



The Use Of a Nursing Screening Tool and a Clinical Decision Support Order in the Electronic Health Record to Reduce *Clostridium difficile* LabID Events.

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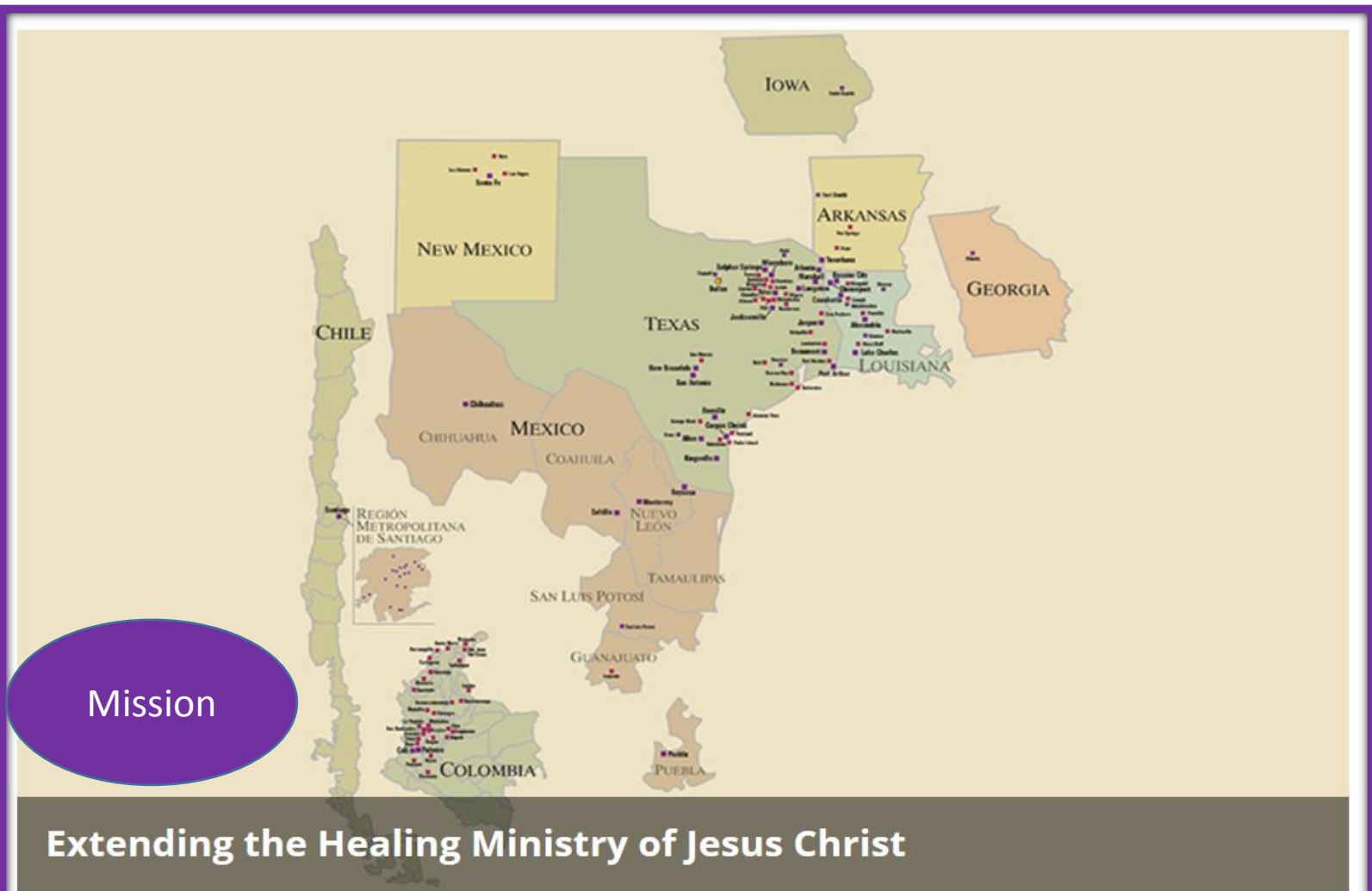


Conflict of Interest Disclosure

No real or conflicts of interest to report for:

- Michelle Charles MSN, RN or
- Karen Vallejo MSN, RN, CIC







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Objectives

- Describe the process for the development of a nursing screening tool for *Clostridium difficile* (*C. diff*) and Clinical Decision Support (CDS) order in the EHR.
- Discuss the workflow and the implementation process of the Emergency Department and inpatient screening tools in the EHR.
- Describe the Impact of the implementation of the screening tool and CDS ordering for *C. diff* and the reduction of inappropriate testing and LabID events.
- Discuss lessons learned from the implementation of *C. diff* initiative.
- Next Steps

What is *C. difficile*?

<https://youtu.be/WNfFQI18ABI>





All Hands on Deck



It's all about... **OUTCOMES!**

Excess Days Mortality Blood Utilization EHR Adoption Length of Stay Informatics Readmissions Safety
Process Improvement Antimicrobial Stewardship Cost of Care Quality Data Warehousing Efficiency Care Variation Analytics
Consumer Engagement Clinical Decision Support Value Realization Service Medication Errors eMeasures



C. difficile Testing Guidelines

To facilitate enhanced diagnostic practices, the following guidelines are recommended:

C. difficile testing should only be performed on patients with clinically significant diarrhea defined as **3 or more loose or liquid stools that occur in a 24-hour period**. Providers should ensure that the patient has not been administered laxatives in the prior 24-48 hours as a possible explanation of diarrheal symptoms. *C. difficile* testing should NOT be ordered on patients who have an ileostomy.

C. difficile testing is not recommended as part of a fever workup or evaluation of an elevated WBC unless there is accompanying diarrhea as defined above.

C. difficile testing should not be performed on formed or hard stool samples or on patients who have had a positive specimen within the preceding 21 days as the test may remain positive for months despite clinical response to treatment.

Due to the sensitivity of the PCR test only one specimen will be tested per seven days if it tests negative. When repeat testing is performed for CDI within a 7-day period, the pre-test probability for the second assay is so low that the ratio of true-positive results to false-positive results becomes very unfavorable; this could result in misdiagnosis for some patients.

To operationalize these guidelines, the laboratory will not perform a *C. difficile* PCR test in the following:

- Patients who have previously had a positive PCR for *C. difficile* in the last 21 days
- If stool specimen is received > 72 hours after being ordered
- When the specimen received in the laboratory is formed stool or Type 1 -6 on the Bristol Stool Chart
- Only one specimen will be tested by PCR per 7 days if tested negative



Solutions

- Elimination of inappropriate testing
 - Ensure screening tool is utilized
 - Notify Infection Preventionists to review protocol to ensure appropriate testing
 - The House Supervisor is notified after hours, weekends and holidays until everyone understands the process
- Appropriate testing
 - Prompt testing of patients with diarrheal illness within the first 3 days of hospital admission
 - Ensure patients meet criteria in testing guideline/algorithm
- Notification of positive screening
 - Charge nurse, Infection Preventionist, Nurse Manager, Pharmacist House Supervisor, and Physician

NHSN *C diff* LabID Event Reporting

- CDC NHSN Definition:
 - *C. difficile* LabID Event: A healthcare facility onset (HO) of a specimen collection date >3 days after inpatient admission to the facility.
 - which can result in over reporting due to asymptomatic *C. difficile* colonization.
- The purpose of LabID event reporting is to enable laboratory testing data to be **used without clinical evaluation of the patient** and is least subjective
- Prompt *C difficile* testing of patients with diarrheal illness within the first 3 days of hospital admission will improve hospital onset *C. difficile* LabID reporting accuracy





Goals: Early, Rapid Identification, Diagnosis and Treatment of *C. Diff*

Primary Goal

Rapid Diagnosis that will prompt treatment and implementation of contact precautions that can limit the spread of *C. diff* in the environment of care.

- Screening tool in the ED and inpatient settings to Rapidly Identify Possible *C. diff* patients.
- Established testing criteria to rule in or rule out *C. diff* when test is being placed

Secondary Goal

Rule out *C. Difficile* in patient with Diarrhea

- Proper documentation of Stool in regards to consistency of stool, amount and over what time period
- Lab Policy with established criteria to process *C. diff* test based on the stool consistency and stated protocol.
- Hardwiring of placing patient on Contact precautions when suspected of *C. diff* or positive for *C. diff*.





Methods

- A multidisciplinary *C. diff* Collaborative team formed that included Infection Prevention, Health Informatics, Lab, Pharmacy, Quality, Clinical Standards, Physicians and Nurses.
- A nursing screening tool based on the approved *C. diff* testing guideline was built within the ED and inpatient GI assessment.
- A *C. diff* order was built with clinical decision support to guide the provider(s) with appropriate guidelines for the ordering of a *C. diff* test.
- Job aids were developed and distributed 2 weeks prior to implementation.
- Notification to *C. diff* orders to the Infection Preventionists was placed in the EHR.
- A post-collaborative *C. diff* meeting for Phase 1 was held 6 months after implementation to evaluate the processes and the outcomes of the initiative.





Nurse Screening Tool

If the top of the *C. diff* screen is positive and meet the case definition the *C. diff* risk factors are required to be performed.

If the *C. diff* risk factors are positive then the nurse is required to per the popup to "notify the provider and obtain an order for *C. diff* testing"

Gastrointestinal Parameters	
Defined Gastrointestinal Parameters	<input type="radio"/> Within Defined Limits Abdomen Soft, Non-tender. No Abdominal Pain or Distention. Bowel Sounds Present and Bowel Movements Within Normal Pattern and Consistency for Patient. Tolerating Diet and Having No Reflux or Feeding Intolerance.
C.diff Screen	
Contact - <i>C. difficile</i> precautions in place	<input type="radio"/> Yes <input checked="" type="radio"/> No <u>C. difficile precautions in place, provider notified.</u>
New or progressive diarrhea	<input type="radio"/> Yes <input checked="" type="radio"/> No Screening phase 1: CDI Case Definition Pt presents with new or progressive diarrhea of unknown cause
Significant increase in diarrhea	<input checked="" type="radio"/> Yes <input type="radio"/> No <u>Significant increase in baseline diarrhea</u>
Watery, no solid pieces, entirely liquid stool	<input checked="" type="radio"/> Yes <input type="radio"/> No <u>At least 3 watery, no solid pieces, entirely liquid bowel movements in last 24 hours</u>
Increased Ostomy Output	<input type="radio"/> Yes <input checked="" type="radio"/> No <u>Significant increase in ostomy output.</u>
CDI case definition	<u>Possible C.diff infection, complete Risk Factor section</u> C.diff Infection (CDI) case definition
CDI risk factor	<div><div><input checked="" type="checkbox"/> a. History of C.Diff <input type="checkbox"/> b. Advanced age >65 <input checked="" type="checkbox"/> c. Recent hospitalization <input type="checkbox"/> d. Transfer patient</div><div><input type="checkbox"/> e. Antibiotic use recent <input type="checkbox"/> f. Chemo Treatment <input type="checkbox"/> g. Proton-pump inhibitor <input type="checkbox"/> h. Recent GI Surg</div><div><input type="checkbox"/> i. Fever >100.4 F or 40 C <input type="checkbox"/> j. Leukocytosis(WBC>15K) <input type="checkbox"/> k. Abd cramping,discomfor</div></div> Screening phase 2: CDI risk factor a. History of C. Difficile b. Advanced age: >65 c. Recent hospitalization or overnight stay in healthcare facility d. Transfer from another healthcare facility (nursing, LTAC) e. Antibiotic use (within previous 8 weeks) f. Antineoplastic Agent use (within previous 8 weeks) g. Proton-pump inhibitor use h. Recent GI Surgery or tube feeding i. Fever >100.4 F or 40.0 C j. Leukocytosis (WBC, usually > 15,000) k. Abdominal Cramping, discomfort, or tenderness
C.diff screen follow up	<u>Notify Provider, obtain order for C.Diff testing.</u> 1. Place patient on Contact Precautions - <i>C. difficile</i> 2. Notify provider of positive screen if no laxatives are used for past 24-48 hours 3. Obtain order for C.diff testing before administration of antibiotics 4. Collect stool sample prior to administration of antibiotics





Clinical Decision Support Tool

1 Selected Items.

Order	Category	Clear
✓ IC Clostridium Difficile Ag	LABORATORY	
<End of List>		

IC Clostridium Difficile Ag (LAB)

Order
IC Clostridium Difficile Ag (LAB)

Priority	R	Series?	
Quantity		Directions	
Date	12/12/16	Stop Date	
Time	0859	Stop Time	
		Count	

Comments to Collector:	
Specimen Comment:	

The C. difficile testing is highly sensitive and frequently identifies colonized patients, thus should NOT be performed for patients with a low probability of infection.

Not recommended as part of a fever workup or elevated WBC unless this is accompanying diarrhea.

If any of the following statements are TRUE, this procedure should NOT be ordered.
* Less than 3 or more loose/liquid stools in a 24 hour period? | N
* Laxatives administered 24-28 hours prior to loose stools? | N
* Patient has an Ileostomy? | N
* Positive C. difficile PCR results within the last 21 days? | N
* Negative C. difficile PCR results within a 7-day period? | N
12 to 36 months of age without risk factors... |
who have vomiting as a significant complaint? |
< 12 months of age? | Y

* Collected by Care Area? | Y
* Has specimen been collected/obtained? | N
Stool Characteristics | Loose





Clinical Decision Support Rule

IC Clostridium Difficile Ag (LAB)

Order

IC Clostridium Difficile Ag (LAB)

Priority: R

Quantity: 12/12/16

Date: 0859

Series? Directions: Stop Date: Stop Time: Count:

Comments to Collector: Specimen Comment:

The C. difficile testing is highly sensitive and frequently identifies colonized patients, thus should NOT be performed for patients with a low probability of infection.

Not recommended as part of a fever work workup or elevated WBC unless this is accompanying diarrhea.

If any of the following statements are TRUE, this procedure should NOT be ordered.

- Less than 3 or more loose/liquid stools in a 24 hour period? [N]
- Laxatives administered 24-28 hours prior to loose stools? [N]
- Patient has an Ileostomy? [N]
- Positive C. difficile PCR results within the last 21 days? [N]
- Negative C. difficile PCR results within a 7-day period? [N]
- 12 to 36 months of age without risk factors... who have vomiting as a significant complaint? [Y]
- < 12 months of age? [Y]
- Collected by Care Area? [Y]
- Has specimen been collected/obtained? [N]
- Stool Characteristics: Loose

If **YES** is answered to any of the questions, a message will pop-up with clinical decision to not order the test

Software by MEDITECH

Rule Check: CDIFF

IC Clostridium Difficile Ag (LAB)

Rule Message

The patient does NOT meet criteria for C. difficile testing based on the responses within the ordering screen. Please provide an override reason in order to continue.

Override Rule Comment

Laxative, but has risk factors & clinically significant S/SX
No diarrhea, but has toxic megacolon and ileus
Other

Override

Prev Next





Clinical Decision Support Tool

Order

IC Clostridium Difficile Ag (LAB)

* Priority

Quantity

* Date

Time

R

1/10/17

1102

Series?

Directions

Stop Date

Stop Time

Count

@ Comments to Collector:

@ Specimen Comment:

=====

The C. difficile testing is highly sensitive and frequently identifies colonized patients, thus should NOT be performed for patients with a low probability of infection.

=====

Not recommended as part of a fever workup or elevated WBC unless this is accompanying diarrhea.

=====

Lab will NOT perform a C. difficile PCR for the following:

- Positive C. difficile PCR results within the last 21 days.
- Negative C. difficile PCR results within a 7-day period.

=====

If any of the following statements are TRUE, this procedure should NOT be ordered.

* Less than 3 or more loose/liquid stools in a 24 hour period?

* Taking laxatives over the past 48 hours?

* Does patient have an Ileostomy?

Children 12 to 36 months of age without risk factors...

who have vomiting as a significant complaint?

< 12 months of age?

=====

* Collected by Care Area?

@ Has specimen been collected/obtained?

=====

Bristol Stool Chart ☒ Liquid, no solid pieces

Bristol Stool Chart is available within Reference Link

1 Selected Orders

Reflexed From: IC Clostridium Difficile Ag (LAB)

Other

☒ Isolation - ROUTINE Today Now

If **NO** is answered is answered to all the question, the C. diff Isolation order will fire at the same time.



Bristol Stool Chart – Stool Documentation

IC Clostridium Difficile Ag (LAB)

Order

IC Clostridium Difficile Ag (LAB)

Priority

Quantity

Date

Time

R

12/12/16

0859

Series?

Directions

Stop Date

Stop Time

Count

Comments to Collector:

Specimen Comment:

The C. difficile testing is highly sensitive and frequently identifies colonized patients; thus should NOT be performed for patients with a low probability of infection.

Not recommended as part of a fever work workup or elevated WBC unless this is accompanying diarrhea.

If any of the following statements are TRUE, this procedure should NOT be ordered.

* Less than 3 or more loose/liquid stools in a 24 hour period?

* Laxatives administered 24-28 hours prior to loose stools?

* Patient has an Ileostomy?

* Positive C. difficile PCR results within the last 21 days?

* Negative C. difficile PCR results within a 7-day period?

12 to 36 months of age without risk factors... who have vomiting as a significant complaint?

< 12 months of age?

* Collected by Care Area?

* Has specimen been collected/obtained?

Stool Characteristics

Software by MEDITECH

X

Bristol Stool Chart

Type 1 (Separate hard lumps)

Type 2 (Lumpy and sausage like)

Type 3 (Sausage shape with cracks)

Type 4 (Smooth, soft sausage)

Type 5 (Soft blobs,clear cut edge)

Type 6 (Mushy with ragged edges)

Type 7 (Liquid, no solid pieces)

Cancel

OK





Link to Bristol Chart from *C. diff* Order

=====

Bristol Stool Chart Type 7 Liquid, no solid pieces

Bristol Stool Chart is available within Reference Link



Cancel OK ? ? ? ? ?



Antibiogram
Bristol Stool Chart
HPF WEBSTATION
PDOC Template Suggestion Form
Post Fall Management Protocol
Sound Color Numbers -Shoreline
Sound Color Numbers -South



BRISTOL STOOL CHART

	Type 1	Separate hard lumps	Very constipated
	Type 2	Lumpy and sausage like	Slightly constipated
	Type 3	A sausage shape with cracks in the surface	Normal
	Type 4	Like a smooth, soft sausage or snake	Normal
	Type 5	Soft blobs with clear-cut edges	Lacking fibre
	Type 6	Mushy consistency with ragged edges	Inflammation
	Type 7	Liquid consistency with no solid pieces	Inflammation





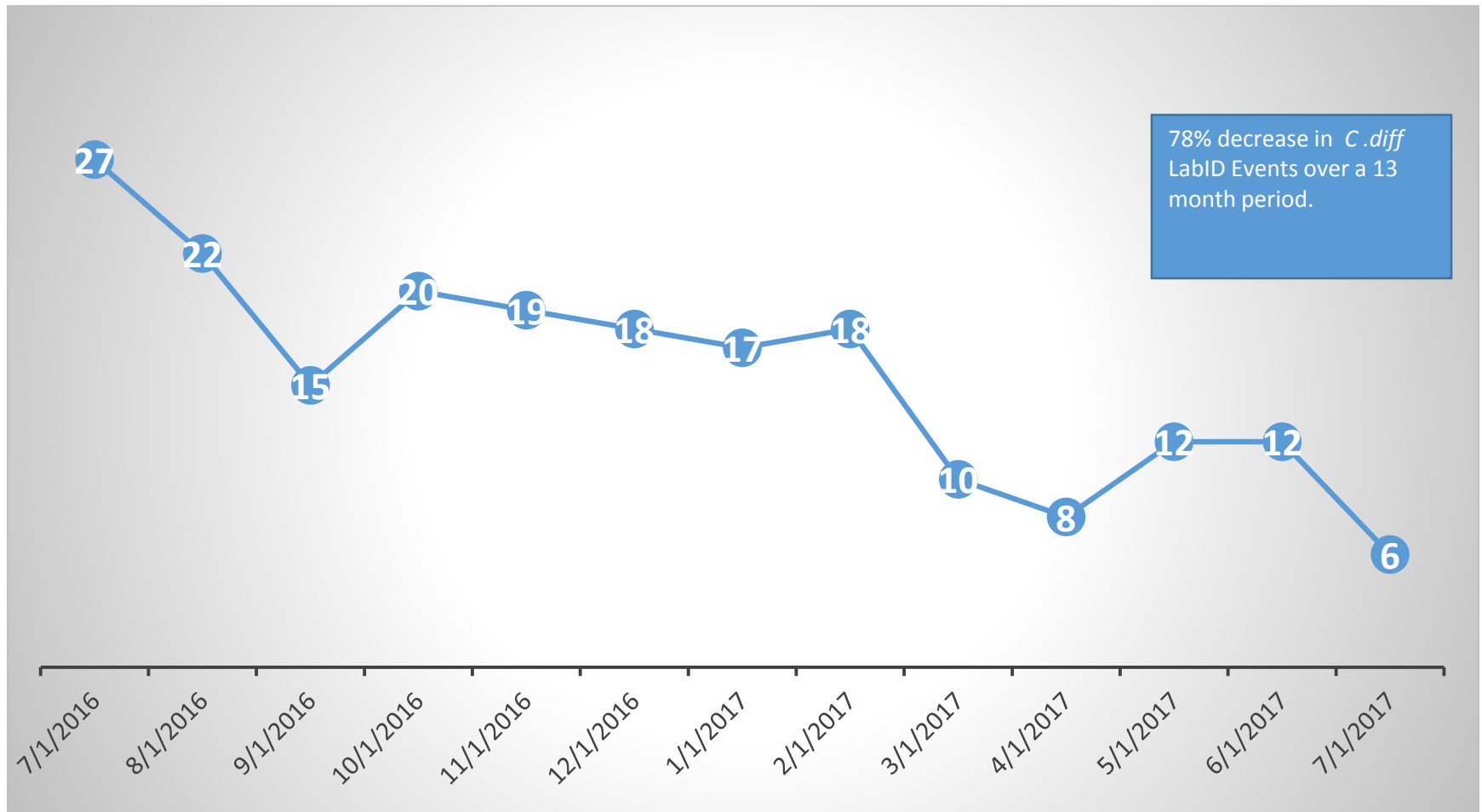
Process Measures - 6 months

- *C. difficile* monthly rates per Compass 2020
- *C. difficile* testing
- Usage of ED and inpatient screening tool
- Cost savings – *C. difficile* testing





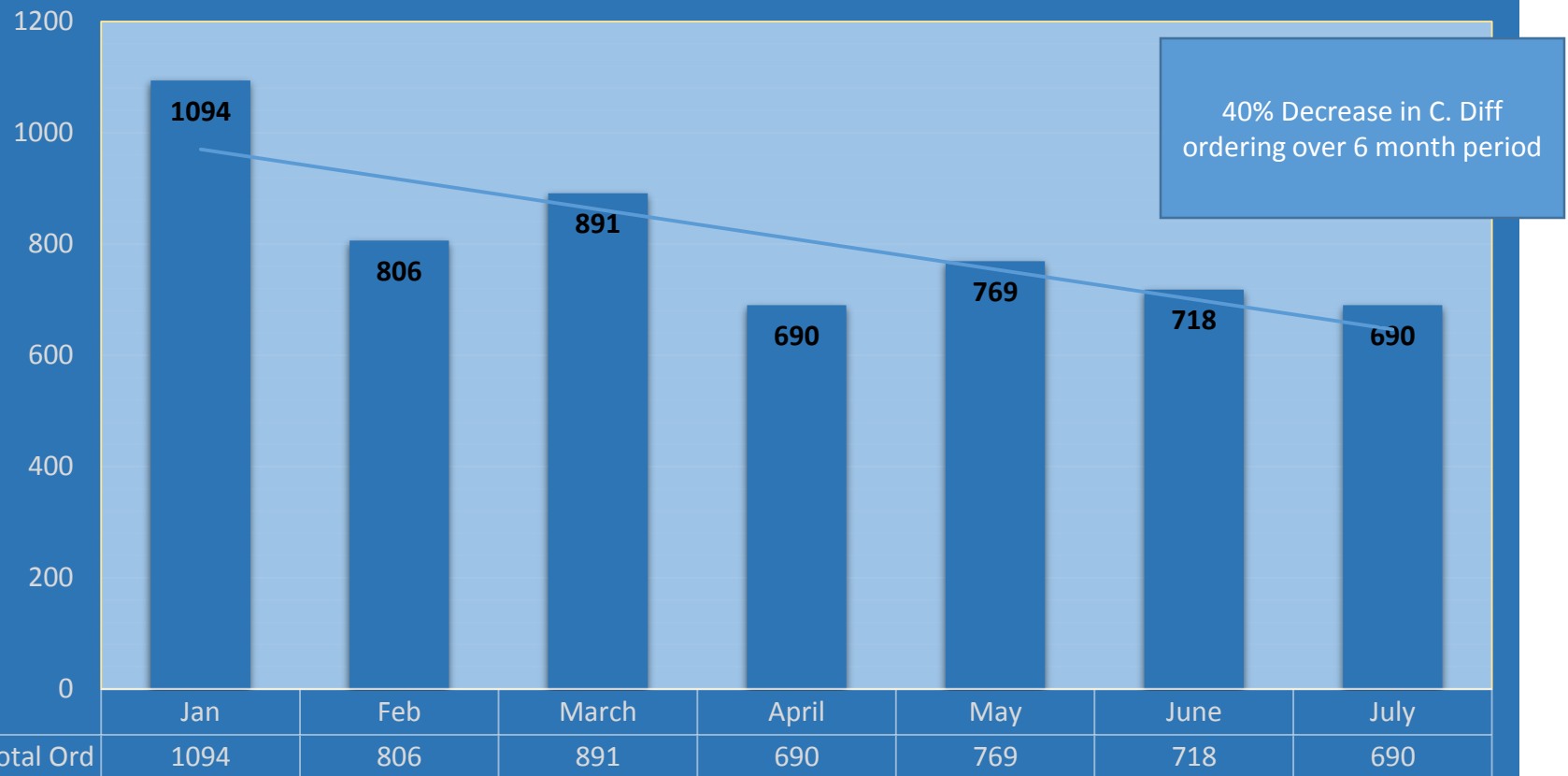
C. difficile LabID Events





C. difficile Ordering Results

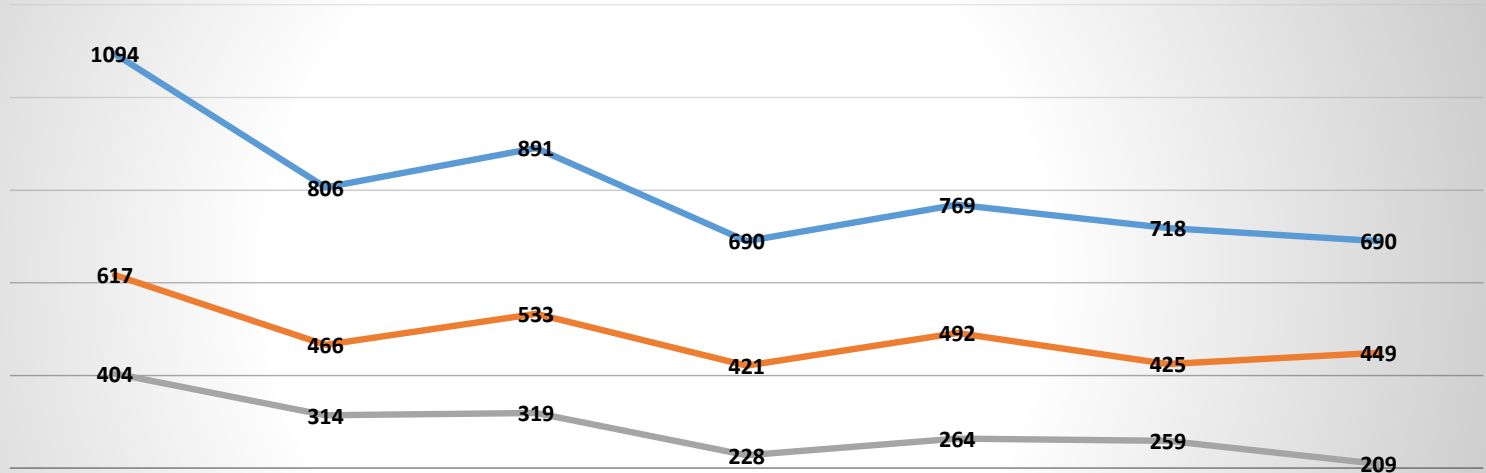
Total ordering by month





C. difficile Ordering Results (cont.).

***C. diff* Ordering by Month: 37% decrease in inappropriate ordering:
total ordering, completed and cancelled orders**



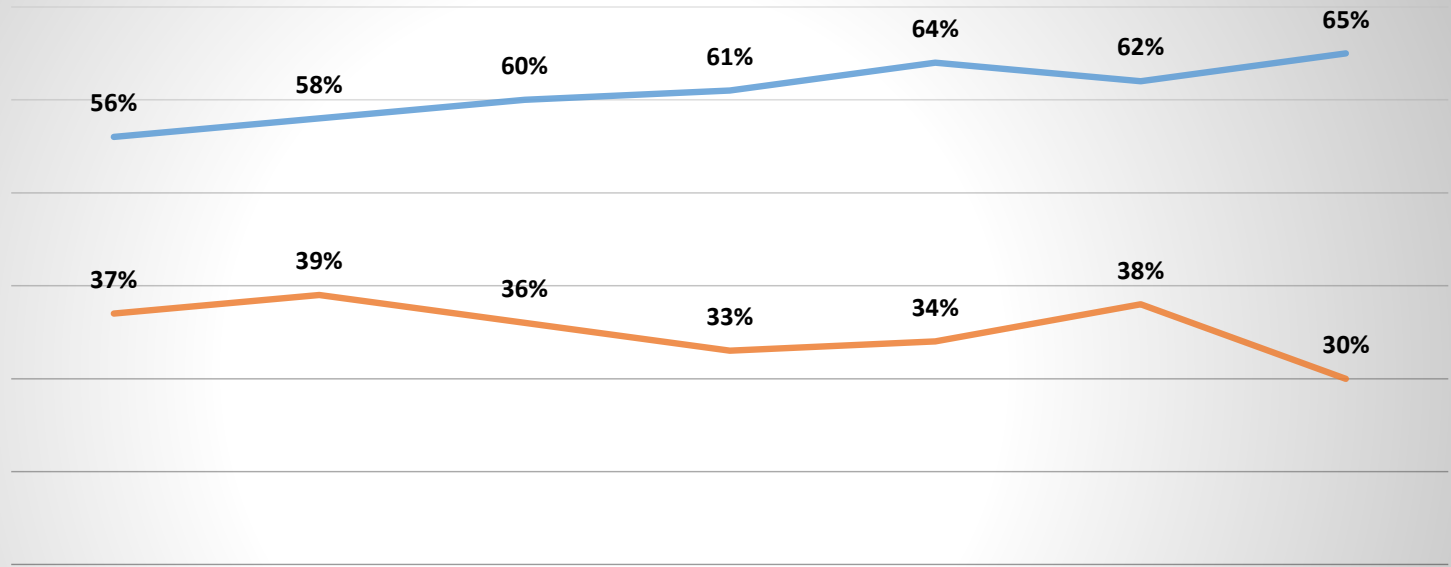
	Jan	Feb	March	April	May	June	July
Total Ord	1094	806	891	690	769	718	690
Completed	617	466	533	421	492	425	449
Cancelled	404	314	319	228	264	259	209





C. difficile Inappropriate Testing

Percentage of orders Completed vs Cancelled



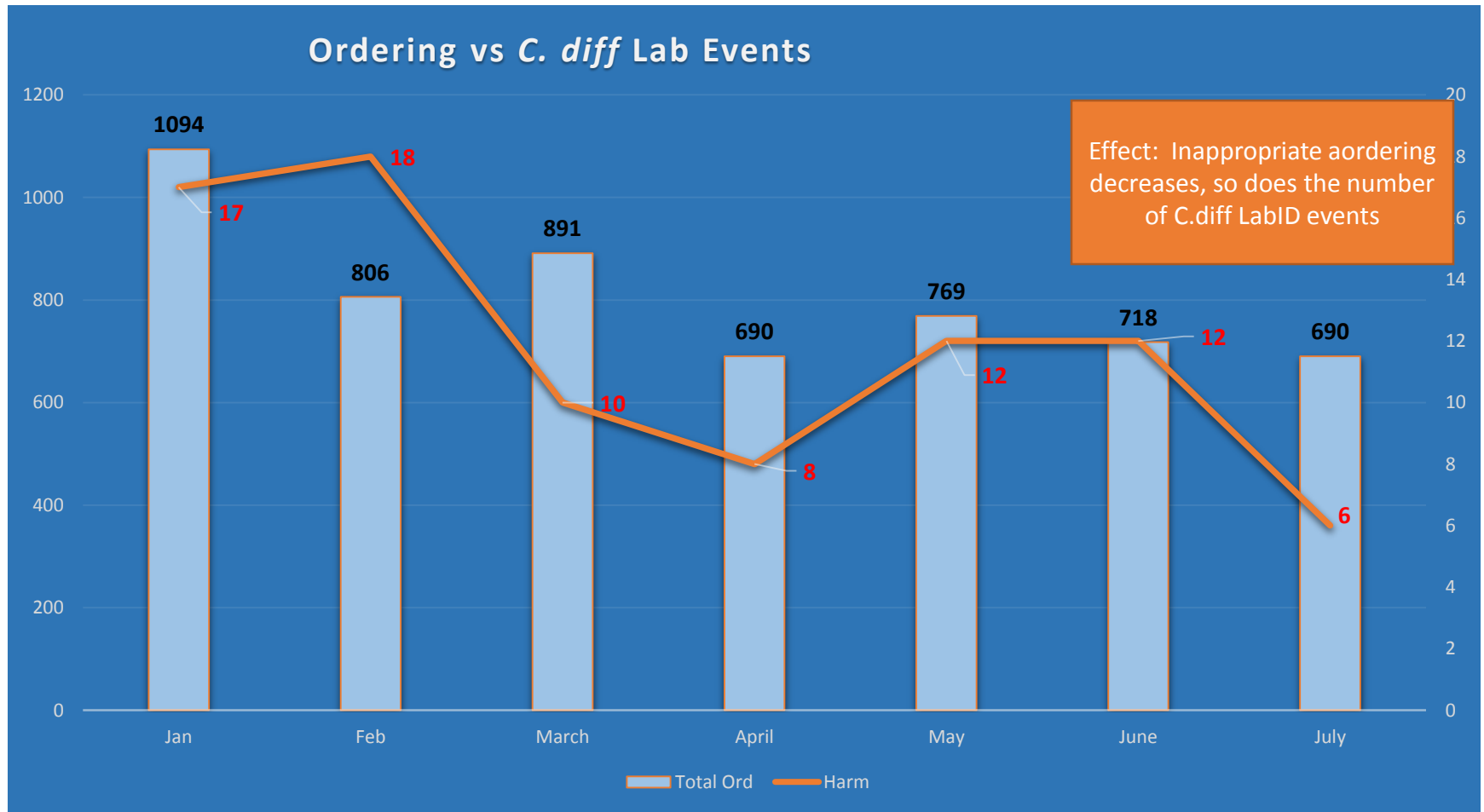
	Jan	Feb	Mar	APR	May	June	July
Total Comp.	56%	58%	60%	61%	64%	62%	65%
Total Canceled	37%	39%	36%	33%	34%	38%	30%

— Total Comp. — Total Canceled





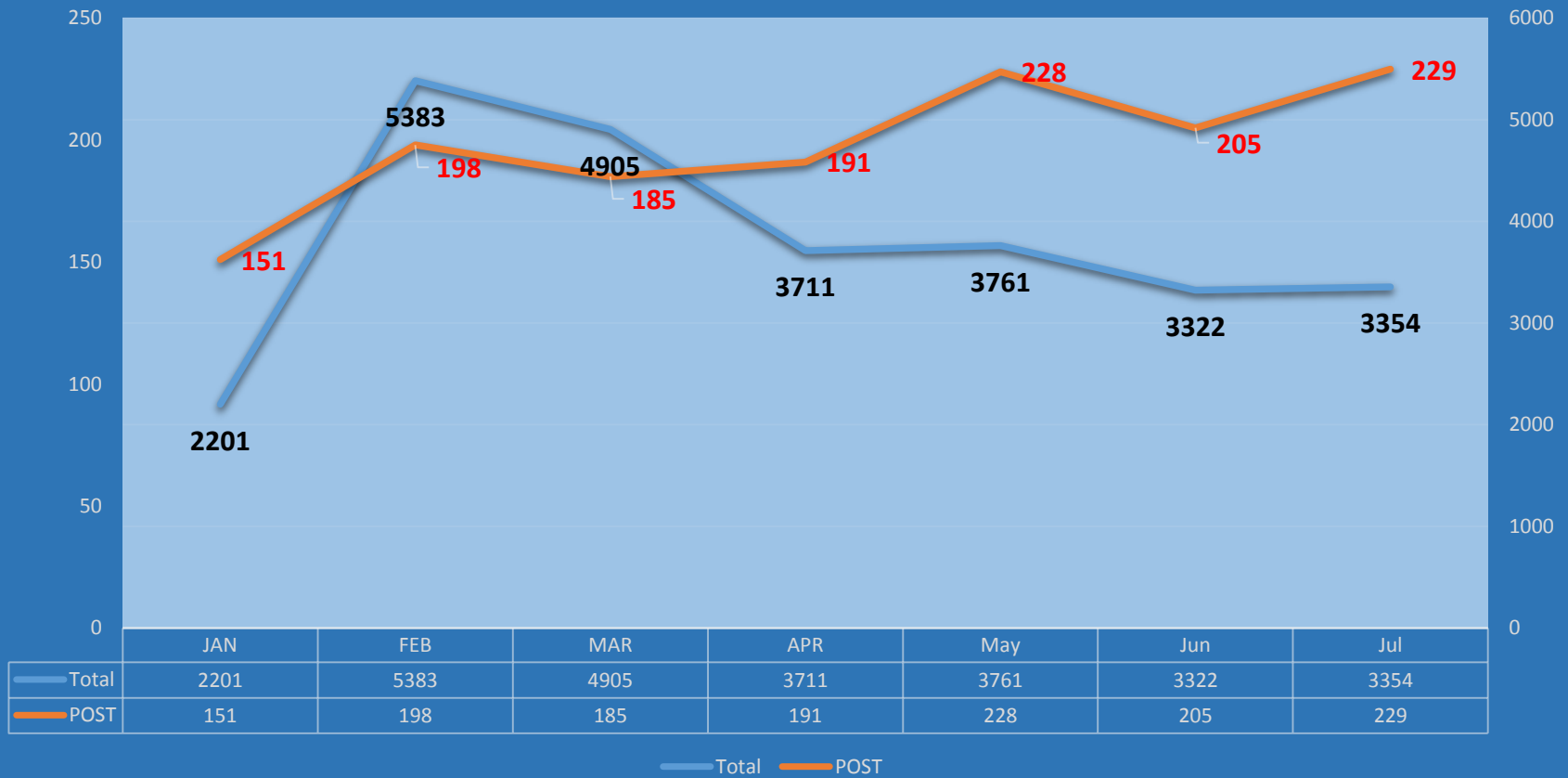
Effect: Ordering and *C. difficile* Events





Nurse Screening Tool

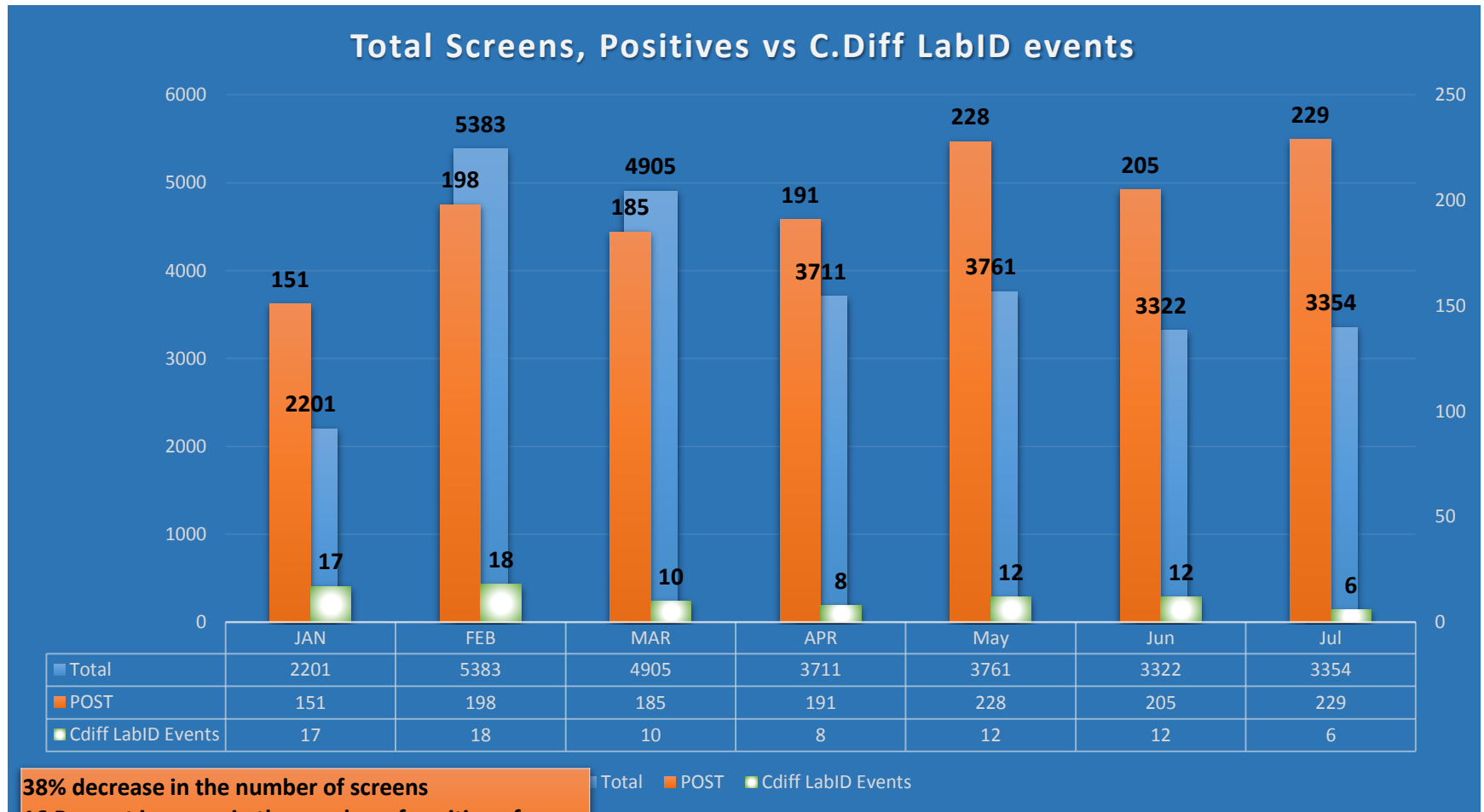
Number of Screens vs Positive. Total ED and Inpatient



It's all about... **OUTCOMES!**

Excess Days, Mortality, Blood Utilization, EHR Adoption, Length of Stay, Informatics, Readmissions, Safety, Process Improvement, Antimicrobial Stewardship, Cost of Care, Quality, Data Warehousing, Efficiency, Care Variation, Analytics, Consumer Engagement, Clinical Decision Support, Value Realization, Service, Medication Errors, eMeasures

Effect: Screening and Effects



38% decrease in the number of screens

16 Percent increase in the number of positive of screens

67 decrease in C diff LABID Events



Cost Savings

C. diff Initiative Cost Savings over 6 months Feb. 2017 to Jul. 2017



Lessons Learned

- Education of screen and order takes time to get hardwired with nurses and physician
- Pediatric population: Screen discontinued.
- Overriding of the *C. diff* test by professionals
- Re-educate that test for cure is not best practice
- Importance of early identification and prompt isolation

Next Steps

Next steps during Phase 2, the multidisciplinary team will continue to focus on:

- Reducing inappropriate testing
- Revising the screening tool
- Incorporating antibiotic stewardship
- Hand hygiene

Conclusion

- The use of a screening tool and a clinical decision support order based on a *C. difficile* testing guidelines resulted in positive outcomes
- **67% reduction in *C. difficile* LabID events over 6 months**
- **40% reduction** in inappropriate testing over a 6 month
- **\$87,000 dollars cost savings**
 - due to a decrease in inappropriate testing and *C. difficile* avoidable events from the previous year.

References

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Questions

