Table B.24: Clostridioides *difficile,* Surveillance–Single Studies

Note: Full references are available in the [Section 4.4 reference list](#Section4point4refs).

| Author, Year | Description of Patient Safety Practice | Study Design;Sample Size;Patient Population | Setting | Outcomes: Benefits | Outcomes: Harms | Implementation Themes/Findings | Risk of Bias (High, Moderate, Low) | Comments |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Albert et al., 201832** | Reporting cases of healthcare facility-onset CDI (HO CDI) using the National Healthcare Safety Network (NHSN) CDI laboratory-identified (LabID) event definition. | Assessment of accuracy of facility reporting of HO CDI to NHSN. Retrospective chart review was performed on 212 NHSN LabID HO-CDI cases. The electronic medical record for each case was reviewed for various clinical events that contributed to *C. difficile* testing. The presence of fever, abdominal pain, and diarrhea was recorded from each case along with the timing and duration of symptoms. | A large urban medical center  | Not provided | Study found only 62% of reported HO-CDI cases met clinical surveillance criteria. Of the reported HO-CDI cases, review of charts found that 13.6% were CA-CDI, 2.8% were recurrent, 1.9% were asymptomatic colonization, 18.4% were symptomatic colonization, 38.7% were possible HO CDI, and 24.5% were probable HO CDI. Within 24 hours of testing, 34.1% had received a stool softener and/or laxative. | Laxative use and failure to identify community-onset infection may contribute to misclassification of HO CDI. Many reported HO-CDI cases involved patients with underlying medical conditions that may mimic symptoms of CDI, highlighting challenges in distinguishing colonization from active disease. Of the reported HO-CDI cases, 103 had documentation of inflammatory bowel disease, chemotherapy, tube feedings, or gastrointestinal bleeding. | Moderate—small sample; chart review is imperfect. | Study about errors in classification/ reporting of CDI to NHSN. An intervention was not tested.  |
| **Benoit et al., 201129** | Electronic laboratory and admission-discharge-transfer data from BioSense, a national automated surveillance system.A total of 4,585 patients from 34 hospitals in 12 States had *C. difficile*–positive assay results. | Retrospective, multi-center cohort study; validation of surveillance system by comparison with other widely accepted surveillance results. | Thirty-four hospitals sending inpatient emergency department and/or outpatient data to BioSense. | Electronic laboratory data sent to the BioSense surveillance system were successfully used to produce disease rates of CDI comparable to those of other studies, which shows the feasibility of using electronic laboratory data to track a disease of public health importance. More than half (53.0%) of the cases were CO CDI, and 30.8% of these occurred in patients who were recently hospitalized. The overall rate of HO CDI was 7.8 cases per 10,000 patient-days, with a range among facilities of 1.52 to 7.8 cases per 10,000 patient-days. | Not provided | Laboratory codes and text-parsing methods were used to extract *C. difficile*–positive toxin assay results from laboratory data sent to BioSense from January 1, 2007, through June 30, 2008; these were merged with administrative records to determine whether cases were community-associated or healthcare onset. Although hospitals incur initial costs in capturing electronic data, the data are useful for tracking many diseases other than CDI. Few hospitals had LOINC- or SNOMED-coded laboratory test and result data, which emphasizes the need for widespread adoption of standard vocabularies to facilitate public health use of electronic data. | Low. Did not include CO CDI, because data were limited to certain health systems. Variability across hospitals in CDI onset type. The electronic data that were analyzed were not validated by comparison with hospital records. | BioSense is a national automated surveillance system operated by the Centers for Disease Control and Prevention (CDC) that receives, analyzes, and visualizes electronic health data for public health use. |
| **Dubberke et al., 201228** | Automated surveillance algorithm using electronically available data based on recommended surveillance definitions(Surveillance Definitions from CDC 2007) | Validation of an automated CDI surveillance algorithm, comparing the algorithm with chart review. A second chart review was performed for discordant results and determined to be the gold standard (the correct categorization). The study population included all adult patients ≥ 18 years of age admitted to four U.S. hospitals from July 1, 2005 to June 30, 2006. 1,767 patients with stool positive for *C. difficile* toxins were identified. | Four CDC Prevention Epicenter hospitals | A total of 1,767 patients had a positive *C. difficile* toxin test. Of these, 440 were CDI cases that the automated and chart review surveillance classified differently. The discordant cases were re-reviewed. The overall sensitivities, specificities, and kappa values of the algorithm by CDI onset compared with the gold standard: hospital onset: 92%, 99%, and 0.90; community onset, study facility–associated: 91%, 98%, and 0.84; community onset, other healthcare facility–associated: 57%, 99%, and 0.65; community onset, community associated: 96%, 94%, and 0.69; indeterminate cases: 80%, 98%, and 0.76; and recurrent cases: 94%, 99%, and 0.94. | The algorithm did not have good agreement with chart review for hospital-onset CDI for hospital B.Community-onset and other healthcare facility– associated CDI showed a wide range of sensitivities (16% to 96%) and kappa values (0.25 to 0.93). Similar trends were seen for community-onset, community-associated, and indeterminate CDI. | Previous research indicates electronic surveillance is more accurate and reliable than manual surveillance. Automated surveillance also requires less time, as it eliminates the need to do chart review, potentially allowing infection preventionists to devote more time to infection prevention efforts. Each hospital had to individualize the algorithm to their facility.Electronic surveillance requires access to an electronic health record (EHR) system.  | Low to moderate. Each hospital had different data available. For example, Hospitals A, B, and C did not have discrete data on where a patient was admitted from (e.g., admitted from home, long-term care facility), whereas hospital D did. | Study found that electronic surveillance performed better than chart review in identifying the types of onset of CDI.  |
| **Dubberke, 201035** | ICD-9 code- based hospital-onset *Clostridium difficile* infection surveillance | Validation of ICD-9 codes for CDI surveillance (by comparison with toxic assay results). HO-CDI cases were identified at five U.S. hospitals between July 2000 and June 2006 using two surveillance definitions: positive toxin assay results (gold standard) and secondary ICD-9 diagnosis codes for CDI. Chi-square tests were used to compare incidence rates, linear regression models were used to analyze trends, and the test of equality was used to compare slopes.A total of 930,692 hospital discharges during the 6-year study period. | Five U.S. academic medical centers—MO, MA, OH, UT, IL.All study hospitals participated in the CDC Epicenter Program. | Of 8,670 hospital-onset CDI cases, 38% were identified by both toxin assay and ICD-9 code, 16% by toxin assay alone, and 45% by ICD-9 code alone. Nearly half (47%) of CDI cases identified by ICD-9 code alone were community-onset cases by toxin assay. The hospital-onset CDI rate was significantly higher by ICD-9 codes compared with toxin assays overall (p <0.001), as well as individually at three of the five hospitals (p <0.001 for all). The agreement between toxin assays and ICD-9 codes was moderate, with an overall kappa value of 0.509 and hospital-specific kappa values that ranged from 0.489 to 0.570. Overall, the annual increase in CDI incidence was significantly greater for rates determined by ICD-9 codes than by toxin assays (p=0.006). | Although ICD-9 codes appear to be adequate for measuring the overall CDI burden, use of the *C. difficile* ICD-9 code without present-on-admission classification is not an acceptable surrogate for hospital-onset CDI surveillance. | While ICD-9 codes may be an adequate surrogate for tracking the overall CDI burden, they may be less useful for tracking HO-CDI incidence compared with toxin assay results. In the future, present-on-admission codes—which became mandatory for Medicare patients discharged on or after October 1, 2007 (i.e., after the study period)—may add precision to ICD-9 code-based CDI surveillance. These codes might provide a mechanism to distinguish pre-existing conditions, and ultimately reduce misclassification of community-onset CDI cases. Discharge diagnosis codes reflect conditions diagnosed or treated during the entire admission, but do not give information regarding the location or date of CDI onset. | Low | ICD-9 codes significantly overreported the incidence of hospital-onset CDI compared with toxin assay results, and the degree to which this happened varied by year and by hospital. |
| **Durkin et al., 201531**  | National Healthcare Safety Network (NHSN) reporting of laboratory identified (LabID) *Clostridium difficile* infection (CDI) versus traditional surveillance methods.LabID: designed to use electronically captured laboratory data and hospital admission dates to determine hospital-onset (HO) versus community-onset (CO) surveillance categories. | Validation of LabID surveillance using a cohort study. A period of 6 months (January 1, 2013, to June 30, 2013) of prospectively collected data using both LabID and traditional surveillance definitions. A total of 1,252 incident LabID CDI events were identified during 708,551 patient-days. CDI events with mismatched surveillance categories between LabID and traditional definitions were identified and characterized further. Hospital-onset CDI (HO-CDI) rates for the entire cohort of hospitals were calculated using each method, then hospital-specific HO-CDI rates and standardized infection ratios (SIRs) were calculated. Hospital rankings based on each CDI surveillance measure were compared. | A cohort of 29 community hospitals in the south-eastern United States | A total of 1,252 incident LabID CDI events were identified during 708,551 patient-days; 286 (23%) mismatched CDI events were detected. The overall HO-CDI rate was 6.0 versus 4.4 per 10,000 patient-days for LabID and traditional surveillance, respectively (p <0.001); of 29 hospitals, 25 (86%) detected a higher CDI rate using LabID compared with the traditional method. | Hospital rank in the cohort differed greatly between surveillance measures. A rank change of at least five places occurred in 9 of 28 hospitals (32%) between LabID and traditional CDI surveillance methods.  | LabID surveillance resulted in a higher hospital-onset CDI incidence rate than did traditional surveillance. Hospital-specific rankings varied based on the HO-CDI surveillance measure used. A clear understanding of differences in CDI surveillance measures is important when interpreting national and local CDI data.Hospitals that adopt the LabID surveillance method should expect to observe higher HO-CDI incidence rates than with traditional surveillance.Mismatched cases between LabID and traditional surveillance that are due to delays in diagnostic testing may potentially penalize hospitals on publicly reported SIR measures. | Low | None |
| **Faires et al., 201424** | Outbreak investigation using the temporal scan statistic in a hospital | Case study. For patients detected with CDI from March 2010 to February 2011, stool specimens were obtained. *Clostridium difficile* isolates were characterized by ribotyping and investigated for the presence of toxin genes by PCR. CDI clusters were investigated using a retrospective temporal scan test statistic. Statistically significant clusters were compared with known CDI outbreaks within the hospital. A negative binomial regression model was used to identify associations between year, season, month, and rate of CDI cases. | A Canadian hospital | Overall, 86 CDI cases were identified. Eighteen specimens were analyzed and nine ribotypes were classified, with ribotype 027 (n=6) the most prevalent. The temporal scan statistic identified significant CDI clusters at the hospital (n=5), service (n=6), and ward (n=4) levels (p ≤ 0.05). Three clusters were concordant with the one *C. difficile* outbreak identified by hospital personnel. Two clusters were identified as potential outbreaks.  | Not provided | Application of the temporal scan statistic identified several clusters, including potential outbreaks not detected by hospital personnel. The identification of time periods with decreased or increased CDI rates may have been a result of specific hospital events. Understanding the clustering of infectious diseases, spatially or temporally, can help identify risk factors, facilitate detailed investigations to determine the association between exposures and disease interventions, and detect outbreaks. A commonly used statistical technique to detect disease clusters, the scan statistic has been used to investigate a wide array of infectious diseases or pathogens. | Low to moderate | None |
| **Gase et al., 201330** | NHSN surveillance versus clinical infection surveillance | 30 facilities collected 6 months of data using a clinical infection surveillance definition, while also submitting the NHSN LabID event for CDI. The datasets were matched and compared to determine whether the assigned clinical case status matched the LabID case status. A subset of mismatches was evaluated further, and reasons for the mismatches were quantified.  | 30 New York State acute care hospitals | A total of 3,301 CDI cases were reported. Analysis of the original data yielded a 67.3% (2,223/3,301) overall case status match. After review and validation, there was 81.3% (2,683/3,301) agreement. The most common reason for disagreement (54.9%) occurred because the symptom onset was less than 48 hours after admission but the positive specimen was collected on hospital day 4 or later. The NHSN LabID hospital-onset rate was 29% higher than the corresponding clinical rate. | Not provided | Use of the NHSN LabID event minimizes the burden of surveillance and standardizes the process. With a greater than 80% match between the NHSN LabID event data and the clinical infection surveillance data, the New York State Department of Health decided to use the NHSN LabID event CDI data for public reporting purposes. | Low | None |
| **Hardy et al., 201022** | Use of measure of period of increased incidence (PII) to identify clusters and trigger interventions | Case study. Observational 18-month study of 102 PIIs involving 439 patients. For January 2008 to September 2008, multiple interventions were implemented, with PCR ribotyping of isolates being carried out on those PIIs with more than 10 cases. From October2008 to July 2009, isolates from all PIIs were ribotyped 9.A PII was classified as an outbreak of CDI if there were two or more cases of the same PCR ribotype within a 28-day period.  | A large teaching hospital with a total of 1,800 beds at three different sites | During roughly 1.5 years of the intervention, the number of PIIs investigated per month decreased, from a peak of 14 per month in February 2008 to 1 in June 2009. In the first 9 months of the study, isolates were ribotyped on those PIIs with more than 10 cases; for the last 8 months of the study, isolates were ribotyped for all PIIs. In this case, an outbreak was defined as two or more cases of the same PCR ribotype within a 28-day period. In the final 8 months, ribotyping of the isolates confirmed nine (32%) of these PIIs to be outbreaks, with three being due to ribotype 027, two to ribotype 078, and all the others being distinct ribotypes. | Not provided | The current study aimed to preempt and prevent outbreaks of CDI from becoming established, as opposed to being reactive and trying to control CDI once an outbreak was evident. The early identification and notification of PIIs enabled actions to be prompt and targeted. The authors postulate that concentrating on selected PII wards reduced the potential environmental sources of CDI transmission to the rest of the hospital. | Low to moderate | None |
| **Jones et al., 201237** | ICD 10 data for CDI surveillance | Evaluation of ICD-10 codes for CDI surveillance. Retrospective data analysis; during 2000–2010, 317,040 hospitalizations. Laboratory results and/or the ICD-10 code for *C. difficile* infection were positive for 698 cases. | A 750-bed university-affiliated public hospital in Paris | Sensitivity of the ICD-10 code, with laboratory results as the standard, was 35.6% (95% CI, 31.9 to 39.5), and specificity was 99.9% (95% CI, 99.9 to 100.0). The positive and negative predictive values were 79.2% (95% CI, 73.9 to 83.7) and 99.9% (95% CI, 99.8 to 99.9). | The sensitivity of ICD-10 codes in this study is inferior to that of values previously reported in the United States (71%–78%) and in Singapore (49.6%). | Compared with use of laboratory results, use of ICD-10 codes to estimate incidence of *C. difficile* infection resulted in underestimates. The relationship between methods for yearly incidence during the 11-year period was strong. Low sensitivity could be due to poor coding.  | Low | None |
| **Lavan et al., 201223** | Monitoring CDI in an acute hospital with limited resources/ technology: prevalence or incidence studies? | Comparison of two CDI surveillance methods (incidence and prevalence). Prevalence of CDI, antibiotic use, and associated co-morbidity was assessed weekly on two wards over 6 weeks. In addition, CDI incidence surveillance was performed on all new CDI cases over a 13-week period. Cases were assessed for CDI risk factors, disease severity, response to treatment, and outcome at 6 months. A prospective Microsoft Excel database was created. Fisher’s test was used for comparisons between count data, and continuous variables were assessed with two-sample t-test or Mann–Whitney test for nonparametric data. | Two wards in an acute hospital, Ireland | *Clostridium difficile* infection prevalence was 3.5% (range 2.9% to 6.1%) on the medical ward and 1.1% (range 0 to 3.5%) on the surgical ward. In the context of the study, it took, on average, 25 minutes per ward per week to measure prevalence. The workload to calculate incidence amounted to an average of 2.15 hours per day in the current study and depended on the number of ongoing cases. In contrast to the prevalence study, the incidence study was able to provide data on risk factors, symptoms, treatment, and patient outcomes. | Not provided | The studies were done without sophisticated technology—case counting and Excel spreadsheets were used. CDI prevalence surveillance gives a broad overview of CDI, and pointed to areas that required more-detailed surveillance and required little time. However, patient-based CDI incidence surveillance provided a more useful analysis of CDI risk factors, disease, and outcomes for planning preventive programs and focusing antibiotic stewardship efforts. | Low to moderate | None |
| **Quan et al., 201512** | A system for MDROs and *C. difficile* tracking that automated the following three main surveillance and tracking activities: monitoring microbiology results and initiation of chart-based flags, ordering contact precautions on admission, and ensuring appropriate removal of precautions. | Quasi-experimental before-and-after study. In 2012, the system automatically reviewed daily positive laboratory results for 110,212 patient-days and cross-checked these results with historical MDRO and *C. difficile* flags, to determine whether 2,375 positive results represented incident cases. | A 410-bed tertiary care academic medical center | Automation saved 43 infection preventionist hours per 1,000 admissions (850 hours of infection preventionist time annually). It also saved previously unquantified hours spent reviewing MDRO history for every admission. Automatic retiring of certain MDRO flags ensured removal of contact precautions after a specified time. A point-prevalence assessment of eligibility for discontinuation found that all precautions were appropriate, with none of them eligible for removal.  | Not provided | Automated tracking useful for determining when to start/ discontinue contact precautions/ put patients in single person rooms. When the EHR system detected a finalized positive laboratory test result, it automatically checked whether an organism-specific flag was already present and added the flag if needed. For *C. difficile* specifically, because precautions are based on diarrheal symptoms, any readmission within 60 days of an initial flag resulted in an automated order for precautions. Discontinuation criteria were displayed for review when physicians attempted to discontinue a precaution order. | Low to moderate | Automated ordering prevented missed precautions, which might be caused by errors, such as admitting providers not noticing a flag, or healthcare workers missing history of infection on manual review. |
| **Saeed et al., 201818** | *Clostridium difficile* multidisciplinary team root cause analysis (MDT-RCA) (vs. on-the-spot investigation) of a breached case | Investigation of the financial impact of MDT-RCAs to the Trust. Methodology: over 2 years, the MDT-RCA forum reviewed 84 hospital-onset CDI cases. HFT serves a population of approximately 600,000.  | Three hospitals in UK totaling over 850 beds  | In total, 543 staff attended the MDT-RCAs at a potential cost to the Trust of £23,795.74 to £51,670.10. Over 24 months, the Trust had appealed against financial penalties for 27 cases, and 14 appeals were successful. This suggests that £140,000 would have been avoided had 14 cases not breached hospital CDI case targets. (Hospital groups, i.e., trusts, are required to demonstrate year-on-year reductions in CDI cases. Breaches of *C. difficile* targets—in this case, 37 cases for the first year— incur financial penalties to the Trust to the value of £10,000 per case.) After the appeal, only two cases breached the threshold.  | In the end, targets were breached by only two cases, meaning £20,000 in fines was avoided. Deducting this from the total costs of the MDT-RCA meant the Trust lost £3,795.74 to £31,670. | Over the 2 years reviewed, the MDT-RCA proved to be costly to the Trust, with “no additional learning or quality improvement measures identified.”Key learning themes from the 84 cases: the delay in isolating symptomatic patients and the delay in sending stool samples to the laboratory. Concerns were also raised with lack of documentation, such as the clinical and nursing teams not completing the *C. difficile* care pathway and diarrhea and vomiting risk assessment. One possible benefit of the MDT-RCA meetings may have been heightening the awareness of CDI among staff that attended. | Low to moderate  | Touches on issues of financial penalties for “preventable” CDI cases.Article is about financial implications of RCA specific to the commission-ing groups in the UK.  |
| **Schlackow et al., 201241** | Biomarker- based surveillance: automated electronic systems providing early warning of the changing severity of infectious conditions. Iterative sequential regression (ISR)-based severity monitoring. | Assessed the generalizability of ISR-based severity monitoring. Study of 5,551 toxin-positive and 20,098 persistently toxin-negative patients tested for CDI between February 1998 and July 2009, in a group of hospitals. Investigated 28-day mortality and biomarkers of inflammation collected at diagnosis using ISR, a novel join point-based regression technique. Assessed the generalizability of ISR-based severity.  | A group of UK hospitals | ISR-based severity monitoring allowed the detection of the severity change years earlier than mortality monitoring. Among *C. difficile* toxin-positive patients in the Oxford hospitals, mean neutrophil counts on diagnosis increased from 2003, peaked in 2006–2007, and then declined; 28-day mortality increased from early 2006, peaked in late 2006–2007, and then declined. Molecular typing confirmed these changes were likely due to the ingress of the globally distributed severe *C. difficile* strain, ST1. Strong associations found between isolation of the ST1 severe strain and higher neutrophil counts at diagnosis in two unrelated large multi-center studies. Similar trends were  | One concern is feasibility. The samples used to predict severity were routinely collected and came from inpatients. Although in many hospitals in high-income countries, such samples are taken in most admissions, this may not be the case in lower resourced settings. | General methods of detecting changing virulence that would permit early recognition and control, and optimal management of such threats, would be highly desirable.The studied method requires that there be at least one routinely collected biomarker associated with disease-related mortality for each target condition. Researchers envisage that initially a number of potential severity markers could be investigated for each infection—retrospectively, using historical data if available, or prospectively, based on routine electronic databases. Comparing historical data with mortality retrospectively, and/or investigating any ‘‘signals’’ prospectively, would identify which biomarkers were most useful for passive severity monitoring. | Low to moderate | None |
| **Schmiedeskamp et al., 200936** | Use of ICD-9 codes and use data to identify nosocomial CDI (vs. ICD-9 code alone) | Validation sample cross-sectional study. Laboratory and medical records were queried to identify symptomatic CDI toxin–positive adult patients with nosocomial CDI and were compared with records of patients whose cases were predicted to be nosocomial by means of ICD-9-CM code and CDI therapy data. Administrative claims data from July 1, 2004, to June 30, 2005, were queried. Population/sample size: 23,920 adult patients discharged from the hospital. | An academic health center in Virginia | The sensitivity of the ICD-9-CM code alone for identifying nosocomial CDI was 96.8%. The specificity was 99.6%, the positive predictive value was 40.8%, and the negative predictive value was 100%. When CDI drug therapy was included with the ICD-9-CM code, the sensitivity ranged from 58.1% to 85.5%, specificity was virtually unchanged, and the range in positive predictive value was 37.9% to 80.0%. | Combining the ICD-9-CM code for CDI with drug therapy information increased the positive predictive value for nosocomial CDI, but decreased the sensitivity. | Beginning October 1, 2008, the Centers for Medicare & Medicaid Services required hospitals to indicate which diagnoses were present on admission. The method proposed in this investigation should be useful to help determine the post-admission day that nosocomial CDI became evident. A limitation in using ICD-9-CM codes to identify CDI is the inability to determine which cases are nosocomial, because ICD-9-CM codes are assigned to all patients with CDI at any time during hospitalization. | Low to moderate  | The purpose of this study was to determine whether combining the ICD-9-CM code with medication treatment data for CDI in hospitalized patients could be used to distinguish between patients with nosocomial CDI and patients who were admitted with CDI. |
| **Truong et al., 201733** | Real-time electronic tracking of diarrheal episodes and laxative therapy for verification of *Clostridium difficile* clinical testing criteria | A quasi- experimental study from June 22, 2015, to June 30, 2016, on consecutive inpatients with *C. difficile* test orders; 2,321 cancelled *C. difficile* test orders  | An academic hospital | Use of *C. difficile* testing decreased upon implementation from an average of 208.8 tests to 143.0 tests per 10,000 patient-days (p<0.001). HO-CDI incidence rate decreased from an average of 13.0 cases to 9.7 cases per 10,000 patient-days (p=0.008). | Not provided | Real-time electronic clinical data tracking is an effective tool for verification of *C. difficile* clinical testing criteria and safe reduction of inflated HO-CDI rates. Oral vancomycin days of therapy decreased from an average of 13.8 days to 9.4 days per 1,000 patient-days (p=0.009). Clinical complication rates were not significantly different in patients, with 375 canceled orders, compared with 869 episodes with diarrhea but negative *C. difficile* results. | Low | None |
| **Wilcox, et al., 201239** | Enhanced surveillance in England using the *Clostridium difficile* Ribotyping Network | Case study/system evaluation. Criteria used to assess the service include investigation of increases in the frequency of CDI cases (or high baseline rates) and increased severity, recurrence, complications, or mortality associated with CDI. A standardized request form for clinical and epidemiological data is used and is available via a web-based electronic requesting (and reporting) portal. | Regional, UK | Overall in England, mortality decreased, as did CDI incidence. In the first 3 years (2007 to 2010), the CDRN service processed 12,603 fecal specimens for culture and ribotyping. The average proportion of patients in England with reported CDI from whom samples were sent for ribotyping over the whole analysis period (2007 to 2010) was 10.8%. The reasons cited by requestors for referral to CDRN did not change over this time: case clusters (46% to 55%); unexplained increase in CDI rate (12% to 13%); and increased severity of symptoms (10% to 13%). | Not provided | Access to CDRN ribotyping is limited to several regional microbiology laboratories in England, which aim to provide timely access to C. difficile culture and ribotyping according to standardized criteria for submission of fecal samples. The target turnaround time for delivery of ribotyping results, is <2 weeks. There was a 61% reduction in reports of C. difficile in England (36,095, 25,604, and 21,698 in 2008 to 2009, 2009 to 2010, and 2010 to 2011, respectively). The reduction was coincident with the control of the epidemic C. difficile ribotype 027, which accounted for 55%, 36%, and 21% of samples submitted to CDRN in 2007 to 2008, 2008 to 2009, and 2009 to 2010, respectively.  | Low to moderate | Responding to a national public health need, the Health Protection Agency created the CDRN for England, as part of an enhanced surveillance program for C. difficile in 2007.  |