MRSA Bacteremia and CDI LabID Event Reporting Group Exercise

Tim is discharged from 3E at Memorial Medical Center (MMC) on 12/24/18 after a long hospitalization; on this date a *C. difficile* LabID event is identified. On 1/9/19, he feels ill with fever and is transported to the ER at MMC for assessment. In the ER, he's noted to be dehydrated/ hypotensive with concern for sepsis; blood cultures (BC) are collected, diarrhea is noted, antibiotics are initiated and Tim is admitted to observation status on 1/9. Due to bed availability, he remains in the ER until 1/10 when he transfers to an inpatient medical unit where again, diarrhea is noted. On 1/12, BC return MRSA+ so orders are written for inpatient admission. Tim is hypoxic with spike in temperature and continued loose stools. He's transferred to ICU later this day where a stool specimen is collected/submitted for C. diff testing. The facility standardly tests for CDI using a multistep algorithm of GDH/EIA with PCR for discrepant results. This C. diff test is reported as: GDH +, Toxin negative, PCR +. Tim stabilizes and transfers to the medical floor on 1/16 where a single loose stool is noted/submitted for CDI testing. This CDI test is finalized as GDH negative, toxin positive with no additional testing or results noted on the final lab report.

**MMC follows FacWideIN MRSA bacteremia & *C. difficile* LabID event reporting.

1) Is there a MRSA bacteremia LabID event identified? **Yes**

2) If so, to what location is the event attributed? **ER**

In the ER, he's noted to be dehydrated/ hypotensive with concern for sepsis; blood cultures (BC) are collected, diarrhea is noted, antibiotics are initiated and Tim is admitted to observation status on 1/9. Due to bed availability, he remains in the ER until 1/10 when he transfers to an inpatient medical unit where again, diarrhea is noted. On 1/12, BC return MRSA+

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3) Is the MRSA LabID event considered recurrent due to prior admission?

NO

BONUS: Memorial conducts active surveillance screening for MRSA and Tim screens positive. Does this change the event determination?

NO

**MMC follows FacWideIN MRSA bacteremia & *C. difficile* LabID event reporting.

1) How many CD LabID events are identified at MMC? **3**

2) What is the date (s) of events?

1) **12/24**
2) **1/12**
3) **1/16**

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5) Should the 1/16 CDI finding be disregarded since the algorithm of testing wasn't complete?

NO

BONUS: How should the facility answer the quarterly primary testing methodology question?

NHSN drop down for CDI test type
EIA - Enzyme immunoassay (EIA) for toxin
Cyto - Cell cytotoxicity neutralization assay
NAAT - Nucleic acid amplification test (NAAT)
NAATEIA - NAAT plus EIA, if NAAT positive (2-step algorithm)
GDH - Glutamate dehydrogenase (GDH) antigen plus EIA for toxin
GDHNAAT - GDH plus NAAT
GDHEIA - GDH plus EIA for toxin, followed by NAAT for discrepant results
ToxiCul - Toxigenic culture
OTH - Other (specify)

Analysis Group Exercise – CDI LabID Event

Questions (Exercise A)

Below is a copy of a CDI Line List obtained for patient "Tim". Answer the questions that follow.

Patient ID	Event ID	Specific Organism	Facility Admit Date	Location	Outpatient	Specimen Date	onset	cdiAssay
Tim	1	CDIF	10/5/2018	3E	N	12/24/2018	HO	Incident
Tim	2	CDIF	1/9/2019	ICU	N	1/12/2019	HO	Recurrent
Tim	3	CDIF	1/9/2019	Medical Floor	N	1/16/2019	HO	

1. While reviewing the CDI Line List, our hospital's infection preventionist (IP) has spotted one or more potential data entry errors on Tim's 2nd and 3rd CDI LabID events. Using the information presented in the previous case, can you find the error(s) in the line list?

2. After fixing the data entry error for "Tim" and generating new analysis datasets, how will the CDI Line List change? Complete all fields for Event #2 and #3:

Patient ID	Event ID	Specific Organism	Facility Admit Date	Location	Outpatient	Specimen Date	onset	cdiAssay
Tim	1	CDIF	10/5/2018	3E	N	12/24/2018	HO	Incident
Tim	2	CDIF						
Tim	3	CDIF						

3. Why is cdiAssay "blank" on event #3?

ANSWERS (Exercise A)

Answer #1: Data entry error is on the facility admission date for the 2nd and 3rd event.

Answer #2: see table below

Patient ID	Event ID	Specific Organism	Facility Admit Date	Location	Outpatient	Specimen Date	onset	cdiAssay
Tim	1	CDIF	10/5/2018	3E	N	12/24/2018	HO	Incident
Tim	2	CDIF	1/10/2019	ICU	N	1/12/2019	CO-HCFA	Recurrent
Tim	3	CDIF	1/10/2019	Medical Floor	N	1/16/2019	HO	

Answer #3: The patient had a prior positive CDI event within 14 days of this event. The "recurrent" category only applies to events that are 15-56 days after a prior specimen.

Questions (Exercise B)

To prepare for the 2019 Q1 CMS deadline, we would like to review our CDI LabID Event data that will be submitted to CMS. Let's assume that the IP at the hospital has generated new analysis datasets, and is ready to begin the data review! Below is a copy of the 2019 Q1 CDI Line List for Memorial Medical Center.

CDI LabID Event Line List
2019 Q1

PatID	Event ID	Pat Dis 4 wks*	Location	Outpatient	Fac Admit Date	Specimen Date	Onset	cdiAssay	FWCDIF_facIncHO Count
AA12	4	Y	Medical ward	N	1/11/2019	1/11/2019		Incident	
AA12	5	N	24-hr obs	Y	.	2/25/2019		Recurrent	
AA12	6	N	Medical ward	N	2/27/2019	3/2/2019			
CC34	7	N	ICU	N	2/1/2019	2/13/2019		Incident	
EE45	8	N	ED	Y	2/1/2019	2/1/2019		Incident	
EE45	9	N	Medical ward	N	3/15/2019	3/24/2019		Recurrent	
GG67	10	N	ED	Y	3/3/2019	3/3/2019		Incident	
JJ01	11	Y	ICU	N	1/8/2019	1/10/2019		Incident	

**Pat Dis 4 wks: Has patient been discharged from your facility in the past 4 weeks?*

1. In the table above, complete the column for "onset".

   (Options: "CO" – community-onset; "HO" – healthcare facility-onset; "CO-HCFA" – community-onset healthcare facility-associated)

2. The IP would like to determine which of these events will count in their facility's SIR. The last variable on this line list is the SIR indicator variable (FWCDIF_facIncHOCount). This variable should be either a "0" (not counted in the SIR), or a "1" (counted in the SIR) for each event. Complete this column in the table above.

3. Which events will be counted in the 2019 Q1 CDI SIR?

4. Enter the numerator of the SIR (answer from #2) into the formula below:

$$SIR = \frac{number\ of\ observed}{number\ of\ predicted}$$

$$SIR = \frac{\quad}{4.61}$$

5. The IP is concerned about the number of predicted events. To review the accuracy and quality of the SIR calculation, the IP decides to check the "Risk Adjustment Factors" table, which can be found in the NHSN analysis SIR report, beneath the SIR table. The results are shown below for 2019 Q1, as well as the prior two quarters, for comparison. Do you notice any potential data quality issues with the risk factors used in the 2019 Q1 SIR calculation? What additional steps could you take in NHSN to investigate this?

Summary YQ	CDI_COprevRate+	cdiTestType	numICUBeds	facType	numBeds	ED/OBS indicator	medType	numpatdays
2018Q3	0.054	NAAT	25	HOSP-GEN	50	1	M	1950
2018Q4	0.057	NAAT	25	HOSP-GEN	50	1	M	1890
2019Q1	**2.200**	**NAAT**	**25**	**HOSP-GEN**	**50**	**1**	**M**	**2055**

+ CDI_COprevRate: (# community-onset CDI events/# admissions)* 100

6. **BONUS**: How would the data quality issue(s) above impact the SIR?

ANSWERS (EXERCISE B)

Answer #1 and #2: see table below

PatID	Event ID	Pat Dis 4 wks	Location	Outpatient	Fac Admit Date	Specimen Date	Onset	cdiAssay	FWCDIF_facInc HOCount
AA12	4	Y	Medical ward	N	1/11/2019	1/11/2019	**CO-HCFA**	Incident	**0**
AA12	5	N	24-hr obs	Y	.	2/25/2019	**CO**	Recurrent	**0**
AA12	6	N	Medical ward	N	2/27/2019	3/2/2019	**HO**		**0**
CC34	7	N	ICU	N	2/1/2019	2/13/2019	**HO**	Incident	**1**
EE45	8	N	ED	Y	2/1/2019	2/1/2019	**CO**	Incident	**0**
EE45	9	N	Medical ward	N	3/15/2019	3/24/2019	**HO**	Recurrent	**0**
GG67	10	N	ED	Y	3/3/2019	3/3/2019	**CO**	Incident	**0**
JJ01	11	Y	ICU	N	1/8/2019	1/10/2019	**CO-HCFA**	Incident	**0**

Answer #3: Event ID # 7

Answer #4: Number of observed = 1

Answer #5: The Community-onset (CO) prevalence rate has drastically increased in 2019 Q1 compared to the prior quarters. We could review the CDI Rate Tables to confirm that the # of CO events and # of FacWideIN admissions (Row 3) were entered correctly for 2019 Q1. The prevalence rate data could also be reviewed using the LabID event Line List, Summary Data Line List, or by manual review of the FacWideIN denominator records.

Answer #6: CO prevalence rate is a continuous variable in the CDI SIR model, with a higher CO prevalence rate contributing to a higher number of predicted events, and subsequently a lower SIR.