Brief Report

Assessing Immunization Registry Data Completeness in Bexar County, Texas

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Background: Immunization information systems (or registries) are increasingly being used to promote and sustain high levels of vaccination coverage. However, the perception among many providers that registry data are too incomplete to be relied on when making immunization decisions has impeded the acceptance of registries.

Methods: To evaluate registry completeness, immunization coverage levels from the San Antonio Immunization Registry System (SAIRS) were compared with coverage levels derived from immunization records from 77 (37%) of the 210 clinics participating in the Vaccines for Children (VFC) program in 1998, 44 (21%) clinics in 1999, and 10 (5%) clinics in 2000.

Results: Clinic data indicated an average immunization coverage level for the 4:3:1 series of 39.8%. The overall coverage level for these clinics based on registry data was 64.1%. Registry-coverage levels for these clinics were ≤65% above the coverage levels based on clinic records.

Conclusions: Immunization coverage levels based on SAIRS data were the same or higher than coverage levels based on clinic records. These data suggest that San Antonio's registry data were more complete than clinic records and may assist in changing provider perceptions regarding registry data completeness.

Medical Subject Headings (MeSH): immunization, registries, data collection, program evaluation, evaluation studies, information systems (Am J Prev Med 2002;22(3):184–187)

Introduction

The National Vaccine Advisory Committee has recommended the development of immunization registries as a strategic tool for tracking, improving, and maintaining immunization coverage.[1] Immunization registries are confidential, population-based, computerized information systems that collect vaccination data from providers on patients within a geographic area through direct data entry or electronic transfer.[2] One of the national health objectives for 2010 is to increase to 95% the proportion of children aged <6 years who participate in fully operational population-based immunization registries.[3] Currently, only 21% of children in the United States participate in immunization registries.[2] A major obstacle to reaching the 2010 goal is a lack of widespread provider participation.[1] Barriers to provider participation include concerns regarding data usefulness and confidentiality,[4–6] liability for data entry errors,[7] resources required for use,[8–11] and provider understanding of registry benefits.[4,11] Provider participation may also be hindered by the perception that registry data are incomplete and cannot be relied upon for immunization decision making.[1] Local providers' comments articulating this perception prompted San Antonio Metropolitan Health District staff to study registry data completeness.

Background

The San Antonio Immunization Registry System (SAIRS) includes all public immunization providers and 76% of private immunization providers in the city of San Antonio, Texas, and surrounding Bexar County. The SAIRS contains at least two immunizations for 80% of the children aged <6 years in the covered area. Since its beginning, SAIRS developers have worked to maintain high levels of data completeness through quality assurance checks and the identification of multiple records that may contain partial immunization histories for a single individual.

Since 1995, immunization projects funded under section 317a of the *Public Health Service Act* have been required to conduct coverage assessments of public health centers.[12] The primary tool used is the Clinic Assessment Software Application (CASA) developed by the Centers for Disease Control and Prevention (CDC).

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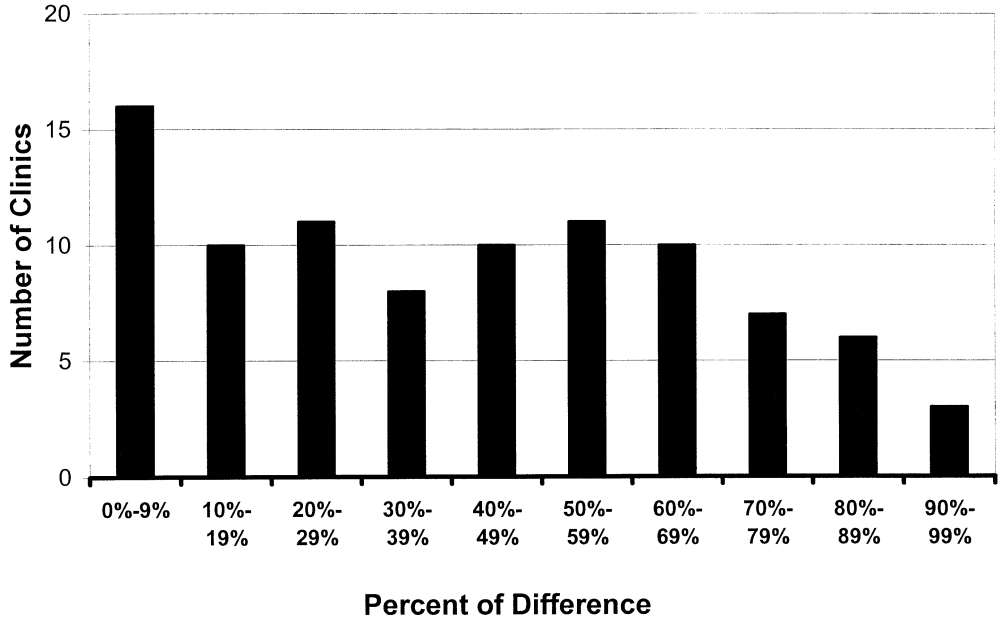

Figure 1. Percent difference distribution between clinic records and immunization registry data based on 4:3:1 (4 diphtheria–tetanus–pertussis, 3 *Haemophilus influenza* type b, and 1 measles–mumps–rubella) coverage levels (N = 92). The percent difference in coverage rates was calculated by subtracting clinic-based coverage levels from coverage levels based on the San Antonio Immunization Registry System (SAIRS) for each clinic, divided by SAIRS-based coverage levels.

An assessment includes the selection of a random sample of 200 records for children aged 12 to 35 months that are then analyzed with CASA to determine the coverage level among the clinic's patients. A detailed description of the assessment process using CASA is available elsewhere.[13]

Methods

In 1998, the San Antonio Vaccines for Children (VFC) team conducted initial CASA assessments at 77 of the 210 clinics in the VFC program. Fifteen additional VFC clinics underwent initial CASA assessments in 1999. Eleven (12%) of the 92 clinics studied were public health clinics; the remaining 81 (88%) were private clinics. These clinics were nonrandomly chosen based on the number of children served and the accessibility of records. While these selection criteria resulted in a sample that was not representative of all clinics, they ensured that the largest numbers of records were assessed. In 1999, 29 clinics were selected from the initial sample of 77 clinics for a second assessment, and 10 clinics were selected from these 29 for a third assessment in 2000.

In each clinic, a random sample of 200 patient records for children aged 12 to 35 months were selected for analysis. If a practice did not have 200 patients in this age range, all appropriate records were selected. The CASA was used to calculate coverage levels for the 4:3:1 (4 diphtheria–tetanus–pertussis, 3 *Haemophilus influenza* type b, and 1 measles–mumps–rubella) series based on Advisory Committee on Immunization Practices (ACIP) recommendations.[14] Coverage level was defined as the percentage of children whose immunizations are up to date based on ACIP-published immunization practice guidelines.

For comparison, coverage was also evaluated using SAIRS data. Each clinic record in this study was matched to a record in the SAIRS. The percent difference in coverage rates was calculated by subtracting clinic-based from SAIRS-based coverage levels. The resulting value was then divided by SAIRS-based coverage levels.

Results

The percent difference between coverage rates based on clinic data and SAIRS data for the 92 initial clinic assessments is described in Figure 1. The average coverage rate from clinic data was 39.8% (standard deviation [SD]=24.8%). Using registry data, this rate averaged 64.1% (SD=16.7%). Although clinic-based coverage rates from eight (8.7%) clinic assessments were equal to SAIRS-based rates, clinic-based coverage rates from the remaining 84 (92.3%) clinics were lower than SAIRS-based coverage rates.

The average percent difference between coverage rates based on clinic data and SAIRS data was larger for initial clinic assessments (23.9%) than for second (12.3%) and third (6.8%) clinic assessments (see Table 1).

Conclusions

Although concordance rates between individual records were not calculated, a comparison of coverage rates based on clinic record assessments with rates based on registry data suggests that registry data are more complete than clinic records in San Antonio.

Table 1. Average difference between clinic record and registry data coverage levels

	Assessment year		
Assessment	**1998**	**1999**	**2000**
First	23.9% (n = 77)	21.5% (n = 15)	—[c]
Second	—[a]	12.3% (n = 29)	—[c]
Third	—[a]	—[b]	6.8% (n = 10)

[a] 1998 was the first year that the assessments were completed.
[b] 1999 was the second year of assessment. Efforts were split between re-assessing clinics and reaching clinics that had not been previously assessed.
[c] Program changes limited assessments in 2000 to a sample of clinics previously assessed twice.

Several factors may account for this finding. More than 20% of children in the United States move during the first 2 years of life and an even higher percentage change providers.[15] A registry that captures immunization information from multiple providers may have more complete data than an individual immunization provider, particularly in highly mobile populations.[11] However, unless a registry can identify and consolidate fragmented records from multiple providers to create a complete and accurate immunization record, registry data may be more incomplete than clinic records. In 2000, 28 (87.5%) of the 32 U.S. population-based registries consolidated immunization records from multiple providers using de-duplication and edit checking procedures to optimize data accuracy and completeness.[2]

Clinic record keeping may be improved by serial CASA clinic/registry assessments. Data from San Antonio indicate that the disparity between CASA assessment of clinic and registry records decreases with repeated assessments. Serial record comparisons may have educated provider staff about deficiencies in their record keeping practices that may have resulted in missing data. Further work is needed to assess the effectiveness or sustainability of serial CASA clinic/registry assessments in improving clinic data completeness.

The San Antonio Metropolitan Health District immunization staff now use this study information in their efforts to dispel the misperception that registry data are too incomplete to use for immunization decision making. It is anticipated that these findings will help increase the number of providers willing to rely on the SAIRS as an authoritative source of immunization histories. Assessing registry data quality has been a difficult task for registries. Current efforts that include electronic edit checking, multiple database comparison, and user record review tend to be functional rather than scientific. These methods provide a means of identifying errors but not a means of statistically evaluating the overall quality of the data. The methodology used for this study could be implemented by developing registries as a means of evaluating data quality for their own provider recruitment efforts.

Further comparisons of clinic and registry data could identify provider and child characteristics associated with incomplete clinic records. In addition, evaluation of the impact of these findings on provider registry participation is critical. Because the SAIRS consistently receives data from a higher percentage of its target population than other registries in the United States, it will be important to assess the study's generalizability to other more typical registries.

It has been noted that questions still remain concerning the impact of immunization registry utilization.[16] This report focuses on a single aspect of immunization registries, but information systems can have an impact on a variety of immunization practices.[11,17,18] This report serves as one item in a growing body of research supporting the argument that immunization registries can be used to help improve/maintain immunization coverage levels.

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