Community Preventive Services Task Force

Increasing Appropriate Vaccination: Immunization Information Systems

Task Force Finding and Rationale Statement

Table of Contents

Suggested Citation:

The Community Preventive Service Task Force (CPSTF). *Increasing Appropriate Vaccination: Immunization Information Systems.* The Community Guide [www.thecommunityguide.org]. The Community Preventive Service Task Force, Atlanta, Georgia, 2010. https://doi.org/10.15620/cdc/168617

Task Force Finding and Rationale Statement

Context

Immunization information systems now operate in all but one U.S. state. Most IIS serve all children, adolescents, and adults in the jurisdiction (CDC [www2a.cdc.gov/vaccines/iis/iissurvey/legislation-survey.asp]).

Intervention Definition

Immunization information systems (IIS) are confidential, population-based, computerized databases that record all immunization doses administered by participating providers to persons residing within a given geopolitical area. At the point of clinical care, an IIS can provide consolidated immunization histories for use by a vaccination provider in determining appropriate client vaccinations. At the population level, an IIS provides aggregate data on vaccinations for use in surveillance and program operations, and in guiding public health action with the goals of improving vaccination rates and reducing vaccine-preventable disease. In the U.S., minimum functional standards [www.cdc.gov/vaccines/programs/iis/func-stds.html] for the operation of immunization information systems were developed in 1997 by the Centers for Disease Control and Prevention, the National Vaccination Advisory Committee, and immunization program grantees. In 2012, CDC and the IIS community updated the IIS Functional Standards for implementation during the period 2013-2017.

Task Force Finding (July 2010)

The Community Preventive Services Task Force recommends immunization information systems on the basis of strong evidence of effectiveness in increasing vaccination rates.

Evidence is considered strong based on the findings from 108 published studies and 132 conference abstracts showing that IIS are effective in increasing vaccination rates and reducing vaccine-preventable disease through their capabilities to:

1. Create or support effective interventions such as client reminder and recall systems, provider assessment and feedback, and provider reminders
2. Determine client vaccination status for decisions made by clinicians, health departments, and schools
3. Guide public health responses to outbreaks of vaccine-preventable disease
4. Inform assessments of vaccination coverage, missed vaccination opportunities, invalid dose administration, and disparities in vaccination coverage; and
5. Facilitate vaccine management and accountability

Rationale

For this review of a public health infrastructure intervention, the Task Force considered a wide range of information relevant to a consideration of program effectiveness. The Task Force review included studies published in the peer-reviewed literature (search period January 1994--April 2011), as well as abstracts presented at conferences in the U.S. during the period January 2002—April 2011, with specific focus on four conferences (Immunization Registry Conference; National Immunization Conference; Pediatric Academic Society; Vaccine University). In addition to studies providing a comparative assessment of program impact, the Task Force considered studies providing descriptions of IIS program activities and capabilities. The Task Force findings represent the first effort within a systematic review for the Guide to Community Preventive Services to incorporate quantitative assessments of change with qualitative assessments of program activities.

The Task Force review considered 240 studies (108 published studies and 132 conference abstracts) and assigned them to 9 categories for evidence assessment: 1) overall evidence on IIS effectiveness in increasing vaccination rates; 2) IIS-supported interventions to increase vaccination rates; 3) IIS use in vaccination-related decisions by clinicians, schools, and health care systems; 4) IIS use in public health response; 5) IIS use to support vaccine management; 6) IIS to assess vaccine safety and effectiveness; 7) IIS as a tool for in public health decision support; 8) IIS integrated with other child health information systems; and 9) IIS as contributing to change in documentation.

The Task Force found limited evidence providing a comparison of vaccination rates in a region implementing an IIS with vaccination rates in a region without an IIS. Only one study, a program review of the Australian Childhood Immunisation Registry (ACIR), provided before-after assessment of change in IIS-reported vaccination rates following the linkage of the ACIR with incentive payments for both clients and providers. Although vaccination rates steadily increased over the period of observation, the observed change likely reflects increased participation rates driven by the linkages to incentive payments.

The Task Force considered a large body of evidence demonstrating the capabilities and effectiveness of IIS to generate or directly support interventions known to increase vaccination rates: 1) client reminder and recall systems (30 studies); 2) provider assessment and feedback (15 studies); and 3) provider reminders (3 studies). In 2009, the Task Force determined that each of these interventions has strong evidence on effectiveness in increasing vaccination rates.

The Task Force found limited evidence to evaluate the use of IIS by vaccination providers in clinical settings, which is an important potential use of these systems in the management of client vaccinations. Several studies described utilities of IIS for schools (10 studies) and healthcare systems in the U.S. (4 studies).

The Task Force examined multiple studies describing the use of IIS in responding to outbreaks of vaccine-preventable diseases (including 2 studies describing targeted recall notices for clients in communities with a measles outbreak) and other public health emergencies (including 3 studies on vaccinations for individuals displaced by Hurricane Katrina and the potential costs saved by using IIS to prevent over-immunization). In addition, 14 studies described the use of IIS in the process of vaccine supply management, distribution, and accountability, including the use of IIS to meet accountability requirements with the U.S. Vaccines for Children (VFC) program.

Most of the included studies described the use of IIS to provide assessment information or to support specific investigations of changes, trends, or gaps in vaccination coverage in the population. In these cases, the IIS provided information for decision-makers to use in planning and implementing additional interventions to address the identified issue. The included studies described a wide range of IIS capabilities including coverage assessments for specific vaccinations (51 studies), investigations of coverage in high-risk subsets of the population (32 studies), and an ability to monitor the uptake of new vaccines (16 studies).

Most of the included studies described activities in the U.S. Studies from the ACIR (Australia) were included in this review, but the evidence from that system, with linked incentive payments for client and provider participation must be interpreted with those enhancements in mind. Overall, the available information may reflect the accomplishments of higher functioning systems, and effectiveness may not directly translate to IIS with lower rates of client and provider participation.

The major additional benefits discussed by the Task Force include efficiencies in common vaccination-related activities such as the rapid generation of official vaccination records for use by schools, health departments, and vaccination providers.

The Task Force identified no specific harms of IIS. Vaccination provider concerns that may impede IIS implementation include the time and effort required to participate, as well as concerns about data quality of vaccination records (timeliness, completeness, and accuracy). Increasingly, providers are using electronic transfer of data, thereby reducing barriers to provider participation. However, a remaining challenge includes increasing IIS capability to exchange data using Health Level Seven (HL7) messaging standards. Further, there is a need to develop and implement standards for data exchange and interoperability among IIS, health plans, Health Information Exchanges (HIE), and other health information systems. Finally, in U.S. schools, IIS utilization must adhere to the requirements of the Family Education Rights and Privacy Act (FERPA), which may impede the exchange of information.

The Task Force also reviewed the evidence from economic studies to assess the costs and overall value of IIS as implemented and used in the U.S.

Fourteen studies (12 published papers and 2 government reports) were included as the final body of evidence. All studies assessed IIS in a U.S. setting and focused on pediatric immunizations. Most studies involving cost data evaluated (1) system costs of building an IIS, and (2) cost of exchanging immunization data; most economic benefits focused on administrative efficiency. Four studies compared the benefits to costs and found net savings. A major challenge to evaluating a technology-based intervention is the changes that come with technological improvement and advancement. Although the cost and benefit data may be less applicable today owing to changes in system technology, data exchange methods, availability of vendor support, and system functionalities, it is likely that more up-to-date estimates would support the findings of cost savings in this review.

There are several important limitations in the evidence considered in this review. Most of the included studies reporting vaccination rates relied on the IIS for measurements of change during periods in which IIS participation and reporting were also increasing. In general, studies provided little information to distinguish between actual improvements in vaccination rates or coverage, and improvements in participation and reporting. On the other hand, evidence from early IIS reports may not reflect current capabilities and utilities of maturing systems. As IIS shift from a childhood to a lifespan focus, additional evaluations on the utility of IIS for the whole population will be needed.

The Task Force notes that a critical gap in the current body of evidence is a lack of information regarding the daily use and utility of IIS to vaccination providers, especially in clinical settings. As this is one of the major uses of IIS, the lack of information is particularly important. Intervention research should attempt to quantify the use and effectiveness of IIS as a clinical decision support tool, and investigate the effective practices and requirements involved in the incorporation of IIS into clinical practice.

Publications

Groom H, Hopkins DP, Pabst LJ, Morgan JM, Patel M, Calonge Ned, et al. Immunization information systems to increase vaccination rates: a Community Guide systematic review. *Journal of Public Health Management and Practice* 2014;00(00):1–22.

Patel M, Pabst L, Chattopadhyay S, Hopkins D, Groom H, Myerburg S, Morgan JM, the Community Preventive Services Task Force. Economic review of immunization information systems to increase vaccination rates: a Community Guide systematic review. *Journal of Public Health Management and Practice* 2014;00(00):1–10.

Community Preventive Services Task Force. Recommendation for use of immunization information systems to increase vaccination rates. *Journal of Public Health Management and Practice* 2014;00(00):1–4.

Novick LF. Immunization information systems (Editorial). *Journal of Public Health Management and Practice* 2014;00(00):1–2.

Disclaimer

The findings and conclusions on this page are those of the Community Preventive Services Task Force and do not necessarily represent those of CDC. Task Force evidence-based recommendations are not mandates for compliance or spending. Instead, they provide information and options for decision makers and stakeholders to consider when determining which programs, services, and policies best meet the needs, preferences, available resources, and constraints of their constituents.

Document last updated June 12, 2014