**Survey Responses**

 **Characteristics of Respondents**

|  |  |  |
| --- | --- | --- |
|  | **No.** | **%** |
| SRN members surveyed | 95 | - |
| Responded | 50 | - |
| Location |  |  |
|  United States or Canada | 46 | 92 |
|  International | 4 | 8 |
| Institution type |  |  |
|  Academic medical center | 25 | 50 |
|  Community hospital | 12 | 24 |
|  VA hospital | 3 | 6 |
|  Public hospital | 2 | 4 |
|  Federal non-military hospital | 1 | 2 |
|  Other adult/pediatric acute care hospital | 4 | 8 |
|  Not specified | 3 | 6 |

|  |
| --- |
| **Question #1. Does your hospital have written indications or criteria for when to order *C. difficile* tests?** |
|

|  |  |  |
| --- | --- | --- |
| **Response** | **No.** | **%** |
| Yes | 40 | 80 |
| No | 8 | 16 |
| I don’t know | 1 | 2 |
| No response | 1 | 2 |

**Question #2. Please indicate the content addressed in the written indications or criteria. Select all that apply.**

|  |  |  |
| --- | --- | --- |
| **Response** | **No.** | **%1** |
| Test only patients with symptoms consistent with *C. difficile* infection.  | 39 | 98 |
| Do not order *C. difficile* tests on asymptomatic patients. | 33 | 83 |
| Do not order multiple *C. difficile* tests in positive patients within the same diarrheal episode. | 37 | 93 |
| Do not order *C. difficile* tests on patients using laxatives. | 37 | 93 |
| Risk factors for *C. difficile* infections | 11 | 28 |
| We cover other topics.2 | 5 | 13 |

1. Denominator is 40, the respondents from Question #1 who indicated that their hospital has indications or criteria for when to order *C. difficile* tests.2. Other topics reported: “Asymptomatic admission screening for all adult patients”; “no repeat testing in 7d interval”; “avoid testing in infants”; “More aggressively seek testing within first 48 hrs. higher threshold after 96 hrs. order EIA and GH first”; “r/o other causes of diarrhea first in non-critically ill patients”; “Do no test for cure.”**Question 3. Please indicate if your institution has implemented training related to *C. difficile* testing for the following groups.1 Select all that apply.**

|  |  |  |
| --- | --- | --- |
| **Response** | **No.** | **%** |
| Nurses | 40 | 80 |
| Attending physicians | 37 | 74 |
| Residents and fellows | 41 | 82 |
| Other trainees2 | 4 | 8 |
| Other staff3 | 2 | 4 |

1. 46 respondents (92%) reported training of at least one group of employees.2. Other trainees reported: medical students, pharmacy and physician assistant trainees3. Other staff reported: laboratory personnel**Question 4. Please indicate all of the different types of training related to *C. difficile* that are available at your hospital.1 Select all that apply.**

|  |  |  |
| --- | --- | --- |
| **Response** | **No.** | **%** |
| Web-based | 24 | 48 |
| In-person | 32 | 64 |
| Other types of training2 | 12 | 24 |

1. The same 46 respondents (92%) from Question 3 reported at least one type of training.2. Other types of training reported: “Order sets”; “email”; “email blast”; “phone”; “print”; “electronic dissemination of education materials”; “management guide, poster, cheat card for nurses”**Question 5. At your institution, is it mandatory to enter the indication(s) for *C. difficile* testing when placing an order in your Computerized Physician Order Entry (CPOE) or Electronic Medical Record (EMR) system?**

|  |  |  |
| --- | --- | --- |
| **Response** | **No.**  | **%** |
| Yes  | 11 | 22 |
| No | 32 | 64 |
| Don’t know | 1 | 2 |
| No response1  | 6 | 12 |

1. Two respondents indicated that they do not have a CPOE or EMR.**Question 6. When placing an order for *C. difficile* testing in your CPOE or EMR system, are there any best-practice advisories (or “pop up” messages) that appear related to the following? Select all that apply.**

|  |  |  |
| --- | --- | --- |
| **Response** | **No.**  | **%** |
| We do not receive any messages when placing *C. difficile* tests orders. | 16 | 321 |
| Respondent reported that users receive a message | 31 | 621 |
| We receive a message that states that the laboratory will only test unformed stool for *C. difficile*. | 18 | 582 |
| We receive a message that discusses signs and symptoms of *C. difficile* infection. | 14 | 452 |
| We receive a message that discusses avoidance of repeat testing. | 21 | 682 |
| We receive a message that discusses avoidance of *C. difficile* testing in patients using laxatives. | 28 | 902 |
| We receive a message, but it has different content.3  | 3 | 102 |
| No response | 3 | 61 |

1. Denominator is 50, the total number of respondents.2. Denominator is 31, the number of respondents who indicated that a message appears when placing an order for *C. difficile* testing.3. Other message topics reported: “not allowed to repeat neg less than 7 days; or positive less than 30 days.”; “call ID if ordering the test on kids <2 yrs”; “Avoid testing in infants <12 months”; “At least 3 liquid stools in last 24 hours”**Question 7. When placing an order for *C. difficile* testing in your CPOE or EMR system, are there any “hard stops” that may prevent you from ordering the test? Select all that apply.**

|  |  |  |
| --- | --- | --- |
| **Response** | **No.** | **%** |
| No, we do not have any “hard stops” that prevent us from ordering *C. difficile* testing. | 34 | 681 |
| Respondent reported that a hard stop is used | 14 | 281 |
|  It is based on concurrent laxative use.  | 8 | 572 |
|  It is based on repeat *C. difficile* testing.  | 11 | 792 |
|  It is based on another parameter.3 | 2 | 142 |
| No response | 2 | 41 |

1. Denominator is 50, the total number of respondents.2. Denominator is 14, the number of respondents who indicated that their CPOE or EMR uses a hard stop.3. Other parameters used for hard stop: “< 3 diarrheal stools in past 24 h”; “after 3rd hospital day”**Question 8. Does your laboratory reject stool samples submitted for *C. difficile* testing based on the following?**

|  |  |  |
| --- | --- | --- |
| **Response** | **No.** | **%** |
| Our laboratory never rejects stool submitted for *C. difficile* toxin testing. | 4 | 81 |
| Respondent reported that laboratory has criteria for rejecting stool submitted for *C. difficile* testing | 45 | 901 |
| Our laboratory rejects formed stool for *C. difficile* testing.  | 44 | 982 |
| Our laboratory rejects *C. difficile* test requests based on other criteria.3 | 11 | 242 |
| No response | 1 | 21 |

1. Denominator is 50, the total number of respondents.2. Denominator is 45, the number of respondents who indicated that their laboratory rejects stool samples submitted for*C. difficile* testing based on established criteria.3. Other laboratory-based rejection criteria: “sooner than 7 days”; “no repeat test within 7 days of a negative or 30 days of a positive result without prior authorization”; “repeat testing with a prior positive during the same hospitalization”; “laxative use in 48 hours, less than 3 unformed stools in 24 hours before test ordered, repeat testing within 7 days for past negative and 14 days past positive test”; “repeat testing within 1 week”; “bristol stool chart”; “if tested <7 days without discussion with microbiology; “Age <3, test within 4 days, positive within 2 weeks”; “repeat within 7 days”; “laxatives, enema”; “Age <= 1, positive test with 14 d, negative test within 4 d”**Question 9. What kind of test(s) does your laboratory offer for routine *C. difficile* testing? Select all that apply.1**

|  |  |  |
| --- | --- | --- |
| **Response** | **No.** | **%** |
| Single test, *C. difficile* toxin NAAT (ex. PCR, microarray) | 25 | 50 |
| Single test, *C. difficile* toxin NAAT as part of a GI panel | 7 | 14 |
| Single test, *C. difficile* toxin EIA  | 1 | 2 |
| Single test, cell cytotoxin neutralization testing | 2 | 4 |
| Single test, Other | 1 | 2 |
| Multi-step algorithm1 | 25 | 50 |

1. GDH/Toxin A&B combination assay reflexed to NAAT when discrepant (n=13); NAAT reflexed to EIA when NAAT is positive (n=8); other algorithm (n=4)**Question 10. Do *C. difficile* test reports (issued by the laboratory) contain any special guidance to clinicians about interpretation of positive results?**

|  |  |  |
| --- | --- | --- |
| **Response** | **No.** | **%** |
| Yes | 18 | 36 |
| No | 31 | 62 |
| I don’t know | 1 | 2 |
| No response | 0 | 0 |

**If yes, please describe the guidance**

| **Reported testing method** | **Guidance** |
| --- | --- |
| GDH/Toxin A&B combination assay reflexed to NAAT when discrepant | “Specifies if PCR (+) or toxin (+) and discuss potential that PCR (+) result reflects colonization.”  |
| NAAT reflexed to EIA when NAAT is positive | “Describes that PCR +, toxin negative require clinical judgement as far as need for treatment.” |
| Single test, *C. difficile* toxin NAAT | “Special precautions (we call them contact plus)…” |
| GDH/Toxin A&B combination assay reflexed to NAAT when discrepant | “When GDH is positive and toxin EIA is negative, and PCR is positive, the result comes with a disclaimer that this could represent either colonization with a toxigenic strain that is not actively producing toxin, or true CDI but with a toxin concentration that is low given the poor sensitivity of toxin EIA.” |
| NAAT reflexed to EIA when NAAT is positive | “NAAT+, EIA - = ‘likely colonization’; NAAT+, EIA+ = ‘likely infection’; ASP reviews and advises on all test results.” |
| NAAT reflexed to EIA when NAAT is positive | “Clinical judgement on PCR+/EIA- samples” |
| Other algorithm (“GDH🡪PCR🡪toxin”) | “language about colonization vs disease” |
| NAAT reflexed to EIA when NAAT is positive | “The NAAT (+), EIA (-) results: clinicians advised to use clinical judgment in determining whether to treat.” |
| GI panel | “For our full GI panel, there is a comment that it should be interpreted in conjunction with clinical laboratory and epidemiology data. The microorganism detected may not be the definite cause of the disease. Positive tests on the GI Panel do not rule out infection with organisms not included in the GI Panel. The panel is not meant to be a test of cure. Contact plus isolation is needed if the patient is symptomatic.”  |
| NAAT reflexed to EIA when NAAT is positive | “NAAT+/Tox- could represent colonization. Consider ID consultation.” |
| NAAT reflexed to EIA when NAAT is positive | “Instructions re: interpretation of toxin negative PCR positive stools” |
| GDH/Toxin A&B combination assay reflexed to NAAT when discrepant | “must be graded bristol 6 or 7. assess use of antibiotics, laxatives and signs and symptoms of C diff infection. Since all active infection should have a + GDH, then Toxin +/GDH- will be reported as indeterminate regardless of the PCR result. The provider should interpret these results and consider repeat collection and testing if clinically appropriate. GI BioFire results will NOT have C diff results reported.” |
| GDH/Toxin A&B combination assay reflexed to NAAT when discrepant | “For GDH+,Toxin-, NAAT +, it provides some guidance on how most of these represent colonization and clinical correlation is required.”  |

**Question 11. Please indicate how your antimicrobial stewardship program (ASP) acts on positive *C. difficile* test results. Select all that apply.**

|  |  |  |
| --- | --- | --- |
| **Response** | **No.** | **%** |
| Our ASP does not monitor or act on positive *C. difficile* test results. | 25 | 501 |
| Respondent reported at least one activity3 | 24 | 481 |
| Our ASP monitors positive *C. difficile* test results. | 5 | 212 |
| Our ASP performs audit and feedback on positive *C. difficile* test results.  | 17 | 712 |
| Our ASP acts on positive *C. difficile* test results in a different way. | 4 | 172 |
| No response | 1 | 21 |

1. Denominator is 50, the total number of respondents.2. Denominator is 24, the number of respondents who indicated that their antimicrobial stewardship program acts on positive *C. difficile* test results.3. Reported ASP activities based on positive *C. difficile* test results: “AMT is part of a multidisciplinary task force which includes ID, Infx Control, HKSP, IT, many others. Their role was to assist teams to minimize use of empiric abx regimens that are more likely to 'promote' cdiff and to assist teams to narrow abx regimens as quickly as medically safe/appropriate.” “IP&C team (not ASP) reviews all hospital-onset C. difficile cases to assess for appropriateness of testing and provides feedback to clinical team when inappropriate testing is found.”“Surveillance of test results is monitored by Infection Prevention and Control rather than ASP. But we are in the midst of developing a new clinical pathway for CDI that ASP is helping lead. In addition, our ASP reviews the C. difficile surveillance data and develops interventions to address high-risk antibiotic use based on the data” “Ensures appropriate treatment is given” “When we went live with admission screening, the ASP team followed up with each team to remind them that asymptomatically - colonized patients don't need treatment and to encourage them to stop unneeded PPIs, etc. This was a very low-value intervention, and we subsequently improved our BPA and other clinical decision support rules” “We perform root cause analysis for any hospital onset C. diff in which both infection control and antibiotic prescribing practices are reviewed” “ASP gives feedback regarding appropriate treatment. HE/IP gives feedback when patient did not meet criteria for testing and was tested anyway”“ASP is working with the infection preventionists who are assisting in real time.”“surveillance of C. difficile done on a monthly basis. Feedback on rates to the clinical teams and HICC”“HO Cdiff data is routinely reported to ASP. Action plans evolve depending on results.”**Question 12. Please describe any other strategies that your institution has used to optimize *C. difficile* testing.** “We review pending tests >24 hours and consider canceling if no clinical indication”“Built 'dynamic order panel' in Epic, sequentially incorporating recent test results, laxatives administered within 48 hours and 24 hour stool count. Panels fire sequentially if the conditions apply and require the ordering provider to either contact lab for approval, recommend d/c laxative and delay testing, or attestation from that the patient meets stool frequency / consistency criteria before the final test order panel will become available.”“We report the C. difficile surveillance data at every one of our monthly Infection Prevention committee meetings (with clinicians present) and discuss testing as part of those conversations.”“Currently ordering note with hard stop and NAAT followed by EIA for positives”“Planning for hard stop. Lab rejects unformed samples or repeat test in 7 days, but not a pop up or alert in EMR.”“All requests for c diff testing after 3 days inpt stay are reviewed by id physician before being the test is done by lab”“Feedback to clinicians after positive tests for patients who do not appear clinically to have C. difficile diarrhea.”“Lab based criteria leading to canceling test if doesn't meet evidence based criteria for appropriate specimen type”“Lab and Infection Prevention Dept monitor for testing outside of guidelines/contraindications”“Admission screening for all adults and for select peds patients (stem cell transplant, neuroblastoma)”“Switch from NAAT-only to 2-step algorithm”“BioFire C diff results are hidden. We have stopped reporting them.”“We have integrated a testing check list into our nursing workflow. If an order is placed for C diff, the bedside nurse will run the checklist to determine if it is appropriate. If it isn't appropriate, they'll speak with the ordering clinician and/or have the charge nurse evaluate the situation.”“Clinical guidelines/education accessible via website”“Much of the attention is placed on continued override of best practice alerts.”“Reminders and audit and feedback on when to order, and when to treat”“Regular training to staff on criteria for sending samples to the lab, interpretation of reports and managing infection control issues”“When place C diff order in EMR, must answer 2 questions:Has patient had a laxative within past 24 hrs? Has patient had at least 3 unformed stools within past 24 hrs?”“Education to physicians and nurses, Routine feedback of SIR at IC Comm, Medical Exec Comm, daily safety huddle”**Question 13. In general, have the interventions that have been implemented at your institution to optimize *C. difficile* ordering and testing helped to *reduce and/or control your reported C. difficile rates*?**

|  |  |  |
| --- | --- | --- |
| **Response** | **No.** | **%** |
| Yes. | 38 | 76 |
| No.  | 4 | 8 |
| I do not know.  | 5 | 10 |
| We have not implemented any interventionsto optimize *C. difficile* ordering and/or testing. | 3 | 6 |

**Question 14**.  **In general, have the interventions that have been implemented at your institution to optimize *C. difficile* ordering and testing helped to *reduce unnecessary treatment* of patients who are colonized with *C. difficile*?**

|  |  |  |
| --- | --- | --- |
| **Response** | **No.** | **%** |
| Yes. | 28 | 56 |
| No.  | 6 | 12 |
| I do not know.  | 12 | 24 |
| We have not implemented any interventions to optimize *C. difficile* ordering and/or testing | 4 | 8 |

 |