USE OF A DATA ANALYTIC PLATFORM FOR THE DETERMINATION AND TRACKING OF BLOOD CULTURE CONTAMINATION AT AN ACADEMIC HEALTH CARE SYSTEM

Study | Tampa General Hospital, Tampa, Florida

PARTICIPANTS

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BACKGROUND

Monitoring of blood culture contamination may be prone to errors when identified manually. This study evaluated the trend and accuracy of blood culture contamination rates obtained from the CLARION™ Blood Culture Stewardship (BC) dashboard, a bioMérieux data analytic platform, versus manual monitoring at an academic healthcare system.

OBJECTIVE

- To compare the trend and accuracy of blood culture contamination rates obtained from the CLARION BC Dashboard versus manual determinations
- To describe how implementation of the CLARION BC Dashboard impacted the workflow and efficiency of blood culture contamination determination and reporting
- To describe how the depth of knowledge and insight on blood culture contamination provided by the CLARION BC Dashboard can be used for quality improvement

METHODS

Tampa General Hospital, an academic healthcare system serving West Central Florida, implemented the CLARION BC dashboard in May 2021 as a data analytic platform to track, trend, and monitor key performance indicators within the laboratory. Using an interrupted times series design, the monthly percentages of blood cultures contaminated during the post implementation period (May 2021 – August 2023; when blood culture contamination rates were determined by the CLARION BC dashboard) were compared to a pre-implementation period (January 2015 – April 2021; when blood culture contamination rates were determined manually by a medical laboratory staff).

Figure 1: Segmented regression analysis of blood culture contamination during pre- and post-implementation phases

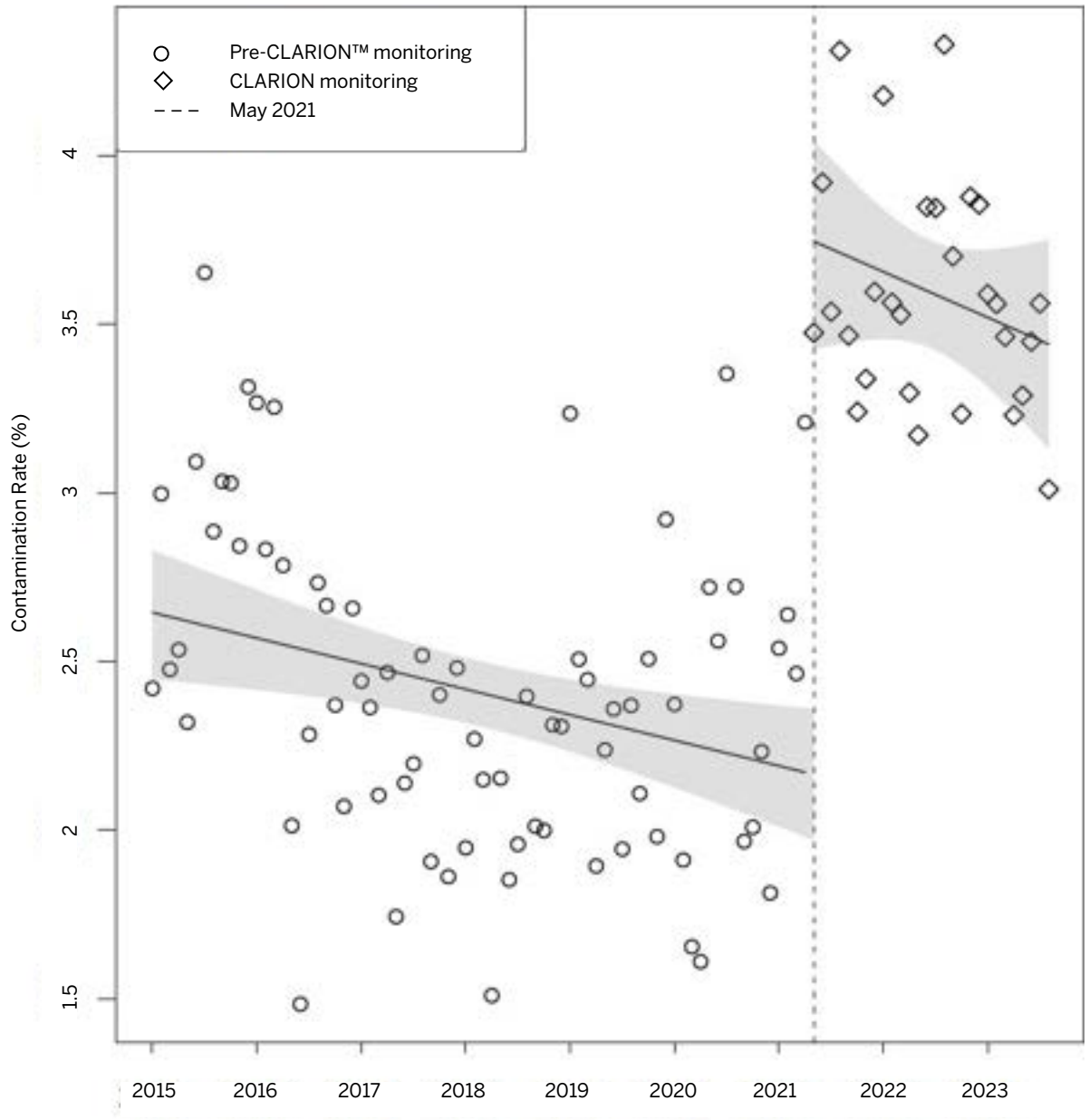


Figure 2A: Frequency and contamination % by age group

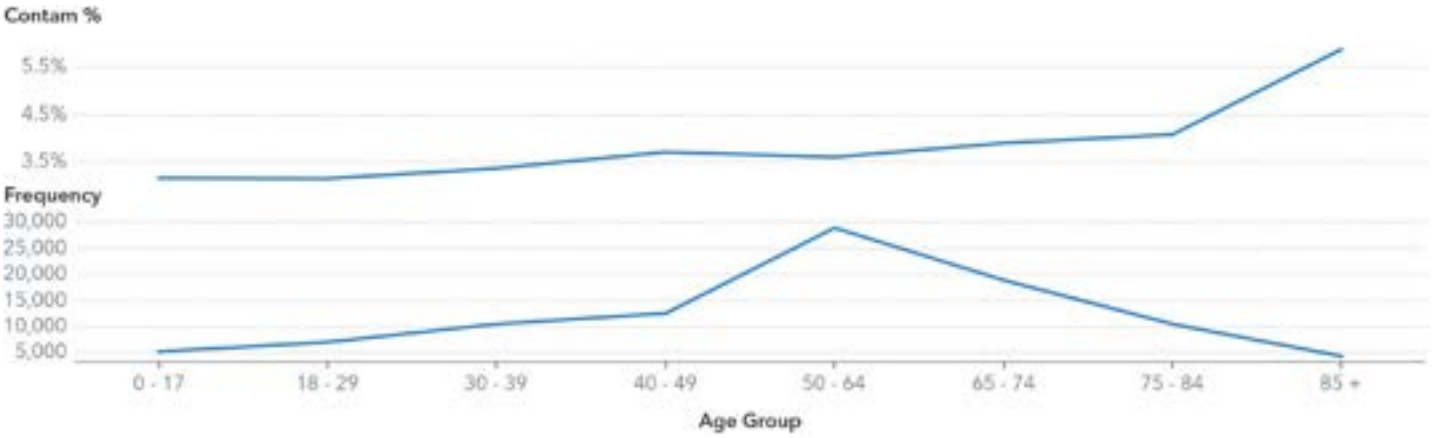


Figure 2B: Contamination % by collector class

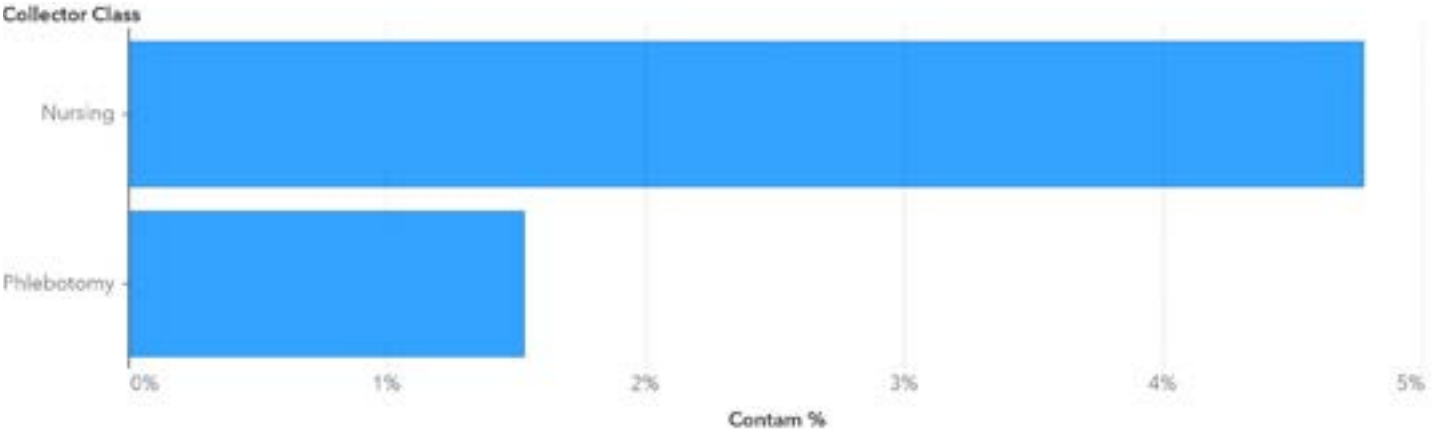
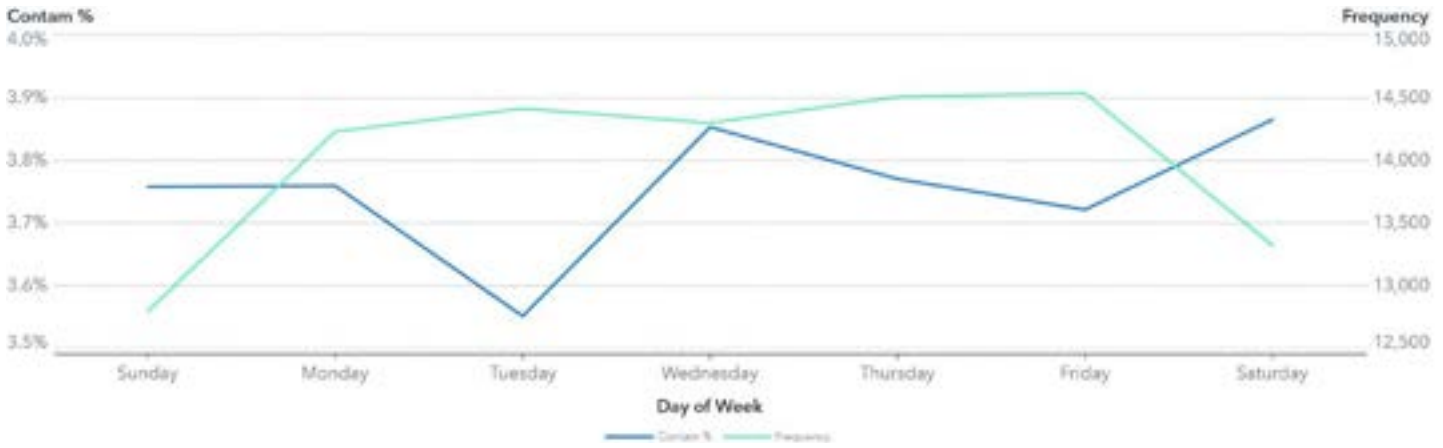


Figure 2C: Frequency and contamination % by day of week



Workflow variables for blood culture contamination calculations pre- and post-implementation of a data analytic platform

Table 1: Manual process for determination of blood culture contamination workflow

Step	Description	Frequency (time required)
1	Medical laboratory scientist (MLS) working the blood culture bench reviews all the positive cultures and flags contaminants	Daily (15 minutes)
2	Patient label placed on a 3-ring binder designating the blood culture to be contaminated, along with the date and the organism isolated	
3	Third-shift MLS manually counts work cards to obtain the total number of collected blood cultures	
4	Designated MLS reviews the binder to determine whether the cultures tracked were true contaminants or not	Weekly (1 hour)
5	Designated MLS reviews LIS to obtain the location and collector information, then collates all data to determine blood culture contamination rates	Monthly (2 days)
	MLS time spent per month	**27.5 hours**

Table 2: CLARION™ Blood Culture Stewardship dashboard workflow

Step	Description	Frequency (time required)
1	Log into data analytics platform and download an Excel spreadsheet of the detailed data for the month	Monthly (2 hours)
2	Separate contaminated blood cultures based on collector type	
3	Add info to main table to calculate contamination rate	
4	Submit email with all information	
	MLS time spent per month	**2 hours**

RESULTS

A total of 301,544 blood culture sets occurred during the study period. During the pre-implementation period, contamination rates ranged from 1.48% to 3.65%, while 3.01% to 4.33% were contaminated during the post-implementation period. In segmented regression analysis, electronic monitoring of contamination rates in the post-implementation period was associated with an absolute 1.56% (95% confidence interval [CI]: 1.20% to 1.95%) and relative 72.0% (95% CI: 55.1% to 90.0%) increase in contamination compared with projected estimates from the pre-implementation period. This increase is represented in Figure 1 (see page 2) by the difference between the solid regression line segments coinciding with the CLARION ™ Blood Culture Stewardship dashboard implementation.

CONCLUSION

The data analytic platform helped to streamline the process for determination of blood culture contamination at a large academic healthcare system by automating daily and monthly case finding and reporting activities.

Identification of blood culture contamination through an electronic system may save valuable MLS time that could be used for expert level tasks.

Electronic monitoring of blood culture contamination rates through a data analytic platform may identify contaminants that are missed when rates are calculated manually. Accurate surveillance is necessary for infection control and antimicrobial stewardship programs to implement interventions to decrease contamination rates, unnecessary antibiotic exposure, and healthcare costs.

Streamline processes by automating daily and monthly case finding and reporting activities.

Identification of blood culture contamination through an electronic system may save valuable MLS time.

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