

APPENDIX K
THE VALUE OF ENCOUNTER DATA COMPARED TO MEDICAL RECORD DATA
FOR STUDIES OF MEDICAID MANAGED CARE

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The Value Of Encounter Data Compared To Medical Record Data For Studies Of Medicaid Managed Care

A HCFA-sponsored report to the Division of Performance Measurement and Quality Improvement, Minnesota Department of Human Services

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Background

States are required by the Health Care Financing Administration (HCFA) to monitor the performance of health plans under contract with the Medicaid program. These performance assessments include evaluations of the quality of health care. Generalizable, defensible studies of the quality of care require population-based and clinically-focused studies. Such studies should evaluate a representative sample of enrollees so that States can make inferences about care for an entire population at risk. Such studies also examine the appropriateness and timeliness of health care and investigate outcomes of health care for specific medical conditions. These types of studies go beyond earlier HCFA-directed assessments of health care that were done through random audits of a relatively small number of patient records.

Data sources for these generalizable, clinically-focused studies include

- claims data -- claims submitted for insurance reimbursement of health care services,
- encounter data -- records of encounters between health care providers and patients for administrative purposes other than reimbursement,
- enrollment data -- records of enrollment of individuals in a health plan (records containing demographic and insurance policy information for each enrollee and information about enrollees' dependents under the policy),
- medical record data -- the official patient record kept by physicians or hospitals on the health condition and course of treatment of the patient.

Claims are typically available under fee-for-service arrangements and contain clinical information that is critical for managing the use of and expenditures on health care. Under capitation arrangements claims are not submitted. Rather, health plans usually require the submission of encounter records for other administrative purposes -- monitoring the workload and productivity of providers, understanding the patient load and mix of the health plan, planning resources, negotiating per capita payments for services contracted to other organizations ("carve-outs"), satisfying accreditation requirements, and managing the business of the health plan. However, not all health plans maintain encounter records and each health plan is likely to establish its own requirements for encounter records. This means that encounter data may not always be adequate for assessments of the quality of care across health plans and health care providers.

Medical records are generally considered the universally-available, complete, and historical record of care of the patient, but even this data source can be incomplete. Medical records are incomplete when providers give little attention to documentation or when they purposely withhold stigmatizing information. Medical records also are incomplete when records are not passed to other physicians as patients are referred for care. Nevertheless, medical records are considered to be more complete than other data sources and are frequently used as the “gold standard” for assessing administrative datasets. An important difference between medical records and administrative records is that medical records are nearly always kept on paper and administrative records are nearly always kept electronically.

Medical record data currently remain the most frequently used information source for quality of care assessments of health care plans under Medicaid risk contracts for two reasons: 1) these data contain the greatest clinical detail and 2) most states do not have access to established encounter databases with sufficient clinical information. As States require and amass encounter and enrollment databases of managed care organizations and use them for quality-of-care assessments, these databases will become more accurate, complete, and useful for studies that examine the quality of health care.

In addition to administrative and medical record data, special data collection may be required to assess some aspects of quality of health care. Special surveys of patients and/or providers of health care may be necessary to assess the process and outcomes of health care that are not captured in administrative databases or in medical records.

Purpose

The Minnesota Department of Human Services has requested assistance in understanding the advantages and disadvantages of encounter data systems compared with medical record data for clinically-focused studies of the quality of health care. This is one of eight tasks to provide technical assistance to the Minnesota Department of Human Services through a HCFA Contract (Number 500-92-0035).

This document

- describes the strengths and weaknesses of administrative data and medical records data,
- provides examples of topics that could be studied with administrative data, and
- lists aspects of encounter and enrollment data systems that should be evaluated before they are promoted as a source of data for clinically-focused studies.

Although prepared for the State of Minnesota, this document should help any state that is considering the best ways to collect and use data for improving the quality of health care.

Comparison of Encounter Data and Medical Record Data for Clinically-Focused Studies

There are many dimensions on which data sources should be evaluated in order to assess their appropriateness for clinically-focused, population-based studies. Below are the important attributes and a comparison of encounter data and medical record data along these dimensions.

Attribute

Encounter Data

Medical Record Data

Population-based measures

Straightforward: Encounter data can be easily accessed and analyzed for all members of an enrolled population -- subject to the completeness and timeliness of encounter and enrollment records.

Difficult: Because of the difficulties in accessing and abstracting medical records, it is difficult to analyze data for an entire population. Small subsamples must be drawn for study purposes.

Expense

Inexpensive: If the data exist for other administrative purposes, the acquisition cost is pennies per record. However, some revisions of data systems may be necessary to make them adequate for quality-of-care studies.

Very expensive: For retrospective studies, data must be abstracted because of the length, detail, lack of uniformity, and paper medium of medical records. Collection instruments must be developed and abstractors trained. Rule-of-thumb cost estimates range from \$15 to \$40 per record. (Prospective studies can also be used to monitor the quality of care. However, providers resist these because the provider bears the cost of data collection.)

Accessibility

Readily accessible: Data usually exist in computerized systems and usually can be obtained with appropriate confidentiality assurances and procedures.

Difficult to obtain: Individual providers must be contacted. Patient privacy may limit direct access and compromise validity of the data abstracted. Physicians may prohibit access to their patients' records.

Attribute

Encounter Data

Medical Record Data

**Confidentiality
protections**

Easy to apply: Encryption of direct and indirect identifiers is an important safeguard for confidential information and is easy to achieve with computerized records. Most administrative data systems do not already apply encryption techniques, however.

Difficult to apply: Identification of the patient is difficult to eradicate from lengthy medical records on paper. Other less protective methods (such as pledges of confidentiality from abstractors) are necessary. Patient authorization may be required to collect information for the study.

**Timeliness of
obtaining an
individual record**

Poor: Providers are asked to submit encounter records within a period of time by most health plans. However, the length of time varies by plan and can be months. Furthermore, providers have little incentive to comply and submit records for all encounters.

Excellent: The medical record is often created while the patient is being counseled or is dictated shortly thereafter.

**Timeliness of
obtaining information
on a complete
population**

Poor to good: The timeliness of obtaining *all* records is good, provided that the health plan requires encounter records and audits submission rates or creates an incentive to encourage submissions. Most plans do not. For those that do, the allowed period of submission will delay the availability of records for the complete population until the end of the submission period.

Poor: The difficulty of data abstraction and the number of sources that must be sought makes it difficult and costly to assemble health services information for the total population for a study. Sampling of sources is usually necessary.

Attribute

Encounter Data

Medical Record Data

Comprehensiveness in terms of health services received by the patient

Varies: Ancillary services are often included in encounter data systems. However, only services covered by the health plan will be captured. And when health plans “carve out” services or allow out-of-plan self-referral for specialists’ services, then the encounter system usually will not capture all services received by the enrolled population.

Incomplete: Generally very comprehensive and complete for services of the provider. Ancillary test results may be missing depending on the provider’s attention to documentation. Rarely includes data for services provided by other health care providers.

Clinical detail

Poor: Generally 1 or 2 diagnoses or symptoms, if any, are recorded. Availability of procedures depends on the encounter data system. (Procedures are well captured in systems tied to fee-for-service payment). Not usually available are: laboratory test results, prescription drug use, and patient outcomes of treatment.

Excellent: This is considered the “gold standard” for documenting clinical detail on the complaint of the patient and the diagnosis and treatment delivered by a provider. Often outcomes of treatment, are also recorded, although the medical record may be incomplete and difficult to read and use.

Detail on other patient characteristics.

Limited: Only characteristics on enrollment files (age, gender, relationship to insured, marital status, number of dependents (if they use services), female- or male-headed households) are available. Race is rarely collected

Good: Medical records usually record broader socioeconomic data (education, occupation, race). However, such information is not uniformly collected by all providers.

Ease of study replication

Easy: Since encounter records are automated, studies are easy to replicate with subgroupings of the original data or new data for new time periods.

Difficult: Medical record data allow one-time analyses and are not voluminous to support subgroup analyses. Labor time and cost to reabstract information is as high as the initial abstraction.

Attribute

Encounter Data

Medical Record Data

Ease of tracking

Easy: Once a system is in place and has been evaluated as adequate for the study, the same measures can be tracked over time because computer records are updated regularly.

Very difficult: Abstraction for new data is costly.

Ease of use

Somewhat difficult: Requires staff who 1) are trained in statistical analysis and computer programming, 2) understand the limitations of encounter data systems for clinically-focused studies, 3) understand the conventions of coding systems and their annual revisions. Requires computer hardware and software that are efficient at handling large volumes of data.

Very difficult: Requires staff who are trained in 1) instrument development, 2) medical record abstraction, 3) medical terminology and coding of clinical information, 4) database design and verified data entry techniques, and 5) statistical analysis and computer programming. Requires standard computer hardware and analytic software because the size of databases are usually small.

Accuracy of data available

Questionable: There are usually no incentives for keeping accurate encounter records. When summarized encounter data are not fed back to the source or there is no incentive for good record-keeping, accuracy of the data is suspect. Many health plans use their own proprietary coding systems (in place of CPT codes) which adds to problems of comparisons across plans.

Very high. Accuracy of medical records is thought to be very high, although this is not easy to assess.

Attribute

Encounter Data

Medical Record Data

Completeness of clinical and other information in records

Poor for many managed care plans: Completeness of encounter records is dependent on the health plan's culture and requirements surrounding recordkeeping. Many plans attract physicians through reduced-paperwork campaigns. Furthermore, if there are no incentives for keeping complete records, they are frequently incomplete. For example, the last two digits of diagnosis and service codes are frequently truncated in encounter records because plans don't insist on the detail from their providers.

Good: Physicians must document the patient information and the services they provide in order to provide appropriate continuing care to their patients. However, services provided to a single patient by different physicians may not be documented or available in a single record. The task of tracking down documentation for a given patient can be difficult.

Reliability of data collection (ease of getting the same information from repeated collection)

Low: Coding of information is dependent on coders who have not been comparably trained and plans which have different views about the importance of accurate coding. The reliability of coding in an administrative data system is difficult to assess except against the medical record.

Moderate: The complexity of medical records often makes reliable data abstraction difficult. However, such work is done under the controlled circumstances of a study design where abstractors can be trained consistently and supervisors can reabstract records randomly to assure accuracy. Under these circumstances inter-rater reliability can be quantitatively assessed.

Reliability of study results (ease of assessing the reproducibility of the results of a study)

Easy: Reliability can be statistically tested with subsamples from existing encounter datasets.

Difficult: Additional data must be collected to reproduce the results of a study.

Attribute

Validity (correct measurement of concepts for a study)

Sensitivity (rate of detection of true positives from the data) -- a high rate indicates "high sensitivity."

Specificity (rate of detection of false positives from the data) -- a low rate indicates "high specificity."

Encounter Data

Questionable: Validity depends on the quality-of-care concepts to be studied. Encounter data should be used as the sole data source for a particular study *only* when the data are valid for measuring the concepts of the study.

Low sensitivity: Sensitivity of the data is related to the incentives that influence the original data collection and the completeness of data collection. With respect to incentives, for example, fee-for-service payment will create a high rate of true positives for procedures reimbursed by insurers. However, the definitiveness of diagnoses or severity of the conditions that relate to those procedures may be exaggerated because of the incentive to code reasons for treatment that will be reimbursed by the insurer. With respect to completeness, missing records and incomplete coding create serious problems of underreporting in encounter data systems.

Low specificity: Because of the incentive to code "rule out diagnoses" as diagnoses, the rate of false positives can be high and misleading for some diseases.

Medical Record Data

Excellent: The record nearly always describes in detail the condition of the patient and the care provided. Thus, measures of the quality of health care are most believable when obtained from this source. However, outcomes of the treatment are not always recorded.

High sensitivity: Accurate records are essential for shared treatment responsibilities and referrals among physicians. However, services provided by physicians other than the primary care provider (PCP) may not be documented in the PCP's record. Tracking down documentation for a given patient can be difficult.

High specificity: The rate of false positives will be determined by the actual rate of false positives in clinical testing, not by incentives of recordkeeping that can increase false positives.

The major strengths of using encounter data in clinically-focused studies are:

1. **Size and scope of the database:** The databases from managed care organizations that include encounter and enrollment data will be large (individually or combined across plans) and population based. These databases can support estimates of the enrolled population afflicted by specific diseases, studies of many different diseases, studies of relatively rare diseases, and analyses of subgroups of the study population. Sample sizes for studies relying on medical records are always minimized because of the costs of obtaining the data in useable formats for analysis.
2. **Low cost:** Encounter data are inexpensive to obtain. Data are usually available for pennies (or fractions thereof) per record. Large volumes of data can be extracted and manipulated quickly with analytical software packages and/or spreadsheets.

Medical records require handling large, uncoded text documents for each patient and are frequently fragmented and scattered among several providers. Using medical records requires medical expertise to interpret and code clinical information relevant to a study. Medical record costs include the costs of instrument development; training on the study and instrument; transportation of abstractors to provider sites for data collection or the cost of blinding patient identity, duplicating, and mailing all the relevant portions of the needed medical records to a study site; labor costs for finding, coding, and checking the relevant information; and cost of implementing confidentiality protections. In addition, the database must be designed and data must be entered and checked before analyses can begin.

3. **Availability of ancillary services:** Services such as ambulance transport, home health, pharmacy, and durable medical equipment are more likely to be available in encounter data systems. Such information is unlikely to be contained in the patient's medical record kept by the physician and will be scattered among records of many suppliers of health services.
4. **Longitudinal tracking:** Encounter data systems in place for various administrative uses are continuously updated with new patient encounters. These data systems are ideal for tracking health care services over time because they codify each encounter by personal identifier. Longitudinal analysis using medical records is difficult because a patient may see several providers over time for treatment of a condition and because confidentiality protections may require encryption of patient identifiers. Encryption that maintains the linkability of records over time is difficult to ensure with manual systems and multiple providers. Even in studies based on medical records, encounter data are often necessary to identify the relevant medical records for the study.
5. **Ease of conducting multiple studies:** Encounter databases serve as a continuous source of information for new studies not conceived of when the database is constructed. Once an adequate encounter data system is established, many types of clinical conditions can be studied. Different dimensions (limited by the sensitivity and specificity of the measures)

can be assessed for different conditions. Databases from medical records will be generally for one-time use because of the expense of updating these data.

The major strengths of using medical record data and weaknesses of using encounter data in clinically-focused studies are:

1. **Accuracy and completeness:** The medical record is the most accurate and complete source of information to assess the quality of care provided to a patient by a specific provider. The medical record is the “gold standard” for this purpose. Encounter data are affected by the incentives (or lack thereof) for recording information and the attention paid by recorders to completing the record. The accuracy of such data systems improve noticeably as information from them is used for performance assessment. Of course, using either data source for monitoring increases the likelihood that some providers will “game the system” by recording information selectively.
2. **Validity, sensitivity, and specificity:** Measures created from information in medical records usually align closely with the clinical quality-of-care concepts that are the focus of study. Sensitivity and specificity of measures from medical records are much greater than from encounter data. Some concepts, however, can be appropriately assessed from encounter data systems.

In short, encounter data are prolific, available, inexpensive, and allow population-based analyses that cannot be conducted easily with medical record data. However encounter data must be used judiciously for studies of health care quality because of their shortcomings on accuracy, completeness, validity, sensitivity, and specificity. The limitations of encounter data do not eliminate their usefulness for clinically-focused studies, but the limitations indicate that great caution should be exercised before using the measures from these data to expose the performance of health care providers.

In some instances, neither encounter data nor medical records will be the best source of information for a given study. For example, attitudes about care received from a health care provider must be obtained from the patient directly. Some measures of patient care, such as whether a diabetic patient received a foot examination during a visit to the doctor, may be better assessed by asking the patient. Because foot exams are relatively inconsequential, they may not be recorded in the medical record even if done. Furthermore, the outcomes of some services may be obtained best from enrollee surveys.

How to Use Encounter Data for Clinically-Focused Studies

Encounter data can be used for developing many measures that relate to the quality of health care. They can be used for studies of:

- avoidable hospitalizations,
- complications of treatment,

- appropriateness of care, and
- access to care.

The Appendix provides an example of each of these types of studies. It a) lists a hypothetical question for each, b) describes the measure to be derived from encounter data, c) specifies the period of measurement, d) specifies how a numerator would be constructed, e) defines the denominator for the measure, and f) identifies a published benchmark that could be used for comparison. These are basic components that are needed to use encounter data for assessing quality of care. Another issue to consider is the stratifiers and subgroups for which comparisons would be made.

The examples given in the Appendix use rates or ratios as measures. This approach allows the analyst to define the denominator as narrowly as he or she chooses so that the population being evaluated is relatively homogeneous with the same conditions, complications, and comorbidities. Other methods use more heterogeneous groups and control statistically for severity differences and comorbidities.

To control statistically for clinical differences among patients, disease classification schemes are needed. *Disease Staging* (Gonnella et al., 1994) is one software package that can be used to control for the stage of illness of the patient and the unrelated comorbidities of the patient without confounding the analysis with the treatment choices that were made.¹

Generally, measures from encounter data can be assembled relatively quickly over a broad spectrum of diseases and conditions. As such, they allow a broad view of where potential problems might exist and where more focused, in-depth studies should be conducted. These more focused studies could single out specific medical conditions and providers whose measures lie outside the normal range.

Using Encounter Data and Medical Record Reviews

A good approach to quality-of-care assessments is one that uses encounter data as a first look and then uses more targeted medical record reviews for in-depth analysis. This approach has two advantages. First, it combines the strength of both data sources -- efficiency of encounter data and the accuracy of medical records -- so that the benefits of each contribute most effectively to understanding the quality of health care. Second, the dual analyses can be used to understand when encounter-data-based measures are and are not sufficient for evaluating quality of care.

Performance Measures

There are a number of aids that can be used to derive measures from encounter data systems. First, a valuable source for searching for performance measures for specific purposes is

¹ Classification systems developed for reimbursement, such as Diagnosis Related Groups (DRGs) and Ambulatory Care Groups (ACGs), combine the medical condition of the patient and the treatment to explain differences in costs. The DRG or ACG classification systems cannot be used to control simply for the severity of illness and comorbidities of the patient because they confound the disease groups with treatment decisions.

CONQUEST (Palmer et al., 1997). This software package is a taxonomy of conditions and performance measures that are cross classified. The measures are evaluated along several important dimensions such as: Are the measures validated?

A second measure set that was developed specifically for use with inpatient discharge records and claims and which should be useful for analyzing inpatient encounters is the Healthcare Cost and Utilization Project - Quality Indicators (HCUP-QIs). This is a set of about 30 measures that include complications of care, appropriateness of inpatient utilization, and hospitalizations that imply inappropriate access-to-care. Easy to follow instructions for applying the HCUP-QIs are available from the Agency for Health Care Policy and Research (Ball et al., 1995).

There are also proprietary software packages to which a State's data can be added and from which performance measures can be easily derived. The Clinical Performance Manager Workstation (The MEDSTAT Group, 1997) is built on evidence-based clinical practice guidelines and can be applied not only to inpatient databases but also to outpatient claims and encounter data.

How to Assess Your Encounter Data for Clinically-Focused Studies

Before planning studies from an encounter data system, the data should be assessed for their usefulness and limitations. Encounter data usually can be used for utilization studies but such data should be assessed carefully for quality-of-care studies. The potential for improving encounter data systems should not be overlooked because relatively minor changes such as incentives for good recordkeeping or feedback of information to physicians could have large payoffs in the accuracy and completeness of encounter data and the types of studies that could be conducted with these data.

Below is a list of system features that should be assessed before planning to undertake studies from encounter data systems.

1. *Submission Time:* The length of time between date of service and date of submission of an encounter record should be as short as practical. If the length of time is six months or greater this means that studies with annual measures cannot start until at least six months after the end of the year. The longer the time allowed the longer the State will have to wait to assure that data are complete and reflect the actual experience of the population.
2. *Scope of Services:* The services captured by the database should be as specific and inclusive as possible. This is often not the case. For example, bundled services, such as professional services for prenatal delivery and postpartum care, may not be captured in the encounter database. This would mean that specific office-based prenatal care could not be assessed adequately with the encounter data system.

As another example, detail on EPSDT services may be missing because many physicians do not submit records of all services performed during an EPSDT screening. Out-of-plan services also may be excluded from the encounter data system of the health plan. For

example, some types of immunizations are not administered exclusively by the health plans and are given in public health clinics, which may or may not send a record of the service to the State.

3. *Coding Conventions:* The State should consider implementing efforts to make coding as consistent across health plans as possible. The current work of the U.S. Department of Health and Human Services to set national standards for health data for administrative transactions should assist the states in implementing and requiring standard coding practices. Currently, plans may use a variety of internally developed codes to identify certain services such as vision care, transportation, and home health services. Plan-specific codes must be translated into codes that are consistent across health plans for these data to be useable in studies.
4. *Clinical Coding:* The State may want to institute methods to improve the completeness and accuracy of coding primary and secondary diagnoses and procedures in ambulatory care settings. While hospitals have clinical coders who are generally well trained and experienced because of the use of Diagnosis Related Groups since 1983, coders of physician and other ambulatory care services are generally poorly trained. CPT and ICD-9-CM codes are updated annually, and some coders are not aware that codes can change and new codes become available.

Health plans do not always check their encounter records for valid clinical codes and as a result many records may be unusable. Studies often require fourth and fifth digit diagnosis codes (for example, for the portion of the body affected by a condition), but not all encounter data systems require this level of detail. Some plans substitute their own procedure coding schemes for the standard CPT coding system, destroying the comparability of data across plans.

While inpatient summary records include diagnoses and procedures, outpatient records may only include reason for the visit or service. Such information is not sufficient for clinically focused studies of the quality of health care. Furthermore, many patients with chronic conditions have comorbidities that influence their course of treatment and assessment of the quality of care. Without improved coding of the underlying clinical problems, assessment of the quality of care of some conditions will be difficult to measure from encounter data systems.

5. *Unique personal identifiers:* States should require health plans to maintain unique personal identifiers that link enrollment information with encounter records. This is necessary for accurate identification of at-risk populations for the denominators of quality assessment measures. Unique enrollee identifiers also are needed to determine accurate estimates of services delivered to a population over time. (See #8 below for the prospects of unique national personal identifiers.)
6. *Individual provider identifiers:* States should decide and announce their decision to adopt the National Provider Identifier for all provider identification as soon as these identifiers

are assigned by the Health Care Financing Administration. The NPI system (which is being proposed for implementation in the near future) will assign identifiers to all physicians (in solo or group practice), to all group practices, and to other health care providers and suppliers so that each provider/supplier is identified uniquely without duplication.

To be able to attribute services, quality measures, and outcomes of care to individual providers, it is essential to know who provided the service. For example, in claims-based systems and some encounter-based carve-out systems, only the physician who submitted the bill (and who may not have given the service) is identified with the service. Accurate provider identification is important for targeting quality improvement programs, assessing the use of physician assistants, nurse practitioners and other professionals as actual care providers, tracking referral patterns for specialty care, and identifying fraud and abuse.

7. *Race:* States that want to assess the access to care of traditionally underserved populations should require health plans to collect racial and ethnic data. The most accurate way to do this is to ask the enrollee to specify his or her race/ethnicity at enrollment.

For comparable categories, States should start with the Federal guidelines for collecting race and ethnicity as established by the Office of Management and Budget. OMB Directive 15 establishes categories used by Federal agencies and many States for classifying this information. By using these groupings States will be able to compare their statistics to Federal and other State statistics.

States that change their race and ethnicity categories should do so in a way that allows mapping back to the Federal categories. Without this information, States will not be able to assess the access to and use of services by racial/ethnic subgroups of the Medicaid population.

8. *Linkages with external data:* States may want to encourage collection of enrollee identifiers by other health data collection systems. If there are other sources of health data (such as birth, immunization, and disease registries) that can be linked to health plan information by enrollee identifiers, then these other sources could add depth and breadth to the encounter data available for clinically focused studies.

Eventually, there may be a national unique personal identifier, which would obviate a need for State solutions. However, the privacy issues surrounding such a national number have been serious enough for the National Committee on Vital and Health Statistics to recommend against such a national identifier until a strong health data privacy law is in place.

Key fields on the encounter data should be validated to determine the accuracy and completeness of the submitted information and their usefulness for studies. Unvalidated data can be used as a

starting point for discussion and an impetus for new data collection projects and new study designs. However, unvalidated data elements, especially those known to be subject to serious data collection problems, should never be used to determine the rights, benefits, or privileges of individual consumers or providers of health care.

Summary and Conclusion

Generalizable, defensible studies of the quality of care require population-based and clinically focused studies so that States can make inferences about care for an entire population at risk. This document describes the strengths and weaknesses of encounter data and medical record data for clinically focused studies of the quality of health care.

Encounter data are prolific, available, inexpensive, and allow population-based analyses that cannot feasibly be conducted with medical record data. However, encounter data, which are subject to various incentives of recordkeeping for administrative purposes, are frequently inaccurate and incomplete and do not always provide valid measures of quality-of-care concepts. Therefore, encounter data must be used judiciously in studies.

The limitations of encounter data do not destroy their usefulness for clinically focused studies. Measures from encounter data can be assembled relatively quickly over a broad spectrum of diseases and conditions. As such, they allow a broad view of where potential problems might exist and where more focused, in depth studies should be conducted.

A good approach to quality-of-care assessments is one that uses encounter data as a first look and then conducts, or encourages providers to conduct, more targeted medical record reviews for in-depth analyses. This approach combines the strengths of both data sources -- the population view and efficiency of encounter data with the clinical depth and accuracy of medical records -- so that the benefits of each contribute most effectively to understanding the quality of health care.

Before planning any studies from encounter data systems, these data should be assessed carefully for their usefulness and limitations. Features that should be assessed include:

- data submission timeliness,
- scope of services covered by the database,
- consistency of coding conventions across data sources,
- completeness and accuracy of clinical coding,
- availability of unique personal identifiers at the plan level,
- availability of unique identifiers for the provider of care,
- availability of specific measures important to the specific study (for example, race for access-to-care studies), and
- availability of linkages with external data.

Key fields on the encounter data should be validated to determine the accuracy and completeness of the information and its usefulness for specific studies. Unvalidated data elements, especially

those known to be subject to serious data collection problems, should not be used to determine the rights, benefits, or privileges of individual consumers or providers of health care.

State and Federal experiences in using administrative claims data to compare the performance of health care providers tell us that when encounter data are put to similar uses -- comparing providers, publishing the results, and influencing business decisions -- then collection of encounter data will become an important business asset and will be done carefully. Until that time, encounter data should be used as one tool to improve the quality of health care. In the process, encounter data will be improved and will become even more informative of the quality of health care in the future.

Appendix

Hypothetical Examples of Clinically-Focused Measures from Encounter Data Systems

We developed the following examples as a general guide on how to start thinking about quality-related indicators from encounter data. The measures in these examples are not fully developed and are not validated. For example, the methods should consider how coding is implemented rather than how coding would be done according to established coding guidelines.

1. Effectiveness of Drug-Abuse Treatment

Question: What is the effectiveness of primary care for drug abuse treatment for Medicaid enrollees in this plan?

Indicators:

- a. Rate of drug-abuse-related emergency room (ER) visits per year per 100,000 beneficiaries in the plan.

- b. Rate of drug-abuse-related ER visits per enrollee receiving drug-abuse-related treatment during the year. (This measure adjusts for the number of known drug-abusers in the plan.)

Frequency of measurement: Annual.

Numerator: The number of ER visits during a year that include at least one of the following CPT codes: 99281-99285, 99288 AND that include at least one of the following ICD-9-CM diagnostic codes: 292.0-292.9, 304.0x-304.9x, or 305.0x-305.9x, where x=0,1, or 2.

Denominator:

- a. All Medicaid enrollees in the plan at any time during the year.

- b. All Medicaid enrollees in the plan receiving drug-abuse-related treatment during the year in any setting.

Benchmark:

- a. *Healthy People 2000 Goals: 140.6 drug-abuse-related ER visits per 100,000 population.*

- b. Use the plan's rate for prior years in subsequent years of the study.

2. Effectiveness of Prenatal Care

Question: How effective is each Medicaid plan in reducing the rate of severe complications of pregnancy among its pregnant women each year?

Indicator: The rate of pregnancy-related hospitalizations due to pregnancy complications prior to delivery among all deliveries.

Frequency of measurement: *Annual*

Numerator: The number of inpatient admissions per year for women aged 11-49 with any one of the following ICD-9-CM diagnosis codes: 632.0-632.9, 634.0-634.9, 640.0x-644.9x, 646.6x, 648.0x, 648.8x where x is NOT = 1 or 2. (These complications include preterm labor, spontaneous abortion, genitourinary infections, hemorrhage of early pregnancy, vomiting, pregnancy-induced hypertension, diabetes in pregnancy, and missed abortion. Other complications could be used.)

(To assess where better care might be provided, also rank the number of admissions by these diagnoses.)

Denominator: The number of inpatient admissions for women aged 11-49 with any one of the following ICD-9-CM diagnosis codes: 640.0x-648.9x, 650, 651.0x-676.9x, where $x = 1$ or 2 .

Benchmark: *Healthy People 2000 Goals:* 15 hospitalizations related to severe pregnancy complications per 100 deliveries.

3. Appropriate Care for Sickle Cell Anemia

Question: Are Medicaid plans providing effective antibiotic prophylaxis for children with sickle cell anemia?

Indicator: Percent of children 2 months of age to 1 year of age with a diagnosis of sickle cell anemia who are receiving continuous outpatient oral antibiotic treatment.²

Frequency of measurement: *Annual*

Numerator: The number of children 2 months of age to 1 year of age with a diagnosis of sickle cell anemia³ (ICD-9-CM diagnosis codes 282.60-282.69) who also receive oral antibiotic therapy during the year. (Note: This requires development of person-level records and evidence of prescription drug refills each quarter.)

² The guideline does not place an upper bound on the age of the child for antibiotic treatment. This is the kind of issue that would have to be reviewed and resolved during methodological development of the measure

³ Excludes those with sickle cell trait or thalassemia.

Denominator: The number of children 2 months of age to 1 year of age who have a diagnosis of sickle cell anemia.

Benchmark: *AHCPR Guidelines #6: Penicillin prophylaxis should begin by 2 months of age for infants with suspected sickle cell anemia.*

4. Access to Primary Care

Question: What is the proportion of African Americans and Hispanics enrolled in each Medicaid plan who have a specific source of ongoing primary care?

Indicator:

- a. The percent of each racial/ethnic category that has received at least one primary care visit during the year.
- b. The percent of each racial/ethnic category that has been enrolled for two years and that has received at least 2 primary care visits from the same physician or group practice. (Note: This measure requires study of a subset of those continuously enrolled for two years.)

Frequency of measurement: Annual.

Numerator:

- a. The number of enrollees by racial/ethnic category who have 1 visit during the year to a primary care physician -- general practitioner, family practitioner, internist, pediatrician, obstetrician/gynecologist, physician assistant, or nurse practitioner.
- b. The number of enrollees by racial/ethnic category who have at least 1 visit during the year to a primary care physician or primary care group practice who the enrollee has seen in the previous year.

Denominator: The total number of enrollees of the plan by racial/ethnic group during the year.

Benchmark: *Healthy People 2000 Goals:* 95 percent of enrollees have a specific source of ongoing primary care services.

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