Practice Brief Report

Recommendation for Use of Immunization Information Systems to Increase Vaccination Rates

Community Preventive Services Task Force

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Based on findings of a systematic review, 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 articles and 132 conference abstracts showing that immunization information systems 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) generate and evaluate public health responses to outbreaks of vaccine-preventable disease; (3) facilitate vaccine management and accountability; (4) determine client vaccination status for decisions made by clinicians, health departments, and schools; and (5) aid surveillance and investigations on vaccination rates, missed vaccination opportunities, invalid dose administration, and disparities in vaccination coverage.

KEY WORDS: immunization information systems, immunization registries, vaccination coverage

● About the Task Force and This Recommendation

This article provides the recommendation of the Community Preventive Services Task Force (Task Force) for the use of immunization information systems (IISs). The Task Force makes recommendations about community- and system-based interventions, determined by the Task Force, to be of public health impor-

tance in preventing illness, injury, or premature death. Recommendations are based on a systematic review of the evidence on effectiveness, as well as on benefits and harms and applicability to populations other than those studied. Gaps in the available evidence are also noted during the review.

The Task Force recognizes that a decision to implement an evidence-based intervention involves more consideration than evidence alone. Potential implementers should understand the evidence but individualize decision making to the specific population(s) and setting(s) in which the intervention will be implemented, as well as the relevant constraints (eg, resources).

● Task Force Finding

The Task Force recommends IIS on the basis of strong evidence of effectiveness in increasing vaccination rates. Evidence is considered strong, based on the findings from 108 published articles and 132 conference abstracts showing that IISs are effective in increasing vaccination rates and reducing vaccine-preventable disease through their capabilities to:

• create or support effective interventions such as client reminder and recall systems, provider assessment and feedback, and provider reminders;

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The authors declare no conflicts of interest.

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- generate and evaluate public health responses to outbreaks of vaccine-preventable disease;
- facilitate vaccine management and accountability;
- determine client vaccination status for decisions made by clinicians, health departments, and schools; and
- aid surveillance and investigations on vaccination rates, missed vaccination opportunities, invalid dose administration, and disparities in vaccination coverage.

The full Task Force Finding and Rationale Statement are available at www.thecommunityguide.org/vaccines/RRimminfosystems.html.

● Definition

Immunization information systems are confidential, population-based, computerized databases that record all immunization doses administered by participating providers to people living in a given geopolitical area.[1] At the point of clinical care, an IIS can provide consolidated immunization histories and forecasts for immunizations due or past due 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 United States, minimum functional standards for the operation of IISs were developed in 1997 by the Centers for Disease Control and Prevention, the National Vaccination Advisory Committee, and immunization program grantees. These standards are updated periodically.[2]

● Basis of Finding

The Task Force considered a wide range of information relevant to program effectiveness. The Community Guide systematic review on which the Task Force finding is based[3] included articles published in the peer-reviewed literature from January 1994 to April 2011, as well as abstracts presented at conferences in the United States between January 2002 and April 2011, with specific focus on 4 conferences (National Immunization Conference; Pediatric Academic Society; Vaccine University; Immunization Registry Conference). In addition to studies providing a comparative assessment of program impact, the Task Force considered articles providing descriptions of IIS program activities and capabilities. The Task Force finding represents the first effort within a systematic review for

the Guide to Community Preventive Services (Community Guide) to incorporate quantitative assessments of change with qualitative assessments of program activities.

The systematic review included a number of studies demonstrating the capabilities and effectiveness of IIS to generate or directly support interventions known to increase vaccination rates: (1) client reminder and recall systems; (2) provider assessment and feedback; and (3) provider reminders. In 2009, the Task Force determined that each of these interventions had strong evidence of effectiveness in increasing vaccination rates (http://www.thecommunityguide.org/vaccines/index.html).

The role of IIS in generating and evaluating public health responses to outbreaks of vaccine-preventable disease and other public health emergencies was also well described in the included evidence. Several studies characterized the use of IIS records and system capabilities to target reminder and recall notices during outbreaks of measles and hepatitis A, to evaluate provider responses during pertussis outbreaks, and to inform vaccine allocation during the 2009 H1N1 influenza pandemic.

Included studies also demonstrated the utility of IIS in facilitating vaccine ordering, inventory monitoring, and vaccine-related accountability, especially the use of IIS for vaccines available through the US Vaccines for Children (VFC) program. Studies also described efforts to integrate the VFC-required Vaccine Tracking System (VTrcks) within the existing IIS.

Interactions between IISs and health care systems and between IISs and schools and daycares were described in the available evidence. Several included studies described how IIS data were used by health care systems for quality measurements including HEDIS (Healthcare Effectiveness Data and Information Set) reporting. Many studies highlighted how inclusion of school and daycare data in the IIS helped improve data completeness and accuracy, thereby becoming a more useful tool for assessing student immunization status.

The Task Force found limited evidence to evaluate the use of IIS by vaccination providers in clinical settings. Although several studies described IIS utility in vaccine management, few studies provided information on whether and how vaccination providers used IIS data or capabilities during clinical encounters or in the management of client vaccinations.

Most of the identified studies described the use of IISs to provide surveillance 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 surveillance capabilities

including coverage assessments for specific vaccinations, investigations of coverage in high-risk subsets of the population, and an ability to monitor the uptake of new vaccines.

● Applicability

Most of the included studies described activities in the United States and findings are likely applicable to US settings, systems of care, and client populations. Available evidence may reflect the capabilities and accomplishments of more mature IISs, and effectiveness my not directly translate to IISs with lower rates of client, provider, or practice participation.

● Economic Evaluation

A review of the economic evidence found 12 studies and 2 government reports that met Community Guide criteria for a systematic review of economic evidence. 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 with costs and found net savings. A major challenge to evaluating a technology-based intervention is the change that comes 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.

● Considerations for Implementation

The Task Force found benefit of IISs in efficient implementation of common vaccination-related activities, such as the rapid generation of official vaccination records for use by schools, health departments, and vaccination providers, and the ability to use IIS data to assess coverage and develop activities to improve on it. Furthermore, the Task Force identified no specific harms of IISs. 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, remaining challenges include increasing IIS and electronic health record system capability to exchange data using Health Level Seven messaging standards. There is also a need to continue supporting implementation of standards for data

exchange and interoperability among IISs, health plans, Health Information Exchanges, and other health information systems. Finally, issues related to client participation and confidentiality requirements may limit the ways that IIS data can be entered, retrieved, or used for clinical and public health purposes. For example, in US schools, IIS utilization must adhere to the requirements of the Family Education Rights and Privacy Act (available at www.ed.gov/policy/gen/guid/fpco/ferpa/index.html), which may impede the exchange of information.

● Information From Other Advisory Groups

The National Vaccine Advisory Committee has published a series of reports on the progress of IIS over time and has stated that "IIS have demonstrated their effectiveness in improving immunization services and immunization coverage," while also highlighting barriers and challenges to their use.[4,5] A number of associations and advisory groups have issued letters of support for IIS, including the American Academy of Pediatrics, the American Medical Association, the American Public Health Association, the National Medical Association, and the US Department of Education (www.cdc.gov/vaccines/programs/iis/resources-refs/partner-org-support.html).

● Healthy People 2020

Broader implementation of IIS capabilities described in this review may be useful in meeting *Healthy People 2020* objectives to increase vaccination coverage and reduce vaccine-preventable disease. *Healthy People 2020* has established 2 IIS-related objectives: (1) to increase from 75% to 95% the proportion of children younger than 6 years whose immunization records are in fully operational, population-based IIS (IID-18) and (2) to increase the number of states that have 80% of adolescents aged 11 to 18 years with 2 or more age-appropriate immunization recorded in an IIS (IID-20) (http://healthypeople.gov/2020/topicsobjectives2020/objectiveslist.aspx?topicid=23).

● Evidence Gaps

The Task Force noted a critical gap in the body of evidence reviewed: information about the daily use and utility of IISs to vaccination providers, especially in clinical settings, is lacking. As this is one of the major applications of IISs, gaining additional insight in this area is particularly important. Intervention research

should attempt to quantify the use and effectiveness of IISs as a clinical decision support tool and investigate the effective practices and requirements involved in incorporating IISs into clinical practice.

Additional studies are needed to examine the relationship between IIS and IIS-related activities on overall vaccination coverage in the general population, or on important target populations with gaps in coverage. In terms of the economic efficiency of IISs, additional research is needed to address gaps in information and enable a more up-to-date and comprehensive economic assessment of IISs.

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