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Documentation of Contact Precautions in an Electronic Health Record

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Abstract

Contact precautions are implemented to reduce transmission of multidrug-resistant organisms but may also increase hospital costs and patient complications. The goal of this study was to determine the prevalence of documentation of contact precautions (provider orders and nursing flowsheet documentation) in an electronic health record. Orders and nursing documentation were simultaneously present for only 42.3% of patient rooms with contact precaution signs, and 17.8% of rooms with signs had neither orders nor nursing documentation.

Keywords

contact precautions; electronic health record; isolation precautions; multidrug-resistant organisms; nursing documentation

HEALTH CARE-ASSOCIATED INFECTIONS are common across the United States, and the proportion of infecting organisms that are resistant to antibiotic therapies continues to grow.^{1,2} The Centers for Disease Control and Prevention's Healthcare Infection Control Advisory Committee recommends that contact precautions (CP)—a type of isolation or transmission-based precaution—be employed for patients who are infected or colonized with epidemiologically significant pathogens, such as multidrug-resistant organisms (MDROs), and for other clinical indications including wound drainage and fecal incontinence.^{3,4} Previous studies have demonstrated that use of CP adds not only to hospital costs^{5,6} but also to the potential for patient complications: patients may be seen less frequently by health care providers and also experience higher levels of anxiety and depression while in isolation.⁷⁻⁹ Given the dual importance of appropriately implementing CP to prevent organism transmission and discontinuing unneeded CP to prevent excess hospital costs and adverse patient events, institutional tracking of the use of CP is critical.

While several institutions have developed automated electronic surveillance systems, which compile patients' laboratory and clinical data and use algorithms to indicate to health care personnel the need for implementation and discontinuation of CP and other isolation

precautions, such systems generally do not track actual initiation, continuation, and cessation of isolation by the clinical team.¹⁰⁻¹³ Because patient care teams sometimes make individualized decisions about isolation on the basis of microbiology results and other clinical factors, actual implementation of CP can differ markedly from indications provided by electronic surveillance. For example, Clock et al¹⁴ reported that only 85% of patients indicated for CP by an electronic surveillance system were actually isolated, and only 75% of patients who were actually on CP were indicated by the system for isolation. Information on the true use of CP is essential for fully capturing patients' clinical experiences, as well as for maintaining accurate hospital records—particularly in light of increasing use of hospital data for quality of care measurement, insurance claims reimbursement, and clinical and health services research.¹⁵⁻¹⁷ Despite the growing need to properly document patient care procedures, the extent to which isolation precautions are recorded in patients' health records is unknown. The goal of this study was to determine the type and prevalence of documentation of CP in an electronic health record (EHR).

METHODS

Sample and setting

An observational survey was conducted at 3 sites within a large hospital network in New York City: a 692-bed adult academic tertiary-care facility, a 283-bed pediatric academic acute-care facility, and a 221-bed adult community hospital. All inpatient care units were included except those in emergency, psychiatry, and maternity departments. The 3 study sites used the same commercial EHR (Eclipsys Sunrise, Eclipsys Corp, Atlanta, Georgia) for computerized provider order entry and as the primary source for clinical documentation entered by nursing and ancillary staff. Staff members of the hospitals' infection prevention and control departments had access to a locally developed automated surveillance system, which was used to identify and track patients who were suspected of being colonized or infected with epidemiologically significant pathogens requiring CP—primarily MDROs, *Clostridium difficile*, respiratory syncytial virus, and rotavirus.

Contact precautions policy and procedures

As per institutional infection control policy, CP were implemented by physicians, physician assistants, nurse practitioners, and registered nurses for patients colonized or infected with epidemiologically significant organisms. Contact precautions also could be initiated as a precautionary measure on the basis of clinical judgment pending receipt of a positive microbiology test result or because of unit policy (3 of 9 intensive care units [ICUs] observed in this study—all located in the adult tertiary-care facility—enforced a universal CP policy, meaning that all patients in the units were placed on CP regardless of culture results or clinical indication). As soon as CP were initiated for a patient, institutional infection control policy required hospital-issued CP signs to be displayed on or near the patient's door. Providers were expected to enter electronic orders for CP, and nurses were expected to document the daily continuation of CP on a nursing flowsheet in the EHR. While provider orders and nursing flowsheet documentation of CP were recommended practices, the institution's infection control policy did not require such documentation at the time of the study.

Data collection

The study was approved by the participating medical center's institutional review board. Direct observations were conducted in 4 5-consecutive day periods at each study site between April and June 2008, totaling 60 days. Using a standardized form, 2 trained observers recorded the presence or absence of a CP sign for each room occupied by a patient. In the 3 units that practiced a universal CP policy, the presence or absence of CP

signs were recorded for all patients indicated by the automated surveillance system to be colonized or infected with an epidemiologically significant organism and for a sample of patients with CP signs due only to unit policy. Pilot data were collected by 3 observers prior to the study period to ensure systematic recording of observations; more than 95% interrater reliability was achieved before commencing the study.

Electronic provider orders and daily nursing documentation of CP were extracted from the institution's clinical data warehouse and matched to each direct observation on the basis of time and location (unit, room, and bed number) of observation. A provider order was considered to be present if there was an active order for CP at the time of observation. Nursing documentation of CP was considered present if "Contact," "Droplet/Contact," or "Airborne/Contact" were selected from a list of possible isolation categories in the flowsheet, or if "contact" was typed into the free-text field (Figure). Nursing documentation was considered present if it was recorded at any time during the calendar day on which the direct observation took place.

Analysis

Data were entered into Microsoft Excel (Microsoft Corp, Redmond, Washington) and analyzed using SPSS version 16.0 (SPSS, Inc, Chicago, Illinois) and SAS (SAS Institute, Cary, North Carolina). Using direct observation as the reference standard, the presence of CP documentation in electronic provider orders and electronic nursing flow sheets was calculated for all daily observations, the first day of observation of each unique patient, and the last day of observation of each unique patient observed on more than 1 day. Pearson's chi-square test for independence was used to assess differences in documentation by type of hospital (adult tertiary, pediatric, community) and type of care setting (ICU vs non-ICU, excluding patients who had CP signs due only to unit policy) for the first and last days of observation. Within the adult tertiary-care facility, which contains 6 of the 9 ICUs included in the study, presence of CP documentation was compared between the 3 ICUs with universal CP policies and the 3 ICUs without universal CP policies, stratified by presence of an MDRO. Logistic regression for repeated measures was used to test for association between the presence of an active provider order and the presence of nursing documentation for CP.

RESULTS

During 60 days of direct observation, 3030 patient rooms were observed to have CP signs. The 3030 observations ("cases") included 630 unique patients, 473 of whom were observed on more than 1 day. Patients were observed for an average of 4.8 days (median = 3 days). On the first day of observation for each unique patient, provider orders were active for 49% of patients (311/630) and nursing documentation for that day was present for 48% of patients (305/630). On the last day of observation for each unique patient observed on more than 1 day, provider orders were active for 56% of patients (266/473) and nursing documentation for that day was present for 59% of patients (278/473). For all days of observation, provider orders were active in 61% of cases (1858/3030) and nursing documentation for the day of observation was present in 63% of cases (1914/3030).

Presence of CP documentation on the first and last days of observation for each unique patient differed significantly between hospitals and unit types (Table 1). Compared with the 2 adult hospitals, orders and nursing documentation were present more frequently in the pediatric hospital, where provider orders and nursing documentation were present in 71.9% and 90.4% of cases, respectively. Orders were present less frequently in ICUs than in other units (58.6% vs 64.6%), but nursing documentation was present more often in ICUs (80.2% vs 57.6%).

Of 662 observations made in the ICUs of the adult tertiary-care facility, 401 (60.6%) were made in units that had a universal CP policy (Table 2). Provider orders were present more frequently in ICUs that did not have a universal CP policy, both for patients with and without MDROs (82.9% vs 45.6% and 77.9% vs 8.9%, respectively). Nursing documentation was more prevalent in ICUs that did not have a universal CP policy only among patients without MDROs (63.2% vs 54.4%); among patients infected or colonized with MDROs, nursing documentation was more prevalent in ICUs that did have a universal CP policy (85.3% vs 76.2%).

Nursing documentation differed significantly according to the presence of a provider order for CP ($P < .001$). When a provider order was present ($n = 1858$), nursing documentation was present in 69% of cases; when the order was absent ($n = 1172$), documentation was present in 54% of cases. Similarly, when nursing documentation was present ($n = 1914$), provider orders were present in 67% of cases; when documentation was absent ($n = 1116$), orders were present in 52% of cases. Both provider order and nursing documentation were absent for 540 (17.8%) of the 3030 total observations.

DISCUSSION

When epidemiologically significant organisms or clinical indications for isolation are identified, actions must be taken by the patient care team to implement CP or other isolation precautions in an appropriate and timely manner. To assess the impact of CP on transmission dynamics and hospital resource utilization, it is essential to have accurate records of when, and for whom, CP are implemented. As more institutions adopt EHRs as their primary source of clinical documentation,¹⁸ the need for confidence in the accuracy and completeness of information entered into these records is critical. Electronic health records are recognized as rich sources of data, supporting not only requirements for mandatory reporting and reimbursement but also quality improvement and research initiatives.^{19,20} Inaccurate and inconsistent documentation limits the usefulness of electronic data for these purposes.^{21,22} Failure to document CP can also have a negative impact on infection control practices. A study by Vidal-Trecan et al²³ found that the presence of a written provider order for isolation was the only observed factor that significantly improved implementation of isolation precautions.

To our knowledge, this is the first study to compare direct observation of isolation precautions with evidence of isolation recorded in an EHR. An electronic provider order and notation in nursing flow sheets for CP were simultaneously present for only 42.3% of patient rooms with CP signs, and 17.8% of rooms with CP signs had neither provider orders nor nursing documentation. Higher sensitivities for orders and nursing documentation were found for the last day of observation of each unique patient than for the first, indicating that CP documentation may improve over time. It is unclear whether this improvement is due to increased communication among the care team and with the Infection Prevention and Control Department, the ability of the EHR to display orders and nursing documentation from previous days, or some other factor.

The importance of consistent documentation of isolation practices and other procedures underscores the need for clear institutional policies regarding when, where, and how to record these measures. During the study period, hospital staff entered CP orders and recorded that isolation precautions were in place, despite the fact that these documentation practices were not required by infection control leadership at the time. The results of this study suggest that there was variation among staff in their understanding and/or execution of documentation procedures. Formal policies and training initiatives are necessary to standardize the way by which institutions document the implementation, continuation, and

discontinuation of isolation protocols such as CP. Vendors and those who configure EHR systems can encourage appropriate documentation of CP by enhancing provider order entry systems and nursing flow sheets to automatically trigger prompts for isolation documentation when certain microbiology results become available. Consistency of nursing documentation for CP can be improved by constraining the choices of isolation categories to a uniform list.²⁴

This study had some limitations. The first day of observation for each patient did not necessarily correspond with the first day that the patient was placed on CP, which limited our ability to draw conclusions about changes in rates of documentation over time. In addition, only specific provider orders for CP were extracted from the electronic record; general nursing orders, in which providers may have entered free-text comments requesting CP, were not evaluated. While the prevalence of general nursing orders that included a request for isolation precautions was not assessed, we believe that the ordering of CP via general nursing orders happened infrequently, and the availability of these data would not considerably change the results of the study. These limitations underscore the need for specific policies not only on what documentation is required but also on where to document isolation precautions and other procedures, because electronic charting systems often offer multiple entry fields.²⁵ Although EHRs can be valuable sources of data, hospital administrators and researchers should carefully consider the validity of information gleaned from these systems at the aggregate level.

Because CP are recommended for interrupting transmission of pathogenic organisms in health care settings and also represent an economic burden to hospitals and a social burden to patients, we recommend that electronic surveillance systems be adopted for monitoring patients requiring isolation.⁸ While electronic surveillance systems are helpful for identifying patients who might require isolation precautions, hospitals should also consider reviewing the actions performed by members of the care team for patients indicated for CP. Among the actions that may be reviewed using EHRs are the placement of orders for isolation precautions by physicians or other providers and documentation of adherence to isolation precautions by nursing staff. Accurate and timely documentation is important for measuring the impact of infection control policies and interventions involving isolation precautions.

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Figure.

Nurses documented the continuation of all types of isolation precautions under the “Safety” section of the electronic nursing flowsheet. Contact precautions were indicated by selecting “Contact,” “Droplet/Contact,” or “Airborne/Contact,” or by typing “contact” into the free-text field.

Table 1

Frequency of Provider Orders and Nursing Documentation of Contact Precautions

	Type of Hospital			Type of Unit		P ^c
	Adult Tertiary, ^a % (n)	Pediatric, % (n)	Community, % (n)	ICU, ^b % (n)	Non-ICU, % (n)	
First day of observation for each unique patient						
CP sign present, N	422	111	97	136	434	
Provider order present	43.6 (184)	63.1 (70)	58.5 (57)	47.1 (64)	56.5 (245)	.055
Nursing documentation present	41.0 (173)	84.7 (94)	39.2 (38)	66.2 (90)	42.9 (186)	<.001
Last day of observation for each unique patient ^d						
CP sign present, N	323	80	70	93	361	
Provider order present	52.3 (169)	67.5 (54)	61.4 (43)	47.3 (44)	60.7 (219)	.020
Nursing documentation present	54.2 (175)	85.0 (68)	50.0 (35)	81.7 (76)	53.5 (193)	<.001
Total observations						
CP sign present, N	2207	459	364	762	2164	
Provider order present	58.0 (1281)	71.9 (330)	67.9 (247)	58.6 (446)	64.6 (1399)	
Nursing documentation present	59.5 (1314)	90.4 (415)	50.8 (185)	80.2 (610)	57.6 (1246)	

Abbreviations: CP, contact precautions; ICU, intensive care unit.

^aIncludes cases in which contact precautions sign was present due only to unit policy.^bExcludes cases in which contact precautions sign was present due only to unit policy.^cDifferences between hospitals and type of unit were assessed using Pearson's chi-square test for independence.^dFor patients observed on more than 1 day.

Table 2
 Comparison of Contact Precautions Documentation Practices Between Intensive Care Units with and Without Universal Contact Precautions Policies^a

	ICUs with Universal CP, % (n)	ICUs without Universal CP, % (n)
Observations of patients colonized/infected with MDROs only		
CP sign present, N	252	193
Provider order present	45.6 (115)	82.9 (160)
Nursing documentation present	85.3 (215)	76.2 (147)
Observations of patients not colonized/infected with MDROs only		
CP sign present, N	149	68
Provider order present	8.9 (13)	77.9 (53)
Nursing documentation present	54.4 (81)	63.2 (43)
Total observations		
CP sign present, N	401	261
Provider order present	31.9 (128)	81.6 (213)
Nursing documentation present	73.8 (296)	72.8 (190)

Abbreviations: CP, contact precautions; ICU, intensive care unit; MDROs; multidrug-resistant organisms.

^aData represent observations conducted in the 6 ICUs of the academic tertiary-care facility, 3 of which had a policy of universal contact precautions.