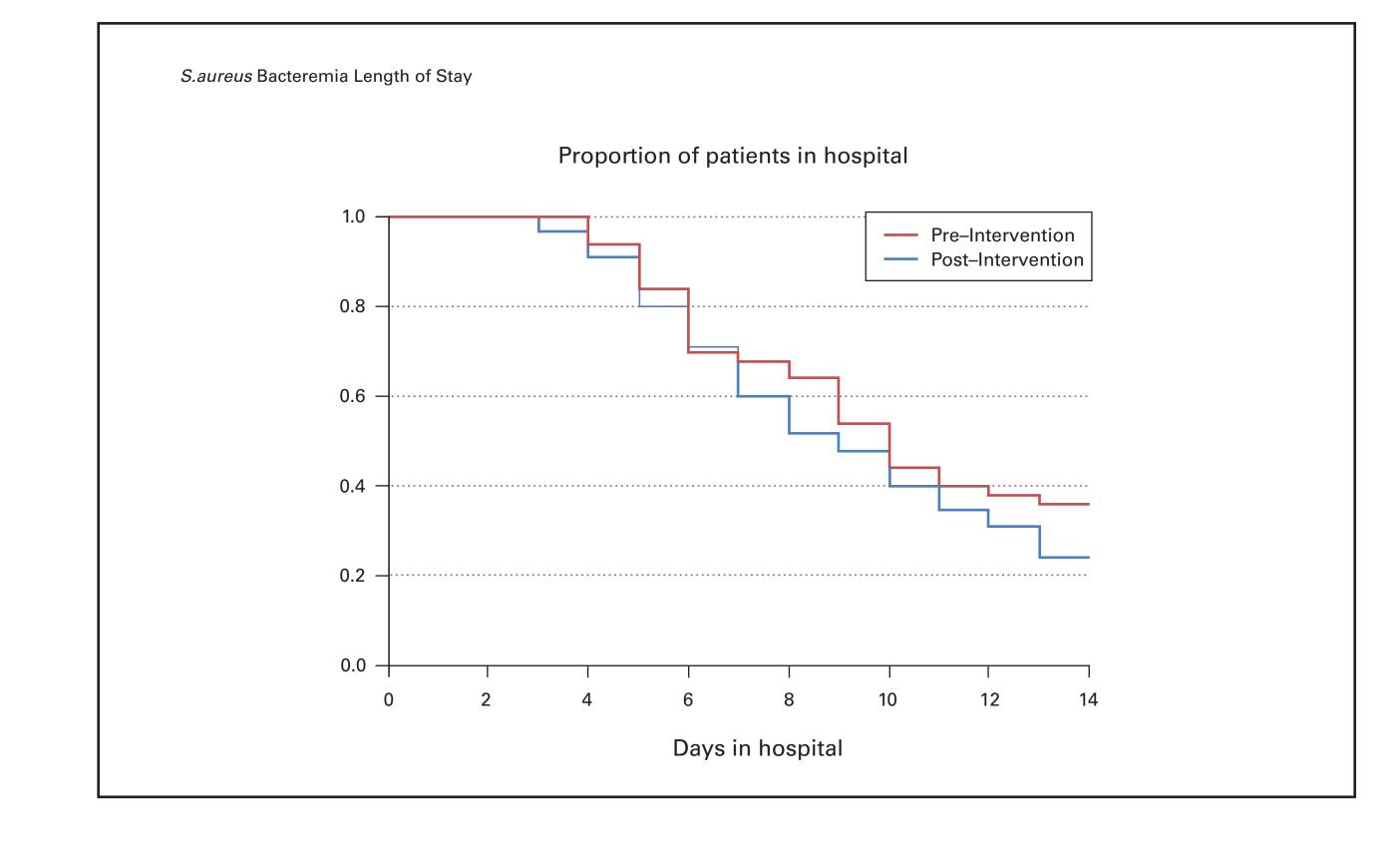
Pharmacist Intervention	Rapid Diagnostic Results n=2,046
Adjusted based on RBRP*	1,139 (55.7%)
Escalated spectrum	455 (22.2%)
Dose optimization	264 (12.9%)
De-escalated spectrum	429 (21%)
Isolation orders	135 (6.6%)

Clinical outcomes: Staphylococcus aureus bacteremia (SAB)

- Patient population
- > Community acquired SAB
- Random sample
- 50 pre-RBRP
- 100 post-RBRP
- Patients well matched with respect to
- Demographics
- Social and medical history
- Severity of illness
- Reduced length of stay (LOS) post-RBRP
- Median 9 (IQR: 6-13) days vs. 9 (IQR: 6-15) days (Adjusted hazard ratio (aHR): 0.49; 95% CI: 0.26 – 0.92; p=0.026), respectively

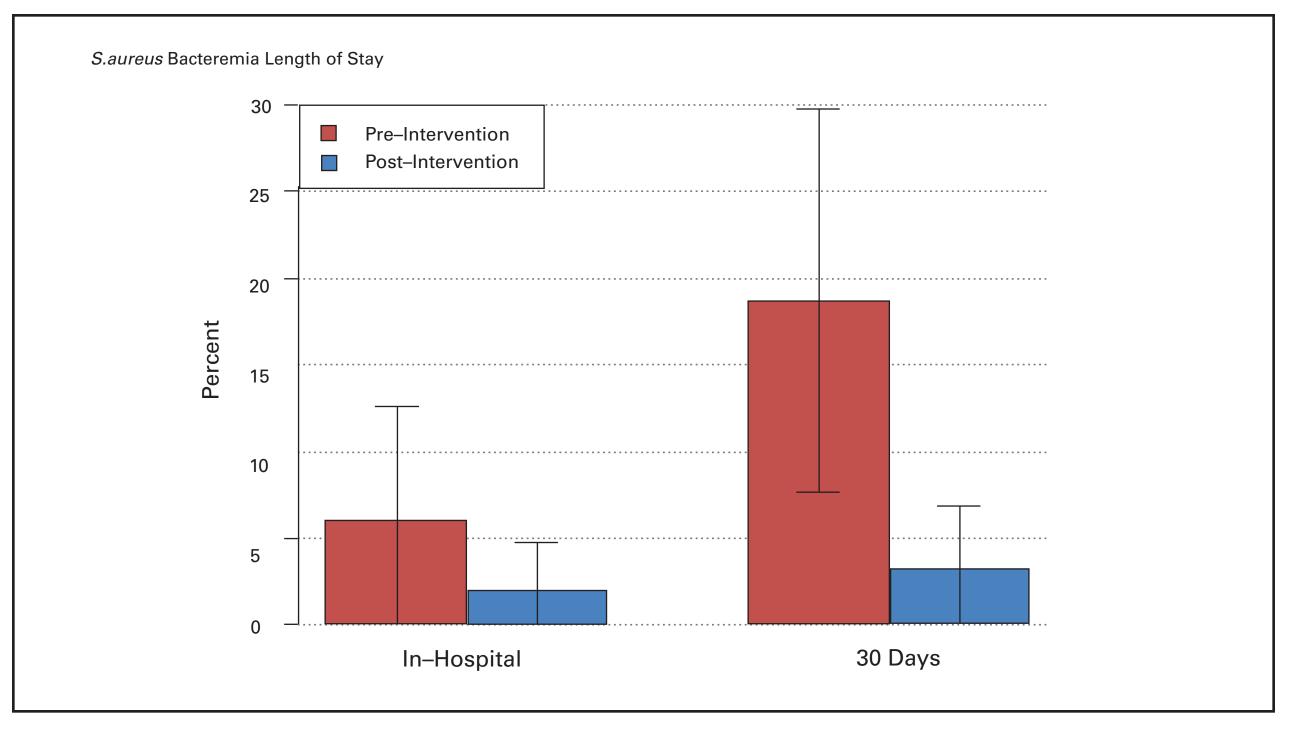
Experience with the Program (continued)

SAB LOS



- 30-day mortality reduced by 93%
- At 30 days, 9 (19%) patients were deceased pre-RBRP, compared to 3 (3%) patients post-RBRP (Adjusted odds ratio (aOR): 0.072, 95% CI: 0.009 0.365, p=0.004)

SAB Mortality



Discussion/Conclusion

- RBRP is associated with reduced LOS and 30-day mortality in patients with community acquired SAB
- RBRP highlights the role of pharmacy services as champions of complex disease states by efficiently, accurately, and comprehensively managing multiple facets of bacteremia care
- Gram stain assessment
- > STAT antimicrobial doses
- Blood culture ordering
- > Rapid diagnostic results interpretation
- Patient isolation
- > Antimicrobial escalation or de-escalation
- RBRP is reproducible in most hospitals and other healthcare settings because it does not rely heavily on infectious diseases clinical coverage

References

- Bauer KA, Perez KK, Forrest GN et al. Review of rapid diagnostic tests used by antimicrobial stewardship programs. *Clin Infect Dis.* 2014; 59:S134-45.
- TimbrookTT, Morton JB, McConeghy KW et al. The effect of molecular rapid diagnostic testing on clinical outcomes in bloodstream infections: a systematic review and meta-analysis. *Clin Infect Dis.* 2017; 64:15-23.
- Box MJ, Sullivan EL, Ortwine KN et al. Outcomes of rapid identification for gram-positive bacteremia in combination with antibiotic stewardship at a community-based hospital system. *Pharmacotherapy.* 2015; 35:269-76.
- Lockwood AM, Perez KK, Musick WL et al. Integrating rapid diagnostics and antimicrobial stewardship in two community hospitals improved process measures and antibiotic adjustment time. *Infect Control Hosp Epidemiol.* 2016; 37:425-32.
- 5. Caliendo AM, Gilbert DN, Ginocchio CC et al. Better tests, better care: improved diagnostics for infectious diseases. *Clin Infect Dis.* 2013; 57:S139-70.