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Using Discharge Diagnoses for Early Notification of Reportable Diseases in Georgia

Rene Borroto*[1], Jessica Grippo[1], Karl Soetebier[1], Wendy Smith[2], Bill Williamson[1], Patrick Pitcher[1], Lance Ballester[1] and Cherie Drenzek[1]

[1]Georgia Department of Public Health, Atlanta, GA, USA; [2]Fulton County Board of Health, Atlanta, GA, USA

Objective

To describe how the Georgia Department of Public Health (DPH) uses ICD-9 and ICD-10-based discharge diagnoses (DDx) codes assigned to Emergency Department (ED) patients to support the early detection and investigation of outbreaks, clusters, and individual cases of reportable diseases.

Introduction

The Georgia DPH has used its State Electronic Notifiable Disease Surveillance System (SendSS) Syndromic Surveillance (SS) module to collect, analyze and display analyses of ED patient visits, including DDx data from hospitals throughout Georgia for early detection and investigation of cases of reportable diseases before laboratory test results are available. Evidence on the value of syndromic surveillance approaches for outbreak or event detection is limited (1, 2). Use of the DDx field within datasets, specifically as it might be used for investigation of outbreaks, clusters, and/or individual cases of reportable diseases, has not been widely discussed.

Methods

The DDx field of the ED data set sent to DPH by 120 facilities was queried for diseases that are immediately-reportable, as well as those reportable within 7 days of diagnosis. The query was performed twice a day using a combination of SAS 9.4 and the internal query capabilities of SendSS. District Epidemiologists (DE) were notified by email, with an Excel file attached that includes the details of the patient's visit. DEs contacted Infection Control Practitioners (ICPs) of the facilities where the patients had received a discharge diagnosis of a reportable disease. True or false positives were determined after the outcome of the follow-up with the ICP had been known and after the patient had been entered as a case of reportable disease in SendSS by the DE. Hence, if the patient was a confirmed or probable case of a reportable disease, it was recorded as a True Positive, and True Negative otherwise. This led to the calculation of Predictive Value Positive (PVP) by reportable disease.

Results

Table 1 shows the number of notifications sent to DEs that were later demonstrated to be True Positives and False Positives. It also shows the PVP by diseases being reported, for the period spanning from 05/01/2016 to 08/31/2017. Use of these notifications has allowed early investigation and identification of 158 cases of notifiable diseases by DEs. This includes 25 epi-linked cases (varicella=12, pertussis=4, cryptosporidiosis=3, shigellosis=2, malaria=2, and viral meningitis=2), as well as two clusters of varicella, one cluster of pertussis, and one outbreak of varicella in an elementary school that had not been reported to the local health department. A notable limitation of this study is that no systematic and exhaustive tracking is done of all notifications, as DEs have latitude to decide whether to follow up on a specific notification, depending on other local data that could be related to the event. Therefore, the PPVs may be biased due to over-/under-estimation of unknown size and direction. One exception to this is varicella notifications, whose outcomes have been exhaustively tracked by the DPH surveillance coordinator of this disease.

Conclusions

The use of ED discharge diagnoses to examine potential cases of reportable diseases can help improve detection and early response by local health departments to outbreaks, clusters, and individual cases of reportable diseases. Exhaustive tracking of all the notifications by specific diseases may improve the estimation of the PPVs of the notifications sent to DEs.

Table 1. True Positives, False Positives, and Predictive Value Positive, by reportable disease, State of Georgia.

Reportable Disease	True Positives	False Positives	Predictive Value Positive (%)
Varicella	68	89	43.3
Pertussis	11	11	50
Mumps	2	0	100
Measles	0	4	0
Meningitis	32	23	58.2
Bacterial meningitis	4	6	40
Viral meningitis	28	17	62.2
Salmonellosis	18	0	100
Shigellosis	4	2	66.6
Campylobacteriosis	4	0	100
Cryptosporidiosis	4	0	100
Hemolytic Uremic Syndrome	0	4	0
Malaria	15	6	71.4
Q Fever	0	2	0
Toxoplasmosis	0	2	0
Rocky Mountain Spotted Fever	0	1	0

Source: Discharge Diagnosis field from Emergency Departments and Urgent Care Centers sending data to the SS module of SendSS

Keywords

discharge diagnosis; reportable disease; surveillance; emergency department

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***Rene Borroto**
E-mail: rene.borroto@dph.ga.gov