The Costs of Operating and Maintaining an Immunization Registry

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The Costs of Operating and Maintaining an Urban Immunization Registry

Background

Many community-based immunization registries have been planned and implemented to help achieve and maintain high immunization levels. Due to the lack of systematically collected information regarding use of resources, it is difficult to determine the efficiency of registries or different methods of interfacing with providers.

Specific Aims

- To determine the direct costs of maintaining an immunization registry infrastructure; and

- To determine the incremental direct costs to health care providers who are participating in an immunization registry.

Immunization Project Study Design

Time Frame

October 1, 1997, through September 30, 1999

Costs To Be Measured

Direct program-related costs

Analytic Method

Prospective, concurrent program evaluation

Sources of Data

(1) MATCH registry **financial documents**;

(2) **interviews** with MATCH registry personnel;

(3) **interviews** with personnel at provider sites participating in the MATCH registry and the Chatham County (Georgia) All Kids Count Registry;

(4) **observation** at provider sites participating in the MATCH registry and the Chatham County All Kids Count Registry.

Description of Registries

MATCH Immunization Registry

- Community-based partnership between two county health agencies, local non-profit agencies, and community health centers;

- Services provided include record lookups, clinical data entry interface or batch data entry interface, capability available to generate reminder/recalls;

- Members who have health management systems can interface with the MATCH registry, but it is the responsibility of the MATCH members to develop the data formatting interface software;

- MATCH implemented in public health clinics, community health centers, and hospital-based pediatric clinics in DeKalb and Fulton Counties, Georgia.

Description of Registries

Chatham County All Kids Count Registry (HOST)

- HOST system is an integrated children's health care system that includes health check, WIC, and immunization information;

- Services provided include record look-ups, manual data entry, generation of reminder and recall notices through postcards, letters, or an autodialer, and practice assessment of immunization coverage;

- HOST implemented in all three birth hospitals, all public health sites, all community health centers, a hospital pediatric clinic, and 98% of private providers in Chatham County.

Data Analyses

Objective 1: Determine the costs of maintaining the MATCH infrastructure.

Methods

- Itemize registry costs through interviews with registry personnel and a review of financial and organizational documents from 1993 to 1997;

- Follow-up interviews with registry personnel to confirm or clarify financial and operational information and identify in-kind contributions of personnel and equipment;

- Designate major cost areas as:
  (1) **Administrative** (i.e., rent, financial administration, operations manager);
  (2) **Equipment (purchased and donated)** (i.e., computers, printers, telephone lines); and
  (3) **Development and maintenance** (i.e., personnel time involved in system design and maintenance, system and manual upgrades, and addressing data quality issues);
  (4) **Registry outreach functions** (i.e., reminder and recall)

Data Analyses

Objective 1: Determine the costs of maintaining the MATCH infrastructure.

Methods

- Calculate costs for in-kind contributions of equipment including depreciation;
- Calculate donated effort from comparable job descriptions; and
- Prospectively evaluate cost to registry for bringing a community provider on-line.

Costs for Maintaining the Registry Infrastructure

by Type of Expense, 1995-1997, in 1997 dollars

	Start-up Costs	Maintenance Costs	
	1995	1996	1997
Type of Expense	**(% of total)**	**(% of total)**	**(% of total)**
Administrative expenses	$76,237 (60%)	$77,929 (62%)	$118,589 (63%)
Staffing	$62,232	$62,232	$104,432
Donated effort	$62,232	$62,232	$62,232
Rent/supplies	$14,005	$15,697	$14,157
System design and maintenance	$33,198 (26%)	$37,136 (30%)	$56,933 (30%)
Equipment expenses	$18,032 (14%)	$9,823 (8%)	$11,355 (6%)
Total personnel costs	$95,430 (75%)	$99,368 (80%)	$161,365 (86%)
Total non-personnel costs	$32,037 (25%)	$25,520 (20%)	$25,512 (14%)
Total costs	$127,467	$124,888	$186,877
Average monthly cost	$10,622	$10,407	$15,573

Comparison of Expenditures at the Study Site and the Sheps Center Study Sites

Type of Expenditure	% of Study Site Costs	% of Sheps Sites Costs
Personnel Expenditures *(100%)*		
Administrative tasks	64%	11%-48%
Computer and technical tasks	36%	45%-76%
Registry outreach tasks	0%	0%-45%
Non-personnel Expenditures *(100%)*		
Computer and technical	47%	74%-80%
Other	53%	20%-26%

From: Cecil G. Sheps Center for Health Services Research. *The Cost of Immunization Registries.* April 1998; Rebecca T. Slifkin, Ph.D., Principal Investigator.

Criteria for Selection of Provider Sites

Objective 2: Determining the Direct Costs Incurred by Participating Providers

- Consistent participation in a registry as reported by registry activity logs;

- Evaluation of a variety of different methods of interfacing with a registry.

Description of Provider Sites

Site A

- Urban county health department that processes data for five public health clinics
- Automated data entry interface

Site B

- Urban hospital-based pediatric clinic primarily staffed by physician assistants and nurse practitioners
- Manual data entry interface

Site C

- Urban hospital-based pediatric clinic staffed by pediatric residents
- Manual data entry interface

Site D

- Urban community health center that provides primary care to children, adolescents, and adults
- Manual data entry interface

Data Collection

- Interviews and direct observation at provider sites;
- Flowcharts developed to depict the process of obtaining and distributing registry information at each provider site;
- Personnel costs calculated by linking information collected during interviews and direct observation to salaries obtained from public labor statistics;
- Equipment identified during site visits and interviews with provider site personnel;
- Computer equipment costs were estimated based upon 1997 acquisition costs for comparable systems;
- Hardware costs amortized over five years at a 5% discount rate with 10% scrap value.

RESULTS—Annual Costs

Provider Site	Type of Provider	Method of Data Entry	Patients Vaccinated per Year and Entered	Annual Cost of Participating in Registry
Site A	County health department	Automated	18,500	$12,065
Site B	Hospital-based primary care clinic	Manual-clinic staff	1,800	$13,938
Site C	Hospital-based primary care clinic	Manual-clinic staff	4,000	$16,377
Site BC	Hospital-based primary care clinic	Manual-data entry specialist	6,600	$24,246
Site D	Community health center	Manual-clinic staff	1,400	$6,083

- The highest annual costs were incurred by Site BC that employed a data entry specialist full-time.

RESULTS—Annual Costs per Patient

Provider Site	Type of Provider	Method of Data Entry	Annual Cost per Patient	Annual Cost per Shot
Site A	County health department	Automated	$.65	$.24
Site B	Hospital-based primary care clinic	Manual-clinic staff	$7.74	$3.24
Site C	Hospital-based primary care clinic	Manual-clinic staff	$4.09	$1.65
Site BC	Hospital-based primary care clinic	Manual-data entry specialist	$3.67	$1.47
Site D	Community health center	Manual-clinic staff	$4.35	$2.53

- The cost per patient and cost per shot were the least expensive in the site that used automated data entry (A).

Both Labor and Fixed Costs Are Important Determinants of Manual Data Entry Costs

Type of Cost	Number of Patients	Annual Cost	Annual Cost Per Patient
Sites B and C	6,600		
Labor		$7,950.82	$1.21
Equipment		$2,029.72	$ .31
Total		**$9,980.54**	**$1.51**
Site D	1,400		
Labor		$ 687.71	$ .49
Equipment		$1,014.86	$ .72
Total		**$1,702.57**	**$1.22**

- The primary determinant of costs for manual data entry in the larger clinic is labor whereas costs in the smaller clinic are driven by computer expenses.

Comparison of Manual Data Entry and Editing Time between the Two Registries

Data Entry Times	Mean	Range	SD	*t*	P
Immunization Record					
Sites B and C	147.92	20-420	113.71	3.60	.001
Site D	57.00	30-90	22.25		
Demographic Record					
Sites B and C	306.43	30-600	159.69	3.27*	.004
Site D	87.50	45-150	40.71		

* Unequal variance *t*-test

- Data entry times at Site D were significantly less.

Reasons:

- User-friendly interface
- Higher proportion of children already entered in registry
- Staff familiarity and training

Conclusions

(1) *The costs incurred by providers vary across registries*

- ease of interface—affects manual data entry time required
- staff familiarity—affects manual data entry time required
- volume—economies of scale for fixed expenses like a dedicated computer

(2) *The costs incurred by providers are affected by the method that the provider uses to enter and retrieve data*

- automated interface is cheaper

Conclusions

(3) *The costs incurred by providers are affected by the degree of integration of registry activities into the patient flow*

- conflicting results

(4) *The costs incurred by providers are affected by the extent to which the registry has complete capture of the target population*

- editing existing records requires less time and effort than entering new records