# Validation of CY 2017 Central Line-Associated Bloodstream Infection

# (CLABSI) in Maine Hospitals

# Conducted on behalf of the Maine Quality Forum

# FINAL REPORT



John Snow, Inc.

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# ACKNOWLEDGMENTS

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## Validation conducted and report written by:

Priscilla Davis MHA

Paddy Dipadova MBA

Amy Cullum RN, MA, MPH, MSN

Nancy Reinhalter RN, CCRC

and

Laureen Kunches MPH, MSN, PhD

Validation of Maine Acute Care Hospitals

Central Line-Associated Bloodstream Infection (CLABSI) Reporting for 2017

## INTRODUCTION

In an effort to support the healthcare associated infection reporting requirements described in 90-590 CMR Chapter 270, UNIFORM REPORTING SYSTEM FOR QUALITY DATA SETS, and the State of Maine Healthcare Associated Infections Plan 2015-2018, the Maine Quality Forum (MQF), the state agency responsible for monitoring and improving the quality of health care in the State of Maine, has contracted with John Snow, Inc. (JSI), to conduct external validation of calendar year 2017 Central Line-Associated Blood Stream Infection (CLABSI) data.

90-590 CMR Chapter 270, requires Maine hospitals to submit data quarterly to the Maine Health Data Organization for central line-associated blood stream infection rates for patients in intensive care units, medical units, surgical units, medical/surgical units and for high-risk nursery patients. To minimize the administrative burden of reporting this data to both a federal repository and the MHDO, MHDO has agreed to access the data from the federal repository, the National Healthcare Safety Network (NHSN),

The purpose of the external validation is to verify the completeness and accuracy of the calendar year 2017 CLABSI data submitted to NHSN, and to identify potential areas for improving the reporting process.  MQF manages this contract in collaboration with the Maine Center for Disease Control and Prevention (Maine CDC).

## *The problem:*

## Healthcare Associated Infections (HAIs) may occur during the course of healthcare treatment for other conditions. They can be transmitted in hospitals, nursing facilities and rehabilitation centers as well as outpatient surgery centers, dialysis centers, community clinics and other healthcare settings. They may also occur during the course of treatment at home.

## Four infections together account for nearly half (47%) of all HAIs across the U.S.: Surgical site infections; Catheter-associated urinary tract infections; Central line-associated bloodstream infections; and Ventilator-associated pneumonia. HAIs are caused by a wide variety of common and unusual bacteria, fungi, and viruses. The most serious HAI threats result from the emergence of difficult-to-treat, drug-resistant bacteria. The federal Centers for Disease Control and Prevention (CDC) currently estimates the U.S. has 23,000 deaths each year due to antibiotic-resistant bacteria. The emergence of drug-resistant bacteria is accelerated by the widespread overuse and misuse of antibiotics. Curbing antibiotic misuse has gained growing attention in Maine and nationally.

## Refer to the most recent 2018 Annual Report of HealthCare Associated Infections in the State of Maine, submitted by the Maine Quality Forum for detailed information on the state of healthcare associated infections in Maine by Maine hospitals; and on the statewide activities that are underway to prevent healthcare associated infections,

## <https://mhdo.maine.gov/_mqfdocs/2018%20HAI%20Annual%20Report%20FINAL.pdf>

Purpose of External Validation:

*The purpose of this external validation is to verify the completeness and accuracy of the CLABSI data submitted to the National Healthcare Safety Network (NHSN), and to identify potential areas for improving the reporting process.*

CDC’s National Healthcare Safety Network (NHSN), the nation’s most comprehensive medical event tracking system, is currently utilized for tracking HAIs and other related measures by more than 23,000 U.S. healthcare facilities. [[1]](#footnote-1)  NHSN provides stable and timely data to guide prevention efforts aimed at protecting patients. In recent years, Medicare payments to hospitals have been tied to HAI reporting via NHSN. Consequently, CDC and CMS have emphasized that accurate and complete reporting through strict adherence to the NHSN definitions is critical. [[2]](#footnote-2)

To this end, CDC has recommended that states use available resources to validate the completeness and accuracy of HAI reporting, recognizing that the definitions are complex and the intensity of HAI surveillance can vary between facilities. External validation is also considered an important educational opportunity for a hospital’s Infection Prevention and Control Department as it is a way to measure their adherence to mandated reporting requirements.

## METHODS

The CLABSI validation approach included components described in the *National Healthcare Safety Network (NHSN) External Validation Guidance and Toolkit* for 2017. [[3]](#footnote-3) Facility selection was targeted to prioritize validation of hospitals where CLABSIs are most expected. Maine has 33 hospitals eligible for CLABSI validation and therefore followed the recommended approach for facility selection for a medium state. Eighteen hospitals were selected using a targeted facility ranking algorithm based on data reported to NHSN and an additional two hospitals were selected at random. Facility selection was conducted by the State of Maine HAI Coordinator.

The 20 selected hospitals were notified on June 19, 2018 concerning the upcoming validation and received instructions for securely submitting their laboratory data files to JSI. Each facility sent a data file securely to JSI, which contained all positive blood cultures from 2017 and included patient location, admission date, organisms identified, etc. Using NHSN data provided to JSI by the State HAI Coordinator, the reported CLABSI events for 2017 were identified and up to 20 of these per facility were selected for medical record review. An additional 40 patients were selected as unreported “candidate” CLABSIs, including an oversampling for neonatal intensive care unit patients (NICUs) when present; this affected three Maine facilities.

Candidate CLABSI selection was random but prioritized “targeted pathogens” including:

* + 1. *Candida spp*., *Torulopsis spp*. (yeast)
		2. *Enterococcus spp*.
		3. *Staphylococcus aureus* (includes MRSA, MSSA)
		4. Coagulase-negative staphylococcus (includes most staphylococcus spp. other than *S. aureus*, MRSA, MSSA)

5. *Klebsiella spp*., *E. coli*, or *Pseudomonas spp*. (common gram negatives)

A central line-associated bloodstream infection (CLABSI) is defined as, "a laboratory-confirmed bloodstream infection where [the] central line or umbilical catheter", had been in place for more than two days and the catheter was still in place on the day or day before the blood sample was taken.[[4]](#footnote-4) However, CDC’s sampling plan for CLABSI validation selects patients for medical record reviews without having information on the presence of a central line or the date of the culture with respect to admission date. As a result, many of the randomly selected patients have no central line or have bacteremia that is present on admission, which disqualifies them from meeting the definition of CLABSI.

Hospitals received the list of selected patients for review, with the goal of up to 60 per facility. In smaller hospitals, where the number of positive blood cultures was less than 40, all patients were treated as “candidate” CLABSIs and included in the review. Medical record access was arranged for on-site or remote reviews, including creating electronic data privacy agreements and other security requirements. Medical record reviews were completed between August and November 2018. Fourteen of the hospitals were visited by the JSI reviewers for on-site record reviews; six other facilities were validated using remote access and communication of information and documents. As recommended by CDC, all reviewers were blinded to the event status (i.e., whether the patient was reported to have a CLABSI) of the cases during the review. At the completion of the reviews, feedback discussions were held with the Infection Preventionists concerning any discrepancies. Validation of the denominator data (i.e. device days for central lines) will be done in conjunction with the catheter-associated urinary tract infection (CAUTI) validation planned for 2019.

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## RESULTS

Table 1 provides the details of the findings for the 20 facilities. As shown, a total of 729 records were reviewed, including 54 patients with reported CLABSI events. JSI did not identify any missed or over-reported CLABSI events from any facility. The Infection Preventionists were consulted on a small number of cases where there were potential disagreements and need for further clarification. Through these clarifications, agreement was ultimately reached without needing to consult with CDC through the NHSN support team.

**Table 1. Findings for Central Line-Associated Bloodstream Infection (CLABSI) in Patients of 20 Maine Acute Care Facilities**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Facility** | **Cases Reviewed** | **Correctly reported events**  | **Missed Events** | **Over-reported Events** |
| Blue Hill Memorial Hospital\* | 10 | 0 | 0 | 0 |
| Bridgton Hospital\* | 40 | 0 | 0 | 0 |
| Cary Medical Center | 40 | 0 | 0 | 0 |
| Central Maine Medical Center | 45 | 5 | 0 | 0 |
| Down East Community Hospital\* | 3 | 0 | 0 | 0 |
| Eastern Maine Medical Center | 59 | 19 | 0 | 0 |
| Franklin Memorial Hospital | 41 | 0 | 0 | 0 |
| Houlton Regional Hospital | 40 | 0 | 0 | 0 |
| Maine General Medical Center | 46 | 6 | 0 | 0 |
| Maine Medical Center | 60 | 20 | 0 | 0 |
| Mayo Regional Hospital\* | 28 | 0 | 0 | 0 |
| Mercy Hospital\* | 40 | 0 | 0 | 0 |
| Mid Coast Hospital | 42 | 1 | 0 | 0 |
| Penobscot Bay Medical Center | 40 | 0 | 0 | 0 |
| Sebasticook Valley Hospital\* | 3 | 0 | 0 | 0 |
| SMHC Biddeford Medical Center | 40 | 0 | 0 | 0 |
| St. Joseph Hospital | 32 | 3 | 0 | 0 |
| St. Mary's Regional Medical Center | 40 | 0 | 0 | 0 |
| The Aroostook Medical Center | 40 | 0 | 0 | 0 |
| Waldo County General Hospital | 40 | 0 | 0 | 0 |
| **TOTAL** | **729** | **54** | **0** | **0** |
| \*Reviewed remotely |  |  |  |  |

## SUMMARY OF FINDINGS

 The findings of the audit are as follows:

* JSI has confirmed that CLABSI was correctly identified and reported to NHSN 100% of time in 2017 by the 20 Maine hospitals that participated in the external audit.
* Based on the validation, staff knowledge of the NHSN definitions appears to be high and surveillance methods are comprehensive.
* The diligent efforts of all parties involved in training, implementing, monitoring, and evaluating the CLABSI surveillance are clearly producing high quality results.
1. 2015 National and State HAI Data Report. <https://www.cdc.gov/hai/data/archive/2015-HAI-data-report.html> [↑](#footnote-ref-1)
2. Adherence to the Centers for Disease Control and Prevention’s (CDC’s) Infection Definitions and Criteria is Needed to Ensure Accuracy, Completeness, and Comparability of Infection Information. <https://www.cdc.gov/nhsn/cms/cms-reporting.html> [↑](#footnote-ref-2)
3. <https://www.cdc.gov/nhsn/pdfs/validation/2017/2017-nhsn-ev-guidance.pdf> [↑](#footnote-ref-3)
4. <https://www.cdc.gov/hai/bsi/clabsi-resources.html> [↑](#footnote-ref-4)