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Urgent Care Providers' Knowledge and Attitude about Public Health Reporting and Pertussis Control Measures: Implications for Informatics

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Abstract

Objectives—We assessed urgent care providers' knowledge about public health reporting, guidelines, and actions for the prevention and control of pertussis; attitudes about public health reporting and population-based data; and perception of reporting practices in their clinic.

Methods—We identified the 106 providers (95% are physicians) employed in 28 urgent care clinics owned by Intermountain Healthcare located throughout Utah and southern Idaho. We performed a descriptive, cross-sectional survey and assessed providers' knowledge, attitudes, beliefs, and behaviors associated with population-based data and public health mandates and recommendations. The online survey was completed between 11/1/2007 and 2/29/2008.

Results—Among 63 practicing urgent care providers (60% response rate), 19% knew that clinically diagnosed pertussis was reportable, and only half (52%) the providers correctly responded about current pertussis vaccination recommendations. Most (35–78%) providers did not know the prevention and control measures performed by public health practitioners after reporting occurs, including contact tracing, testing, treatment, and prophylaxis. Half (48%) the providers did not know that health department personnel can prescribe antibiotics for contacts of a reported case, and only 22% knew that health department personnel may perform diagnostic testing on contacts. Attitudes about reporting are variable, and reporting responsibility is diffused.

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All authors helped to conceptualize ideas, create the survey design and questionnaire, interpret findings, and review drafts and the final manuscript. A Wuthrich and M Carter pilot tested the questionnaire, created the online survey, and managed implementation of the survey. P Gesteland and M Allison summarized the study results. C Staes was the primary author of the manuscript. S Mottice and R Boulton provided the public health expertise for the questionnaire. M Samore and C Byington conceived of the survey as part of a larger study, provided funding, and reviewed manuscripts.

Conclusion—To improve our ability to meet public health goals, systems need to be designed that engage urgent care providers in the public health process, improve their knowledge and attitude about reporting, and facilitate the flow of information between urgent care and public health settings.

Keywords

Pertussis; Disease Notification; Public Health Practice; Clinical Decision Support Systems; Ambulatory Urgent Care

INTRODUCTION

Control of communicable diseases is a high-priority public health function, particularly for vaccine-preventable respiratory diseases that are highly contagious and may incur high morbidity, mortality, and costs, both annually and during outbreaks.(1–3) Strategies for detecting and controlling respiratory diseases, such as pertussis, include: 1) accurate diagnosis based on laboratory and clinical findings, 2) vaccination of target populations to protect individuals and create herd immunity, and 3) timely reporting to public health authorities by health care providers and others when a reportable disease is suspected or confirmed.

Public health reporting of certain infectious diseases is mandated by law in each US state (4–6) and is the key step in a chain of events that results in public health actions. Depending on the disease, reporting may lead to public health investigation, immunization, and/or chemoprophylaxis of susceptible contacts, treatment of infected contacts, implementation of control measures to prevent further spread, and identification of trends and outbreaks. All of these activities may be implemented directly by local public health authorities, or they may be delegated to others while the health department assures that these activities occur. Regardless of who performs the activity, reporting is the key step to initiating control efforts. Reporting and control strategies are strengthened when front-line health care providers are aware of and understand current public health recommendations about vaccination, diagnostic testing, and public health reporting. When case reports are not submitted, delayed, or have incomplete information, new instances of disease may occur.

Problems with reporting have been recognized for years (7–15) but have not been assessed in the urgent care setting, nor have factors that influence a provider's motivation to report been adequately explored. Urgent care medicine is a growing specialty with approximately 20,000 providers currently practicing in over 10,000 dedicated urgent care clinics in the US. (16) Urgent care providers are important for appropriate public health response to communicable diseases and acute community threats because they may be the first or only provider to interact with patients seeking care for acute illness. They focus on rapid diagnosis and treatment of mild to moderate acute infections and injuries (16) and are likely to diagnose illness and injuries included on a state's list of reportable conditions.(17) Public health control efforts are impacted by urgent care providers' decision-making about diagnosis, treatment, prevention, and reporting. Yet, urgent care providers may not think about public health issues in their daily clinical practice and may not have systems to facilitate information flow between clinical and public health providers. It is important to understand limitations with current knowledge and processes in the urgent care setting in order to design information technology and decision support systems in the future to meet public health goals.

To assess urgent care providers' knowledge and attitude about public health reporting and population-based recommendations, we focused on pertussis for several reasons. First,

pertussis is a relevant disease for urgent care providers and providers in the community are likely to have had recent experience with pertussis. Acute respiratory illness is a condition often addressed in an urgent care setting(16) and the reported rate of pertussis in Utah increased from 2 to 31 pertussis cases per 100,000 population per year between 2000 and 2006.(18) Utah had the highest state-specific pertussis rate in the nation during 2006(19), and the second highest rate during 2007.(20) Second, pertussis is a disease with characteristics similar to other reportable diseases. For example, the recommended strategies for preventing, diagnosing, and treating pertussis require that providers make population-based clinical decisions and be knowledgeable about evolving vaccine strategies, the likelihood of encountering pertussis, and the methods for diagnosing pertussis. In addition, both clinical and laboratory-confirmed cases of pertussis must be reported to enable effective control measures.

The objectives of our study were to assess urgent care providers' (a) knowledge about public health reporting, guidelines, and actions for the prevention and control of pertussis; (b) attitude about reporting and population-based data; and (c) perception of reporting practices in their clinic.

METHODS

Study population

The study population included all 106 providers who cared for patients in any one of the 28 urgent care clinics owned and operated by Intermountain Healthcare (Intermountain). During 2008, there were over 450,000 patient visits to Intermountain urgent care clinics. Intermountain is an integrated health care delivery organization that operates 20 hospitals and over 100 ambulatory care facilities, including 28 urgent care settings, located throughout Utah and southern Idaho. At Intermountain, approximately 95% of the urgent care providers are physicians. Approximately 25% of all Intermountain non-specialty ambulatory care physicians work in urgent care settings.

Survey design and procedure

We performed a descriptive, cross-sectional survey of the study population. The survey consisted of 60 individual questions to assess providers' knowledge, attitudes, and perceptions of public health mandates and recommendations, and providers' knowledge, attitudes, beliefs, and behaviors associated with their use of population-based data. In addition, seven demographic questions were included. To develop the survey, we queried key informants from a local health department and the Utah Department of Health and pilot tested the survey among pediatricians working in a University-based pediatric clinic. To implement the survey, we sent as many as three sequential weekly e-mails to providers requesting their participation in the survey. The e-mail included a link to a Web-based survey. The first screen of the survey served as a cover letter to describe the rationale and purpose of the research, methods to preserve confidentiality, information about who to contact for questions, and the time commitment to complete the survey.

A study coordinator tracked the names of the participants who completed the survey so survey respondents would not receive additional e-mail messages. After three attempts to contact participants by e-mail, a paper-based version of the survey was mailed to the participant's home address. The investigators did not have access to the names of respondents or non-respondents, and the database used for analysis did not include participants' names or any information that could potentially identify an individual respondent. Surveys were completed between November 1, 2007 and February 29, 2008.

Institutional Review Board approval was obtained from Intermountain Healthcare and the University of Utah.

Data analysis

We used descriptive statistics to report urgent care providers' (a) knowledge about public health reporting, guidelines, and actions for the prevention and control of pertussis; (b) attitude about reporting and population-based data; and (c) perception of reporting practices in their clinic. The survey questions were analyzed individually because there was no evidence to support combining survey questions to describe knowledge or attitudes. The relationship between knowledge, attitude, and demographic characteristics were analyzed using Fisher's Exact test for categorical variables and Kruskal-Wallis for the continuous variables such as age, with a significant level of $p=0.05$. Other results gathered by the survey concerning knowledge, attitudes, and use of population-based data are reported separately. (21)

RESULTS

Description of respondents

Among 106 eligible providers, 63 (60%) responded to the survey. Half (51%) of the providers were male. The providers were an average of 44 years of age (ranging from 31 to 60 years) and had worked an average of 11 years in clinical practice (ranging from 0.5 to 30 years). The providers cared for both adults and children in urgent care settings. Most (78%) of the providers reported that during a typical week, more than 25% of their patients were younger than 18 years; 24% of the providers only cared for pediatric patients. A majority of providers (90%) reported spending greater than 20 hours per week seeing patients during the 2007–2008 winter "respiratory season". Though all the providers worked in an urgent care setting, the primary work setting for most of the providers was reported to be urgent care (71%), office-based primary care (21%), or another setting (8%), including emergency medicine ($n=2$) as a specialist ($n=2$) or hospitalist ($n=1$).

Knowledge about public health reporting, guidelines, and actions to control pertussis

Most (92%) of the providers correctly acknowledged that reporting is allowable under Health Information Portability and Accountability Act (HIPAA) rules. Almost all (98%) of the 63 urgent care providers knew that all cases of lab-confirmed pertussis should be reported to the health department. In contrast, only 19% of the providers knew that a clinically-diagnosed case of pertussis should be reported (98% vs. 19%; $p<0.0001$). The remaining providers were either unsure (35%) or did not know that clinically-diagnosed cases should be reported (46%). Knowledge of reporting requirements was not significantly related to the provider's age or mean number of years in practice; however, correct knowledge that clinical pertussis is reportable was associated with a positive attitude about the time it takes to report a case ($p=0.03$).

The providers' knowledge about public health guidelines for pertussis diagnosis and control was variable. Most (82%) providers identified polymerase chain reaction (PCR) as the preferred method for diagnosing pertussis in a child (22) while the remaining providers identified culture (10%) and direct fluorescent antibody (DFA) (8%) as the preferred diagnostic method. Only half (52%) of the providers correctly answered the question about pertussis vaccine recommendations for adolescents published in March 2006 (22): One-third (33%) of the providers incorrectly responded to a question about the timing of the tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis (Tdap) vaccine for children.

The providers' knowledge of the public health actions resulting from public health reporting was variable (Table 1). Most of the providers (86%) correctly responded that the health department would tally the reported cases for statistics. Older and more experienced providers were more likely to have this knowledge ($p=0.03$ age, $p=0.01$ years in practice) (Table 2). In contrast, fewer providers knew about public health investigation and control measures, including contact tracing, testing, treatment, and prophylaxis that occur after a case is reported to the health department. Half (48%) the providers did not know that health department personnel can prescribe antibiotics for contacts of a reported case and only 22% knew that health department personnel may perform diagnostic testing on contacts.

Knowledge about public health reporting, guidelines, and actions to control pertussis was not related to the provider's primary work setting. There was no significant knowledge difference between those providers who specified office-based primary care as their primary work setting and those providers who specified other primary settings.

Attitude about reporting and population-based data

Providers' attitudes varied about the ease of reporting and the time required to report cases to the health department (Table 2). These two questions were inversely correlated (Cronbach's $\alpha=0.89$). Only half (46%) of the providers believed that patient confidentiality is adequately protected (Table 3). Many (70%) providers agreed that population-based data is dependent on data reported from practices like their own. In addition, as we published previously (21), many (79%) providers agreed that population-based data about respiratory pathogens would be useful for deciding whether to order a test for pertussis.

Perception of reporting practices

When asked, "Does your practice report cases of reportable diseases to the health department?" the providers responded: never (0%), rarely (6%), sometimes (10%), usually (56%), and always (29%). When asked, "If cases ever get reported to the health department, who in your practice contacts the health department to report the case?" a variety of personnel (not mutually exclusive) were identified, including nurses (63%), medical assistants (30%), laboratory personnel (27%), providers (27%), and infection control practitioners (11%). Finally, 11% selected the response, "Somebody does, but I'm not sure who." Half (54%) of the providers indicated that one type of personnel performs reporting, while the remainder identified two to four types of reporters. Only two (3%) providers indicated that they were the only person to contact the health department when cases are reported. There was no significant relationship between perceptions of reporting practices and the knowledge and attitudes assessed by the survey.

DISCUSSION

We identified knowledge deficits, attitudes, and reporting practices that may negatively impact the ability of public health authorities to control communicable diseases in general and pertussis in particular. Preventing and controlling pertussis in the population is important to prevent morbidity and mortality among infants that have not yet been fully immunized and to prevent morbidity and economic costs associated with school outbreaks, missed work, and disease among adolescents and adults.(22,23) Most Intermountain urgent care providers were not aware of the need to report clinically diagnosed pertussis, were not knowledgeable about recent pertussis vaccine recommendations, and did not understand public health control measures that occur after reporting to public health. Only half the providers correctly answered the question about the preferred age for immunization with Tdap (11–12 years) published in March 2006.(22) Providers' attitudes and practices

concerning reporting varied. These findings are disturbing because pertussis is underreported yet remains one of the most common vaccine-preventable diseases. (2) Intensive public health efforts have been underway in Utah and nationally to control pertussis (22,23), and urgent care providers are likely to care for patients with acute respiratory illness including pertussis.

Previous studies have documented 1) problems with the completeness of reporting by health care providers, 2) problems with providers' knowledge about reporting requirements and processes, 3) problems with the lack of standardized reporting processes within the clinical setting, 4) delegation of reporting duties to infection control practitioners (ICP) and other personnel, and 5) an assumption that laboratories or "someone else" will report the case.(7–15,24) In our survey of providers in the urgent care setting, we found similar problems and evidence of inefficient reporting processes. The majority of Intermountain urgent care providers believed that most reportable conditions are reported to the health department, few providers believed that reporting to the health department is easy, some providers were concerned that the process does not adequately protect patient confidentiality, and 8% did not agree that reporting was allowable under HIPAA regulations. The responsibility for reporting is diffused among at least five different types of personnel. In fact, 11% of the providers did not know who reported but believed that someone handled the duty. Without laboratory results to trigger automated or ICP-based case finding of clinical cases, a physician must communicate results to the person responsible for reporting when a clinical diagnosis is made. These undefined and manual processes, combined with knowledge deficits, may contribute to problems with underreporting.

We found no previous studies that assess public health reporting among urgent care providers or previous studies that addressed the following two factors that may influence a provider's decision-making and motivation to report. First, we found no studies that assessed providers' knowledge about the need to report clinically diagnosed notifiable diseases in the absence of supporting laboratory results. According to Utah law, as is common throughout the US, providers are required to report to public health authorities when they suspect that a patient has pertussis, regardless of laboratory confirmation.(5) Only 19% of the providers knew of the duty to report clinically diagnosed pertussis. Second, we found no studies that addressed providers' knowledge of public health actions that may occur after reporting. In our study, most providers either did not know or incorrectly responded to questions about case finding, treatment, and prevention activities performed by public health practitioners in response to a reported case. This knowledge deficit may reduce providers' motivation to report because they do not know the value of reporting and cannot explain to a patient the activities that may follow reporting. Motivation for reporting may be enhanced when a provider understands that a) a clinical diagnosis will not be recognized by laboratory or infection control personnel or automated laboratory-based detection systems that may be tasked to perform reporting, and b) implementation of important control measures are dependent on the reporting of both clinical and laboratory-based diagnoses of pertussis.

Several knowledge deficits we identified may be addressed by educational strategies to improve a provider's engagement in activities that meet public health goals. First and foremost, clinicians need to be educated about the allowance for reporting under HIPAA regulations. Even if providers are not the person actually reporting, this lack of knowledge could be a barrier if they restrained someone else from reporting. This deficit should be addressed in both medical and continuing education. Second, there is a need to inform providers, and their patients, about public health actions that occur after reporting takes place. Closing this loop, educating all the stakeholders, and delivering feedback about actions performed may improve compliance and have other unrecognized positive outcomes.

Patient education materials about public health reporting may enable the reporting process. Providers may be reluctant to report when they cannot explain the consequential activities that follow reporting; thus, educational materials may support the provider-patient relationship and educate both parties. Finally, public health authorities should address both knowledge deficits and negative attitudes about public health reporting. We were encouraged to find that providers who were aware of the need to report clinically diagnosed pertussis had a positive attitude about public health reporting.

Informatics strategies and new policies may be used to improve a provider's engagement in public health and improve processes for reporting and implementing vaccination guidelines. First, information search and decision-support tools could be used to improve the delivery of salient recommendations to providers at the point of care. Currently, vaccine recommendations are often included in long and unwieldy documents that providers may not have time to read.(22,23) Informatics research is needed to find optimal methods of inserting this knowledge into clinical practice. Second, there is a need to explore the requirements for physician-initiated reporting in the public health reporting process. The requirement to report is shared by many entities (e.g., laboratories, clinicians, hospitals, others) (5) and the process of reporting is shared by many types of personnel. It may not be necessary to require that a physician initiate every report of every notifiable disease for case reporting. The "astute clinician" is critical for identifying emerging infectious diseases, such as hantavirus, West Nile virus, and anthrax, (25–27) and cannot be replaced by an automated decision support system. However, the process of reporting can be improved by better communicating what should be reported, identifying those conditions for which reporting can be automated, and standardizing the procedures and roles for reporting. Strategies to address underreporting in ambulatory settings have ranged from supporting the traditional manual clinician reporting process (28) to automating case detection and reporting while continuing to allow providers to decide if a case should be reported before the information is transferred to public health. (29) Use of electronic health records and automated decision support is promising; however, in 2008, only 17% of providers working in ambulatory settings used an electronic health record, and only 4% of the providers had fully functional electronic health record systems.(30) Much research is needed to improve automated reporting as electronic health record systems evolve and become more prevalent in the future.

This study has limitations. First, we did not measure the actual rate of reporting from the urgent care setting. We expect that the 85% of respondents who stated that someone usually or always reports to public health authorities represent a best-case scenario. These providers are referring to those patients with conditions they recognize to be reportable. Therefore, the completeness of reporting would be even lower. Second, while the survey response rate is high (60%) for surveys of providers(31), there may be a confounder related to reporting and a provider's likelihood to respond to this survey. Non-responding providers may be less likely to initiate communication with public health authorities. Therefore, again, the completeness of reporting is likely lower than we observed. Third, we surveyed providers in one healthcare enterprise that has standardized and advertised the use of PCR for diagnosing pertussis. The high proportion of providers (92%) who correctly selected PCR as the appropriate diagnostic test(22) may not be observed among providers outside the healthcare enterprise. Finally, the sample of urgent care providers employed by Intermountain may not be representative of all urgent care providers nationwide. Intermountain urgent care clinics are primarily staffed by providers, not physician assistants or nurse practitioners, and Intermountain clinical programs emphasize the use of protocols and clinical system improvement. Urgent care providers at Intermountain may not be similar to urgent care providers in other locations around the country, but there is no reason to believe the findings overestimate the problems. Further study in other locations should be performed. We believe

that our results underestimate problems with reporting, diagnosis, and knowledge about public health guidelines.

Conclusion

Urgent care providers have an important role in the control of communicable diseases, and their decision-making about diagnosis, treatment, prevention, and reporting is critical to public health. Current systems are not designed to facilitate the flow of information between urgent care and public health settings. Public health authorities need to improve communication about how and what to report and what actions are taken after reporting occurs. In the urgent care setting, strategies to improve case detection and reporting must be integrated into physician education and clinic workflow and aligned with diagnostic procedures and the functionality of the health record system. To improve our ability to meet public health goals, systems need to be designed that engage providers in the public health process and facilitate the flow of information between providers and the public health community.

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Table 1

Knowledge of public health actions resulting from pertussis reporting

After a case is reported,....	Response (%)		
	True *	False	Don't know
...the health department will tally the case for statistical purposes.	86%	0%	14%
...the health department will call the patient or their family to identify contacts at risk of getting the disease.	65%	10%	24%
...the health department can prescribe antibiotics for contacts.	24%	48%	29%
...someone from the health department may go the patients house and obtain a pertussis sample from an untested patient or asymptomatic contact.	22%	17%	60%

* correct answer

Table 2

Knowledge that the health department will tally reported cases for statistical purposes, by age and years in practice

		Mean (95% confidence interval)	
	response	Age	Yrs in Practice
After a case is reported, the health department will tally the case for statistical purposes.	True (n=54)	45 (42.9, 47.4)	12 (10.0, 14.6)
	Don't Know (n=9)	39 (35.5, 41.8)	5 (2.4, 6.8)
		p=0.03	P=0.01

Table 3

Attitude about public health reporting and population-based data

	Agree or strongly agree	Neutral	Disagree or Strongly Disagree
Reporting a case to the health department is easy.	33.4%	46.0%	20.7%
Reporting a case to the health department takes too much time.	25.4%	50.8%	23.8%
Health department personnel adequately protect patient confidentiality.	46.1%	54.0%	0.0%
Population-based data is dependent on data reported from practices like mine	69.8%	30.2	0.0%