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Studies in Ambulatory Care Quality Assessment in the Indian Health Service

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STUDIES IN AMBULATORY CARE
QUALITY ASSESSMENT IN THE
INDIAN HEALTH SERVICE

Volume I: Overview Of The Methodology

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ABSTRACT

This report describes a method to assess the quality of ambulatory health care. A brief review of the literature is presented and the design decisions basic to the methodology are discussed.

Application of the assessment strategy is completed in stages. First a set of health problems is selected to represent the major health problems of the community. A process map (or clinical algorithm) is constructed for each health problem to describe the expected process of health care. Process maps specify necessary elements of prevention, diagnosis and treatment, and they define acceptable health outcomes.

Criteria, which are the benchmarks of effectiveness, are translated into audit questions (called indicators) which are the actual measures of quality. Some indicators are provider-oriented and focus on health worker performance. Other indicators are patient-oriented and track individuals through the problem solving process to determine the distribution; continuity and end results of care. Throughout, emphasis is placed on local staff involvement during all phases of planning and implementation. Special attention is given to reviewing the operations of the health system as a whole, as well as the performance of individual providers.

A pilot study of this methodology is briefly described. Subsequent reports will present and discuss results from the pilot studies.
INTRODUCTION

Recent years have witnessed a growing concern among health professionals, consumers, medical organizations, and the federal government for improvements in the quality of health care. The Joint Commission on Accreditation of Hospitals (JCAH) has been the major operational quality assurance program since 1952, however quality assurance activities have been mandated more recently under two federal laws. The PSRO legislation of 1972 (P.L. 92-603) directs that medical care evaluations are to be pre-requisites for reimbursement of costs payable under Medicare and Medicaid. In 1973 the Health Maintenance Organization (HMO) Act (P.L. 93-222) required quality assurance activities in all federally supported HMO's.

Much of the work in quality assurance has been directed toward inpatient care, while the state-of-the art of ambulatory care quality assurances remains in its infancy. Most of the existing quality assurance mechanisms focus on institutions and examine the performance of the facility or its providers for those patients who utilize the facility, rather than examining the quality of the health care received by the recipient community.

The Indian Health Service (IHS) is charged with the responsibility of assuring comprehensive health services to defined communities of American Indian and Alaskan Natives. This responsibility is discharged through a number of local IHS Service Units designed to function as a comprehensive health care system. Health services are provided through a combination of inpatient, outpatient, and field activities directed toward the total
care of the patient in the context of his environment. Consistent with its responsibility, each Service Unit directs its effort toward environmental sanitation, health education, preventive practices, and well patient surveillance in addition to traditional modes of acute and chronic care. In recent years the Tribal and Native organizations have accepted increasing responsibility in manning and managing segments of its health care program. As a result, each local health care system has become increasing complex and existing mechanisms of quality assurance are not entirely adequate to meet the existing demands for quality control.

The Office of Research and Development of the Indian Health Service has been examining methods to assess the quality of care for ambulatory patients with three basic performance criteria in mind. First, the method must be easily and economically applied. Any method that requires additional resources or significant systems description is likely to be viewed as a special study rather than a routine periodic application of a genuine systems component. Second, the method must identify areas of deficiency in health care and suggest adaptive programs to correct deficiencies. Any method that merely attempts to identify care or "good" or "bad" is not likely to lead constructively to improved health care. Finally, the method must view health care from the community perspective and examine the health care received by the community rather than focusing entirely on the care provided by any given facility.
This report presents an overview of an evolving methodology for assessing ambulatory patient care currently under development in the IHS. The intent is neither to present a comprehensive review of the quality assurance literature nor to describe an ideal method that is consistently followed. Rather, it offers some empirically derived guidelines for examining the quality of ambulatory health care, briefly describes an extensive field test design, and comments on the feasibility of the approach. Subsequent reports will describe the results of the field application of the methodology.
METHODOLOGIC DESIGN DECISIONS

At the outset it is useful to review the fundamental design decisions that were made in the design of the quality appraisal method.

1) What mode of health care delivery is assessed?

The majority of emphasis in quality assessment programs has centered on hospital care. Methods for specifically evaluating outpatient and field health care are not as well established. Ambulatory care was chosen for examination for three reasons. First, it is the primary mode of care for patients in the Indian Health Service. Second, it is an appropriate arena to study patient education, primary education, screening, early diagnosis and treatment, and follow-up. Third, it is a fertile area for quality appraisal research.

2) What aspect of quality is measured?

The term "quality" as it pertains to health care, is multi-faceted. In a classic paper written in 1953, Lee and Jones\textsuperscript{1} identified eight dimensions of quality care including comprehensiveness and emphasis on prevention. In later review, Klein\textsuperscript{2} categorized 16 aspects of quality such as patient understanding and continuity of care. More recent discussions have focused on efficiency\textsuperscript{3} and acceptability.\textsuperscript{4}

The principal aspect of quality that is examined in this methodology is effectiveness; i.e., the ability to solve and prevent health problems. Effectiveness was selected because it is the sine qua non of quality care. Other dimensions are examined indirectly.
3) **What is the content of the evaluation?**

According to Donabedian, the content of most health care evaluations can be divided into three categories: review of structure, process, and outcome. Appraisal of structure is the least direct method and involves a review of the "settings and instrumentalities" available for the provision of health care. Factors such as organizational policies, physical plant, and staff qualifications are monitored. It is assumed that if the structure is adequate, effective care will be delivered. A more direct approach is to study the process of care; i.e., what is done on behalf of patients. Process components includes primary prevention, screening, diagnostic work-up, treatment, and follow-up. It is evaluated by determining if necessary services are provided and if services provided are appropriate. The most direct approach to assessing effectiveness is to measure outcomes, which are the results of care.

Several different types of outcomes may be measured. Williamson identifies diagnostic outcomes which "represent the data required to determine the need for care, specify therapy and prognosis", and therapeutic outcomes which "represent the health status of a patient following treatment." He also distinguishes between final outcomes and intermediate outcomes. The final outcome describes a state in which "the patient's health status is stabilized at a definable level." The intermediate outcome is based on pathophysiologic variables which have a direct relationship to the end results, but are measured prior to stabilization.
Sanazaro\textsuperscript{7} differentiates between patient end results and process outcomes. The former refers to changes in signs, symptoms and functional capabilities, while the latter refers to changes in patient cognition which affects attitudes, comprehension and compliance. Decker\textsuperscript{8} describes administrative outcomes including "the utilization of health services, waiting times and other volumetric measures of managerial interest" and economic outcomes which specify "costs generated by services provided."

The content of this evaluation method is limited to measures of process, diagnostic outcome, and intermediate therapeutic outcome for representative health problems. By evaluating process and outcome simultaneously, it can be directly determined if health problems are being prevented, diagnosed and solved, and causes of observed deficiencies can be pinpointed. Measurement of administrative economic and process outcomes require specialized data collection techniques and are not included in this methodology.

4) \textbf{How is quality assessed?}

Two categories of judgments have been described for determining the quality of care: implicit and explicit. According to Brook\textsuperscript{9}, implicit judgment is based on subjective impressions of the "adequacy of the process" and the "possible improvability of the outcome." Explicit judgments are based on objective determinants of quality care which are documented ahead of time.
Patient care criteria serve as yardsticks for explicit appraisal. These are elements against which process and outcome can be measured. Each criterion is associated with a performance standard which defines the goals of acceptable compliance in a defined population, and an indicator which specifies what information is required to apply the criterion. For example, consider the criterion, "Pregnant women should have a urinalysis in the first trimester." The performance standard adopted by a health system might be "a minimum of 90% compliance." The resulting indicator asks, "What percent of pregnant women have a urinalysis in the first trimester?"

In this method, patient care criteria and performance standards are used to make judgments of quality. The results from this type of approach tend to be more uniform than those generated by implicit judgments. Also, explicit judgments can be made by trained para-professionals or computers. This may reduce evaluation costs and improve feasibility of maintaining large sample sizes for case review.

5) From what perspectives are measurements taken?
Two viewpoints are used for patient care appraisal. In one, attention is focused on the patient population so that the continuity, distribution, and end results of care can be measured. In the other, attention is focused on the providers so that the quality of their performance can be assessed. Two classes of indicators are derived from these perspectives. Population-based indicators ask what happens to the patient population; e.g., "What percent of the population is
being screened for hypertension?" or "What percent of infants received all immunizations by 13 months of age?" They are expressed in the following units: percent of patient population in compliance with the criteria for effective care.

Provider-based indicators ask about the delivery of health services; e.g., "On what percent of laceration follow-up visits does the provider document wound healing?" They are expressed in the following units: percent of study encounters or cases in which the provider complied with criteria. Both perspectives are incorporated in this approach.

6) How are the results analyzed?

Results from discreet cases or encounters can either be aggregated or studied individually. Aggregated data offer a view of the overall level of care. Isolated results provide a useful starting point for in-depth case review. Here both methods of data analysis are employed in order to achieve a balanced picture at the mainstream of care and the exceptional cases.

In summary, these design decisions were made:

• The object of attention is ambulatory care rather than hospital care.
• The dimension of quality measured is effectiveness.
• The content of evaluation includes measures of process and outcome for a group of representative health problems.
• The yardsticks employed to measure quality are explicit patient care criteria.

• The perspectives from which measurements are taken are both patient-based and provider-based.

• Methods of data analysis include aggregation of individual results and isolation of exceptional results.
OVERVIEW OF THE ASSESSMENT METHODOLOGY

Given the basic design decisions listed above, the development of a patient care evaluation is carried out in a stepwise manner. First, a group of health problems are chosen to represent the major health problems of the community. Selection is based on the prevalence and potential severity of the health problem as well as the effectiveness of available strategies.

Kessner recommends the following guidelines for selecting representative health problems:

- Each problem should be relatively well-defined and easy to diagnose.
- Each should have a significant, measurable functional impact.
- The techniques of medical management should be well defined for at least one of the following: prevention, diagnosis, treatment and rehabilitation.
- The outcome should vary with the utilization and effectiveness of care.
- The condition should have a high prevelancy rate.
- The epidemiology of the problem should be well understood.

Although there is no proof of commonalities between tracers and the rest of the health problems in the system, the use of tracer conditions should not be abandoned. Conditions which are prevalent and have a large effect on the health care system will be somewhat representative by virtue of their weight and impact. We, therefore add two criteria to those of Kessner for selecting tracers.
As a group, the diseases being monitored should cover all clinical functions including primary prevention, screening, diagnostic evaluation, treatment, follow-up, and well patient surveillance.

As a group, they should cover a broad spectrum of conditions; e.g., acute/chronic, adult/pediatric, physical/mental, surgical/medical, remedial/preventive. Table 1 shows the relationship between the tracer conditions used in the pilot study to the clinical functions of health care.

After selecting a set of tracer conditions, each is reviewed in detail to determine which areas will be examined in the assessment. Graphic models of the health care process (process maps) are useful in defining the scope and content of the assessment for each tracer.

The development of a process map for iron deficiency anemia serves as a useful example. First, a simple diagram may be drawn to show the basic sequence of clinical functions (Figure 1). Patients either pass all the way through the process or drop out. The map in Figure 1 may be employed for some basic audit designs, but it does have obvious limitations. For one, not all patients who might enter the sequence will have anemia. These individuals do no need to pass through distal elements. Moreover, the map does not distinguish between mass screening and selective screening, and it wrongly suggests that follow-up is a necessary condition for a successful outcome. Finally, all pathways on the map lead to dead ends.
If audit planners desire a more realistic representation of the process, a revised map like the one in Figure 2 can be constructed. In this example, new pathways are introduced, and routes are contingent upon diagnostic and therapeutic results. Also, the new map describes a closed loop system. Those screened negative are referred for periodic rescreening, treatment failures are scheduled for additional therapy, and so on. If the planners want to differentiate between the various causes of iron deficiency anemia (e.g., pregnancy, dietary deficiencies, chronic blood loss, etc.), if they want to cover the diagnosis and management of adverse drug reactions, or if they want to isolate the management of initial episodes of anemia from subsequent episodes, then additional branches can be added to the sequence.

There are no absolute rules governing the design of process maps; however, the following suggestions might be made. First, a conscientious effort should be made to include all major clinical functions. Second, the map should include more closed loop pathways than dead ends. Finally, branches should be included whenever the potential benefits seem to outweigh projected costs for planning and auditing. The process maps for each tracer constructed for the pilot study are shown in Figures 2 through 9 (Appendix A).

Next, a list of problem specific criteria are developed and translated into indicators which serve as the basis for the audit protocol. The indicators consist of three types. **Population-based indicators** express a percent of the total community which has received a particular health
service. This class of indicators characterizes the extent to which the health care system is meeting the needs of its total patient population. By tracking specific patient cohorts they describe the continuity, distribution, and appropriateness of health services received. This measure of system performance might be reflected by population-based indicators such as:

1. What percent of the community has been adequately screened for hypertension?
2. What percent of infant in the community have been adequately immunized against poliomyelitis?
3. What percent of patients diagnosed with otitis media, received adequate antibiotic therapy?

Provider-based indicators express a percent of contacts between patients and the health care system in which particular health services were provided. This class of indicator characterizes the adequacy of health services provided when patients utilize the health care system, provider-based indicator data can be aggregated to characterize the performance of individual providers, provider disciplines, or all providers in the system. This performance measure might be reflected by indicators such as:

1. What percent of patient visits due for a screening blood pressure resulted in a blood pressure recording?
2. What percent of infant visits due for poliomyelitis immunization resulted in an immunization?
3. What percent of patient visits including a diagnosis of otitis media, was an appropriate antibiotic prescribed and a follow-up visit scheduled at an appropriate referral?

Finally, health status indicators express the percent of patients for whom a change in health status has been documented. One should be cautioned against equating health status indicators with measures of incidence or prevalence since the latter requires a random sampling of the population. Health status indicators on the other hand often reflect change in health status of selected patient group; e.g., only those who were followed-up.

The process maps of Figures 2 - 9 (Appendix A) show the points in the process of care where indicators are measured. The indicators are analogous of sensors or probes which monitor the function of complex machinery. As a group they pinpoint the areas of strength and weakness in the process of health care.

Some population based indicators are analogous to "flow meters" and can be constructed in a sequence in order to examine the continuity of care. Referring to a process map, such as the one in Figure 7 of Appendix A, the patient population can be seen to percolate down through a variety of pathways. If flow meter indicators are placed along the major routes, they will measure the distribution and continuity of health services. For example, if an indicator is placed at the entrance of the screening element, the results will show how well screening services are distributed among the at-risk population. These indicator sequences may focus on any of the clinical functions of the health care process.
and can express "continuity" as a series of conditional probabilities based on empirical data.

By examining continuity of care in this way, the assessment methodology can identify discontinuities in health care and distinguish between those related to provider-behavior and those related to patient utilization of services. In general a required health task is completed only when three basic steps occur. First, there must be contact between the patient and an appropriate provider. Second, the need for that health care task must be recognized, and finally the task must be performed. Conventional wisdom would suggest that making contact with the health care system for services is generally the responsibility of the patient. The recognition function is the shared responsibility of the patient, who may reflect need in his chief complaint, and the provider who reviews the patient's record. Finally, the performance of the task is the responsibility of the provider. The tracers whose process maps appear as Figure 7, 8, and 9 (Appendix A) employ indicator sequences designed to examine the continuity of care in this way.

The next step in designing an assessment methodology involves defining criteria for each indicator. Professional guidance from consultants or local experts can be solicited to help develop the initial criteria list. An exhaustive literature search is often necessary to validate assessment criteria. Even if criteria are borrowed from pre-existing criteria lists, they must be adopted for local circumstances. This burden can be relieved by expert consultants who are familiar with the literature.
In generating criteria it is useful to consider the suitability of criteria for auditing the quality of care. Suitability is a function of the expected documentation patterns, scientific validity, and potential constructiveness of the proposed criteria.

- With respect to documentation, audit specific data, which are used to determine compliance, should be reliably recorded in the medical record. In general, prescriptions, measurements, lab results and diagnosis are well documented, but historical data, physical findings (especially negative findings), and educational treatment plans are not.

- With respect to scientific validity, proposed criteria should be supported by the results of controlled clinical studies. If this is not possible, consensual support should be obtained from the local professional community.

- With respect to constructiveness, effective corrective action programs should be available at the local level to assure compliance with the proposed criterion. It is a waste of time to measure elements of care which cannot be changed.

Local providers should be encouraged to inspect and modify the proposed criteria list. When they are not given the opportunity to internalize the criteria which will be used to judge their performance, the resulting quality assessment effort can be like a major organ graft that does not take. Initially, there is a great deal of concern and anxiety, and then there is a relentless process of rejection. This "host reaction"
can be prevented by promoting local provider involvement in generating the assessment criteria.

The indicators and criteria generated for each tracer condition in the pilot study are shown in Tables 3 through 10 of Appendix B.

After the local staff gives formal approval to criteria, performance standards and indicators, the evaluation can begin. The first task is to identify the material which is to be audited. Usually, charts are selected on the basis of demographic information or diagnoses. Claims forms and disease registries can be used to find the appropriate records. A sample as small as 50 charts is usually adequate to measure most indicators, however, larger samples will be needed if multiple statistical breakdown of results are anticipated. If more clinic material is available than is required for auditing purposes, a representative sample of records can be chosen using a random method.

Next, the length of the study period is clearly defined. Longer time frames will provide more audit specific information; however, if the study period is too extensive, specificity is diminished, and the chance for rapid performance feedback is lost. Evaluations which cover consecutive six to twelve month periods are practical for most health problems. The study of acute, seasonal illnesses may require a shorter time frame, and measurements may cover non-consecutive study periods.

Chart auditors can be drawn from a wide variety of occupations. Medical records librarians, clerks with a knowledge of medical terminology, laboratory personnel and college students majoring in health related
professions have all performed well in chart review. Training objectives include developing an understanding of pertinent medical terminology and a knowledge of where audit specific information is located in the record. Prior to the audit, trainees in our program reviewed at least ten charts per indicator with a qualified health professional.

Two instruments are useful for data collection. The first is a graphic algorithm or abstractor's map which summarizes the elements upon which judgments are based. Auditors follow the pathways in the map as a guide to interpretation of data in the medical record. The maps can also serve as the basis of computer programs for automated evaluation system, or as the data collection instrument for tracers used to assess continuity of care. In the pilot study, the data collection instruments for hypertension, non-deficiency anemia, and urinary tract infections were patterned closely after the process map. They are shown in Appendix C. The second instrument is the data collection form for those tracers for which provider-based indicators are used. These are included in Appendix C.

Large evaluations can be streamlined by conducting the chart review in stages. First, health outcomes are assessed. If there is compliance with outcome performance standards, additional auditing is unnecessary. If outcome standards are not met, a process audit can be undertaken to determine where operations have broken down. The initial objective of the process audit is to confirm that all major clinical functions are present, and that there is continuity between them. If major functions are absent,
or if continuity is poor, additional auditing is not indicated until corrective action has been taken. If, on the other hand, major functions are present, continuity is good, but the outcome is poor, the deficiency is probably due to inadequate provider performance rather than a general system failure. A highly specific set of provider-based indicators is required to study this type of problem.

The validity of the review process should be periodically re-examined. A health professional other than the original chart auditor should check 10% of the indicator measurements in a single blind study. For our purposes, a minimum of 80% reproducibility has been considered adequate.
THE PILOT STUDY

A pilot study has been implemented using the tracers, criteria, indicators, and data collection instrument described. Assessment of the quality of ambulatory care was completed in six Service Units of the IHS, three rural private practices, and two large Health Maintenance Organizations. The results of the assessments will be described in subsequent reports.

Cost Considerations

The costs of implementing this ambulatory care quality assessment methodology can be reasonably estimated from experience in the pilot sites, and are shown in Table 2. In the pilot study there was a single study design utilized in all the sites and therefore the design costs could be spread over a total of eleven sites. Likewise an additional Service Unit that wished to use exactly the same methodology could do so without investing the manpower specified under the design phase. However, the manpower requirements for implementation would necessarily be duplicated in each study site.

In the pilot study, a variety of disciplines were found to serve quite well as data collectors, including medical records personnel, undergraduate students in health-related studies, medical students, and nursing personnel. Local manpower availability should probably dictate who is used as a data collector, and in our experience the method allows a great deal of flexibility.
Data Reliability

A test of data reliability was performed by using an independent physician auditor who reexamined a sample of medical record previously reviewed by each data collector. In all cases there was at least an 85% agreement between the physician standard and the data collector.

Data Validity

A deserves mention that this methodology examines the medical record rather than direct observation of the health care providers' performance. Therefore assessments of the quality of care provided are in reality assessments of the quality of care as documented in the medical record. This methodologic problem in quality assessment has been noted by others\(^{15,16}\) and certainly is not solved by this study design. The methodology does, however, emphasize the need to select indicators (and their criteria) which are reliably documented in the medical record.

A parallel line of reasoning would suggest that essential items in the process of care should be reliably documented in the medical record, particularly in health care settings involving several providers. If the elements of health care incorporated into indicators are considered as essential to good health care, then documentation of those items in the medical record should also be considered as essential to good care. Therefore a quality assurance mechanism that improves the documentation of such essential items could be considered as achieving an improvement in the process of health care.
DISCUSSION

An eclectic approach to patient care evaluation has been described. It is intended for monitoring individual provider performance, the overall continuity and distribution of services, and impact on patient health status. Information is gathered from both population-based and provider-based perspectives, and judgments rest on explicit criteria. Results distinguish between health worker deficiencies and health system deficiencies. Ultimately, the method supports an holistic approach to quality assurance activities which includes peer review, provider self-assessment and education, management and planning. Despite these features, a number of important evaluation topics such as acceptability, accessibility and affordability, are not given direct consideration. Methods for assessing these areas are beyond the scope of this paper.

One final caveat is offered. The benefits of patient care appraisal, for both providers and recipients of health services, are proportional to the amount of effort and commitment that goes into evaluation efforts. Our experience suggests that a significant amount of work is required to achieve a measurable impact. We seriously doubt that half-hearted, isolated attempts at evaluation will have any long term impact on the quality of care. Furthermore, we feel that audits which do not have the support of the local staff will almost certainly fail to produce constructive change. On the other hand, active participation by the local staff in designing the evaluation and interpreting the results, is the first
step in converting a health services delivery system into a dynamic, self-correcting system for the prevention and solution of health problems. Potential rewards are great.
REFERENCES


FIGURE 1.

Process Map for Iron Deficiency Anemia: Original Version
Process Map for Iron Deficiency Anemia: First Revision
<table>
<thead>
<tr>
<th>Condition</th>
<th>Prevention</th>
<th>Well-Patient Surveillance</th>
<th>Screening</th>
<th>Diagnostic Evaluation</th>
<th>Treatment</th>
<th>Follow-up</th>
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<td>Prenatal Care</td>
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<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
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<td></td>
<td></td>
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<td></td>
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<td>Streptococcal Disease</td>
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<td></td>
<td></td>
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<tr>
<td>Lacerations of Scalp and Extremities</td>
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<td>X</td>
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<td>X</td>
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<td>Hypertension</td>
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<tr>
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<tr>
<td>Iron-Deficiency Anemia</td>
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<td></td>
<td></td>
<td></td>
<td>X</td>
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</tbody>
</table>

**TABLE 1:** Tracer Conditions Used in Pilot Study, Shown in Relation to the Clinical Functions of Health Care.
### DESIGN PHASE

<table>
<thead>
<tr>
<th>Role</th>
<th>Time</th>
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<tr>
<td>Quality Assurance Director</td>
<td>10 Man-Days</td>
</tr>
<tr>
<td>Physician Consultants</td>
<td>5 Man-Days</td>
</tr>
<tr>
<td>Local Physician (review of criteria &amp; indicators)</td>
<td>$\frac{3}{2}$ Man-Day (each)</td>
</tr>
</tbody>
</table>

### IMPLEMENTATION

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<tr>
<td>Physician (training data collector(s))</td>
<td>2 Man-Days</td>
</tr>
<tr>
<td>Data Collectors (data collection)</td>
<td>10 Man-Days</td>
</tr>
<tr>
<td>Data Collectors (data analysis)</td>
<td>4 Man-Days</td>
</tr>
<tr>
<td>Quality Assurance Director (interpreting results)</td>
<td>2 Man-Days</td>
</tr>
<tr>
<td>Quality Assurance Director (other)</td>
<td>2 Man-Days</td>
</tr>
</tbody>
</table>

**TABLE 2:** Estimates of Cost of Implementing Ambulatory Care Quality Assurance Methodology in a given site.
APPENDIX A

PROCESS MAPS
FIGURE 2: STREPTOCOCCAL DISEASE AUDIT ALGORITHM

STUDY POPULATION
#1 (all patients over the age of 6 years).

Did patient contact the system for pharyngitis?

NO
Reject for Audit

YES

Was throat culture taken within 2 days?

NO

Follow-up 0-15 days after treatment?

NO

Follow-up 0-15 days after treatment?

YES

Did patient receive antibiotics for URI/pharyngitis?

NO

Follow-up 0-15 days after treatment?

YES

Did patient receive antibiotics within 5 days?

NO

Was appropriate antibiotic administered?

NO

Go to Next Patient

YES

Positive Sputum Culture Rate

*1.2 mu LA Bicillin or Erythromycin 250 mg. p.o. QID x 10 days.

Selective Screening Rate

Treatment Rate

Treatment-of-choice Rate

Unsupported Treatment Rate
FIGURE 3: RHEUMATIC FEVER PROPHYLAXIS AUDIT ALGORITHM

STUDY POPULATION (all patients on RF register)

Did patient have a recurrence of ARF? 

YES

Go To Next Patient

NO

Was patient treated prophylactically?

YES

GO TO NEXT PATIENT

a

b

Examine each patient encounter within the system

Was patient covered by prophylaxis?

YES

Was LA Bicillin 1-2mm used?

NO

NO

NO

NO

YES

Was patient allergic to penicillin?

YES

Was Erythromycin or Sulfa used?

YES

YES

GO TO NEXT PATIENT

POPULATION-BASED INDICATOR

PROVIDER-BASED INDICATOR

HEALTH STATUS INDICATOR (OUTCOME)

Prophylaxis Rate

Drug-of-choice Rate

Cohort Prophylaxis Coverage Rate

Prophylaxis Coverage Rate

Prophylaxis Renewal Rate

Acute Rheumatic Fever Recurrence Rate
STUDY POPULATION
(all people over the age of 6 years old)

Did patient encounter system for a laceration?

YES

Was there documentation of wound description?

NO

Was there documentation of extent of the injury?

NO

Was patient covered by previous tetanus immunization?

NO

Tetanus Prophylaxis Coverage Rate

d

FA

Follow-up Rate

YES

Was wound sutured?

NO

Go To Next Patient

YES

Wound Description Rate

a

Documentation of Extent of Injury Rate

b

Tetanus Prophylaxis Renewal Rate

c

Observed Wound Infection Rate

g
FIGURE 5: PRENATAL CARE AUDIT ALGORITHM

STUDY POPULATION
(all women who had documentation of pregnancy during study period)

Did patient encounter the system by the 13th week?

Was pregnancy wanted, unwanted, or undecided about pregnancy by 13th week?

Did patient receive counselling within 2 weeks?

Was pregnancy unwanted?

Was a TAS done?

Was patient on family planning 2 months after TAS?

PREDNATAL ENTRY RATE

PREDNATAL FOLLOW-UP RATE

PREGNANCY ASSESSMENT RATE

WANTED, UNWANTED, UNDECIDED PREGNANCY ASSESSMENT RATE

UNWANTED PREGNANCY COUNSELING RATE

NUTRITIONAL COUNSELING RATE

PREGNANCY MONITORING RATE

FAMILY PLANNING COUNSELING RATE
STUDY POPULATION
(all women who had documentation of pregnancy in study period)

Was a Hct or Hgb recorded by 20th week?

Yes → K
No → (L)

Was BP recorded 3 times in A and 5 times in 

Yes → (L)
No → (K)

EXAMINE EACH PATIENT VISIT

Was a BP recorded?

Yes → m
No → p

Was diastolic BP > 90?

Yes → (m)
No → o

Was result recognized?

Yes → (o)
No → m

Was Hct or Hgb recorded?

Yes → n
No → p

Was Hct > 37 or Hgb > 12?

Yes → (n)
No → (p)

Anemia Screening Rate
Pregnancy-Induced Hypertension Screening Rate
Pregnancy-Induced Hypertension Rate

Observed Prevalence of Anemia in Pregnancy
Abnormal Blood Pressure Recognition Rate
Anemia Recognition Rate
FIG 7: HYPERTENSION SCREENING AUDIT ALGORITHM

1. Study Population (Patients between 40-60 years of age)

   Did patient encounter health system 1-1-74 to 3-1-77?
   YES
   Did patient encounter health system 1-1-76 to 3-1-77?
   YES
   Was diastolic blood pressure recorded?
   YES
   Was diastolic blood pressure greater than 90%?
   YES
   Was there evidence that evaluated blood pressure was recognized?
   YES
   Did the patient contact health system within 6 weeks?
   YES
   Was a blood pressure taken?
   YES
   Screening Contact Rate
   Screening Rate
   Abnormal Screening Recognition Rate
   Abnormal Screening Contact Rate
   Rescreening Rate
   Population Based Indicator
   Provider Cased Indicator
   Health Status Indicator
   Screening Field
FIG B: IRON-DEFICIENCY ANEMIA
AUDIT ALGORITHM

Study Population
Hgb < 11 gm and/or
Hct < 33%

old

patient
contact health system
within 3 weeks of
positive
screening?

YES

NO

Was

anormal
result recognized?

YES

NO

Was
diagnostic
work-up (diet
history) complete?

YES

NO

Was
treatment
started within
3 weeks of recog-
nition?

YES

NO

old

patient
contact system 3-6
weeks after treat-
ment begun?

YES

NO

Was

need for
follow-up recog-
nized?

YES

NO

Was

Hct/Hgb
done?

YES

NO

Was

result
Hct > 33%/Hgb >
11 gm?

YES

NO

Evaluation Contact Rate
Abnormal Screening Recognition Rate
Diagnostic Work-up Rate
Treatment Rate
Follow-up Recognition Rate

Population Based Indicator
Provider-Based Indicator
Health Status Indicator
Contact Rate for Follow-up
Follow-up Rate
FIG 9: URINARY TRACT INFECTION
AUDIT ALGORITHM

Study Population [patients with laboratory studies positive for UTI]

Did patient contact health system within 2 weeks? NO

a

Was abnormal screening recognized? YES

b

Was diagnostic evaluation complete? NO

c

Was adequate treatment begun within 2 weeks? NO

d

Did patient contact system 1-4 weeks after treatment began? YES

e

Was need for follow-up recognized? NO

f

Has urine culture taken? NO

g

Has result <10,000 colony count? NO

h

Evaluation Contact Rate

Abnormal Screening Recognition Rate

Diagnostic Evaluation Rate

Treatment Rate

Follow-up Contact Rate

Follow-up Rate

Population Based Indicator

Provider-Based Indicator

Health Status Indicator

Follow-up Recognition Rate

Negative Reculture Rate
APPENDIX B

INDICATORS AND AUDIT CRITERIA
# TABLE 3: STREPTOCOCCAL DISEASE PROVIDER BASED PROCESS INDICATORS

<table>
<thead>
<tr>
<th>TITLE</th>
<th>DESCRIPTION</th>
<th>STUDY POPULATION</th>
<th>NARRATIVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selective Screening Rate</td>
<td>What percent of first visits for pharyngitis received a throat culture within two days of the initial visit?</td>
<td>All patients over the age of 6 years who contacted a health provider for pharyngitis.</td>
<td>Number of first visits for pharyngitis in which a strep culture was obtained divided by total number of visits.</td>
</tr>
<tr>
<td>Treatment Rate</td>
<td>What percent of patients with a positive strep culture received an antibiotic within 5 days of the culture date?</td>
<td>All patients over the age of 6 years who contacted a health provider for pharyngitis.</td>
<td>Number of patients with positive strep culture results who received any antibiotic treatment within 5 days of the culture result divided by the number of patients with a positive strep culture.</td>
</tr>
<tr>
<td>Treatment-of-Choice Rate</td>
<td>What percent of patients with a positive strep culture received either 1.2 mU LA Bicillin (600,000 mU for children less than 60 lbs or 9 yrs or less), Oral pen 10 x 10 days Erythromycin x 10 days within 5 days of the culture date?</td>
<td>All patients over the age of 6 years who contacted a health provider for pharyngitis.</td>
<td>Number of patients receiving LA Bicillin, Oral Penicillin, or Erythromycin within 5 days divided by the number of patients with a positive strep culture.</td>
</tr>
<tr>
<td>Unsupported Treatment Rate</td>
<td>What percent of patients with an episode of pharyngitis received an antibiotic without receiving a strep culture?</td>
<td>All patients over the age of 6 years who contacted a health provider for pharyngitis.</td>
<td>Number of patients who received an antibiotic divided by the number of patients who did not receive a strep throat culture.</td>
</tr>
</tbody>
</table>

---

# TABLE 4: STREPTOCOCCAL DISEASE PROVIDER BASED PROCESS INDICATORS

<table>
<thead>
<tr>
<th>TITLE</th>
<th>DESCRIPTION</th>
<th>STUDY POPULATION</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Selective Screening Rate</td>
<td>What percent of first visits for pharyngitis received a throat culture within two days of the initial visit?</td>
<td>All patients over the age of 6 years.</td>
<td>Number of first episodes of pharyngitis in which a strep culture was obtained divided by total number of episodes.</td>
</tr>
<tr>
<td>Treatment Rate</td>
<td>What percent of patients with a positive strep culture received an antibiotic within 5 days of the culture date?</td>
<td>All patients over the age of 6 years.</td>
<td>Number of patients with positive strep culture results who received any antibiotic treatment within 5 days of the culture result divided by the number of patients with a positive strep culture.</td>
</tr>
<tr>
<td>Treatment-of-Choice Rate</td>
<td>What percent of patients with a positive strep culture received either 1.2 mU LA Bicillin (600,000 mU for children less than 60 lbs or 9 yrs or less), Oral pen 10 x 10 days Erythromycin x 10 days within 5 days of the culture date?</td>
<td>All patients over the age of 6 years.</td>
<td>Number of patients receiving LA Bicillin, Oral Penicillin, or Erythromycin within 5 days divided by the number of patients with a positive strep culture.</td>
</tr>
<tr>
<td>Unsupported Treatment Rate</td>
<td>What percent of patients with an episode of pharyngitis received an antibiotic without receiving a strep culture?</td>
<td>All patients over the age of 6 years.</td>
<td>Number of patients who received an antibiotic divided by the number of patients who did not receive a strep throat culture.</td>
</tr>
</tbody>
</table>

---

# TABLE 5: STREPTOCOCCAL DISEASE HEALTH STATUS (OUTCOME) INDICATORS

<table>
<thead>
<tr>
<th>TITLE</th>
<th>DESCRIPTION</th>
<th>STUDY POPULATION</th>
<th>NARRATIVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive Strep Culture Rate</td>
<td>What percent of episodes of pharyngitis which were cultured resulted in a positive strep culture?</td>
<td>All patients over the age of 6 years who received a throat culture for pharyngitis.</td>
<td>Number of positive strep cultures divided by number of episodes of pharyngitis in which a culture was obtained.</td>
</tr>
</tbody>
</table>
**TABLE 6: RHEUMATIC FEVER PROPHYLAXIS**
**POPULATION BASED PROCESS INDICATORS**

<table>
<thead>
<tr>
<th>TITLE</th>
<th>DESCRIPTION</th>
<th>STUDY POPULATION</th>
<th>COMPUTATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prophylaxis Rate</td>
<td>What proportion of patients were treated prophylactically during the study period</td>
<td>All patients on rheumatic fever registry for whom registry called for prophylactic treatment</td>
<td>Number of patients receiving at least one prophylactic dose divided by the total study cohort.</td>
</tr>
<tr>
<td>Drug of Choice Rate</td>
<td>What proportion of patients received LA Bicillin or (if allergic to penicillin) either Erythromycin 250 mg QID or Sulfadiazine 1 gram q.d.</td>
<td>All patients on rheumatic fever registry for whom registry called for prophylactic treatment</td>
<td>Number of patients receiving LA Bicillin, Erythromycin or Sulfadiazine divided by the total study cohort.</td>
</tr>
<tr>
<td>Cohort Prophylaxis Rate</td>
<td>What is the mean percent of the study year during which the study cohort was covered prophylactically?</td>
<td>All patients on rheumatic fever registry for whom registry called for prophylactic treatment</td>
<td>Number of weeks each patient was covered with prophylaxis divided by the study cohort times 52 weeks.</td>
</tr>
<tr>
<td>Prophylaxis Coverage Rate</td>
<td>What is the mean percent of the study year during which those individuals receiving prophylaxis were covered prophylactically?</td>
<td>All patients on rheumatic fever registry for whom registry called for prophylactic treatment</td>
<td>Number of weeks each patient was covered with prophylaxis divided by the number of patients receiving prophylaxis times 52 weeks.</td>
</tr>
<tr>
<td>Acute Rheumatic Fever Recurrence Rate</td>
<td>What percent of patients suffered a recurrence of ARF during the study time frame (1 year)?</td>
<td>All patients on rheumatic fever registry for whom registry called for prophylactic treatment</td>
<td>Number of patients with an episode of acute rheumatic fever during the study year divided by the study cohort.</td>
</tr>
<tr>
<td>Prophylaxis Renewal Rate</td>
<td>What percent of visits by post ARF patients not covered prophylactically resulted in a renewal of prophylaxis?</td>
<td>All patients on rheumatic fever registry for whom registry called for prophylactic treatment</td>
<td>Number of patient visits resulting in a renewal of prophylaxis divided by the number of patient visits not covered by prophylaxis.</td>
</tr>
</tbody>
</table>

**TABLE 7: RHEUMATIC FEVER PROPHYLAXIS**
**PROVIDER-BASED PROCESS INDICATOR**

<table>
<thead>
<tr>
<th>TITLE</th>
<th>DESCRIPTION</th>
<th>STUDY POPULATION</th>
<th>COMPUTATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prophylaxis Renewal Rate</td>
<td>What percent of visits by post ARF patients not covered prophylactically resulted in a renewal of prophylaxis?</td>
<td>Patients on rheumatic fever registry for whom registry called for prophylactic treatment</td>
<td>Number of patient visits resulting in a renewal of prophylaxis divided by the number of patient visits not covered by prophylaxis.</td>
</tr>
</tbody>
</table>

**TABLE 8: RHEUMATIC FEVER PROPHYLAXIS**
**POPULATION-BASED HEALTH STATUS INDICATOR**

<table>
<thead>
<tr>
<th>TITLE</th>
<th>DESCRIPTION</th>
<th>STUDY POPULATION</th>
<th>COMPUTATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Rheumatic Fever Recurrence Rate</td>
<td>What percent of patients suffered a recurrence of ARF during the study time frame (1 year)?</td>
<td>Patients on rheumatic fever registry for whom registry called for prophylactic treatment</td>
<td>Number of patients with an episode of acute rheumatic fever during the study year divided by the study cohort.</td>
</tr>
<tr>
<td>TITLE</td>
<td>DESCRIPTION</td>
<td>STUDY POPULATION</td>
<td>NARRATIVE</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Wound Description Rate</td>
<td>Percent of scalp or extremity laceration encounters documented: 1) The time since the laceration, 2) Cause of the laceration, and 3) Description of the wound.</td>
<td>All patients over the age of 6 years who contacted a health provider for a scalp or extremity laceration.</td>
<td>Number of encounters documenting the time, cause and description of wound divided by the total number of encounters for scalp and extremity lacerations.</td>
</tr>
<tr>
<td>Documentation of Extent of Injury Rate</td>
<td>Percent of scalp or extremity lacerations with documented consideration of bone, nerve and vascular involvement.</td>
<td>All patients over the age of 6 years who contacted a health provider for a scalp or extremity laceration.</td>
<td>Number of encounters documenting if the wound was superficial plus, if not superficial, the number of cases documenting sensory, vascular or motor function distal to the laceration plus the number of scalp wounds where a skull fracture was considered. The above divided by the total number of encounters for scalp and extremity lacerations.</td>
</tr>
<tr>
<td>Tetanus Prophylaxis Coverage Rate</td>
<td>Percent of scalp or extremity lacerations which had current tetanus immunization or where given tetanus protection.</td>
<td>All patients over the age of 6 years who contacted a health provider for a scalp or extremity laceration.</td>
<td>Number of encounters with current tetanus immunization or number of encounters given a tetanus toxoid divided by the total number of scalp and extremity laceration encounters.</td>
</tr>
<tr>
<td>Revisit Rate</td>
<td>Percent of patients with sutured scalp or extremity laceration by any health provider for any reason within 5-15 days of laceration encounter.</td>
<td>All patients over the age of 6 years who contacted a health provider for a scalp or extremity laceration.</td>
<td>Number of patients seen for any reason 5-15 days after laceration encounter divided by the total number of sutured scalp and extremity lacerations.</td>
</tr>
<tr>
<td>Follow-up Rate</td>
<td>Percent of patients with sutured scalp or extremity lacerations with documentation of wound healing 5-15 days after laceration encounter.</td>
<td>All patients over the age of 6 years who contacted a health provider for a scalp or extremity laceration.</td>
<td>Number of patients with documentation of wound healing divided by the number of patients with sutured lacerations.</td>
</tr>
</tbody>
</table>

**TABLE 10: LACERATIONS OF SCALP AND EXTREMITIES PROVIDER-BASED PROCESS INDICATORS**

<table>
<thead>
<tr>
<th>TITLE</th>
<th>DESCRIPTION</th>
<th>STUDY POPULATION</th>
<th>NARRATIVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wound Description Rate</td>
<td>Percent of scalp or extremity laceration encounters by provider type (MD, PA, DO, RN, PT) that documented: 1) Time since laceration, 2) Cause of laceration, and 3) Description of wound.</td>
<td>All patients over the age of 6 years who contacted a health provider for a scalp or extremity laceration.</td>
<td>By provider type number of encounters documenting the time, cause and description of wound divided by the total number of encounters for scalp and extremity lacerations.</td>
</tr>
<tr>
<td>Documentation of Extent of Injury Rate</td>
<td>By provider type percent of scalp or extremity lacerations with documented consideration of bone, nerve and vascular involvement.</td>
<td>All patients over the age of 6 years who contacted a health provider for a scalp or extremity laceration.</td>
<td>By provider type number of encounters documenting if the wound was superficial plus, if not superficial, the number of cases documenting sensory, vascular or motor function distal to the laceration plus the number of scalp wounds where a skull fracture was considered. The above divided by the total number of encounters for scalp and extremity lacerations.</td>
</tr>
<tr>
<td>Tetanus Prophylaxis Renewal Rate</td>
<td>Percent of patients who were due for tetanus immunization and received tetanus toxoid.</td>
<td>All patients over the age of 6 years who contacted a health provider for a scalp or extremity laceration.</td>
<td>Number of patients who received a 0.5 cc adsorbed tetanus toxoid divided by the number of patients who did not have a tetanus booster within 5 years.</td>
</tr>
<tr>
<td>Follow-up Rate</td>
<td>By provider type, percent of patients with sutured scalp or extremity lacerations who revisited provider 5-15 days after laceration with documentation of wound healing.</td>
<td>All patients over the age of 6 years who contacted a health provider for a scalp or extremity laceration.</td>
<td>Number of patients who revisited a health provider and had a statement of wound healing divided by the total number of patients in the cohort.</td>
</tr>
<tr>
<td>Observed Wound Infection Rate</td>
<td>Percent of scalp or extremity laceration encounters with documentation of wound infection within 2 weeks.</td>
<td>All patients over the age of 6 years who contacted a health provider for a scalp or extremity laceration.</td>
<td>Number of patients with evidence of wound infection within 2 weeks of laceration encounter divided by total number of encounters for scalp and extremity lacerations.</td>
</tr>
<tr>
<td>Description</td>
<td>Study Population</td>
<td>Computation</td>
<td></td>
</tr>
<tr>
<td>-------------</td>
<td>-----------------</td>
<td>-------------</td>
<td></td>
</tr>
<tr>
<td><strong>Prenatal Entry Rate</strong></td>
<td>Women with a diagnosis of pregnancy between Oct. 1, 1974 and Oct. 1, 1975.</td>
<td>Number of women who made a prenatal visit at 20 week gestation or less divided by the total number of women who made a prenatal visit during the study period.</td>
<td></td>
</tr>
<tr>
<td><strong>Prenatal Work-Up Rate</strong></td>
<td>Women with a diagnosis of pregnancy between Oct. 1, 1974 and Oct. 1, 1975.</td>
<td>Number of women who had a VDRL, cervical culture, Pap smear, evaluation of rubella status and clinical pelvimetry by the 20th week of gestation divided by the total number of women who made a prenatal visit during the study period.</td>
<td></td>
</tr>
<tr>
<td><strong>Pregnancy Assessment Rate</strong></td>
<td>Women with a diagnosis of pregnancy between Oct. 1, 1974 and Oct. 1, 1975.</td>
<td>Number of women who had a statement of risk or prognosis of pregnancy by the 20th week of gestation divided by the total number of women who made a prenatal visit during the study period.</td>
<td></td>
</tr>
<tr>
<td><strong>Wanted, Unwanted, Undecided Pregnancy Assessment Rate</strong></td>
<td>Women with a diagnosis of pregnancy between Oct. 1, 1974 and Oct. 1, 1975.</td>
<td>Number of women with statement of pregnancy wanted, unwanted, or undecided by the 13th week of gestation divided by the total number of women who had a prenatal visit during the study period.</td>
<td></td>
</tr>
<tr>
<td><strong>Unwanted Pregnancy TAB Rate</strong></td>
<td>Women with a diagnosis of pregnancy between Oct. 1, 1974 and Oct. 1, 1975.</td>
<td>Number of women who received a TAB divided by the total number of women with an unwanted pregnancy prior to the 13th week of gestation.</td>
<td></td>
</tr>
<tr>
<td><strong>Nutritional Counseling Rate</strong></td>
<td>Women with a diagnosis of pregnancy between Oct. 1, 1974 and Oct. 1, 1975.</td>
<td>Number of women who received nutritional counseling by the 26th week of gestation divided by the total number of women who made a prenatal visit during the study period.</td>
<td></td>
</tr>
<tr>
<td><strong>Family Planning Counseling Rate</strong></td>
<td>Women with a diagnosis of pregnancy between Oct. 1, 1974 and Oct. 1, 1975.</td>
<td>Number of women who received family planning counseling during pregnancy or prior to discharge following delivery divided by total number of women in study cohort.</td>
<td></td>
</tr>
<tr>
<td><strong>Pregnancy Induced Hypertension Screening Rate</strong></td>
<td>Women with a diagnosis of pregnancy between Oct. 1, 1974 and Oct. 1, 1975.</td>
<td>Number of women who had blood pressure checks at least 3 times in the second and 5 times in the third trimester divided by the total number of women in study cohort who were seen during their 2nd and 3rd trimesters.</td>
<td></td>
</tr>
<tr>
<td><strong>Pregnancy Induced Hypertension Recognition Rate</strong></td>
<td>Women with a diagnosis of pregnancy between Oct. 1, 1974 and Oct. 1, 1975.</td>
<td>Number of patients with a recorded diastolic blood pressure greater than 90 who had a diagnosis of or narrative documenting recognition of the abnormal diastolic blood pressure divided by the number of patients with a diastolic blood pressure greater than 90.</td>
<td></td>
</tr>
<tr>
<td><strong>Anemia Screening Rate</strong></td>
<td>Women with a diagnosis of pregnancy between Oct. 1, 1974 and Oct. 1, 1975.</td>
<td>Number of women who had a Hgb or Hct during their first 20 weeks of gestation divided by the number of women in the study cohort.</td>
<td></td>
</tr>
<tr>
<td><strong>Pregnancy Monitoring Rate</strong></td>
<td>Women with a diagnosis of pregnancy between Oct. 1, 1974 and Oct. 1, 1975.</td>
<td>Number of women who had their fundal height measured 3 times in the second and 5 times in the 3rd trimester and the FHR documented once in the second and 5 times in the 3rd trimester divided by the study cohort seen in the 2nd and 3rd trimester.</td>
<td></td>
</tr>
<tr>
<td><strong>Postpartum Follow-up Rate</strong></td>
<td>Women with a diagnosis of pregnancy between Oct. 1, 1974 and Oct. 1, 1975.</td>
<td>Number of women who were seen within 8 weeks of delivery divided by the number of women in the study cohort who delivered.</td>
<td></td>
</tr>
<tr>
<td>TITLE</td>
<td>DESCRIPTION</td>
<td>STUDY POPULATION</td>
<td>COMPUTATION</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Prenatal Work-up Rate</td>
<td>What proportion of pregnant women had a VDRL, cervical culture, papanicolaou, and clinical pelvicometry within 2 weeks of the first prenatal visit?</td>
<td>Women with a diagnosis of pregnancy between Oct. 1, 1974 and Oct. 1, 1975.</td>
<td>Number of women who had a VDRL, cervical culture, papanicolaou, and clinical pelvicometry within 2 weeks of the first prenatal visit divided by the total number of women who made a prenatal visit during the study period.</td>
</tr>
<tr>
<td>Pregnancy Assessment Rate</td>
<td>What proportion of pregnant women had documentation of risk or prognosis of pregnancy within 2 weeks of the first prenatal visit?</td>
<td>Women with a diagnosis of pregnancy between Oct. 1, 1974 and Oct. 1, 1975.</td>
<td>Number of women who had a statement of risk or prognosis of pregnancy within 2 weeks of first prenatal visit divided by the total number of women who made a prenatal visit during the study period.</td>
</tr>
<tr>
<td>Wanted, Unwanted, Undecided Pregnancy Assessment Rate</td>
<td>What proportion of pregnant women had documentation of wanted, unwanted, or undecided pregnancy on the first prenatal visit?</td>
<td>Women with a diagnosis of pregnancy between Oct. 1, 1974 and Oct. 1, 1975.</td>
<td>Number of women with a statement of pregnancy wanted, unwanted or undecided divided by the total number of women who made a prenatal visit during the study period.</td>
</tr>
<tr>
<td>Unwanted Pregnancy Counseling Rate</td>
<td>What proportion of pregnant women with unwanted or undecided pregnancy documented on first visit received counseling within two weeks after first prenatal visit?</td>
<td>Women with a diagnosis of pregnancy between Oct. 1, 1974 and Oct. 1, 1975.</td>
<td>Number of women with unwanted or undecided pregnancy who received an explanation of options within 2 weeks of first prenatal visit divided by the number of women with a statement of unwanted or undecided pregnancy on first prenatal visit.</td>
</tr>
<tr>
<td>Anemia Screening Rate</td>
<td>What proportion of pregnant women had a hematocrit or hemoglobin checked within 2 weeks of the first prenatal visit?</td>
<td>Women with a diagnosis of pregnancy between Oct. 1, 1974 and Oct. 1, 1975.</td>
<td>Number of women with an Hgb or Hct within 2 weeks of first prenatal visit divided by the total number of women who made a prenatal visit during the study period.</td>
</tr>
<tr>
<td>Pregnancy Monitoring Rate</td>
<td>What proportion of visits made after the prenatal evaluation resulted in documentation of fundal height?</td>
<td>Women with a diagnosis of pregnancy between Oct. 1, 1974 and Oct. 1, 1975.</td>
<td>Number of visits made after the prenatal evaluation with documented fundal height divided by the number of visits made by the study cohort.</td>
</tr>
<tr>
<td>Pregnancy Induced Hypertension Screening Rate</td>
<td>What proportion of visits made by pregnant women in the second and third trimesters resulted in a documented blood pressure recording?</td>
<td>Women with a diagnosis of pregnancy between Oct. 1, 1974 and Oct. 1, 1975.</td>
<td>Number of visits in 2nd and 3rd trimesters with recorded blood pressure divided by the total number of visits in the 2nd and 3rd trimesters by the study population.</td>
</tr>
<tr>
<td>Abnormal BP Recognition Rate</td>
<td>What proportion of visits with a recorded diastolic BP greater than 90 had a recorded diagnosis or narrative documenting recognition of the abnormal BP?</td>
<td>Women with a diagnosis of pregnancy between Oct. 1, 1974 and Oct. 1, 1975.</td>
<td>Number of visits with a recorded diastolic BP greater than 90 with a diagnosis or narrative documenting recognition of the abnormal diastolic blood pressure divided by the number of patients with diastolic BP greater than 90.</td>
</tr>
<tr>
<td>TITLE</td>
<td>DESCRIPTION</td>
<td>STUDY POPULATION</td>
<td>COMPUTATION</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Normal Birth Weight Rate</td>
<td>Percent of pregnancies resulting in a birth weight between 5 lbs 8 oz and 9 lbs.</td>
<td>Newborns of women diagnosed as pregnant between Oct. 1, 1974 and Oct. 1, 1975.</td>
<td>Number of newborns with a birth weight between 5 lbs 8 oz and 9 lbs divided by the total number of newborns in the study population.</td>
</tr>
<tr>
<td>Acceptable 1 Minute Apgar Rate</td>
<td>Percent of pregnancies resulting in an infant with an Apgar 7 or greater.</td>
<td>Newborns of women diagnosed as pregnant between Oct. 1, 1974 and Oct. 1, 1975.</td>
<td>Number of newborns with a one minute Apgar score 7 or greater divided by the total number of newborns in the study population.</td>
</tr>
<tr>
<td>Pregnancy Induced Hypertension Rate</td>
<td>Percent of pregnancies with documentation of pregnancy induced hypertension or diastolic BP greater than 90 mm Hg.</td>
<td>Women diagnosed as pregnant between Oct. 1, 1974 and Oct. 1, 1975.</td>
<td>Number of women with pregnancy induced hypertension or diastolic BP greater than 90 divided by the total study population.</td>
</tr>
<tr>
<td>Gestational Diabetes Rate</td>
<td>Percent of pregnancies with documentation of gestational diabetes.</td>
<td>Women diagnosed as pregnant between Oct. 1, 1974 and Oct. 1, 1975.</td>
<td>Number of women with documented gestational diabetes divided by the total study population.</td>
</tr>
<tr>
<td>Operative Delivery Rate</td>
<td>Percent of pregnancies terminating with operative delivery.</td>
<td>Women diagnosed as pregnant between Oct. 1, 1974 and Oct. 1, 1975.</td>
<td>Number of pregnancies terminating with operative delivery divided by the total study population.</td>
</tr>
<tr>
<td>TAB Family Planning Rate</td>
<td>Percent of women with TAB who received family planning within 4-8 weeks after TAB.</td>
<td>Women diagnosed as pregnant between Oct. 1, 1974 and Oct. 1, 1975.</td>
<td>Number of women who received family planning 4-8 weeks after TAB divided by the total number of TAB in the study population.</td>
</tr>
<tr>
<td>Post Partum Family Planning Rate</td>
<td>Percent of pregnant women who delivered who began family planning within 4-8 weeks of delivery.</td>
<td>Women diagnosed as pregnant between Oct. 1, 1974 and Oct. 1, 1975.</td>
<td>Number of women who began family planning 4-8 weeks post partum divided by the total number of deliveries.</td>
</tr>
<tr>
<td>Remaining Free of Pregnancy For One Year Rate</td>
<td>Percent of women that remained free of pregnancy one year.</td>
<td>Women diagnosed as pregnant between Oct. 1, 1974 and Oct. 1, 1975.</td>
<td>Number of women who remained free of pregnancy one year after delivery divided by the total number of women who delivered.</td>
</tr>
</tbody>
</table>
### TABLE 14: INFANT CARE POPULATION BASED PROCESS INDICATORS

<table>
<thead>
<tr>
<th>TITLE</th>
<th>DESCRIPTION</th>
<th>STUDY POPULATION</th>
<th>COMPUTATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Feeding</td>
<td>What proportion of infants' mothers received diet or feeding instruction prior to discharge after delivery?</td>
<td>Women who delivered between July 1, 1975 and July 1, 1976.</td>
<td>Number of women who received nutrition feeding counseling prior to discharge after delivery divided by number of live deliveries in study population.</td>
</tr>
<tr>
<td>Initial Infant Care</td>
<td>What proportion of infants' mothers received instructions on general topics of infant care prior to discharge after delivery?</td>
<td>Women who delivered between July 1, 1975 and July 1, 1976.</td>
<td>Number of women who received infant care counseling prior to discharge after delivery divided by the number of live deliveries in study population.</td>
</tr>
<tr>
<td>Counseling</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Growth Monitoring</td>
<td>What proportion of infants had weight and length recorded at least 3 times in first 6 months and at least 2 times in second 7 months of life?</td>
<td>Births between Aug. 1, 1974 and Aug. 1, 1975 (must be 13 mo. old between 9/1/75 and 9/1/76).</td>
<td>Number of infants with weight and length recorded 3 times in first 6 months and 2 times in second 7 months of life divided by the total number in the study population.</td>
</tr>
<tr>
<td>Development Monitoring</td>
<td>What proportion of infants had documented statements of developmental milestones at least 4 times in the first 6 months and at least 3 times in the second 7 months of life?</td>
<td>Births between Aug. 1, 1974 and Aug. 1, 1975 (must be 13 mo. old between 9/1/75 and 9/1/76).</td>
<td>Number of infants with developmental history at least 4 times in the first 6 months and at least 3 times in the second 7 months of life divided by the total number in the study population.</td>
</tr>
<tr>
<td>Rate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diet Monitoring</td>
<td>What proportion of infants had documentation of dietary intake at least 4 times in the first 6 months and at least 3 times in the second 7 months of life?</td>
<td>Births between Aug. 1, 1974 and Aug. 1, 1975 (must be 13 mo. old between 9/1/75 and 9/1/76).</td>
<td>Number of infants with diet history at least 4 times in the first 6 months and 3 times in the second 7 months of life divided by the total number in the study population.</td>
</tr>
<tr>
<td>Immunization Rate</td>
<td>What proportion of infants had received 3 DPT, 2 OPV, a measles and a rubella immunization by age 13 months?</td>
<td>Births between Aug. 1, 1974 and Aug. 1, 1975 (must be 13 mo. old between 9/1/75 and 9/1/76).</td>
<td>Number of infants who received 3 DPT, 2 OPV, a measles and rubella immunization by age 13 months divided by total number in study population.</td>
</tr>
<tr>
<td>Infant Care Counseling</td>
<td>What proportion of infants' mothers received counseling in topics of infant care at least once in first six months and once in second 7 months of life?</td>
<td>Births between Aug. 1, 1974 and Aug. 1, 1975 (must be 13 mo. old between 9/1/75 and 9/1/76).</td>
<td>Number of mothers receiving infant care counseling once in first 6 months and once in second 7 months of life divided by total number in study population.</td>
</tr>
<tr>
<td>Rate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anemia Screening Rate</td>
<td>What proportion of infants had a Hct/Hgb recorded in second 7 months of life?</td>
<td>Births between Aug. 1, 1974 and Aug. 1, 1975 (must be 13 mo. old between 9/1/75 and 9/1/76).</td>
<td>Number of infants with an Hct or Hgb recorded in the second 7 months of life divided by the total number of infants in the study population.</td>
</tr>
<tr>
<td>Rate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anemia Screening Yield Rate</td>
<td>What proportion of infants screened for anemia were screened positive (Hct less than 12 gm. or Hgb less than 37 g.)</td>
<td>Births between Aug. 1, 1974 and Aug. 1, 1975 (must be 13 mo. old between 9/1/75 and 9/1/76).</td>
<td>Number of infants with a Hct less than 37 or Hgb less than 12 gm. between 6 months and 13 months of life divided by the number of infants who received a Hct or Hgb between 6 and 13 months of life.</td>
</tr>
<tr>
<td>TB Screening Rate</td>
<td>What proportion of infants had a PPD or Tine test in the second 7 months of life?</td>
<td>Births between Aug. 1, 1974 and Aug. 1, 1975 (must be 13 mo. old between 9/1/75 and 9/1/76).</td>
<td>Number of infants with a PPD or Tine test recorded in the second 7 months of life divided by the total number of infants in the study population.</td>
</tr>
<tr>
<td>Rate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hip Dysplasia Screening Rate</td>
<td>What proportion of infants had documentation of specific hip exam in their first 6 months of life?</td>
<td>Births between Aug. 1, 1974 and Aug. 1, 1975 (must be 13 mo. old between 9/1/75 and 9/1/76).</td>
<td>Number of infants with a hip exam in the first 6 months of life divided by the total number of infants in the study population.</td>
</tr>
</tbody>
</table>
### Table 15: INFANT CARE PROVIDER BASED PROCESS INDICATORS

<table>
<thead>
<tr>
<th>TITLE</th>
<th>DESCRIPTION</th>
<th>STUDY POPULATION</th>
<th>COMPUTATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Growth Monitoring Rate</td>
<td>What proportion of visits had weight and length recorded during first 13 months of life?</td>
<td>Births between 8/1/74 and 8/1/75.</td>
<td>Number of visits with recorded weight and length during first 13 months of life divided by the total number of visits made by the study population.</td>
</tr>
<tr>
<td>DPT Immunization Rate</td>
<td>What proportion of visits made when an infant was due for a DPT immunization was the immunization given?</td>
<td>Births between 8/1/74 and 8/1/75.</td>
<td>Number of visits made while overdue for DPT and received a DPT divided by total number of overdue visits.</td>
</tr>
<tr>
<td>Diet History Rate</td>
<td>What proportion of visits had documentation of recent dietary intake?</td>
<td>Births between 8/1/74 and 8/1/75.</td>
<td>Number of visits with documentation of diet history divided by total number of visits made by study population.</td>
</tr>
</tbody>
</table>

### Table 16: INFANT CARE POPULATION BASED HEALTH STATUS INDICATORS

<table>
<thead>
<tr>
<th>TITLE</th>
<th>DESCRIPTION</th>
<th>STUDY POPULATION</th>
<th>COMPUTATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adequate Growth Rate</td>
<td>What proportion of infants were between the 10th and 90th percentiles for height and weight at approximately 1 year of age?</td>
<td>Births between 8/1/74 and 8/1/75.</td>
<td>Number of infants with height and weight between 10th and 90th percentiles at 1 year of age divided by number of infants in the study population.</td>
</tr>
<tr>
<td>Birth Depression Rate</td>
<td>What proportion of infants had an Apgar Score less than 6 at 1 minute or less than 8 at 5 minutes?</td>
<td>Births between 8/1/74 and 8/1/75.</td>
<td>Number of infants with an Apgar Score less than 6 at 1 minute or less than 8 at 5 minutes divided by the total number of infants in the study population.</td>
</tr>
<tr>
<td>Total Immunization Rate</td>
<td>What proportion of infants had received 3 DPT, 2 OPV, measles and a rubella immunization by age 13 months?</td>
<td>Births between 8/1/74 and 8/1/75.</td>
<td>Number of infants who received 3 DPT, 2 OPV, measles and a rubella immunization by age 13 months divided by total number in study population.</td>
</tr>
<tr>
<td>DPT - OPV Immunization Rate</td>
<td>What proportion of infants received 3 DPT and 2 OPV by age 13 months?</td>
<td>Births between 8/1/74 and 8/1/75.</td>
<td>Number of infants who received 3 DPT and 2 OPV by age 13 months divided by the number of infants in the study cohort.</td>
</tr>
<tr>
<td>Minimum Estimate Prevalence of Anemia</td>
<td>What proportion of infants had documentation of a positive Hgb (less than 12 gm) or Hct (less than 37%) between 6 months and 13 months of age?</td>
<td>Births between 8/1/74 and 8/1/75.</td>
<td>Number of infants with a Hgb less than 12 gm or Hct below 37% between 6 months and 13 months of age divided by the number of infants in the study cohort.</td>
</tr>
<tr>
<td>Infant Nutrition and Feeding Instruction Rate</td>
<td>What proportion of infant mothers received infant nutrition and feeding instructions prior to discharge from the hospital?</td>
<td>Women who delivered between July 1, 1975 and July 1, 1976.</td>
<td>Number of infant mothers who received documentation of infant nutrition and feeding instruction prior to discharge from the hospital divided by the number of infants in the study cohort.</td>
</tr>
<tr>
<td>Breast Feeding Rate</td>
<td>What proportion of infant mothers were discharged from the hospital breast feeding?</td>
<td>Women who delivered between July 1, 1975 and July 1, 1976.</td>
<td>Number of infant mothers discharged from the hospital after delivery with documentation of breast feeding divided by the number of infant mothers.</td>
</tr>
<tr>
<td>Infant Care Counseling Rate</td>
<td>What proportion of infant mothers received infant care counseling prior to discharge from the hospital?</td>
<td>Women who delivered between July 1, 1975 and July 1, 1976.</td>
<td>Number of infant mothers who received documentation of infant care counseling prior to discharge after delivery divided by the number of infant mothers.</td>
</tr>
<tr>
<td>INDICATOR</td>
<td>DESCRIPTION</td>
<td>STUDY POPULATION</td>
<td>COMPUTATION</td>
</tr>
<tr>
<td>---------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>-------------------------------------------------------</td>
<td>----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Screening Contact Rate</td>
<td>Percent of population who made contact with the health care system at least once within the three year time frame (1/1/74-1/1/77).</td>
<td>All persons in the patient population between the ages of 40-60 years.</td>
<td>Number of persons who made contact with the health care system at least once during the time frame, divided by the total study population.</td>
</tr>
<tr>
<td>Screening Rate</td>
<td>Percent of patients making contact who had their blood pressure recorded at least once (in the absence of trauma, pregnancy, intoxication, or under the influence of medication known to elevate blood pressure).</td>
<td>All persons in the patient population between the ages of 40-60 years.</td>
<td>Number of persons who had at least one blood pressure recorded, divided by the number of persons contacting the health care system.</td>
</tr>
<tr>
<td>Abnormal Screening Recognition Rate</td>
<td>Percent of patients with a positive BP screen (diastolic BP &gt;90 for whom there was any statement or action indicating recognition of the abnormal result on that visit.</td>
<td>All persons in the patient population between the ages of 40-60 years.</td>
<td>Number of patients for whom there was documentation of recognition, divided by the number of persons with an abnormal blood pressure.</td>
</tr>
<tr>
<td>Abnormal Screening</td>
<td>Percent of patients with abnormal screening BP who made contact with the system within 6 weeks of the abnormal BP.</td>
<td>All persons in the patient population between the ages of 40-60 years.</td>
<td>Number of patients making contact with the health care system within 6 weeks, divided by the number of persons with an abnormal BP.</td>
</tr>
<tr>
<td>Rescreening Rate</td>
<td>Percent of patients making contact who had a blood pressure recorded within 6 weeks of the original abnormal result.</td>
<td>All persons in the patient population between the ages of 40-60 years.</td>
<td>Number of patients with an additional blood pressure recorded within 6 weeks, divided by the number of persons who re-contacted the health care system.</td>
</tr>
<tr>
<td>Screening Yield</td>
<td>Percent of patients screened during the time frame, who had one or more diastolic blood pressure readings above 90mm Hg.</td>
<td>All persons in the patient population between the ages of 40-60 years.</td>
<td>Number of persons with on or more abnormal blood pressures, divided by the number of persons who were screened during the time frame.</td>
</tr>
<tr>
<td>INDICATOR</td>
<td>DESCRIPTION</td>
<td>STUDY POPULATION</td>
<td>COMPUTATION</td>
</tr>
<tr>
<td>---------------------------</td>
<td>------------------------------------------------------------------------------</td>
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<td>----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Contact for Screening Rate</td>
<td>Percent of infants and prenatal patients who made contact with the health care system when they required screening for anemia. (Percent of infants contacting the system between age 6-13 mos. Percent of prenatal patients contacting the system by 20th week of gestation.)</td>
<td>Women with diagnosis of pregnancy between 10/1/74-10/1/75. Infants born between 8/1/74 and 8/1/75.</td>
<td>Number of persons who contacted the health care system during the time frame for screening, divided by the total study sample.</td>
</tr>
<tr>
<td>Screening Rate</td>
<td>Percent of infants and prenatals making contact for screening, who had a hematocrit and/or hemoglobin.</td>
<td>Women with diagnosis of pregnancy between 10/1/74-10/1/75. Infants born between 8/1/74 and 8/1/75.</td>
<td>Number of persons who were screened, divided by the number of persons who made contact with the system during the time they were due for screening.</td>
</tr>
<tr>
<td>Evaluation Contact Rate</td>
<td>Percent of patients screened positive for anemia (Hct &lt;33 and/or Hgb &lt;11) who made contact with the system within 3 weeks after positive screening.</td>
<td>Patients with a Hct &lt;33 or Hgb &lt;11 between 1/1/76 &amp; 1/1/77 who do not have neoplastic disease, acute or chronic blood loss, or an anemia previously diagnosed as other than iron deficiency.</td>
<td>Number of patients who made contact with the system within 3 weeks after the positive screening result, divided by the number of persons with a positive screening result.</td>
</tr>
<tr>
<td>Abnormal Screening Recognition Rate</td>
<td>Percent of patients making contact for whom there is any statement or action indicating recognition of the abnormal result.</td>
<td>Patients with a Hct &lt;33 or Hgb &lt;11 between 1/1/76 &amp; 1/1/77 who do not have neoplastic disease, acute or chronic blood loss, or an anemia previously diagnosed as other than iron deficiency.</td>
<td>Number of patients for whom there is evidence of recognition, divided by the number of patients contacting the health care system.</td>
</tr>
<tr>
<td>Diagnostic Work-Up Rate</td>
<td>Percent of patients with recognition of abnormal result, for whom any statement of dietary intake was documented.</td>
<td>Patients with a Hct &lt;33 or Hgb &lt;11 between 1/1/76 &amp; 1/1/77 who do not have neoplastic disease, acute or chronic blood loss, or an anemia previously diagnosed as other than iron deficiency.</td>
<td>Number of patients with documentation of dietary intake, divided by the number of patients contacting the health care system.</td>
</tr>
<tr>
<td>INDICATOR</td>
<td>DESCRIPTION</td>
<td>STUDY POPULATION</td>
<td>COMPUTATION</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Treatment Rate</td>
<td>Percent of patients with recognition of abnormal result, who were started on iron therapy within 1 week of diagnosis.</td>
<td>Patients with a Hct &lt;33 or Hgb &lt;11 between 1/1/76 &amp; 1/1/77 who do not have neoplastic disease, acute or chronic blood loss, or an anemia previously diagnosed as other than iron deficiency.</td>
<td>Number of patients started on iron therapy, divided by number of patients with documentation of recognition of abnormal result.</td>
</tr>
<tr>
<td>Contact Rate for Follow-Up</td>
<td>Percent of patients begun on therapy who made contact with the health care system within 3-6 weeks after iron therapy was instituted.</td>
<td>Patients with a Hct &lt;33 or Hgb &lt;11 between 1/1/76 &amp; 1/1/77 who do not have neoplastic disease, acute or chronic blood loss, or an anemia previously diagnosed as other than iron deficiency.</td>
<td>Number of patients on therapy who contacted system, divided by number of patients who began iron therapy.</td>
</tr>
<tr>
<td>Follow-Up Recognition Rate</td>
<td>Percent of patients contacting the system 3-6 weeks after therapy started, for whom there was any statement or action indicating the need for follow-up.</td>
<td>Patients with a Hct &lt;33 or Hgb &lt;11 between 1/1/76 &amp; 1/1/77 who do not have neoplastic disease, acute or chronic blood loss, or an anemia previously diagnosed as other than iron deficiency.</td>
<td>Number of patients with evidence of recognition of need for follow-up, divided by number of patients who contacted the system 3-6 weeks after therapy started.</td>
</tr>
<tr>
<td>Follow-Up Rate</td>
<td>Percent of patients with recognition of the need for follow-up who received a hemoglobin and/or hematocrit within 3-6 weeks after institution of iron therapy.</td>
<td>Patients with a Hct &lt;33 or Hgb &lt;11 between 1/1/76 &amp; 1/1/77 who do not have neoplastic disease, acute or chronic blood loss, or an anemia previously diagnosed as other than iron deficiency.</td>
<td>Number of patients who had a follow-up Hct or Hgb, divided by the number of patients with recognition of the need for follow-up.</td>
</tr>
<tr>
<td>Screening Yield</td>
<td>Percent of infants and prenatal patients screened for anemia who had a Hgb &lt;11 and/or Hct &lt;33.</td>
<td>Women with diagnosis of pregnancy between 10/1/74-10/1/75. Infants born between 8/1/74 and 8/1/75.</td>
<td>Number of infants and prenatal patients with a Hgb &lt;11 and/or Hct &lt;33, divided by number of patients screened.</td>
</tr>
<tr>
<td>INDICATOR</td>
<td>DESCRIPTION</td>
<td>STUDY POPULATION</td>
<td>COMPUTATION</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
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<td>---------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Resolution of Anemia</td>
<td>Percent of patients with a repeat Hct and/or Hgb 3-6 weeks after therapy started, which resulted in a Hct &gt;33 and/or Hgb &gt;11.</td>
<td>Women with diagnosis of pregnancy between 10/1/74-10/1/75. Infants born between 8/1/74 and 8/1/75.</td>
<td>Number of patients with a repeat Hct &gt;33 and/or Hgb &gt;11, divided by the number of patients with a repeat Hct or Hgb.</td>
</tr>
<tr>
<td>INDICATOR</td>
<td>DESCRIPTION</td>
<td>STUDY POPULATION</td>
<td>COMPUTATION</td>
</tr>
<tr>
<td>----------------------</td>
<td>----------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Evaluation Contact</td>
<td>Percent of patients with a positive urine culture (&gt;100,000 organisms) who made contact with the health care system within 2 weeks of positive culture.</td>
<td>Patients with a urine culture &gt;100,000 organisms between 1/1/76 and 1/1/77. Excludes patients with chronic or recurrent UTI or known abnormal anatomy of urinary tract.</td>
<td>Number of patients with positive urine culture who made contact with the system, divided by the total study cohort.</td>
</tr>
<tr>
<td>Rate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Abnormal Screening</td>
<td>Percent of patients making contact within 2 weeks, who had any statement or action indicating that positive culture was recognized.</td>
<td>Patients with a urine culture &gt;100,000 organisms between 1/1/76 and 1/1/77. Excludes patients with chronic or recurrent UTI or known abnormal anatomy or urinary tract.</td>
<td>Number of patients with recognition of abnormal result, divided by the number of patients who contacted the system.</td>
</tr>
<tr>
<td>Recognition Rate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diagnostic Evaluation</td>
<td>Percent of patients with recognition of positive culture, who had documentation of the history, description of symptoms, temperature, and palpation of the abdomen.</td>
<td>Patients with a urine culture &gt;100,000 organisms between 1/1/76 and 1/1/77. Excludes patients with chronic or recurrent UTI or known abnormal anatomy or urinary tract.</td>
<td>Number of patients receiving diagnostic work-up, divided by the number of patients with recognition of the need for a work-up.</td>
</tr>
<tr>
<td>Rate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment Rate</td>
<td>Percent of patients with recognition of positive culture, who were placed on an appropriate antibiotic therapy within 2 weeks of positive culture. (Soluble sulfonamide, ampicillin, tetrachine, or nitrofurantion)</td>
<td>Patients with a urine culture &gt;100,000 organisms between 1/1/76 and 1/1/77. Excludes patients with chronic or recurrent UTI or known abnormal anatomy or urinary tract.</td>
<td>Number of patients placed on antibiotic therapy, divided by the number of patients with recognition of the abnormal result.</td>
</tr>
<tr>
<td>Follow-Up Contact</td>
<td>Percent of patients treated who made contact with the health care system within 1-4 weeks after the treatment was started.</td>
<td>Patients with a urine culture &gt;100,000 organisms between 1/1/76 and 1/1/77. Excludes patients with chronic or recurrent UTI or known abnormal anatomy or urinary tract.</td>
<td>Number of patients who recontacted the system, divided by the number of patients who were started on therapy.</td>
</tr>
<tr>
<td>INDICATOR</td>
<td>DESCRIPTION</td>
<td>STUDY POPULATION</td>
<td>COMPUTATION</td>
</tr>
<tr>
<td>---------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Follow-Up Recognition Rate</td>
<td>Percent of patients making contact for whom there was any statement of action indicating recognition of the need for follow-up.</td>
<td>Patients with a urine culture &gt;100,000 organisms between 1/1/76 and 1/1/77. Excludes patients with chronic or recurrent UTI or known abnormal anatomy or urinary tract.</td>
<td>Number of patients with documentation of recognition of the need for follow-up, divided by the number of patients who made contact with the system.</td>
</tr>
<tr>
<td>Follow-Up Rate</td>
<td>Percent of patients with recognition of the need for follow-up who received a urine culture within 1-4 weeks after treatment started.</td>
<td>Patients with a urine culture &gt;100,000 organisms between 1/1/76 and 1/1/77. Excludes patients with chronic or recurrent UTI or known abnormal anatomy or urinary tract.</td>
<td>Number of patients who had a repeat urine culture, divided by the number of patients with recognition of the need for follow-up.</td>
</tr>
<tr>
<td>Negative Reculture Rate</td>
<td>Percent of patients treated and followed-up who had a repeat urine culture resulting in &lt;100,000 organisms.</td>
<td>Patients with a urine culture &gt;100,000 organisms between 1/1/76 and 1/1/77. Excludes patients with chronic or recurrent UTI or known abnormal anatomy or urinary tract.</td>
<td>Number of patients with a normal repeat culture, divided by the number of patients who had a repeat culture.</td>
</tr>
</tbody>
</table>
APPENDIX C

DATA COLLECTION INSTRUMENTS
III

Sells

SR

Pisimso

IID

PATIENT'S NAME

Last

First

INFANT'S NAME

Last

First

BIRTH DATE

(ce 45-50)

NO. DAY YR.

BIRTH DATE

(ce 51-56)

NO. DAY YR.

INFANT'S RECORD NO.

COMM. OF RESIDENCE

(wait cc 1-7)

OB DATA (Record Type 03-

cc: 5-44)

GR

PAR

Ab

LC

LMP

First Visit

Provider Type/Site

Week of Gestation

No. of visits btw.

LMP & first visit

History

HGB

SEROLOGY

Type/Rh

Blood glucose

MGTT. or GTT

Rubella titre

UA

Pap smear

GC culture

Tine/PPD

CXR

Breast exam

Funduscopy

Cardiac exam

Pelvimetry

Statement of Pregnancy

1-wanted

2-unwanted

3-undecided

4-no statement

If unwanted or undecided

1-counseling

2-TAB discussed

3-TAB planned

4-TAB done

LABOR AND DELIVERY

(Record Type 04-cc8-32)

Documented on admission:

Onset of labor

Time of show

Bleeding

Status of membranes

Length of pregnancy

EFW (est fetal wt.)

Contraction interval

Contraction length

Contraction

FHR

Position

Station

Cervical effacement

BP

UA

Method of Delivery:

1-Spont vag

2-Induced vag

3-Operative

Complications of mother:

Prior to discharge:

Family planning discussed

Method planned

Started

Infant care counseling

Nutrition/Feeding counseling

Breast feeding started

Post Partum (cc 31-41)

Pain

Discharge

Dysuria

Bleeding

Breast exam

Episiotomy

Uterus

BP

UA

Weight

Family planning discussed

Method planned

Started

Breast feeding discussed

Infant care counseling

Newborn care:

Silver nitrate drops in eyes

0.5-1.0 of VITK, IM

Temp recorded daily while in nursery

Statement of risk or prognosis

Newborn (cc 48-64)

B.W.

lb. oz.

Length

APGAR 1'

APGAR 5'

Newborn complications:

(Data Collection Instrument for Prenatal Care)
<table>
<thead>
<tr>
<th>RECORD TYPE 50</th>
<th>WEEK GESTATION (cc 8-10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provider type</td>
<td>01</td>
</tr>
<tr>
<td>Pain</td>
<td>02</td>
</tr>
<tr>
<td>Dysuria</td>
<td>03</td>
</tr>
<tr>
<td>Discharge</td>
<td>04</td>
</tr>
<tr>
<td>&quot;Swelling&quot;</td>
<td>05</td>
</tr>
<tr>
<td>Fetal Movement</td>
<td>06</td>
</tr>
<tr>
<td>Vaginal bleeding</td>
<td>07</td>
</tr>
<tr>
<td>Headache</td>
<td>08</td>
</tr>
<tr>
<td>Blurred vision</td>
<td>09</td>
</tr>
<tr>
<td>No problems</td>
<td>10</td>
</tr>
<tr>
<td>BP diastolic</td>
<td>11</td>
</tr>
<tr>
<td>Weight in lbs.</td>
<td>12</td>
</tr>
<tr>
<td>FHR</td>
<td>13</td>
</tr>
<tr>
<td>FUNDUS</td>
<td>14</td>
</tr>
<tr>
<td>EFW</td>
<td>15</td>
</tr>
<tr>
<td>Edema</td>
<td>16</td>
</tr>
<tr>
<td>Reflexes</td>
<td>17</td>
</tr>
<tr>
<td>Position/Stat/Eng</td>
<td>18</td>
</tr>
<tr>
<td>Urine protein</td>
<td>19</td>
</tr>
<tr>
<td>Urine glucose</td>
<td>20</td>
</tr>
<tr>
<td>Hct/Hgb</td>
<td>21</td>
</tr>
<tr>
<td>Family planning</td>
<td>22</td>
</tr>
<tr>
<td>Breast feeding</td>
<td>23</td>
</tr>
<tr>
<td>Gen. counseling</td>
<td>24</td>
</tr>
<tr>
<td>Nutrition counseling</td>
<td>25</td>
</tr>
<tr>
<td>Stat. of risk or prognosis</td>
<td>26</td>
</tr>
<tr>
<td>No. of inpatient days</td>
<td>27</td>
</tr>
<tr>
<td>PTH - diast. BP</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>29</td>
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<td>30</td>
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<td></td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>33</td>
</tr>
</tbody>
</table>

(Reverse side of data collection form for prenatal care)
**NEWBORN DATA (RECORD TYPE 01-cc 8-27)**

- **B.S (lbs-oz)**
- **Length (inches)**
- **APGAR 1**
- **APGAR 5**

**Method of delivery:**
1. Spont vag
2. Induced vag
3. Operative
4. Unknown

**Nutrition/Feeding COUDS:**
- Infant care counseling
- Stat. of risk or prognosis
- Breast fed:
  - 1 Yes
  - 2 No
  - 3 Unknown

**Newborn complications:**

**MATERIAL DATA (RECORD TYPE 01: cc42-59)**

**Age**
- **Gr.**
- **Prae**
- **Ab**
- **L.C.**

**Infant care counseling**
**Nutrition/Feeding COUDS**
**Family planning discussed between delivery and 6 weeks post partum**
**Method planned**
- 1 IUD
- 2 Pills
- 3 Other
**Family Planning Started**
**Remained free of pregnancy for 12 months after delivery**

- **No. of prenatal visits**
- **made**

**Where delivered**
- 1 Sells
- 2 U or A
- 3 Home

**RECORD TYPE 02**

**Provider type/site**
- **Ears**
- **Nose/throat**
- **Lungs/chest**
- **Cardiac**
- **Abdomen**
- **Hips**
- **Pulses**

**Coordinated**

**Cyo movement**
- **Normal exam**
- **Height (inches)**
- **Weight (lbs)**
- **Hand size**
- **HCT**

**Codes - Provider type/site**
1. Sells OPD
2. MCH Clinic
3. Santa Rosa
4. San Xavier
5. Pisinimo Clinic
6. MEU
7. Sells Inpatient
8. PHN (home visit)
9. Inpatient (other than Sells)

**DATA COLLECTION INSTRUMENT FOR INFANT CARE**
LACERATIONS OF SCALP AND EXTREMITIES
MEDICAL RECORD AUDIT INSTRUMENT

TARGET POPULATION: Over 6 years

PRIORITY GROUP:

STUDY PERIOD: 1 July 75 - 1 July 76

1. Did patient contact system for a laceration of scalp or extremity?
   YES   NO

   Provider MD
   PHN
   PA
   CHA

2. Was all of the following documented?

   Time since laceration
   Cause of laceration (blunt trauma, glass, dog bite, etc.)
   Description of wound (clean, deep, jagged, etc.)
    YES   NO

3. Was the laceration on the scalp?
   YES   NO

   3.1 Was statement of underlying skull fracture made or an x-ray taken?
      YES   NO
      Go to question #5

4. Was laceration stated as superficial?
   YES   NO

   4.1 Was there documentation of sensory, vascular, and motor function distal to the laceration?
      YES   NO

5. Had patient received tetanus booster within 5 years?
   YES   NO

   5.1 Was .5cc adsorbed tetanus toxoid given?
      YES   NO

6. Was the wound sutured?
   YES   NO

   6.1 Was patient seen within 5-15 days (for any reason)?
      YES   NO

   Provide MD
   PHN
   PA
   CHA

   6.2 Was statement of wound healing made?
      YES   NO

7. Was there evidence of wound infection within 2 weeks?
   YES   NO
STREPTOCOCCAL DISEASE
MEDICAL RECORD AUDIT INSTRUMENT

TARGET POPULATION: Over 6 years of age

STUDY PERIOD: 1 July 75 - 1 July 76

CHECK QUARTER RESEARCH WAS BEGUN: _ 1 July 75, _ 1 Sept. 75, _ 1 Jan. 76; _ 1 Mar. (circle episode found)

1.0 Did patient contact system for pharyngitis? ()
   YES NO

   Circle provider type
   MD, PA, CHA, PHN, OTHER

2.0 Was a throat culture taken within 2 days?
   YES NO

   2.1 Did patient receive antibiotic?
      YES NO

   2.2 Was visit made 0-15 days after treatment?
      YES NO

   2.3 Was there evidence that strep was addressed as a problem?
      YES NO

   2.4 Was throat culture taken?
      YES NO

3.0 Was culture positive?
   YES NO Couldn't find result at facility

4.0 Did the patient receive an antibiotic within 5 days of positive culture?
   YES NO

   4.1 Was patient allergic to penicillin/ampicillin?
      YES NO UNCERTAIN

   4.2 Was antibiotic a) LA Bicillin 1.2 mu IM or 600,000 mu for children less than 60 lbs or 9 years or less in age
      b) Oral pen x10 day
      c) Erythromycin QID x10 days
      d) Other

5.0 Was a visit made within 21 days after treatment started?
   YES NO

6.0 Was strep management a purpose of the visit?
   YES NO

7.0 Was culture taken?
   YES NO

8.0 Was culture positive?
   YES NO Couldn't find result at facility
RHEUMATIC FEVER
MEDICAL RECORD AUDIT INSTRUMENT

TARGET POPULATION: All patients with rheumatic fever who should be on prophylaxis as per registry

PATIENTS AGE: ______

WHEN LAST EPISODE OF ARF: Month/Year

NUMBER OF EPISODES ARF: ______

Significant cardiac sequela

1.0 Was patient treated prophylactically with LA bacillin 1.2 mu IM?

YES

NO

2.0 Was patient allergic to penicillin/ampicillin?

YES

NO - go directly to question 3.1

3.0 Was patient treated with either (Circle appropriate)

Sulfadiazine 1 gram g.d. (0.5 gr. under 60 lb.)
Erthromycin 250 mg per QID

3.1 What was method of prophylaxis?

If LA Bicillin: Coverage rate
If oral penicillin: Coverage rate
If Erythromycin: Coverage rate
If oral Sulfadiazine: Coverage rate

4.0 Was patient off prophylaxis 4 or more continuous weeks?

YES

NO

5.0 Did patient make contact with system while off prophylaxis?

YES

NO

Provide type MD

PHN

CHA

PA

6.0 Did provider renew prophylaxis?

YES

NO

7.0 Did patient have a recurrence of ARF during audit year?

YES

NO

DATE
Fe-DEFICIENCY ANEMIA
(Diagnosis and Management)

SITE

STUDY POPULATION (g)

Did patient contact system by 3 weeks after positive screen?

YES

NO

Was abnormal result recognized?

YES

NO

Was diagnostic work-up complete?

YES

NO

Was treatment started within 3 weeks of recognition?

YES

NO
Fe-DEFICIENCY ANEMIA
(Diagnosis and Management)
(Continued)

1. Did patient contact system 3-6 weeks after Rx started?

2. Was need for follow-up recognized?

3. Was Hct/Hgb done?

4. Result Hct <33 Hgb <11?
URINARY TRACT INFECTION
(Diagnosis and Management)

STUDY POPULATION (g)

Did patient contact system within 2 weeks?

Was abnormal screening recognized?

Was diagnostic evaluation complete?

Was adequate treatment begun within 2 weeks (4 weeks if culture repeated)?

Partial work-up
HYPERTENSION - SCREENING

STUDY POPULATION (a)

Did patient encounter the system 1/1/74 to 1/1/77?

YES

Was diastolic BP recorded?

NO

YES

Was diastolic BP >90?

NO

YES

Was there evidence of recognition on that visit?

NO

YES

Did patient contact system again within 6 weeks?

NO

YES

Was patient re-screened again within 6 weeks?