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Abstract

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Roles of Health Literacy in Relation to Social Determinants of Health and Recommendations for Informatics-Based Interventions: Systematic Review

Abstract

This paper describes a probabilistic case detection system (CDS) that uses a Bayesian network model of medical diagnosis and natural language processing to compute the posterior probability of influenza and influenza-like illness from emergency department dictated notes and laboratory results. The diagnostic accuracy of CDS for these conditions, as measured by the area under the ROC curve, was 0.97, and the overall accuracy for NLP employed in CDS was 0.91.

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Roles of Health Literacy in Relation to Social Determinants of Health and Recommendations for Informatics-Based Interventions: Systematic Review

Abstract

Electronic medical record (EMR) systems are a rich potential source for detailed, timely, and efficient surveillance of large populations. We created the Electronic medical record Support for Public Health (ESP) system to facilitate and demonstrate the potential advantages of harnessing EMRs for public health surveillance. ESP organizes and analyzes EMR data for events of public health interest and transmits electronic case reports or aggregate population summaries to public health agencies as appropriate. It is designed to be compatible with any EMR system and can be customized to different states' messaging requirements. All ESP code is open source and freely available. ESP currently has modules for notifiable disease, influenza-like illness syndrome, and diabetes surveillance. An intelligent presentation system for ESP called the RiskScape is under development. The RiskScape displays surveillance data in an accessible and intelligible format by automatically mapping results by zip code, stratifying outcomes by demographic and clinical parameters, and enabling users to specify custom queries and stratifications. The goal of RiskScape is to provide public health practitioners with rich, up-to-date views of health measures that facilitate timely identification of health disparities and opportunities for targeted interventions. ESP installations are currently operational in Massachusetts and Ohio, providing live, automated surveillance on over 1 million patients. Additional installations are underway at two more large practices in Massachusetts.

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Roles of Health Literacy in Relation to Social Determinants of Health and Recommendations for Informatics-Based Interventions: Systematic Review

Abstract

Objective: Test a novel health monitoring approach by engaging an international online diabetes social network (SN) in consented health surveillance. Methods: Collection of structured self-reports about preventive and self-care practices and health status using a software application ("app") that supports SN-mediated health research. Comparison of SN measures by diabetes type; and, SN with Behavioral Risk Factor Surveillance System (BRFSS) data, for US-residing insulin dependent respondents, using logistic regression. Results: Of 2,414 SN app users, 82% (n=1979) provided an A1c and 41% (n=996) completed a care survey of which 931 have diabetes. Of these: 65% and 41% were immunized against influenza and pneumonia respectively, 90% had their cholesterol checked, 82% and 66%, had their eyes and feet checked, respectively. Type 1/LADA respondents were more likely than Type 2/pre-diabetic respondents to report all five recommended practices (Adjusted OR (95% CI) 2.2 (1.5, 3.2)). Past year self-care measures were: 58% self-monitored their blood glucose (SMBG) ≥ 5 times daily, 37% saw their diabetes nutritionist, 56% saw a diabetes nurse educator, 53% saw a doctor for their diabetes ≥ 4 times. Reports of health status did not differ by diabetes type in the SN sample. The SN group was more likely than the BRFSS comparator group to use all five preventive care practices (Adjusted OR (95% CI) 1.8 (1.4, 2.1) and SMBG ≥ 5 times daily (Adjusted OR (95% CI) 10.1 (6.8, 14.9). Conclusions: Rapid assessment of diabetes care practices using a novel, SN-mediated approach can extend the capability of standard health surveillance systems.

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Roles of Health Literacy in Relation to Social Determinants of Health and Recommendations for Informatics-Based Interventions: Systematic Review

Abstract

The Pittsburgh Center of Excellence in Public Health Informatics has developed a probabilistic, decision-theoretic system for disease surveillance and control for use in Allegheny County, PA and later in Tarrant County, TX. This paper describes the software components of the system and its knowledge bases. The paper uses influenza surveillance to illustrate how the software components transform data collected by the healthcare system into population level analyses and decision analyses of potential outbreak-control measures.

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Roles of Health Literacy in Relation to Social Determinants of Health and Recommendations for Informatics-Based Interventions: Systematic Review

Abstract

There is overlap in a wide range of activities to support both public health and clinical care. Examples include immunization registries (IR), newborn screening (NBS), disease reporting, lead screening programs, and more. Health information exchanges create an opportunity to share data between the clinical and public health environments, providing decision support to clinicians and surveillance and tracking information to public health. We developed mechanisms to support two-way communication between clinicians in the Indiana Health information Exchange (IHIE) and the Indiana State Department of Health (ISDH). This paper describes challenges we faced and design decisions made to overcome them. We developed systems to help clinicians communicate with the ISDH IR and with the NBS program. Challenges included (1) a minority of clinicians who use electronic health records (EHR), (2) lack of universal patient identifiers, (3) identifying physicians responsible for newborns, and (4) designing around complex security policies and firewalls. To communicate electronically with clinicians without EHRs, we utilize their fax machines. Our rule-based decision support system generates tailored forms that are automatically faxed to clinicians. The forms include coded input fields that capture data for automatic transfer into the IHIE when they are faxed back. Because the same individuals have different identifiers, and newborns' names change, it is challenging to match patients across systems. We use a stochastic matching algorithm to link records. We scan electronic clinical messages (HL7 format) coming into IHIE to find clinicians responsible for newborns. We have designed an architecture to link IHIE, ISDH, and our systems.

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Roles of Health Literacy in Relation to Social Determinants of Health and Recommendations for Informatics-Based Interventions: Systematic Review

Abstract

To control disease, laboratories and providers are required to report conditions to public health authorities. Reporting logic is defined in a variety of resources, but there is no single resource available for reporters to access the list of reportable events and computable reporting logic for any jurisdiction. In order to develop evidence-based requirements for authoring such knowledge, we evaluated reporting logic in the Council of State and Territorial Epidemiologist (CSTE) position statements to assess its readiness for automated systems and identify features that should be considered when designing an authoring interface; we evaluated codes in the Reportable Condition Mapping Tables (RCMT) relative to the nationally-defined reporting logic, and described the high level business processes and knowledge required to support laboratory-based public health reporting. We focused on logic for viral hepatitis. We found that CSTE tabular logic was unnecessarily complex (sufficient conditions superseded necessary and optional con¬ditions) and was sometimes true for more than one reportable event: we uncovered major overlap in the logic between acute and chronic hepatitis B (52%), acute and Past and Present hepatitis C (90%). We found that the RCMT includes codes for all hepatitis criteria, but includes addition codes for tests not included in the criteria. The proportion of hepatitis variant-related codes included in RCMT that correspond to a criterion in the hepatitis-related position statements varied between hepatitis A (36%), acute hepatitis B (16%), chronic hepatitis B (64%), acute hepatitis C (96%), and past and present hepatitis C (96%). Public health epidemiologists have the need to communicate parameters other than just the name of a disease or organism that should be reported, such as the status and specimen sources. Existing knowledge resources should be integrated, harmonized and made computable. Our findings identified functionality that should be provided by future knowledge management systems to support epidemiologists as they communicate reporting rules for their jurisdiction.

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Roles of Health Literacy in Relation to Social Determinants of Health and Recommendations for Informatics-Based Interventions: Systematic Review

Abstract

Despite the likelihood of poor quality data flowing from clinical information systems to public health information systems, current policies and practices are pushing for the adoption and use of even greater numbers of electronic data feeds. However, using poor data can lead to poor decision-making outcomes in public health. Therefore public health informatics professionals need to assess, and periodically re-evaluate, the quality of electronic data and their sources. Unfortunately there is currently a paucity of tools and strategies in use across public health agencies. Our Center of Excellence in Public Health Informatics is working to develop and disseminate tools and strategies for supporting on-going assessment of data quality and solutions for overcoming data quality challenges. In this article, we outline the need for better data quality assessment and our approach to the development of new tools and strategies. In other words, public health informatics professionals need to ask questions about the electronic data received by public health agencies, and we hope to create tools and strategies to help informaticians ask questions that will lead to improved population health outcomes.

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Roles of Health Literacy in Relation to Social Determinants of Health and Recommendations for Informatics-Based Interventions: Systematic Review

Abstract

Collaborate, translate, and impact are key concepts describing the roles and purposes of the research Centers of Excellence (COE) in Public Health Informatics (PHI). Rocky Mountain COE integrated these concepts into a framework of PHI Innovation Space and Stage to guide their collaboration between the University of Utah, Intermountain Healthcare, and Utah Department of Health. Seven research projects are introduced that illustrate the framework and demonstrate how to effectively manage multiple innovations among multiple organizations over a five-year period. A COE is more than an aggregation of distinct research projects over a short time period. The people, partnership, shared vision, and mutual understanding and appreciation developed over a long period of time form the core and foundation for ongoing collaborative innovations and its successes.

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