Assessing and Assuring the Quality of Home Health Care: A Conceptual Framework

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INCREASED UTILIZATION OF HOME CARE SERVICES, stimulated in part by prospective payment for hospital care, has heightened awareness of the need for improved quality assurance in home health care. The $2 billion Medicare home health program paid for over 45 million visits to 1.7 million Medicare enrollees in 1986 (Health Care Financing Administration [HCFA] 1987; National Association for Home Care 1988). Expenditures for the industry as a whole were estimated at over $9 billion for services and home care products in 1985 (Levit et al. 1985). We can anticipate continued growth as the home care movement continues to gain momentum and the number of disabled elderly continues to rise.

Home health agencies are providing increasingly sophisticated services, such as respiratory therapy and intravenous infusion therapy, to patients with more complex medical and functional problems (American College of Physicians 1986; Smith 1986; McAllister et al. 1986; Shaughnessy and Kramer 1990). Monitoring the quality of such care is particularly important when it is provided in settings where physicians and institutional support are not readily accessible (American Public Health Association 1987; Koren 1986). Furthermore, aides with limited

training provide care requiring substantial skill (e.g., patient assess-
ment and assisting disabled patients with tub transfers and ambula-
tion) to home health patients with increasing functional disabilities and
skilled nursing problems (Shaughnessy, Kramer, and Pettigrew 1987;
U.S. Senate 1987). Anecdotal information from congressional commit-
tee hearings and commissions on care in the home, and limited data
compiled from Medicare quality-assurance surveys confirm that quality
of home care warrants further investigation (U.S. Senate 1977, 1987;
Sabatino 1986; Leader 1986).

Despite these concerns, we have little systematic information on the
quality of home health care and have failed to upgrade quality-
assurance approaches. A major impediment to progress in both of these
areas is lack of a valid and practical approach to assessing home health-
care quality. Current approaches to measuring and assuring the quality
of home care focus on paper compliance with standards for structural
attributes of home health agencies such as management, staffing, and
agency-level policies and procedures (U.S. Department of Health and
Human Services [USDHHS] 1987). More sophisticated quality-assessment
and/or assurance approaches also examine processes of care such as pa-
tient assessment, care planning, and the provision of individual ser-
vices. However, current methods rely heavily on surveyor judgment to
apply general care standards to care provided to the full spectrum of
home health patients. Initiatives are underway to incorporate outcome
measures ˙ ito quality assurance for home health care, but there is little
consensus about the most appropriate outcome measures and how to
implement outcome assessment.

We propose a conceptual framework for assessing the quality of
home health care that could become the basis for a quality-assurance
system for the Medicare home health program and/or used for research
relating to the quality of home health care. The approach was refined
and validated through reviews by multidisciplinary panels of home
health-care clinicians. This system and related operational measures are
undergoing extensive reliability and validity testing in three studies.
The two overriding premises on which the system is based are: (1) a
combination of outcome, process, and, to a lesser extent, structural
measures is required to assess quality of home health care adequately;
and (2) home health-care patients should be classified into homoge-
neous quality indicator groups (QUIGs) from the perspective of the
measures that are appropriate for assessing home health-care quality.

Quality measures that apply only to patients in one or several QUIGs are termed "focused" measures, in contrast to "global" measures, which are relevant to all patients.

In this article, we first discuss why focused outcome and process measures are necessary for assessing the quality of home health care. Then we describe our proposed QUIG classification scheme and how it was developed. We conclude with a review of quality indicators for home health care and a discussion of assessing and assuring home health-care quality using our approach. We use the term *quality indicator* to denote constructs, patient characteristics, or service attributes that, if rigorously defined, can be used to assess the quality of home health care. Various quality measures, or numerical scales, that correspond to each of these indicators can be developed. We are currently testing an extensive set of these operational measures to determine which are the most practical, reliable, and valid for assessing the quality of home health care. We will provide illustrative quality indicators and measures that can be used in the QUIG framework.

Why Focused Outcome and Process
Quality Measures Are Needed
for Home Care Assessment

The merits of the three types of measures have been debated since Donabedian (1966) conceptualized quality measures in the three broad categories of structure, process, and outcome. In recent years, outcome measures have been emphasized for evaluating health-care quality (Lohr and Schroeder 1990; Shortell and Hughes 1988; Rinke 1987; Luft and Hunt 1986; Institute of Medicine 1986; Kane and Kane 1988). We support the emphasis on outcome measures for assessing home health-care quality, but do not recommend exclusive reliance on them. Furthermore, we propose that mainly focused outcome and process measures be used for home health-quality assessment because of the heterogeneity of the home health population.

The Need for Focused Outcome Measures

Because home health care is intended to enhance or at least maintain health, outcome measures can and should be used to assess the ade-

quacy of care in areas of significant and measurable impact. Home care can affect many facets of an individual's health for which outcome quality measures can be constructed, such as physiologic status, functional status, health-related knowledge, compliance, and satisfaction.

However, outcomes are influenced by all aspects of a home health patient's care environment, not just services provided by a home health agency. Physician care, hospital discharge planning, and care provided by family members or other informal caregivers all significantly influence home health patient outcomes. Hence, if we intend to measure the quality of home health care using outcome measures, we must select measures corresponding to attributes of health on which a home health agency can and is expected to impact. These vary depending upon the reason for which the patient is receiving home health care. For example, home health care may significantly improve functional deficits (e.g., bathing, dressing, ambulation) for patients with recent strokes or hip fractures, but may not have an impact on function among patients with congestive heart failure or diabetes. For the latter types of patients, home health care might be targeted at improving patient knowledge, compliance, and ability to take medications and thereby avoid adverse physiologic events.

Another problem with outcome assessment among home health patients is that the probability that patient status will improve or be maintained depends on the underlying condition, comorbidity, and the home environment. If home health patients were homogeneous, we could infer that better quality of care was provided to patients with better outcomes. However, home health care is provided to patients with a spectrum of problems. Case mix varies among agencies because some specialize in certain types of care, do not provide selected services, or do not admit the full spectrum of home health patients. Thus, aggregate patient outcomes from a given home health agency will be influenced as much if not more by agency case mix as by the quality of services provided. For example, an agency that is treating a large number of terminal patients, or even cardiac patients, will have lower rates of functional improvement than an agency treating predominantly strokes or fractures. Although we can adjust for such differences using multivariate methods, stratification using a classification system that controls for many such differences, adding, if necessary, adjustment for comorbidities, is more effective and practical for evaluating quality of care.

Thus, outcome measures provide a reasonable emphasis for quality assurance in home health care when applied with knowledge of potential limitations. Using a range of focused measures that directly relate to the care delivered to groups of similar home health patients can alleviate many of the potential problems.

The Need for Focused Process Measures

Process measures help to elucidate which aspects of care are problematic and thereby translate more readily into recommendations for improving quality. They provide a necessary supplement to outcome measures in order to attribute outcomes—either good or bad—to care administered by a particular agency (Wyszewianski 1988). Among patients for whom outcomes are difficult to define (e.g., mentally impaired) or difficult to measure (e.g., terminally ill), process measures may actually be preferable to outcome measures for evaluating quality of home health care.

Process measures require standards or guidelines to which actual patient care can be compared. For home health care such standards are often global and their application then requires judgment on the part of a surveyor or reviewer (USDHHS 1987; Joint Commission on Accreditation of Healthcare Organizations [JCAHO] 1988; National League for Nursing [NLN] 1989). Standards or guidelines that are developed for specific types of patients (e.g., physical therapy [PT] visit frequencies for patients with strokes, medication teaching frequency for patients with new cardiac medications) can be used to measure process quality by collecting uniform data and comparing actual care with standards. Problem-specific care standards have been developed by many individual home health agencies and agency associations for internal agency quality-assurance programs (Texas Association of Home Health Agencies 1983; Colorado Association of Home Health Agencies 1983). These focused process quality measures that relate to key attributes of care can more easily be linked to specific outcomes. Hence, we strongly endorse the use of focused process measures in combination with outcome measures for quality assessment and assurance in home health care.

The Need for Structural Measures

Structural standards in use for home health care include guidelines on organizational structure, staff qualification, and procedures at the

agency level for issues such as admitting patients, assuring confidentiality, record keeping, dispensing pharmaceuticals, and maintaining equipment (USDHHS 1987; JCAHO 1988). The NLN standards also contain criteria for assessing community needs and developing a program in accordance with community needs (NLN 1989). These organizations have carefully developed and reviewed structural standards using consensus-building approaches with home-health clinicians. However, such standards only establish the presence of agency-level elements necessary to provide adequate care and do not assure that agency capability translates into good patient care.

We endorse the use of selected structural measures to assure that the necessary infrastructure is present in a home health agency. However, we recommend judicious use of structural standards because extensive paper compliance can impose a heavy administrative burden that can detract from the provision of patient care. Because structural measures have been thoroughly developed for home health care and do not assess quality at the patient level, we will not discuss these measures further.

A Classification System for Quality Assurance

To use focused quality measures, we must have a method for grouping (or stratifying) patients into groups that are homogeneous from the perspective of the quality measures that apply to patients in each group. Patient outcomes need not be comparable for all patients in each group; only the measures or constructs used to assess quality need to be similar.

Approach to Developing Quality Indicator Groups (QUIGs)

We began by examining existing home health-classification systems. These systems were generally developed for resource use estimation or for patient-care management, not for measuring or assuring quality of care. However, we anticipated that there could be overlap between classification approaches for different purposes, which would be advantageous. We reviewed the systems for applicability to quality measurement

and assurance, not validity in terms of the purpose for which they were developed.

One of the earliest classification schemes for home health care is the rehabilitation potential patient classification system (RPPCS) (Daubert 1979). Five categories are used to characterize prognosis for recovery and overall care objectives. A single set of quality measures could apply to all patients in the RPPCS end-stage disease group, but not for patients in each of the other four groups. Different outcome and process measures would be required to determine if an appropriate recovery state was achieved or if appropriate services were provided for the different patients included in each of the other four prognostic categories.

Problem-oriented classification approaches have been developed for managing patient care in community health nursing (Simmons 1980; Martin 1982; Visiting Nurse Association of Omaha 1986) and were adapted for assessing resource use (Peters 1987). These approaches have a broader scope than the Medicare home health program, but do not sufficiently emphasize rehabilitative (e.g., physical, occupational, and speech therapy) and postacute (e.g., postsurgical treatment, intravenous therapy) care for a Medicare home health quality-assurance program. Nevertheless, their problem-oriented classification approach is appropriate for quality-measurement purposes.

Manton and Hausner (1987) define case-mix dimensions for estimating resource use that in some cases include patients with fairly specific problems for whom similar quality indicators might apply. For example, dimension 2 includes patients with musculoskeletal problems and dimension 5 includes patients with circulatory and respiratory problems. Foley (1987) and colleagues empirically developed the Resource Utilization Groups–Home Health Care (RUG–HHC) that include some groups, termed hierarchies, of patients for whom similar quality measures apply, such as rehabilitation and mentally/behaviorally impaired. In both of these classification systems, however, there are dimensions (or hierarchies) that encompass heterogeneous patient groups requiring varied outcome and process quality measures.

We concluded that none of these classification approaches could be used in its entirety for quality assessment. However, elements of each could be used in developing the QUIGs.

To design our classification approach, we used an iterative method that was initiated by listing quality indicators and specifying the types of patients for whom each indicator was appropriate. We then grouped

similar patient types according to the constellations of appropriate quality indicators. We considered other indicators that applied to each patient group. We combined groups that required similar quality indicators so that we did not have unnecessary groups. We continued this process until well-defined patient groups and a comprehensive set of potential quality indicators for each group were specified.

After developing the classification scheme and quality indicator lists for each group, we refined our system using two methods. We field tested the classification scheme by using an instrument to classify approximately 300 Medicare patients from four home health agencies. This provided information on the relative frequencies of the different groups and whether there were types of patients that were either difficult to place or did not fall into any of the groups. Although we did not conduct a formal reliability test during this phase of empirical testing, we used respondent comments about classification problems to refine the classification system and instrument.

We tested the face validity of the approach with two different interdisciplinary panels of home health clinicians. The two panels involved a total of 15 experienced clinicians including seven home health nurses, five physicians, a physical therapist, an occupational therapist, and a social worker. Using a modified Delphi process, these panels reached consensus on the most essential quality indicators for each patient group (Crisler, Kramer, and Shaughnessy 1990; Shaughnessy, Crisler, and Kramer 1989). Concurrently, they reviewed the classification scheme from the perspective of whether a uniform set of quality indicators could be specified for patients in each group and whether there was overlap among groups in the appropriate quality indicators.

Description of Quality Indicator Groups (QUIGs)

The QUIG classification (or stratification) system for Medicare patients that was developed and refined based on all of these activities is presented in figure 1. The more frequent home health diagnoses included in each of the groups are listed in table 1. The groups are exhaustive so that all Medicare home health patients can be classified into at least one group. However, a patient can be classified into more than one group if he or she has more than one acute or unstable condition for which home health care is provided.
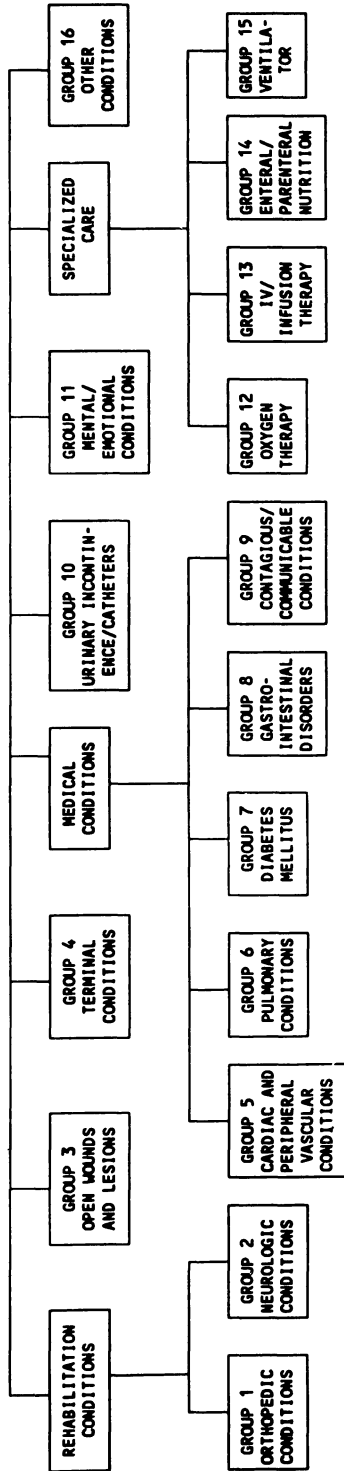
FIG 1.   Quality indicator groups (QUIG) classification system.

TABLE 1

Illustrative Diagnoses and Problems Included in Medicare Quality Indicators Groups (QUIGs)[a]

QUIG number and label	Description
QUIG 1 - Orthopedic conditions	Hip fracture, surgical hip repair, hip replacement, total knee replacement, arthritis, amputation
QUIG 2 - Neurologic conditions	Cerebral vascular accident, multiple sclerosis
QUIG 3 - Open wounds and lesions	Surgical wound, venous stasis ulcer, decubitus ulcer, diabetic foot ulcer
QUIG 4 - Terminal conditions	Palliative care for malignant neoplasm, end-stage cardiopulmonary disease, end-stage renal disease
QUIG 5 - Cardiac and peripheral vascular conditions	Myocardial infarction, congestive heart failure, coronary artery disease, angina, hypertension, deep venous thrombosis
QUIG 6 - Pulmonary conditions	Chronic obstructive pulmonary disease (COPD), asthma, pneumonia, pleurisy, lung tumor
QUIG 7 - Diabetes mellitus	Recently diagnosed diabetes, unstable/poorly controlled diabetes
QUIG 8 - Gastrointestinal disorders	Colostomy, bowel incontinence, gastric ulcer, malnutrition, diarrhea, diverticulitis
QUIG 9 - Contagious/communicable conditions	Hepatitis, tuberculosis, AIDS, salmonella
QUIG 10 - Urinary incontinence/catheter	Neurogenic bladder, indwelling catheter, intermittent catheter, urinary incontinence
QUIG 11 - Mental/emotional conditions	Depression, bipolar affective disorder, acute anxiety, advanced Alzheimer's disease
QUIG 12 - Oxygen therapy	Intermittent oxygen, continuous oxygen
QUIG 13 - Intravenous/infusion therapy	Intravenous fluid, chemotherapy, antibiotics, intravenous pain control, subcutaneous infusion pain control
QUIG 14 - Enteral/parenteral nutrition	Hyperalimentation, nasogastric tube, gastrostomy, jejunostomy
QUIG 15 - Ventilator	Continuous ventilator dependence, intermittent use of ventilator
QUIG 16 - Other conditions	Anemia, vitamin B-12 injections, nonterminal care for malignant neoplasm

[a]Medicare requires that the patient be homebound and that skilled care (nursing, physical therapy, or speech therapy) be provided. Generally, either the patient's condition or his/her ability to provide self-care are expected to improve (except in the case of acute terminal conditions) and the treatment plan requires frequent review and modification.

Because of the emphasis on Medicare home health patients, many groups are defined by conditions that are frequently treated in the Medicare home health program. Neither the QUIGs nor the quality indicators specified for each group are appropriate for patients with chronic conditions that are not generally covered by Medicare. We recognize the importance of home health care for these patients and are developing and refining chronic-condition QUIGs. However, the acute-care QUIGs are designed for use in measuring and assuring quality of Medicare home health care services.

Patients requiring rehabilitation (QUIGs 1 and 2) are treated frequently in the Medicare home health program. The majority of the orthopedic conditions are hip fractures or hip replacements; stroke is the most common of the neurologic conditions. Patients in these groups tend to require an interdisciplinary home health team representing nursing, therapy, home health aides, and social work.

QUIG 3 includes predominately patients with surgical wounds and skin ulcers. Terminal conditions (group 4) includes patients receiving hospice-type care whether or not the home health agency is a Medicare-certified hospice. The medical conditions (groups 5-9) all tend to require monitoring of medical status, teaching about medications or new treatments, and often adjustment of medication doses or lifestyle in the home environment. Despite these similarities, quality-of-care assessment requires measures that are unique to each of these conditions.

Incontinence (QUIG 10) is such a difficult problem to manage in the home that a separate group was considered essential for this condition. Use of urinary catheters is common in the home setting, requiring teaching self-care and/or ongoing monitoring. Acute mental/emotional conditions can be treated in the home under the Medicare program by agencies that are certified to provide psychiatric care. However, this benefit does not cover more chronic care for dementia. Because of the trends toward increasing use of highly specialized and technological services, we chose to have individual specialized-care groups (QUIGs 12-15) despite the low frequency with which these services are provided by many agencies. However, quality is an important consideration in provision of such acute care in the home.

Patients who do not fall into any of the other 15 groups can be classified into the other category. We have found that less than 3 percent of the Medicare home health population is classified only into this group.

Home health admissions can be classified into the appropriate

QUIGs by the primary care provider using the QUIG classification questionnaire, which is completed following the usual admission assessment (involving a complete history and physical exam relating to the home care episode). Referral information provided by the referring physician or hospital is not generally adequate for placing the patient into the appropriate QUIGs. Many patients qualify for two or three QUIGs because they have multiple acute problems for which they are receiving home care.

We also ask the provider to indicate which is the "dominant" QUIG defined by the condition that most significantly impacts on care planning and implementation for that patient. When we train care providers in the use of the instrument, we provide an instruction manual that includes a series of example cases to be classified and discussed. We have found that a trained provider can classify a patient into all the appropriate QUIGs in approximately three minutes once the admission assessment has been completed.

Quality Indicators for Home Health Care

The utility of the QUIGs is apparent from the concise sets of quality indicators that were specified and refined based upon the clinical panel consensus-building activities. For each group, a set of fewer than 20 quality indicators was identified that panel members rated as sufficient to assess adequately quality of care for patients in the group. In this section, we will discuss quality indicators for home health care, highlighting those selected by the clinical panels for three illustrative QUIGs. Throughout this discussion, outcome indicators are presented before process indicators because of a growing consensus that outcomes should be emphasized in quality assessment.

A taxonomy for the types of home health quality indicators that were specified is provided in table 2. The outcome indicators denote changes in status or maintenance of status. Data corresponding to a single point in time are generally not sufficient to measure outcomes because two or more time points are required to assess accurately whether a change has taken place or status has been maintained. The first three categories of outcome indicators correspond to attributes of patient status. The last five categories are outcome indicators for intermediate steps or processes rather than end results of health care. These

TABLE 2
Categories of Quality Indicators for Home Health Care

Outcome indicators
Change in:
1. Functional status: activities of daily living (ADLs)
2. Functional status: instrumental activities of daily living (IADLs)
3. Health status signs and symptoms
4. Knowledge, demonstrated skill, compliance
5. Family/caregiver strain
6. Unmet needs
7. Satisfaction
8. Utilization

Process indicators
1. Service provision
2. Teaching
3. Referral

intermediate-outcome indicators—referred to in jest as "outcess" or "procome" indicators (Donabedian 1987)—are useful in that home health care can significantly impact on these for many patients during a typical home health-care episode. The process indicators relate to the adequacy of services, teaching patients or families, and referrals. The predominant role of process quality indicators in our quality-assessment scheme is to determine the extent to which outcomes can be attributed to care provision, that is, process.

Outcome Indicators

Functional Status: Activity of Daily Living (ADL) Indicators

For QUIGs in which care is oriented toward improving or maintaining functional abilities such as neurologic conditions, outcome measures for functional status change (e.g., ambulation, toileting, transferring, personal hygiene) are essential (table 3). However, for other QUIGs, home health care is not targeted at enhancing or maintaining functional status, rendering ADL outcome measures of questionable value (tables 4

TABLE 3
Quality Indicators for QUIG 2: Neurologic Conditions

Outcome indicators
  Functional status (ADLs)
    Change in patient's ability to:
      1. Get to and from toilet
      2. Transfer
      3. Tend to personal hygiene needs
      4. Bathe entire body
      5. Feed self

  Functional status (IADLs)
    Change in patient's ability to:
      6. Prepare/take all medications reliably/safely
      7. Effectiveⁱʸ express self

  Health status (signs/symptoms)
    Change in:
      8. Range of motion
      9. Presence of pressure sores
      10. Presence of incontinence

  Knowledge, demonstrated skill, compliance
    Change in patient/caregiver compilance with:
      11. Use of assistive devices/adaptive equipment

  Family/caregiver strain
    Change in:
      12. Family/caregiver strain

Process indicators
  Services
      1. Assessment of need for assistive devices/adaptive equipment
      2. Presence of key components of physical therapy, occupational
         therapy, speech therapy assessment

  Referral
    Evidence of referral to:
      3. MSW for psychosocial issues/body image

and 5). When using ADL outcome measures for quality assessment, we should use measures corresponding to individual ADLs as well as combined indices of ADL (Visiting Nurse Association of Metropolitan Detroit 1983; Lalonde 1986; Katz et al. 1963). Home health agencies may be less effective in dealing with certain functional deficits, such as

TABLE 4
Quality Indicators for QUIG 6: Pulmonary Conditions

Outcome indicators
Functional status (IADLs)
Change in patient's ability to:
1. Prepare/take all medications reliably/safely

Health status (signs/symptoms)
Change in patient's:
2. Activity tolerance
3. Level of dyspnea
4. Anxiety level

Knowledge, demonstrated skill, compliance
Change in patient/caregiver knowledge of:
5. Signs/symptoms of pulmonary infection

Utilization
6. Hospitilization for pulmonary problem

Process indicators
Services
1. Key components of respiratory assessment

Teaching
Frequency and provider of teaching:
2. Breathing exercises/techniques
3. Medication use and side effects
4. Signs/symptoms of pulmonary infection

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toileting and transferring, which is important to determine (Shaughnessy, Kramer, and Pettigrew 1987).

Functional Status: Instrumental Activity of Daily Living (IADL) Indicators

A patient's ability to function autonomously depends on restoration and/or maintenance of ability to perform a range of living skills such as meal preparation, shopping, housekeeping, medication administration, communication. These are generally classified as instrumental activities of daily living (IADLs). We recommend the inclusion of a global outcome measure for whether the patient can perform living skills if no caregiver is present. For some patients, improvement in liv-

TABLE 5
Quality Indicators for QUIG 13: IV/Infusion Therapy

Outcome indicators
  Knowledge, demonstrated skill, compliance
    Change in patient/caregiver knowledge of:
      1. Emergency plan
      2. Aseptic technique
      3. Care/use of equipment
      4. Medication regimen
      5. Signs/symptoms of infection
      6. Signs/symptoms of complications
      7. Signs/symptoms of infiltration of IV
  Family/caregiver strain
    Change in:
      8. Family/caregiver strain
  Utilization
      9. Hospitalization for phlebitis, cellulitis, sepsis
      10. Emergency care visits for complications
Process indicators
  Services
    Frequency of:
      1. Equipment malfunction
      2. Emergency plan use
      3. Care coordination effort

ing skills may result from teaching skills not previously acquired because a spouse was available to help. In addition to this global indicator, focused IADL outcome indicators, such as change in ability to take medications reliably and safely, are important to assess for some patients because home health care focuses on enhancing patient ability in these areas (tables 3 and 4).

Health Status Signs and Symptoms

Mortality is the most common global measure of quality for hospital care, but its utility for assessing the quality of home health care is limited because unexpected deaths are relatively rare among home health patients and high-quality home health care often cannot alter longevity (Hedrick and Inui 1986; Stark and Gutman 1986). When care is ori-

ented toward treating specific medical or surgical problems, physiologic status measures relating to the condition or associated morbidity can be important markers of quality (tables 3 and 4). For other elderly patients with chronic illness, control of symptoms (e.g., dyspnea, anxiety, pain) is often the home health treatment objective in contrast to treating the underlying pathology. Hence, assessing quality of care using health status outcomes requires judicious selection of physiologic or symptomatic indicators that home care can be expected to influence. Many agencies, associations, and projects have developed outcome indicators for such signs and, to a lesser extent, symptoms of disease (Minnesota Department of Health 1986; Florida Association of Home Health Agencies 1980; Colorado Association of Home Health Agencies 1983; Lalonde 1987; Greenwald 1987).

Knowledge, Demonstrated Skill, and Compliance Indicators

Teaching patients and caregivers how to use equipment, take medications, identify problems, and respond to situations is the primary focus of home health care for many patients (Visiting Nurse and Home Care 1981; Michigan Home Health Assembly 1987). Quality indicators can relate to acquisition of knowledge, acquisition of skills, or compliance with treatment regimens. For many types of conditions, specific information is identifiable that should be taught over the course of home health services (tables 3, 4, and 5). Quality measures can be constructed by questioning patients and families about the information or skills that should be learned. These essentials have been specified for many common conditions (Minnesota Department of Health 1986; Texas Association of Home Health Agencies 1983; Colorado Association of Home Health Agencies 1983; Hegyvary and Haussmann 1976). Similarly, compliance measures can be based on a comparison between prescribed self-care regimens and interview data on the frequency with which self-care is provided, for example, medication administration (Lalonde 1986).

Family/Caregiver Strain

Counseling patients and families how better to meet their needs, and referring for support services when necessary and available, can be an

important service that a home health agency provides. These services can help to maintain or enhance family/caregiver coping. Despite limitations in an agency's ability to alter financial constraints or relationships, outcome measures of change in coping ability over time are important measures of agency quality (tables 3 and 5; Lalonde 1987; Choi, Josten, and Christensen 1983).

Unmet Needs

Although personal-care services are not provided over an extended period in the Medicare home health program, assisting patients and families in meeting their care needs, particularly for personal care, may be critical to continued functioning in the home. Unfortunately, it is mostly through expanded home-care programs that unmet needs for personal care can be met (Hughes et al. 1988; Kemper, Applebaum, and Harrigan 1987). These measures are often limited in utility for the Medicare home health program.

Satisfaction

Satisfaction can be a useful quality indicator particularly for personal-care services and the interpersonal aspect of care (Cleary and McNeil 1988; Donabedian 1980). Patient satisfaction measures relating to specific aspects of care and services can yield useful information about the adequacy of provider–patient communication (Institute of Medicine 1986). However, global satisfaction measures tend to be influenced by many factors unrelated to the quality of home health-care services (Cleary and McNeil 1988; Larson 1978).

Utilization

Hospitalization can be an important marker of significant decline in health status among home health patients (HCFA 1988). However, hospitalizations may reflect high quality care in situations where a treatable problem is identified and an appropriate referral made (Hedrick and Inui 1986; Starfield 1974). Hence, use of hospitalization as an outcome indicator is enhanced when the reason for the hospitalization is taken into consideration (tables 4 and 5). Nursing-home placement is often not a useful outcome indicator for Medicare home

health care because for most types of patients these services are not able to impact on nursing-home admission (Kramer, Shaughnessy, and Pettigrew 1985; Hedrick and Inui 1986). Home health programs providing expanded services can more easily influence nursing-home utilization if they target patients at high risk for nursing-home use (Skellie, Mobley, and Coan 1982; Nocks et al. 1986; Kemper, Applebaum, and Harrigan 1987).

Process Indicators

Service Provision

For patients with specific postacute conditions, we can establish quantifiable standards for the type and number of home health visits and the minimum number of days until the first visit (Phillips 1988). Alternatively, we can construct quality measures for specific services provided by home health agencies (e.g., assessment, wound care, blood-pressure monitoring) based on accepted standards of care. Process quality measures for these services can be based on whether the service is provided, the frequency of its provision, the qualifications of the service provider, or whether it is provided correctly. The first three of these can be quantified based on information that is available in records and through provider interviews (Shaughnessy, Kramer, and Pettigrew 1987; Shaughnessy, Breed, and Landes 1982). Without observing service provision, it is difficult to assess whether a service is provided correctly.

Teaching

Adequacy of patient teaching can be assessed similarly to adequacy of service provision, based on the frequency and provider of teaching about specific topics (table 3). Because of the emphasis on teaching and preparing patients to function independently in the Medicare home health program, the extent to which patients and families are taught is a critical quality indicator. The advantage of using process indicators for teaching in combination with outcome indicators for knowledge acquisition is that we can assess whether the agency worked at teaching even if a patient or family did not acquire the requisite knowledge or comply with the treatment regimen for other reasons.

Referral

For patients who can benefit from services that are not available in the agency or have not been identified for the patient, referral is an important home health function. An important measure of quality, therefore, is whether referrals were made when other types of care are indicated. Referrals that should be considered can be identified by QUIG (table 3).

Using QUIGs for Assessing and Assuring Quality

We are currently operationalizing, testing, and using the QUIG approach and related quality indicators in three studies of home health care. One study, funded by HCFA, is an evaluation of the cost and quality of home health care in fee-for-service and capitated settings. The QUIGs provide a stratification method for sampling similar patients in the two home health settings and for selecting appropriate quality measures for which relevant data are then collected. The second study, funded by the same agency, is intended to develop and test quality measures that can be used to assure quality in the Medicare home health program. This study is providing the opportunity to test the QUIG approach among other methods in the context of a practical quality-assurance system. The third study, funded by the Robert Wood Johnson Foundation, is intended to develop and test quality measures for application to agency-level quality-assurance activities and to assess the quality of both Medicare and non-Medicare services provided to adults. This involves expanding quality assessment to chronic and preventive care provided by home health agencies.

Operationalizing Quality Indicators

To operationalize our approach, we specified quality measures corresponding to the clinically validated set of quality indicators for each QUIG (presented in tables 3, 4, and 5 for three illustrative QUIGs). We began this process by reviewing quality-of-care literature and quality-assessment instruments pertaining to home health care (Kramer et al. 1989; Shaughnessy, Crisler, and Kramer 1989). During this

review we examined 43 instruments designed by groups or agencies involved in home health quality assurance and over 50 references investigating quality of home health care or related care in nursing homes. Although outcome measures of functional-status changes and physiologic-status changes were found, many of those quality indicators deemed most significant by our clinical panels using the QUIGs were not well represented. In particular, relatively few operational measures and data items were developed for teaching, knowledge acquisition, and compliance; caregiver strain; and symptom control, such as pain management. Furthermore, quality measures frequently lacked specificity or were impractical because they were global rather than focused on specific types of home health patients.

Building on the available literature and instruments, we specified quality measures and data items, and then developed data collection instruments for each QUIG. For example, we developed a patient/caregiver interview instrument that is used for many of the QUIGs at two points in time to assess family/caregiver strain (outcome indicator 12 in table 3 and 8 in table 5), knowledge of key issues related to the patient's condition (outcome indicators 5 in table 4 and 1 to 7 in table 5), and compliance (outcome indicator 11 in table 3). For family/caregiver strain we ask caregivers to respond to several statements using a 4-point scale in which 0 represents strong disagreement, 1 represents disagreement, 2 represents agreement, and 3 represents strong agreement. Illustrative statements include:

"I feel I am able to manage the demands placed on me with regard to my responsibilities of caring for this patient."

"I am unsure/uncertain if I will be able to continue to manage the demands of caring for this patient in the future."

"I feel that caring for this patient has caused me to become physically fatigued."

For knowledge and compliance measures, we have developed questions for each QUIG that we ask patients or their caregivers if the patient cannot respond. For example, patients with orthopedic conditions (group 1) are asked about the frequency with which they perform hip/leg exercise, ambulation/walking exercise, and shoulder/arm exercise if they are on an exercise program and about use of adaptive

equipment. They are also asked about the circumstances under which they do not perform their exercises or perform them differently from how they were taught. Exercise frequency, use of adaptive equipment, and knowledge of contraindications to exercise are then compared with the prescribed therapy according to the home health-care provider.

We are testing several different measures using these data items. Ideally, we would like to assess caregiver strain, compliance, and knowledge at admission and at three weeks after admission (or discharge) in order to examine change. We could then use a dichotomous variable that denotes whether or not there is improvement between admission and three weeks in caregiver strain, compliance, or knowledge. A separate variable would denote whether caregiver strain, compliance, or knowledge has worsened over this period. However, given the complexity of collecting such information at two time points, and the fact that data collection at the first time point might influence compliance or knowledge at the later time point, we are also testing a measure based solely on the response at three weeks or discharge, whichever occurs first. If necessary, we can adjust for baseline differences within QUIGs using other covariates that do not require a baseline patient/caregiver interview.

The majority of the end-result outcome measures require data that can be obtained from the home health-care provider at several points in time. For instance, we obtain the provider's assessment of the patient's bathing ability using a 5-point scale that provides a precise description of bathing ability at each level. Using data obtained from providers at two or more points in time, we can measure improvement, maintenance, and decline in bathing status (outcome indicator 4 in table 3). We are testing similar measures for other quality indicators relating to functional status, physiologic status, symptom severity, and several different types of measures for utilization and process quality indicators.

Assessing Home Health Care Quality Using QUIGs

To measure quality of care using the QUIG approach, the care provider classifies each home health admission using the QUIG classification questionnaire. After determining the QUIGs for which a patient is eligible, the care provider collects quality-of-care and case-mix data for

the first time point. The provider completes the global instrument, which includes data items applicable to all patients, and the QUIG-specific instruments corresponding to each QUIG into which the patient is classified. Subsequent data-collection time points occur every three weeks until discharge from home health care. These time points do not require repetition of many baseline data items such as demographics and family/caregiver supports, but all quality-of-care data are collected at each time point.

Many of the analyses are conducted within QUIGs. We measure outcomes using data from two or more points to determine whether patient status has improved, stabilized, or declined. We use similar measures for change in knowledge acquisition, compliance, caregiver strain, and other intermediate outcomes. Process measures are based on service provision during the entire home health episode or during a selected time interval occurring either immediately following admission or at some later time point.

If patient samples within QUIGs differ across agencies, we can adjust for case mix using multivariate methods. Secondary QUIGs into which a patient falls, as well as baseline characteristics, are potential covariates for these adjustments. We are also investigating methods of further stratifying patients by frequently occurring constellations of QUIGs as a means to control further for case mix through stratification. Global measures generally require case-mix adjustment for which the QUIGs can be used as covariates.

Using QUIGs for Quality Assurance

Based on the QUIG-specific data, we can profile home health agencies on quality of care. Tracer QUIGs can be selected for these profiles so that it is not necessary to collect data on all home health patients. Quality profiles for different home health agencies pertaining to patients within these same QUIGs are more meaningful to compare than profiles for a similar-sized random sample of patients because of the comparability of patients within QUIGs. These profiles can be used as a first-stage quality-assurance screen in order to select agencies or types of care within agencies for more in-depth review either because of potential problems or because they provide exemplary care.

During this second stage of more in-depth review, we will interview providers and patients in greater depth and conduct a case-by-case

record review. The second stage is intended to determine reasons for the outcome findings by a more thorough review of unique patient factors and processes of care. For example, we might identify an agency where stroke patients failed at a higher than normal rate to improve in ability to get to and from the toilet, transfer, and bathe themselves (table 3). If we also observe frequent decline in caregiver's coping, we will investigate agency efforts to counsel and assist caregivers. Additionally, if we observe poor knowledge about and compliance with assistive devices, we will examine adequacy of assessment and teaching about use of devices. Alternatively, we will examine the extent of involvement by physical and occupational therapists. However, we believe as well that providing all agencies with the first-stage quality-of-care profiles and the tools to further investigate potential quality problems, rather than identifying only agencies with the most significant quality problems, will help many agencies improve quality of care on their own (Berwick 1989).

Feasibility, Reliability, and Validity Testing of the QUIG Approach

In the aforementioned projects, we are testing the QUIGs, the related quality measures, and the data collection and analysis approaches. Interrater reliability of the QUIG classification procedure will be tested by comparing the assigned QUIGs between two care providers, each of whom assesses the patient. In addition, we will compare independent QUIG assignments based on the home health record with the care provider's assignments to determine whether patient classification can be conducted using only the record. Finally, we will conduct a comprehensive record review and patient assessment independently of the home health-care provider for a sample of patients to examine the validity of the classification conducted by the care providers.

To select the optimal set of measures for each QUIG, we are examining the feasibility, reliability, and validity of a large set of measures and data items. Feasibility ratings of the availability, accuracy, and data-collection burden of each data item are obtained from care providers who are using the instruments for patients in their caseload. The feasibility rating for each measure is a composite of the ratings for all the data items required for the measure. Interrater reliability will be tested for each measure by obtaining data independently from two care providers

who are both knowledgeable about the patient. Validity of the first-stage quality screen measures will be tested by determining the extent to which they predict quality-of-care assessments based on the more extensive second-stage screen involving record review and interviews with patients and providers. The more comprehensive review will be conducted during site visits by highly experienced home health nurses who have participated in home health-quality assurance, administration, and survey activities. Review criteria are being developed to identify linkages between care process and outcome findings. The most valid measures are those that most effectively identify either quality problems or exemplary care according to these more comprehensive assessments. Using a similar approach, the sensitivity and specificity of quality measures will be determined based upon the extent to which they identify quality problems or exemplary care.

A system of measures will be selected based on a combination of the empirical feasibility, reliability, and validity testing; consensual validity of both indicators and measures; and correlations among measures. This system of measures will then be tested in a larger sample of home health agencies to examine the extent to which quality profiles can detect quality-of-care differences and the utility of the quality measures for internal agency-level quality-assurance activities. This test will include both the first-stage quality measures and subsequent follow-up with the second-stage quality measures.

Advantages and Disadvantages of the QUIG Approach

Using QUIGs to stratify patients assures that appropriate measures will be used for assessing quality of home health care. Although one could collect a voluminous data set for all home health patients and select from it when analyzing quality of care for specific patient types, such an approach is impractical from a data-collection perspective. The QUIG classification scheme provides a means to control for case-mix differences when comparing agencies or types of home health agencies. Finally, we can target quality assessment and assurance efforts on areas of greatest interest or concern using tracer QUIGs.

The greatest weakness of the described approach is that the model is currently undergoing operational testing and is not available as a transportable system of quality measures for home health care. Preliminary

evidence suggests that the conceptual framework and basic methodology have substantial merit, but that refinements to the initial sets of quality indicators and measures will be necessary before the system is ready for operational use in quality assurance. However, we expect that the current operational tests will yield a practical, reliable, and valid set of quality measures. We are beginning with a large set of measures and data items so that we can test alternative measurement strategies.

The conceptual approach of classifying patients into quality-indicator groups, determining appropriate quality indicators that are clinically valid according to providers in the field, and then developing measures and data items is applicable to quality measurement for quality assurance and research purposes in other health-care settings including nursing homes, hospitals, and ambulatory care. Because this approach requires consensus on what constitutes high-quality care for different types of patients before developing measures and data-collection instruments, it requires more time and resources than are typically devoted to developing quality-review procedures. However, current quality-review and assurance strategies are often at odds with provider views, rendering them ineffective (Lohr and Schroeder 1990). The conceptual framework proposed here, and its application following operationalization and field testing, may substantially reduce or even eliminate discrepancies between quality review and provider views about quality of care.

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