National Patient Information Reporting System (NPIRS)

The NPIRS conversion project which began in January 1996, was commissioned as a result of an Office of Management and Budget (OMB) mandate to eliminate mainframe based data centers within the federal government. The original conversion project spanned the timeframe between January 1996 to February 1998. The original contractor exhibited limited progress during this span of development and the project was turned over to the GSA contractor already on-site. The new contractor began the conversion project during the last week of February 1998 and has continued until the current date. The current contractor has attempted to meet the original deadlines of the previous contractor despite encountering several hurdles during the span of development. These hurdles have hampered the progress of the conversion; however, they have also provided the opportunity to enhance the ability of NPIRS to perform its assigned functions more efficiently.

The NPIRS project entailed leapfrogging computer technological generations from a borderline generation 2-3 computer to a generation 5 system using the cutting edge of technology. This leapfrogging of technology required a massive amount of adjustment to existing processing procedures to become effective in the new environment. The mainframe environment was mainly tape oriented with considerable amounts of manual intervention while the newer technology allowed the incorporation of automatic processing techniques to lessen the degree of manual intervention. This transition became time consuming as the system began to replace manual communication interfaces that were the mainstay of the mainframe environment. A breakdown of interface integrity with the distributed system entailed the reexporting of 6 months of data within a 30 day timespan which was required to be processed due to revenue generation requirements. The delivery of new computer equipment, year 2000 documentation and IV&V requirements in addition to conducting monthly processing on two computer platforms also added to the challenges faced by the conversion team. Requests for needed reports by the area personnel also mandated the utilization of conversion team personnel to provide programs and output products upon request during the conversion process. Despite the challenges facing the conversion team, progress not only has been made but enhancements to the system have improved data integrity beyond the original specifications of the conversion project.

The NPIRS development has encompassed the conversion of current processing requirements from the mainframe environment to a mid-tier computer platform. During the process of converting these applications, the conversion team has discovered many deficiencies in the existing software that adversely affected the performance of the central database environment. Data integrity had suffered during a period of years that the old environment had not performed to acceptable levels of accuracy. These discrepancies in processing were mandated by IHS management for repair during the development of the NPIRS thereby modifying the processing sequences of the existing system. This modification of processing required much planning to maintain accuracy in accordance with IHS policy and regulations. New methods of linking medical records data with patient registration data were developed to increase patient utilization reporting for increased accuracy of funds distribution within IHS. Update procedures were modified to account for past deficiencies in data and new year 2000 requirements, thereby, increasing the data integrity of the NPIRS by utilizing data currently stored on tape files but never incorporated into the master database and ensuring compliance to year 2000 requirements. Enhancements to the production environment, while time consuming, were deemed important to the overall success of the NPIRS development project.

The NPIRS project, while exceeding its initial goal of mainframe shutdown on September 30, 1998, has made outstanding progress during the development schedule since February 1998. The adjustment to new technology from a 30-year-old system has taken shape regardless of constantly shifting manpower resource delegation within the conversion team. Newer techniques of processing have increased the data integrity and reports to better reflect the status of IHS activities. Automated functions have replaced manual intervention thus decreasing the reliance upon manual interfaces. The vigilance to year 2000 requirements has eliminated the need for lengthy test procedures to ensure compliance to Y2K guidelines. Overall, the leap to the twenty first century from the doldrums of 1960s computer age, while not happening overnight, has resulted in a product which will ensure performance and reporting improvements for decades to come.

NPIRS Operational Overview

The NPIRS encompasses not only the replacement of the mainframe based central database applications, but also enhancements to those applications to incorporate database integrity repairs, systems processing repairs, and inclusion of new processing methods to decrease the amount of manual intervention required for production processing. The NPIRS is composed of 6 subsystems identified as Patient Registration, Ambulatory Patient Care, Inpatient, Contract Health, Dental, and Reporting. This document is meant as a brief overview of the overall processing procedures to be instituted as NPIRS becomes the new production system.

Production Processing

Production processing begins upon the receipt of data from the area or tribal entities. An RS6000 computer designated as the DPSSYG or "G" machine receives this data. Upon receipt of the data, a production module, which is automatically executed every 5 minutes, will generate an electronic mail message to the sender of the data, specifying receipt of data and the appropriate counts desired by the sender. Currently, this message consists of the name of the file and number of records received.

After the data is received, it is automatically transferred to the NPIRS production computer where it is logged into a tracking database table to be processed into the master database on a daily basis at 8:00 PM MST every evening. At production processing time, the data is edited and required fields converted (ie. Y2K, coded fields, etc...) to prepare for inclusion into the master database. The data is separated by type (ie. Reg, PCC, CHS, etc...) and prepared for processing by the appropriate update module.

The registration data after finishing the edit/conversion process is then loaded into the active database where it will be compared and edited with the current registration data to determine validity and which type of further update or merging action is required. This processing is required to complete an initial attempt at unduplicating patient registration within the area. The registration transactions consist of patient add/change/delete, health record number add/change, patient delete merge, eligibility add/change/delete, and eligibility page 4 & 5 updates. These data must be matched/compared with the current database to determine course of action to be taken. Upon completion of processing the "raw" data received from the area/tribe is transferred to an archive area as a backup measure.

The medical records data (ie. PCC, CHS) is loaded directly into the database without editing. This ensures data capability between the central database and the service unit databases. Pure duplicate entries are flagged and later discarded from the master database. The update then attempts linking the MRS data to a specific patient loaded in the registration area of the database. The linking program attempts these links in the following order until a match is made. This linking technique is known as Advanced Links.

a. Concatenating the facility code and chart number to form a health record number (HRN) and searching for the HRN in the chart table.
b. Modifying the HRN to account for all variations of the area code for the region and attempting match. Each geographic region within IHS is segregated into administrative areas designated by a two-digit area code. Currently, NPIRS allows up to four area codes per region. These area codes denote the type of administrative entity which "owns" the facility/service unit, or area. The administrative entities are IHS, Tribal/638 Contract, Urban, and Non-IHS. These area codes change depending upon the activities of the area. A patient's HRN which is comprised of the facility code (area code is first two digits) and chart number therefore is subject to change if a facility changes ownership within the system. In order to account for these changing HRNs NPIRS attempts to match on all variations of the area code and upon completion of a match, will automatically add the HRN into the Chart Table. This eliminates requiring HRN add transactions from the distributed system.
c. Searching the patient table for a unique social security number (SSN) match. If a unique match is made, the HRN derived from the data will be created for the patient depending upon its uniqueness in the database. Invalid or non-unique HRNs will not be added to the database. This link is in response to the review of unlinkable medical records entries received due to the non-receipt or rejection of HRN add transactions in the past.

Upon completion of the advanced linking technique, the system then updates the appropriate data in the registration area of the database. These data consist of date of last visit, type of last visit, facility of last visit, state, county and community of residence, area and service unit of residence and tribe code. This technique is known as advanced updates. After linking, the update program edits the data and determines whether or not it is workload reportable via IHS policy. All "raw" medical records data is then transferred to an archive area for storage.

The contract health data (CHS) is received from both the CHS fiscal intermediary and IHS/tribal facilities and loaded directly into the database without editing. This ensures data capability between the central database and the service unit databases. Pure duplicate entries are flagged and later discarded from the master database. The update then attempts linking the CHS data to a specific patient loaded in the registration area of the database as described in the previous medical records data section. Upon completion of the advanced linking technique, the system then performs the advanced updates as previously described. After linking, the update program edits the data and determines whether or not it is workload reportable via IHS policy. All "raw" CHS data is then transferred to an archive area for storage.

The dental data (DEN) is received from both private contractors and IHS/tribal facilities and loaded directly into the database without editing. This ensures data capability between the central database and the service unit databases. Pure duplicate entries are flagged and later discarded from the master database. The update then attempts linking the DEN data to a specific patient loaded in the registration area of the database utilizing either the HRN or SSN contained within the data. The advanced links will be performed to achieve this purpose. Registration updates from the DEN data consist of only the date, type and facility of last visit. All "raw" DEN data is then transferred to an archive area for storage.

Upon completion of processing all data received in a given day, the updated database is then backed up and prepared for the following day's processing. Individual area databases are updated for access via the Internet by area personnel. Reports may be generated from the either the master or area databases during the daytime working hours.

Report Processing

The report processing activities of NPIRS consist of audit/edit reports for all subsystems, user population reports, workload reports, third party billing reports, on-request reports and specially requested reports. The report processing activities also encompass the output interfaces from NPIRS. Report processing is conducted mainly from the NPIRS production site with a planned Web interface for on-demand report processing planned for the near future.

Registration reports are created to document production processing activities and errors detected during normal processing. Also included are user population and eligibility reports, which report patients with activity within IHS or tribal facilities within three years of the reporting period and third party eligibility status.

Workload reports output workload information for each area, service unit and facility. Workload reports are also created via varying requirements based upon the needs of the user.

Third party billing reports contain information concerning number and amount of Medicare and Medicaid claims billed, unbillable claims, Inpatient billable claims worksheet as well as the actual claims creation itself. Claims are formatted and transmitted to the fiscal intermediaries via electronic file transfer protocal.

On-request reports are specially requested reports, which are created on an as-required basis. These are reports identified by the users as being needed on a reoccurring basis for specific time periods. Many are also run automatically as per instructions from the user.

Specially requested reports are reports created for special purposes such as studies and programs within IHS and tribal activities. These reports are considered AD-HOC and are created upon demand.

Output interfaces from NPIRS vary from monthly to on-demand. Requesters of information from NPIRS include federal and state agencies, health care organizations, tribal activities, universities, and other public health activities. NPIRS also serves as a central data storage site for re-creation of data in the event of destruction at the area, service unit, facility or tribal level.