

Section A.

Name and Title of Submitters:

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Public Health System Name:

Indian Health Service (IHS) Clinical Reporting System (CRS)

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Description of Communities Served:

The Indian Health Service (IHS) is a Federal agency whose stated goal is “to assure that comprehensive, culturally acceptable personal and public health services are available and accessible to American Indian and Alaska Native people.” The mission of the Indian Health Service is “to raise the physical, mental, social, and spiritual health of American Indians and Alaska Natives to the highest level.” The IHS Clinical Reporting System (CRS) is a tool that allows the clinicians, administrators, and programs to **measure** our progress and improve our success in meeting both the mission and the goal of the IHS.

The communities served by the Clinical Reporting System include American Indians and Alaska Natives who belong to more than 560 federally recognized tribes in 35 states who are using the Health Information Solution (RPMS- Resource and Patient Management System) developed and supported by the Indian Health Service. Tribal members live in urban areas, on reservations and in rural communities, throughout the United States.

Number of FTEs:

A. In entire organization:

The IHS employs approximately 15,000 people, including members of virtually every discipline involved in providing health care, social, and environmental health services. The Federal system consists of 36 hospitals, 61 health centers, 49 health stations, and 5 residential treatment centers. In addition, 34 urban Indian health projects provide a variety of health and referral services. The IHS clinical staff consists of approximately 2,700 nurses, 900 physicians, 350 engineers, 450 pharmacists, 300 dentists, 150 sanitarians, and 85 physician assistants. The IHS also employs various allied health and community professionals, such as nutritionists, health administrators, engineers, and medical records administrators.

The IHS National Program also includes epidemiologists, medical informaticists, disease-specific support staff such as Diabetes, and information technology staff that develop, maintain, and provide instruction on IHS software applications including the CRS.

B. Directly involved in submission project:

There are currently 7 people involved at the national level; in addition, IHS is organized into 12 separate Area Offices located throughout the country. The 12 Area CRS Coordinators are responsible for aggregating and reporting CRS data for all of the reporting sites within their Area. Each site implementing CRS has a local site coordinator as well, and two of them are involved in the submission of this project.

Description of Public Health Program(s) directly affected by submission:

The IHS is an agency within the Department of Health and Human Services (DHHS) that currently provides health care services in 426 facilities nationwide. The IHS health care system operates a comprehensive health service delivery system for approximately 1.8 million of the nation's estimated 2.6 million American Indians and Alaska Natives. Members of federally recognized Indian tribes and their descendants are eligible for services provided by the IHS.

Please list the names of the members of the Electronic Public Health System Team:

Theresa Cullen, MD, MS, National Informatics Consultant, CRS Clinical Lead
Stephanie Klepacki, Management Analyst, Rose International
Michele Gemelas, R.Ph, Performance Improvement Coordinator
Colleen Hayes, MHS, RN, Performance Improvement Coordinator
Carolyn Johnson, R.Ph., Health Information Specialist
Chris Lamer, Pharm D, Clinical Applications Coordinator
Michele Miller, Information Technology Specialist
Carol Goodin, R.Ph, M.P.H., GPRA Coordinator- National Programs
Elaine Brinn, National GPRA Data Analyst- National Programs
Lori Butcher, Director, Systems Development, Cimarron Medical Informatics

Section B.

The Organization

The IHS is first and foremost a public health agency. The IHS Clinical Reporting System (CRS) is a component of the IHS Resource and Patient Management System (RPMS). RPMS is an integrated software system for management of clinical, practice management and administrative data in IHS and tribally operated healthcare facilities. CRS is the reporting tool used by the IHS Office of Planning and Evaluation to improve clinical performance and to collect, report, and evaluate the results quarterly and annually for IHS, as well as DHHS and Congress. The information provided by CRS is used to improve the public health of the population that is being served. In addition, the CRS data are utilized nationally to support IHS' commitment to a culture of quality, as well as locally to help identify clinical measures that require additional improvement.

CRS produces an electronic report of a facility’s performance data specific to any or all of 200 clinical indicators, which represent 41 clinical topics, such as Pap Smear Rates and Childhood Immunizations.

A list of those topics is shown in Table 1 below.

DIABETES	CARDIOVASCULAR DISEASE-RELATED
Diabetes Prevalence	Obesity Assessment
Glycemic Control	Childhood Weight Control
Blood Pressure Control	Nutrition and Exercise Education for At Risk Patients
Lipids Assessment	Cardiovascular Disease and Cholesterol Screening
Nephropathy Assessed	Cardiovascular Disease and Blood Pressure Control
Retinopathy	Controlling High Blood Pressure
Comprehensive Care	Comprehensive CVD-Related Assessment
DENTAL	Beta-Blocker Treatment After a Heart Attack
Diabetes Dental Access	Persistence of Beta-Blocker Treatment After a Heart Attack
Dental Access General	Cholesterol Management After Acute Cardiovascular Event
Dental Sealants	STD-RELATED
Topical Fluoride	Prenatal HIV Testing and Education
IMMUNIZATIONS	HIV Quality of Care
Adult Immunizations – Influenza	Chlamydia Testing
Adult Immunizations – Pneumovax	OTHER CLINICAL
Childhood Immunizations	Osteoporosis Management
CANCER SCREENING	Asthma
Pap Smear Rates	Asthma Quality of Care
Mammogram Rates	Chronic Kidney Disease Assessment
Colorectal Cancer Screening	Medications Education
Tobacco Use and Exposure Assessment	Public Health Nursing
Tobacco Cessation	
BEHAVIORAL HEALTH	
Alcohol Screening (FAS Prevention)	
Intimate Partner Violence/Domestic Violence Screening	
Depression Screening	

Table 1: List of CRS Indicator Topics

CRS reports can display various formats, including the total numbers (count) in the denominator (total patient population evaluated) and the numerator (patients who meet the indicator criteria) as well as the percentage of total patients in the numerator. For example, in Figure 1 below, the two denominators are Female Active Clinical and Female User Population, ages 21-64 years. CRS then reports how many of those patients have recorded in their electronic medical record that they had a Pap smear in the past three years or have refused a Pap smear in the past year. CRS searches for this information in RPMS by looking for specific codes, such as ICD-9 diagnosis and procedure codes, as well as for specific laboratory tests.

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*** IHS 2005 Clinical Performance Report ***									
DEMO SITE									
Report Period: Jul 01, 2004 to Jun 30, 2005									
Previous Year Period: Jul 01, 2003 to Jun 30, 2004									
Baseline Period: Jul 01, 1999 to Jun 30, 2000									

Cancer Screening: Pap Smear Rates									
	REPORT PERIOD	%	PREV YR PERIOD	%	CHG from PREV YR %	BASE PERIOD	%	CHG from BASE %	
Female Active Clinical									
21-64 years									
(GPRA)									
	4,418		4,388			4,389			
# w/Pap Smear recorded									
w/in 3 years (GPRA)	2,769	62.7	2,743	62.5	+0.2	2,589	59.0	+3.7	
A. # Refusals									
w/ % of Total Pap	1	0.0	0	0.0	+0.0	0	0.0	+0.0	
# Female User Pop									
21-64 years									
	6,013		6,015			5,917			
# w/Pap Smear recorded									
w/in 3 years	2,834	47.1	2,806	46.7	+0.5	2,635	44.5	+2.6	
A. # Refusals									
w/ % of Total Pap	2	0.1	0	0.0	+0.1	0	0.0	+0.1	

Figure 1: Sample CRS Report, Pap Smear Rates

Reports also compare the site's performance numbers in the current report period (user defined) to the previous period and to a user-defined baseline period. The default baseline for CRS is 2000, though this application allows sites to choose other years as their baseline. The default baseline year 2000 was chosen to facilitate comparison to Healthy People 2010 goals. Three time periods allow for longitudinal comparison. Users can also request patient lists for each of the measures, displaying patients who do or do not meet the indicator criteria.

The National CRS report provides a summary of the local CRS indicator results compared to national performance and agency goals, as well as compared to Healthy People 2010 and Health Plan Employer Data and Information Set (HEDIS) measurements.

The Clinical Reporting System is available for use by 426 facilities nationwide. In 2004, over 1.16 Million patients were represented in the CRS data submission to the Department of Health and Human Services as part of the performance based budget submission. Annual CRS reporting is mandatory for federally operated programs and voluntary for tribally operated programs; at the current time, over 80% of tribally operated programs voluntarily submit data to the IHS National Program.

Management

A. Objectives

Since 1955, the IHS has demonstrated the ability to utilize limited resources to improve the health status of the American Indian and Alaska Native people by focusing on preventive

and primary care services. The IHS, like all Federal agencies, is under increasing pressure to demonstrate, in a measurable way, the appropriate utilization of federal budgetary dollars, as well as progress towards its mission and goals. The Federal government actively promotes agency accountability and is committed to performance based budgeting as one of five key initiatives within the President's Management Agenda (PMA). The Government Performance and Results Act (GPRA) requires Federal agencies to demonstrate that they are using their funds effectively toward meeting their missions. To do this, Federal agencies are required to report on GPRA measures.

The GPRA measures are also cross-walked into the IHS Strategic Plan. The goals of the IHS Strategic Plan are:

1. Build Healthy Communities
2. Achieve Parity in Access by 2010
3. Provide Compassionate Quality Health Care
4. Embrace Innovation

Because of this, most IHS GPRA measures focus on clinical treatment and prevention measures that affect patient care, as well as population and public health. The GPRA performance measures address the most significant health problems facing the American Indian and Alaska Native (AI/AN) population as identified by representatives of local tribal communities and local health care facilities, as well as areas of national concern to American Indian and Alaska Native populations.

The Director of IHS has designated the CRS as the tool that is used for reporting the GPRA clinical measures. These measures are cross-walked to ensure that they also reflect critical management areas of the President's Management Agenda.

IHS is committed to improving the health status of AI/AN communities. Our long-term strategic plan goals for 2010 include the following measures:

- Decrease years of potential life lost by 20% over FY02 level
- Decrease obesity rates for children (2-6 years) by 10% over FY02
- Assure that 70% of AI/AN children receive dental sealants
- Ensure that 94% of AI/AN homes have safe and adequate sanitation
- Increase childhood immunizations to 95%
- Ensure that 40% of AI/AN diabetic patients have 'ideal' blood sugar control

These long-term goals are tied to annual performance measures in the CRS software. For example, as a first step in addressing obesity rates for children, the 2005 target for this performance measure is to determine the percentage of children ages 2-5 with Body Mass Index (BMIs) greater than 95%, using CRS software. In subsequent years CRS data on this measure will be monitored to see that IHS is making adequate annual progress toward meeting the long-term goal of decreasing obesity rates by 10%. By facilitating electronic

tracking of these measures, CRS enables local and regional assessment of progress towards these objectives as well. Progress is tracked and reported locally, but is also used nationally to report the Agency's progress to Congress.

In addition, IHS tracks the completeness of reporting. In 2003, IHS reported data on a little over 1 million patients. By 2004, IHS was able to report data on over 1.16 million patients.

The success with completeness of reporting was achieved through the development, deployment and utilization of the CRS software application at local facilities since its development in FY 2002.

Currently, IHS also requires quarterly evaluation of local performance at federally administered health care facilities. This quarterly CRS report enables sites to track progress towards their annual goals, as well as early identification of performance issues. These quarterly reports are aggregated and reviewed by the Area Directors, as well as the Office of the Director of the Indian Health Service. This nationally aggregated report is used to help early identification of public health problem areas that may require additional support and resources.

Perhaps more importantly, the use of the CRS software ensures that the same logic is being used at all reporting sites, thus ensuring *comparable* performance data is being reported across all facilities. Prior to CRS, there was no guarantee that all sites were using the same logic (e.g. lab tests and diagnosis and CPT codes) to identify Pap smears.

The GPRA indicators have been measured using the CRS software application for several years. This automated process has helped to improve public health practice by providing comprehensive and longitudinal data in efficient, easy to use reports to individual providers, health administrators, community health programs, tribal leaders, and governing boards. Reports are used to identify patient needs and to assist providers with case management of various disease states including two of the most prominent in AI/AN communities: diabetes and cardiovascular disease. The data gathered also provides opportunities to look at the health of the population and epidemiological patterns. For instance, early data evaluation of BMI data, one of the GPRA measures, has illustrated an obesity epidemic that is worsening in AI/AN communities since 2000. Because of the identification of this epidemic, IHS is implementing patient education programs and a National Obesity Initiative to make its patients aware of the negative health consequences associated with a high BMI and to inform them of the nutritional and physical lifestyle changes they can take to improve their health status.

B. Project Organization

While the CRS development occurs at the national level of IHS, the identification and development of the included measures occurs at the local level. Subject matter experts, including community members as well as tribal organizations are engaged in the development of measures. Measures are accepted into the CRS data set once they pass

through a stringent data evaluation (modeled after the World Health Organization indicator development process). The measure development process determines who will be included in the denominator, what the numerators will be, and what codes (e.g. ICD-9 diagnosis and procedure codes) will be included in the logic.

Indicators are then programmed, extensively tested on developmental servers, which include large databases, and beta tested at facilities by local staff that have volunteered to participate in the process. The software is then submitted to Software Quality Assurance, which conducts a thorough review, certifies and releases the software nationally within IHS. Please refer to the attached Work Breakdown Structure (WBS) for details of CRS software development and testing.

This software development process involved a clinical lead, Dr. Cullen, a senior analyst Stephanie Klepacki, and Lori Butcher, a senior programmer who has developed this software for the last 5 years. Together, this team solidifies requirements, development and testing. In addition, this team is responsible for the development of an appropriate Work Breakdown Structure, developing training materials and support processes, and teaching the CRS classes at each of the Area Offices.

Each year, at least one updated version of CRS software is released to reflect changes in the logic descriptions of the different denominators and numerators, add new GPRA indicators, or to add new developmental clinical indicators, and/or new reports. Software is developed and certified, and then released to the field facilities. At that point, ongoing training occurs including identification of 'best practices' for improving clinical quality and the health of the population. Ongoing support for the application occurs at the local, regional and national level. In addition, the CRS staff manages the content of the CRS web site (<http://www.ihs.gov/cio/crs/>) and notifies users of updated information and future versions of CRS through the CRS listserv.

CRS is intended for use by Area and local performance improvement staff, compliance officers, governing bodies, clinical staff, Area Directors, as well as any staff involved with quality assurance initiatives. Local sites are encouraged to share the clinical and public health results with community members and tribal health boards. Facilities are required to report to the Area Office on a quarterly basis. Many local facilities run the reports more often as part of their performance improvement processes. The Area Offices have established a quarterly review process for the national data and additional key clinical performance measures. The Area Office CRS Coordinator is responsible for submitting their aggregate data to the national programs on an annual basis. This data is evaluated and submitted for Congressional review as part of the budget planning process.

Implementation

a. Public Health System

In addition to meeting the annual reporting requirements, CRS is utilized on a routine basis to identify specific areas where the site is not meeting the measure in order to initiate process changes. The CRS report is also used to identify areas meeting or exceeding

indicators to provide lessons learned to other local sites. Several examples of how clinics have used CRS to improve their patients' health status are included below.

- Both Warm Springs and Cherokee Indian Hospital are using CRS to monitor their challenges and improvements in several areas including:
 - tobacco use screening
 - intimate partner violence/domestic violence screening
 - documentation of medication education
 - flu and pneumooccal immunization rates
 - outcomes related to chronic diseases such as diabetes and cardiovascular disease
- Administrative, community and / or clinical users may review any number of the indicators at any time in order to measure the impact of process and system changes on the indicators. For example, the Electronic Health Record (EHR) was implemented at the Warm Springs Health and Wellness Center and Cherokee Indian Hospital. Patient lists from CRS were generated at Warm Springs to assure that diabetes standards of care were being met during the transition from paper to provider order entry. Quarterly data evaluation helped assure both hospital administration and the community that patient care was being maintained, and in some cases, improving with the advent of this new technology.
- Provider-specific patient lists can be generated to measure their compliance with various public health indicators. At the Warm Springs clinic, provider-specific lists are routinely generated to identify and follow up on patients who are deficient with pneumovax and flu vaccines. These lists are also used to augment the facility's peer review system.
- The Warm Springs Dental program uses CRS to generate a list of diabetic patients who have not had a dental exam within the last year. They are using this list to contact patients and assist them in accessing the care at the clinic. In addition to helping them meet the GPRA objectives, this is also helping IHS to meet a Diabetes Standard of Care.
- The Women's Health program has used CRS patient lists to allocate resources to a "Mammogram Rides" program, by generating a list of patients who were delinquent on their mammograms. Information obtained from these patients helped identify the most significant barrier to women needing mammograms –mammograms were not offered on site. The Women's Health program is also using the CRS to improve data quality in the Women's Health Registry.

b. Scope

CRS is a highly functional and efficient system. It is an application that exists within RPMS , which is the Health Technology solution for the Indian Health Service. RPMS is similar to the VISTA application used by the Veterans Health Administration. IHS has added functionality to meet our needs of providing life long care to our patients. This functionality has included the development of standard code sets for patient education, health factors (for example, tobacco use), screening for certain problems, such as domestic violence and the development and integration of national health maintenance reminders. These reminders are triggered by certain patient and population defined attributes.

Local usage of CRS also depends upon pre-defined taxonomies (i.e. groups of related items) that are populated at the time of application release. However, in order to permit some local site flexibility, local sites can add to some of these taxonomies. For instance, a lab taxonomy for hemoglobin A1C includes the standard LOINC codes and CPT codes for this test; however, a local site can add other locally defined hemoglobin A1C codes to this taxonomy and assure that the data is gathered accurately.

The development of additional standard code sets, local taxonomies and integration of published code sets (i.e. LOINC, CPT, and ICD) enables CRS to search electronically for results. CRS acts as a scavenger, and searches, using predefined logic, through different data fields for patients with these defined attributes. Since RPMS is primarily a clinical database, CRS looks primarily at clinical data, as opposed to other data sets that look primarily to billing and administrative data sets for population reports.

CRS support is available through a web site (<http://www.ihs.gov/cio/crs/>), as well as significant field based teaching. In addition, a new graphical user interface (GUI) (written in .NET) will be deployed during the summer of 2005; this GUI should significantly decrease the amount of user support needed at the local level.

For FY05, CRS Version 5.1 will report on 21 GPRA and 20 developmental indicator topics. Each indicator topic has one or more denominators and numerators defined. The reports display the total numbers (count) in the denominator (total patient population evaluated) and the numerator (patients who meet the indicator criteria) as well as the percentage of total patients in the numerator. The reports also compare the site's performance numbers in the current report period (user defined) to the previous period and to a user-defined baseline period.

Report Options included in CRS

Several report options are included in CRS 2005. In addition to the pre-defined national GPRA-related reports, users have many choices for “customizing” reports for local facility use by selecting different populations and/or specific indicator topics.

National GPRA Report (GP): National reporting for clinical performance measures is accomplished with the National GPRA report. The National GPRA report can be exported to the Area Office by the local sites for aggregation into an Area-wide report. The National GPRA report will also create a delimited electronic file (.txt) with GPRA indicator results designed to be used in Excel to set up graphs.

Patient Lists are available for indicators included in the National GPRA report, and users may choose whether to display patients that do or do not meet an indicator. For some indicators, more patient lists options are available such as those for the Diabetes: Glycemic Control indicator topic:

- List of diabetic patients with a documented HbA1c.
- List of diabetic patients without a documented HbA1c.
- List of diabetic patients with poor glycemic control (HbA1c > 9.5).

- List of diabetic patients with ideal glycemic control (HbA1c < 7).

Patient Lists may be run for (1) a random sample of patients (i.e. 10%), (2) all patients assigned to a designated primary care provider, or (3) for all patients in the indicator. A Clinical Performance Summary Page (Figures 2 and 3) is included at the end of the National GPRA report. The summary displays the site's current, previous and baseline performance results together with the GPRA FY05 goal, national performance for the previous year, and the 2010 goal, (either HP 2010 or IHS). Sites can quickly see which indicators they most need to improve.

*** IHS GPRA Performance Report ***

DEMO HOSPITAL

Report Period: Jan 01, 2003 to Dec 31, 2003

Previous Year Period: Jan 01, 2002 to Dec 31, 2002

Baseline Period: Jan 01, 2000 to Dec 31, 2000

CLINICAL PERFORMANCE SUMMARY PAGE

	Site Current	Site Previous	Site Baseline	GPRA05 Goal	Nat'l 2004	2010 Goal
DIABETES GROUP						
*Diabetes DX Ever	10.0%	9.5%	8.4%	N/A	10.0%	TBD
*Documented HbA1c	83.1%	73.0%	84.1%	N/A	77.0%	50%
Poor Glycemic Control >9.5	24.0%	14.9%	25.7%	17.0%	17.0%	TBD
Ideal Glycemic Control <7	27.3%	12.2%	23.0%	27.0%	27.0%	40.0%
*BP Assessed	98.1%	91.9%	93.8%	N/A	N/A	TBD
Controlled BP <130/80	35.1%	33.1%	34.5%	35.0%	35.0%	50.0%
LDL Assessed	39.6%	0.7%	10.6%	53.0%	53.0%	70.0%
Nephropathy Assessed	51.9%	12.8%	0.0%	42.0%	42.0%	70.0%
Retinopathy Exam	56.5%	61.5%	53.1%	~47.0%	~47.0%	TBD
				#55.0%	#55.0%	
*Depression Assessed	5.8%	4.7%	4.4%	N/A	N/A	N/A
*Influenza Vaccine	76.0%	65.5%	65.5%	N/A	N/A	N/A
*Pneumovax Vaccine Ever	86.4%	84.5%	87.6%	N/A	N/A	N/A
Dental Access Diabetes	21.4%	25.0%	18.6%	37.0%	37.0%	75.0%
DENTAL GROUP						
Dental Access General	16.8%	19.6%	20.1%	24.0%	24.0%	40.0%
Sealants	145	469	420	287,158	&287,158	TBD
Topical Fluoride- # Applications	158	157	63	Baseline	N/A	TBD
Topical Fluoride- # Patients	120	135	60	Baseline	N/A	TBD
IMMUNIZATIONS						
Influenza 65+	77.2%	67.3%	68.4%	54.0%	54.0%	90.0%
Pneumovax Ever 65+	82.8%	78.0%	75.0%	69.0%	69.0%	90.0%
Childhood 19-35 mos	82.7%	68.9%	66.7%	72.0%	&72.0%	80%
CANCER-RELATED						
Pap Smear Rates 21-64	62.1%	63.0%	66.6%	58.0%	58.0%	90.0%
Mammogram Rates 52-64	56.5%	51.9%	43.2%	40.0%	40.0%	70.0%
*Colorectal Cancer 51-80	18.3%	22.7%	27.3%	N/A	N/A	TBD
Tobacco Assessment 5+	2.4%	1.7%	1.4%	27.0%	27.0%	TBD
*Tobacco Use Prevalence	44.1%	26.1%	55.0%	N/A	N/A	TBD
BEHAVIORAL HEALTH						
FAS Prevention 15-44	3.3%	3.0%	3.0%	>7.0%	7.0%	TBD
**IPV/DV Screen 15-40	3.8%	1.2%	1.6%	4.0%	4.0%	25.0%
CVD-RELATED						
BMI Measured 2-74	14.5%	15.4%	17.7%	>60.0%	60.0%	TBD
*Assessed as Obese	35.5%	38.7%	35.4%	N/A	N/A	TBD
Cholesterol Screening 23+	14.4%	13.5%	9.7%	Baseline	N/A	80.0%

Figure 2: Sample Performance Summary Page from GPRA Performance Report, page 1

ADAM	Apr 29, 2005					Page 2
*** IHS GPRA Performance Report ***						
DEMO HOSPITAL						
Report Period: Jan 01, 2003 to Dec 31, 2003						
Previous Year Period: Jan 01, 2002 to Dec 31, 2002						
Baseline Period: Jan 01, 2000 to Dec 31, 2000						

CLINICAL PERFORMANCE SUMMARY PAGE						
	Site	Site	Site	GPRA05	Nat'l	2010
	Current	Previous	Baseline	Goal	2004	Goal

Prenatal HIV Testing	65.9%	10.0%	9.3%	Baseline	N/A	TBD
Public Health Nursing	1366	1707	1358	423,379	423,379	TBD
(* - Not GPRA indicator for FY 2005)						
(~ - National Retinopathy goal/rate)						
(# - Designated site goal/rate)						
(& - Data source other than GPRA+)						
(** - Age range for IPV/DV changed from 16-24 to 15-40 in 2005)						

Figure 3: Sample Performance Summary Page from GPRA Performance Report, page 2

Selected Indicator Reports are intended for local use by a facility for specific public health and/or performance improvement initiatives. Each report allows the user to select one or more indicator topics and different populations.

HEDIS Performance Report: The Health Plan Employer Data and Information Set (HEDIS) is a set of standardized performance measures, originally designed to ensure that purchasers and consumers have the information they need to reliably compare the performance of managed health care plans. The IHS HEDIS report contains only HEDIS measures and is intended for use by sites interested in seeking NCQA certification. CRS v5.0 includes 13 HEDIS indicators from the “Effectiveness of Care” performance section; the remaining clinical indicators that can be derived from RPMS will be included in the future versions of the CRS software. Patient lists are available for this report. The HEDIS Performance report can be exported to the Area Office by the site for aggregation into an Area-wide HEDIS report.

CMS Performance Report: The CMS (Centers for Medicare & Medicaid Services) Performance report provides IHS hospitals with lists of patients and related RPMS data as a basis for chart review and further data abstraction to report CMS Hospital Quality Data for 10 required performance measures on acute myocardial infarction, heart failure, and pneumonia.

Elder Care Report: This report contains quality of care indicators for patients 55 and older, including those related to diabetes prevalence and management, dental access, cancer screening, tobacco use, immunizations, cardiovascular disease, intimate partner violence, depression, and osteoporosis. In addition, the rate of functional status assessment is unique to this report and provides information on patient’s self-care ability, such as dressing, feeding, and transportation. Indicators are also reported by age ranges 55-64, 65-74, 75-84, and 85 and older to facilitate detailed analysis and comparisons. This report

provides a tool that focuses on the quality of care provided to older patients. The Elder Care report can be exported to the Area Office by the site for aggregation into an Area-wide Elder Care report.

c. Integration Level

The Clinical Indicator Reporting system is a software tool that relies upon data abstracted from the IHS Resource and Patient Management System (RPMS). RPMS is the information system that has been utilized by the IHS for decades; it consists of an integrated set of approximately 60 modules with primary focus on clinical applications. RPMS serves as a data repository for over 3000 data fields, including laboratory data, medications, radiology results, women's health, chronic and acute disease diagnosis, etc. CRS has been described as a *scavenger hunt* for data contained in RPMS.

Taxonomies are used to find data items in the RPMS database to determine if a patient or visit meets the criteria for which the software is looking. To ensure comparable data within the agency as well as to external organizations, indicator is based on standard national codes. These codes include ICD-9, CPT, LOINC and national IHS standard code sets (e.g., Health Factors, patient education codes, etc.). These codes are included in hard-coded taxonomies in CRS and may not be edited. Local taxonomies are also used, as noted above.

d. Privacy Protection

Security is provided through the assignment of security keys at the local level. Only users with appropriate security key are allowed to access the application. Users are made aware of the need to protect the information both during CRS training and during annual IHS Computer Security Awareness training, which is mandatory for all IHS computer system users.

Population and public health data is transmitted via a delimited file to a regional non-public server. Only individuals deemed appropriate are allowed access to this regional report. No specific patient identifiers accompany this aggregated report to the area. RPMS includes an appropriate audit trail for all applications, including CRS.

e. System Implementation

Areas and local facilities receive notice of a software release via email notification. Local sites are encouraged to load the software as soon as it is released; however, there is phased training. Over the course of approximately 3 months, training is offered at the 12 Areas. The area training includes an emphasis on clinical quality, population and public health, evaluation of data, as well as performance improvement. Hands -on (computer-based) CRS software training is conducted at Area regional computer training rooms. Evaluations are used to modify the training as well as provide input into functionality that may be beneficial to local sites. The development of the comprehensive cardiovascular disease (CVD) measure was a result of local input at a training session. Other locally driven enhancements include the generation of multiple patient lists, reporting of individual childhood immunization rates as well as aggregate rates, and the inclusion of refusals in numerators.

f. Current State

CRS reporting is mandatory for federally operated programs such as Warm Springs, and voluntary for tribally operated programs, such as Cherokee Indian Hospital. Due to this federal mandate, 100% of federally operated health care facilities are using and reporting quarterly on CRS data. Over 80% of tribally operated sites are currently using and submitting reports using this software. IHS policy makers receive and evaluate the CRS reports on a quarterly basis. Local administrators also receive and act upon this data at least quarterly. Many organizations share their data with tribal organizations and community members. As an example, Warm Springs is posting results, progress and plans for improvement in a public area in their facility and sharing results with the Tribal Council. At Cherokee Indian Hospital, clinical indicators monitored through CRS as part of the performance improvement plan, are also shared quarterly with the hospital governing board and Cherokee Tribal Council.

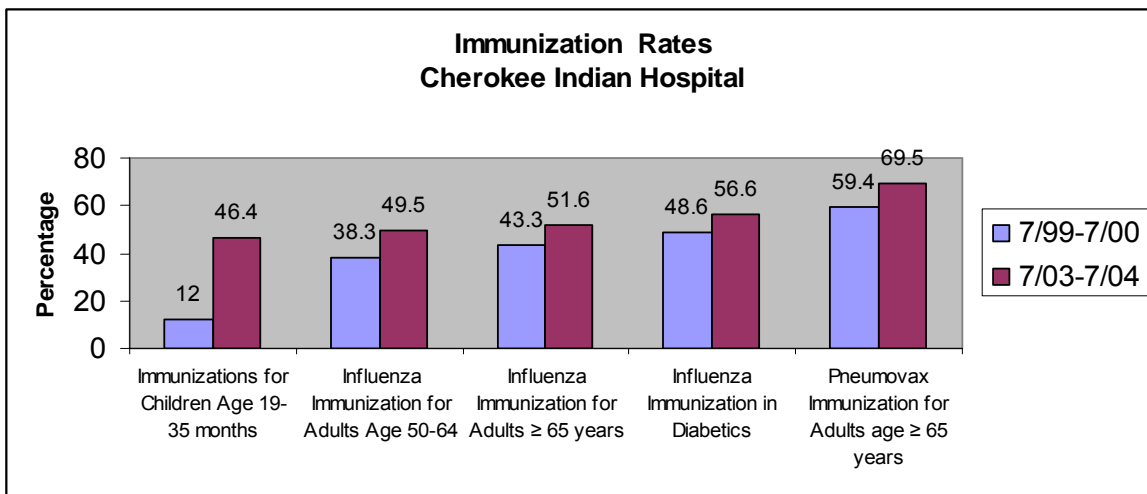
During 2004, data was obtained on over 86% of IHS clinical users (1.16 million patients). Collaborative data sharing exists within many regions; for instance, several Areas routinely share their local data with other facilities within their regions. This data sharing enables the identification of best practices, as well as problem areas. Local sites having difficulty meeting a standard can seek out a site that is successful in that area and share quality improvement strategies. As a recent example, consensual HIV testing in pregnant women was added as a clinical measure. This resulted in ongoing discussion about what constituted appropriate consent within the IHS settings.

Value

a. Success in Meeting Objectives

The CRS system has made a significant impact on the timeliness of quarterly reports for IHS senior staff. Reports are now presented within 6 weeks after the end of the quarter. CRS has dramatically simplified the process of aggregating data at the Area level and again at the Headquarters level.

Patients benefit directly from the use of CRS, and its subsequent impact on population and public health. The following data helps illustrate this impact:

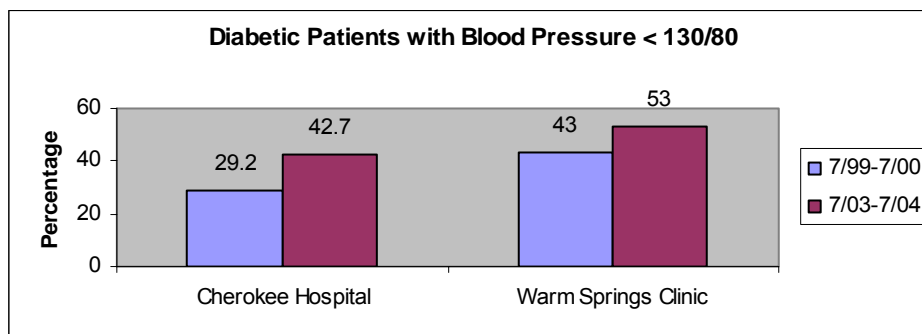


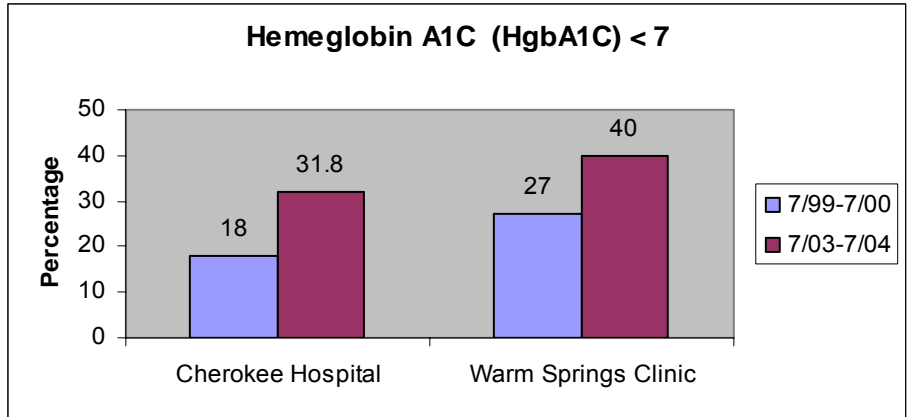
Since the inception of the CRS application in 2002, Cherokee Indian Hospital has shown significant improvement in the documentation of childhood immunizations and adult immunizations indicators, thereby decreasing the likelihood of these patients becoming ill from these diseases.

CRS and GPRA data also provide reports that compare public health information over time for a local population. In using the CRS report, the same logic for the search can be used over the time period, i.e., the same indicator is measured for any time period selected. For example, a comparison of the percentage of patients identified as overweight or obese by age group, from 1990 through 2004 was recently conducted and the data was used for a grant proposal by a community health program seeking to fund an early intervention program for infants and children at risk for obesity.

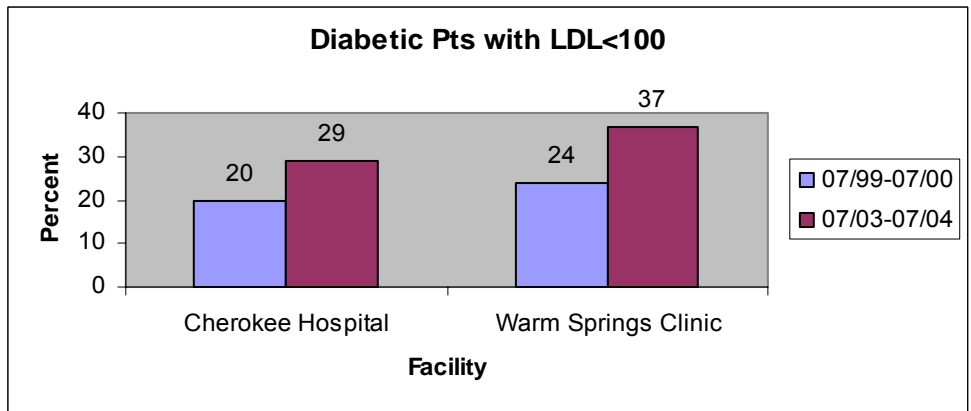
CRS indicators are utilized in specific department Performance Improvement Plans at Cherokee Indian Hospital. For example – the outpatient department has reviewed the CRS indicators and results for CY 2004, and have targeted specific indicators for improvement in CY 2005. Specific targets for improvement were set, and rates and individual provider indicators are measured quarterly. CRS indicators can also be run for an individual provider’s panel of patients, and the provider can see how his panel of patients compares to other providers. For example, Dr. X can compare the percentage of female patients that have been screened for domestic violence, and compare her rate to the overall percentage in the department, and to the provider with the highest screening rate in the clinic. The reports are reviewed quarterly in medical staff meetings and plans for improvement are reviewed and revised as needed.

Diabetes Standards of Care have been incorporated into CRS as well, providing another tool for staff to use to assess the health of the diabetes populations in the AI/AN communities that we serve. The following are graphs that contain both Warm Springs and Cherokee data. They show how CRS data helped improve our performance on these two GPRA objectives: diabetes patients with controlled blood pressures and patients with HbA1c in control.



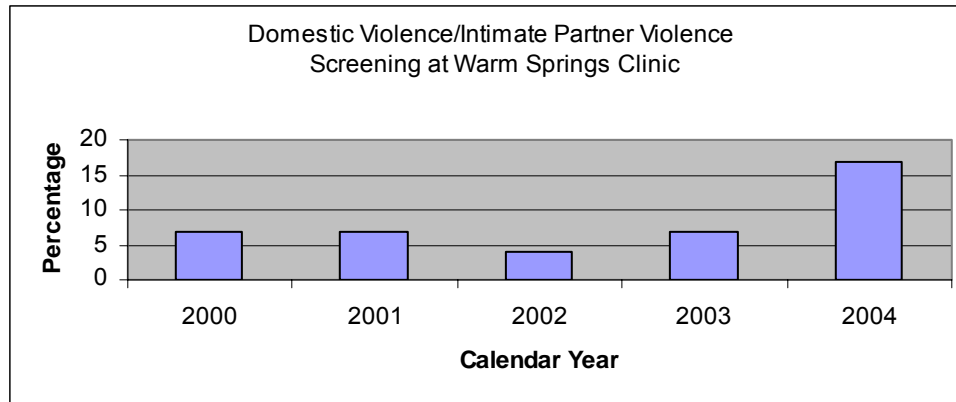


Another GPRA indicator used to assess the care of diabetes patients looks at those who have LDL<100. Below is a graph showing the improvements in the past 4 years at both Cherokee and Warm Springs:



Another example of the benefit of CRS is in domestic violence screening at Warm Springs Clinic. CRS added screening for Intimate Partner Violence/Domestic Violence (IPV/DV) as a GPRA indicator for FY05. However, there was, and currently is, no national standard code set currently for domestic violence screening. IHS developed and distributed a standard code for domestic violence screening, which allows local sites to capture screening information, including the results of these screenings. Low local screening rates were reported in CRS for this GPRA measure, indicating that patients were not being screened and/or they were being screened but the information was not being documented correctly. Consequently, the Warm Springs clinic staff was educated on this new code set and started documenting it appropriately.

Subsequent analysis showed dramatic improvements with a 10% increase in domestic violence screening and documentation in just a 5 month period.



Sites also utilize CRS to identify potential data issues in local RPMS data, i.e., missing or incorrect data. For example, a patient list can be run to see how many children ages 19-35 months have not had an MMR immunization. The information in the patients' charts can be reviewed to see if children actually received the immunization, which was annotated in the chart but not recorded in RPMS, or coded with an incorrect code. This review could also confirm that the child did not receive the appropriate immunization.

b. Costs and Benefits Offsetting Costs

Currently, CRS is developed at the national level; the estimated software development cost is approximately \$400,000/ year. This funding is totally supported by the IHS National Budget. This cost includes staff support, a full time senior analyst, and the programming and deployment of the application. The performance-based reports of this application are used to support the performance-based budget submission for IHS at a national and Congressional level. There has not been a formal Return-On-Investment Analysis on this application.

However, utilization of CRS has significantly decreased the need for independent chart audits. Independent chart audits for this list of indicators are estimated to cost approximately \$50/ chart within the I/T/U setting.

Nationally, the use of CRS results in a cost savings of approximately \$57 million for IHS; for example, this cost savings is approximately \$243,800 for the Warm Springs site per annum.

The value of population based health information has not been assessed; however, as certain sites move towards HP 2010 rates of 90% (for instance, pneumovax, childhood immunizations), we assume that there will be significant cost savings that will be evident in years to come.

Lessons Learned

Critical Success Factors

Our experience with evidence-based and population-based medicine contributed to our success, as did our desire to see more population-based data specific to AI/AN populations. Current technical infrastructure was also critical, as well as the organization's willingness to dedicate personnel to the process. RPMS had been gathering data for decades prior to the CRS application development.

The IHS had historically been developing guidelines and standards of care nationwide, and requiring reporting on diabetes care, childhood immunizations, and others, from every local site. Several of the Areas had implemented indicator reporting systems of their own in years prior to CRS, and this semi-automated, semi-manual data gathering provided plenty of ideas during the creation of the CRS application. These factors contributed to the success of the implementation of CRS

RPMS contains data from decades of healthcare provided to the IHS beneficiaries; RPMS already includes search methodologies that allow the user to query the population database on the fly (QMAN, VGEN, PGEN). These queries are done at local levels, but require fairly sophisticated end user training, so they were not widely used. Many of the capabilities used in CRS have existed in RPMS, but had not been fully utilized due to poor usability.

CRS was NOT an immediate success. Many sites and facilities were concerned about local responsibility for clinical and public health measures. Ongoing dialogue, established between the local, area and national support staff, was critical in overcoming these concerns. The initial software was modified regularly to respond to questions and/or concerns from the field. Our ability to modify software in an agile way, including rapid redeployment of new patches, helped solidify the impression that 'we were trying' to respond to the field's needs at the national level.

The ability to modify the software efficiently and quickly helped overcome skeptics. Moreover, CRS was used as a tool—'If you want to measure something in a standard way, let us know what it is, and we will add it to the software'. Additional requirements were and are catalogued at the national level, and reviewed at least every 6 months for inclusion in the next rewrite. Critical needs (for instance, the failure to include an appropriate ICD code) are 'patched' and released as soon as possible.

Sites started to see improvements in clinical quality measures. The application has matured dramatically in the last 3 years under the current CRS Project Team, producing meaningful reports that are considered accurate; the search logic is consistent with current evidence-based guidelines, making clinicians more apt to use them to improve care. Currently, there is a local and national commitment to develop and support a culture of quality.

Impact

Public Health Operations –General Public – Health Care Providers –

The CRS application has impacted the health of AI/AN populations across the US by providing an efficient, nearly turn-key assessment of the health of the individual communities and populations. Public health researchers have created lists of indicators that would “paint a picture” of the health of a community; many of the CRS indicators are based on these lists. This system has allowed the generation of provider specific quality measures, as well as patient lists for individual providers that can be used for case management. When used to its full potential, CRS rapidly identifies when there is a system problem; the application can help to identify and rectify system issues as well as data quality issues almost immediately.

The data gathered by the CRS application at each site is aggregated at the Area level and then again at the Headquarters level in the IHS. Reliable, population based data helps guide appropriate interventions at the local community and facility level, and appropriate evaluation at the national level. This data set helps medical staff members and other healthcare providers increase awareness of the need for integrating public and population health interventions into each visit. The reports encourage health care delivery systems to provide education about health promotion and disease prevention at each patient visit. Over time, these ongoing efforts improve the health of the communities that we serve. These reports help to illustrate whether or not our interventions have been successful. We are optimistic that this application will help us to continue to improve the care and health status of our AI/AN constituents. This system, used efficiently and correctly, is a major tool in our armamentarium in eliminating health status inequities for the AI/AN population.