VALIDATION OF NURSING HOME QUALITY INDICATORS STUDY

FINAL REPORT

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EXECUTIVE SUMMARY

VALIDATION OF NURSING HOME QUALITY INDICATORS STUDY

A. APPROACH

The goal of this study was to develop a system by which a series of Quality Indicators (QIs) could be used in conjunction with claims data to monitor quality of care in nursing facilities. Fifty QIs were developed and validated using a sample of nursing home residents' medical records for a six month period surrounding the time of a nursing facility's federal certification survey between November 1, 1990 through December 31, 1991.

The validated QIs can be used as the basis for an automated system to continuously monitor the quality of care provided in federally certified nursing homes. Such a system can contribute to lowering costs of care and improving outcomes for Medicaid nursing home residents by reducing the incidence of potentially avoidable inpatient hospitalization and over medication. The system can then be used as an adjunct to the State's Medicaid claims processing system to assist federal and state surveyors in effectively implementing the survey process.

This study builds on work in the area of quality of care in long-term care settings that was completed under a previous cooperative agreement (No. 18-C-99388/02) between the Health Care Financing Administration (HCFA) and The MEDSTAT Group, Inc. In this earlier study, conducted by David Klingman, Ph.D. and Cynthia Tudor, Ph.D. at SysteMetrics, Inc.,[1] one set of nursing facility-level quality indicators (QIs) was developed based on 1986 and 1987 Medicaid and Medicare claims data from Tennessee and Michigan.[2]

[1]Now the Research and Policy Division of MEDSTAT.

[2]Crucial for both of these projects were data derived from HCFA's Tape-to-Tape database, (developed and maintained by MEDSTAT) for California, Georgia, Tennessee and Michigan.

The QIs, developed by Klingman and Tudor and further modified in this study, focus on the occurrence of three broad types of potential problems that can arise in the quality of care provided to individual residents. The QIs focused on the global areas of: (1) *adverse outcomes*, (2) *lack of therapy*, and (3) *inappropriate pharmaceutical treatments*.

The QI algorithm used ICD-9-CM diagnosis codes and CPT-4 and CRVS procedure codes to generate the QIs. These codes represent either medical or surgical conditions which define the indicator events (e.g., inpatient stay or emergency room visit), the covariant diagnoses or case selection factors.

The current study seeks to develop the actual system through which continuous monitoring of the quality of care rendered to Medicaid nursing home residents would be accomplished. Specifically, it validates the facility and resident-level QIs by:

- modifying the original Klingman and Tudor claims-based QIs, (post-OBRA '90), using Medicaid claims data from two Tape-to-Tape states (California and Georgia); and
- examining a sample of resident medical records in a random sample of nursing homes in the two states to compare findings from the claims with the medical records.

To accomplish these objectives, each sampled resident's nursing home medical record was reviewed for three basic types of information:

- In the event a facility triggered one or more QI flags, did the event reported in the resident's claims data (e.g. hospitalization, lack of therapy or drug use patterns) actually occur according to the resident's medical record?
- In the event a facility had one or more QI flags **or** had no QIs flagged, were there quality indicators identified in the medical record that were not identified by the QI-screened claims data?
- In the event a facility did or did not have QI flags, were there other events present in the resident's medical record related to potential quality of care areas that were not identified through the use of the claims-based QI?

Record review was conducted by primary and secondary nurse reviewers, and in some cases, a physician reviewer, using photocopies of the relevant sections of the sample of residents' medical records.

B. RESULTS

1. Frequency of the Quality Indicators

This study repeated the analysis conducted by Klingman and Tudor by examining the frequency and types of claims-based QIs that occurred at the facility - and resident-levels in California and Georgia. The rate of QI flags for California and Georgia nursing homes was adjusted by the facility "exposure rate." This rate was computed by calculating the total number of QIs for all eligible residents divided by the total number of years of residence (total resident days within the study window/365.25) for these residents. The rate of QI flags per resident represents the total number of QIs that have been flagged for a resident during the six-month observation window.

a. California

Five hundred twenty four nursing homes (42% of the facilities in California) were included in the sampling frame. Of the 524 facilities, 53 percent were chain-operated, 79 percent were for profit, the average bed size was 102, and 73 percent of the facilities had fewer than 120 beds.

Seventy-five percent of the facilities had a QI rate (adjusted for exposure) greater than the 25th percentile (2.2 QIs). On the facility-level, the percent of residents within each facility that had no QIs was 48.4 with 1 QI was 19.8, with 2-3 QIs was 23.3, with 4-6 QIs was 7.6, and the percentage with seven or more QIs was 0.9. The average number of QIs per resident at each facility was 1.2, with a range of 0-3.7.

The total number of residents in the sampling frame for California was 28,999. The average age of the residents was 83.6 years. Seventy-five percent were females and 82 percent were white. Among all residents in the sampling frame, the average number of QIs per resident was 1.2, with a

range from 0-11. Almost half of all the residents (47.3%) had no QIs flagged, 20.4 percent had only one QI; 23.3 percent had 2-3 QIs; 8.0 percent had 4-6 QIs, and 0.9 percent had 7 or more QIs. The primary types of QIs that occurred (in descending order of frequency) were: *concurrent use of psychoactive drugs > 60 days* (22.4%), *use of antipsychotics* (14.3%), *hospitalization occurring more than seven days after admission* (11.5%), *use of anti-infectives > 60 days except for treating certain conditions* (7.5%), *exceeding maximum dosage of selected antipsychotics* (7.2%), *lack of therapy* (6.1%), *exceeding maximum dosage of antidepressants* (5.8%), *use of certain antidepressants* (5.7%), *continuous use of antipsychotics for greater than 120 days* (4.4%), and *use of drugs such as long half-life benzodiazepines* (4.2%). Twenty QIs represented 90 percent of all triggered QIs.

A proxy for resident severity was developed based on residents' medical payments during the two months prior to the residents' six month study period. Twenty-five percent of the residents in California had high pre-study medical costs (equal or greater than $96 per day). The study also attempted to estimate how many residents used Medicare for their long-term care services. Out of the population of 28,999 residents, 64 percent had Medicare payments during the pre-study or study periods.

b. Georgia

Two hundred sixteen nursing homes (60% of the total facilities in Georgia) were included in the sampling frame. Of the 216 facilities in the Georgia nursing home sampling frame, 62 percent were chain operated, 77 percent were for profit, the average bed size was 109, and 72 percent of the facilities had fewer than 120 beds.

Seventy-five percent of the facilities had a QI rate (adjusted for exposure) which was greater than the 25th percentile (3.6 QIs). On the facility-level, the percent of residents within each facility who had no QIs was 31.9, with one QI was 20.3, with 2-3 was 28.6, with 4-6 was 16.6, and the percent with 7 or more QIs was 2.5. The average number of QIs per resident at each facility was 1.9 and with a range of 0.6-3.5.

The total number of residents in the Georgia sampling frame was 18,202. The average age of the residents was 82.6. Seventy-eight percent were female and 73 percent were white. The

average number of QIs per resident was 1.9 with a range of 0-13. Approximately 31.7 percent of the residents had no QIs flagged; 20.3 percent had only one QI; 28.9 had 2-3 QIs; and 16.5 had 4-6 QIs; and 2.6 had 7 or more QIs flagged. The primary types of QIs that occurred (in descending order of frequency) were: *concurrent use of psychoactive drugs* (32.6%), *hospitalization* (19.9%), *use of psychoactives* (16.5%), *use of propoxyphene* (14.0%), *use of anti-infectives for > than 60 days* (13.4%), *exceeding maximum dosage of selected antipsychotics* (8.1%), *use of long-term sedative hypnotics* (7.1%), *exceeding maximum dosage of selected anxiolytics* (6.3%), *use of amonglycosides without a creatine or BUN test* (5.1%) and *exceeding the maximum dosage of selected antidepressants* (5.0%). Twenty-four QIs represented 88 percent of all triggered QIs.

Using the proxy for resident severity, twenty-five percent of the residents in Georgia had high pre-study medical costs (equal or greater than $73 per day). Out of the population of 18,202 residents, 46 percent had high prestudy medical costs.

2. Validation of the Quality Indicators

The total number of QIs were reduced from 53 to 50 based on a careful review of the literature as well as input from the study's Technical Advisory Group. Twenty of the 50 QIs account for almost 90 percent of all quality indicators flagged. Percent agreement between the claims record and the medical record was relatively high ($\geq$ 0.80) for most of the 50 QIs. In addition, tests for validity using positive and negative predictive values (PPV and NPV) indicated excellent test characteristics for 22 QIs.

The QIs were aggregated into three levels (e.g., Level I aggregating the 50 QIs to 13; Level II aggregating the 50 QIs to eight; Level III aggregating the 50 QIs to three) based on the three major QI domains: *resident outcomes*, *lack of therapy* and *pharmaceutical treatments*). In general, the PPV and NPVs improved as the aggregation of QIs increased. For example, in the Level III aggregation (e.g. three aggregated QIs), both the *resident outcomes* and the *pharmaceutical treatments* QIs were close to or above the 0.80 threshold. The QI based on *lack of therapy* remained a consistently poor indicator primarily due to the variation in Medicaid nursing home payment and billing policies for therapies in the

study states and the absence of Medicare claims data. The NPV remained high across the aggregation strategies.

3. Other Potential Quality Indicator Area Measurements

Two separate measurements outside of the QIs found in the claims and the medical record were examined in order to make determinations of the quality of care of the nursing home resident: (1) the resident's admissions assessment and (2) the resident's annual assessments. Data elements collected from the admissions and the annual assessment found in the medical record included information on the medical history and physical examination as well as advance directives and health maintenance. In California, admission assessment data was gathered on 570 residents. Study results indicated that there was well-documented data on the resident's reason for admission, active problem list, and past medical history. Information on the resident's current medications, overall review of symptoms, and physical examination were also easily identified in the medical record. Overall functional and cognitive status evaluation data were also performed and documented in high frequency. However, the admissions assessment in the medical record was not always complete in other areas, including preventive care and evaluation of nutrition, hearing, and vision as well as affect, with less than 10 percent of the residents with adequate care in these areas. Advance directives status was identified in only 24 percent of residents. Similar results were seen in the population from Georgia (N = 292).

The other area that was examined in the medical record was annual assessment information. In California, 165 residents were identified as having an annual follow-up during the study interval. Again, there was evidence of attention to the medical history and acute medical problems, but inappropriate lack of ophthalmologic, hearing, dental, and podiatric screening. Advance directive information was present in only 30 percent of the population. Similar results were found in the Georgia population (N = 60).

4. Analysis of Quality Indicators and Covariant Diagnoses

Prevalence rates were assessed for 21 covariant diagnoses and associated QIs, for both disaggregated covariant diagnoses and diagnoses aggregated for the relevant QI. In aggregating covariant flags by QI, information was summarized on comorbidity status for each QI for which associated covariant diagnoses had been assigned. Aggregated diagnosis flags were then used to "risk adjust" quality indicators. In essence, the risk adjustment constituted computing QI rates given the comorbidity status of the resident.

In California, it was found that the percent of cases with a covariant diagnosis was higher in the medical record sample than in the claims data--except for those QI/covariant diagnosis pairs for which no covariant diagnoses were observed.

In general, it was expected that the residents with covariant diseases would have a higher risk of receiving a QI. In California, it was found that for nearly all of the QI/aggregated covariant diagnosis pairs, the adjusted QI rates were higher among the residents who had covariant diseases. The Georgia data revealed a similar pattern, as expected, and in most cases the adjusted QI rate was higher among those who had covariant diseases.

5. Secondary Analyses - Logistic Regression Modeling

A secondary analysis for risk was conducted using multivariate modeling, with the main outcome being the presence of any QI. The goal of this analysis was to construct multivariate models to test the relationship between the study outcome (e.g., the presence of a claims-based QI or group of claims-based QIs) and the resident and facility factors potentially associated with the QI. In exploring the relationship between resident and facility characteristics and the presence of a QI, a multivariate model was chosen to control for potential confounding factors.

Resident-specific characteristics such as advanced age, male gender, and African-American ethnicity were associated with a decreased likelihood of at least one identified QI on a resident's claims record. A resident's use of services covered by Medicare was the most powerful factor related to the

study outcome. Facility characteristics such as urban location and for-profit status were associated with an increased likelihood for at least one QI, while chain affiliation was associated with a decreased likelihood.

6. Analysis of Federal Certification Survey Deficiencies (F-tags) and the Claims-based Quality Indicators

Another study objective was to conduct analyses related to the federal F-tags in order to examine the relationship between federal certification survey deficiencies or F-tags and claims-based QI flags. This was accomplished by addressing two questions: (1) What is the probability that a facility would have an F-tag cited given that at least one resident had an associated quality indicator flagged in the claims? and (2) What is the probability that a facility would have a QI generated from claims for at least one resident given that the facility had an associated F-tag cited as a result of their survey during the study period?

An examination of the frequency of F-tag hits for the 524 California facilities generated from OSCAR data for the study period showed the most frequently flagged F-tag was related to care planning activities (46.7%), followed by use of physical restraints (35.9%), dietary/food preparation, serving, and distribution (35.9%), urinary incontinence (20.8%) and housekeeping services (18.9%).

The frequency of a flagged claims-based QI having at least one F-tag cited by the survey team for the facility was also examined. Four hundred thirteen California nursing facilities (78.8%) had at least one resident who received a QI flag for either the *lack of therapy* or *use of antipsychotics* QI and had at least one associated F-tag cited on their federal certification survey during the study period. The QIs that triggered the lowest percentage of F-tags were QIs 40-50 (*pain management* and *other pharmaceuticals*) (18.1%) and QI 7 (*paralytic ileus*) (0.2%).

The probability of a claims-based QI being generated given that a facility had at least one associated F-tag cited during their survey during the study period was examined using positive and negative predictive values (PPV and NPV). It was found that the PPV and the NPVs were low for the

majority of the QI outcomes overall. Ideally, it would have been desirable to have found more QIs with PPV and NPVs of 0.80 or greater.

Finally, the probability of a facility having an F-tag cited during their survey given that at least one resident has an associated QI flagged in the claim during the study period was examined. This analysis examined the F-tag as the "gold standard" and thus the probability of detecting a specific F-tag given that the associated QI was positive was measured. It was found that the PPVs were less than 0.80 for all the F-tag outcomes, thus, there are times when there is a QI present when an F-tag is not. This follows since the presence of a QI does not necessarily indicate that an actual quality problem exists.

The NPV (e.g., if no QI is flagged, then no F-tag is cited) was found to be above 0.80 in all but two F-tags (i.e., F295, Care Planning, and F377, Store, Prepare Distribute and Prepare Food). Thus, when the QI was absent in the claim, there was a high probability that the F-tag was not cited during the survey for a given facility. Since the PPVs were all < 0.80, the NPVs could reflect an artifact and result in low predictability overall. Also, the study did not adjust for facilities that had one flag versus multiple flags for the same QI. The issue of "severity" or frequency of quality issues being present is an important component of the new federal certification survey process that was implemented on July 1, 1995.

C. STUDY LIMITATIONS

This study continued to use the same basic approach as outlined by Klingman and Tudor by measuring the number of claims-based quality indicators on a facility-basis and a resident-basis, with the ability to calculate rates cross the populations studied. In addition, summary statistics were generated for the frequency of each quality indicator across the populations studied.

The 50 quality indicators were then validated by conducting a thorough review of nursing home medical records for a sample of residents to determine whether the events indicated in the claims data actually occurred. The study also collected additional information which allowed for a more extensive review of the QIs.

This study did not use Medicare claims data in validating the QIs. The absence of Medicare claims data may lead to under-reporting of hospital and nursing home-based procedures, such as *inpatient (IP) stay/ emergency room (ER) stays* and *lack of therapy* quality indicators used in the current study. However, quality indicators in several other areas distinct from this Medicare limitation were included, and these new QIs can form the basis of comparison among facilities and trends among residents. Nevertheless, in performing drug surveillance, one advantage in using Medicaid data is the ability to document all health care service use without recall bias or incomplete history information. However, the limitations of Medicaid claims-based information must also be considered (Bright, 1989; Fisher, 1992).

There are limitations in the methodology of using fiscal codes to describe clinical conditions. These clinical events may not fit into a specific ICD-9 code, yet represent important areas of diagnosis and therapy in the older resident. In addition, while performance of a medical service and documentation of such a service by billing for the procedure may seem to be linked processes, clearly there is always the possibility for the uncoupling of these events. This effect would disturb the validity of the correlation of the quality indicator measurement in claims records ("CR") and medical records ("MR"). In response to this concern, the results presented in this study are conservative and most likely underestimate the true validity of the QIs. It is also important to keep in mind that Medicaid payment and billing systems for nursing homes can vary significantly by state.

It is also important to note that Medicaid payment and billing systems for nursing homes can vary significantly by state. For example, some states include direct therapies (a major QI domain in this study) in the Medicaid per diem rate (Georgia) and other states exclude them and require them to be billed separately (California). This makes it difficult to compare QI experiences between state and could also lead to erroneous QI related findings by survey staff.

This study has focused on the medical record as the constituting "gold standard" for the validation of the QIs. It is possible that for many of the medications evaluated in this study, PRN (Per Required Need) medications were given to the resident. While this information would have been captured in our medical records analysis, because only PRN and scheduled medications actually administered to the resident were counted in the study analysis, it is possible that no claim would have

been filed under the resident's name for the PRN medication in question.

Since it was expected that there would be variability both in the quality of the nursing homes' medical records as well as in the abstractors' ability and experience level when identifying *other potential quality issues*, only a *subset* of both facilities and residents who had complete information present in the medical record (this subset includes cases which have both admission and annual assessment information present) were examined.

While the QIs were designed to be a reliable and valid method for detecting potential quality issues using a claims-based approach, the QIs may still represent a surrogate endpoint in the assessment of quality. While some of the QIs are particularly focused on outcomes (e.g. respiratory infection), many focus on process variables for which the link to outcomes is not as straightforward. While the quantification of quality may remain elusive, and while this approach does not replace the need for continued on-site monitoring of the care provided to the 1.5 million current residents of nursing homes, it is believed the approach suggested by this study represents a detailed, standardized and objective strategy for quality assessment in the long-term setting.

The examination of the claims-based QIs and their relationship to identifying federal deficiencies (e.g, F-tags) in the federal certification survey process has been a preliminary one. First, there needs to be further refinement of the assignment of F-tags to each QI, with "key" F-tags identified for each QI. Second, a method needs to be developed to analyze the relationship between F-tags and their associated QIs as supported in the medical record. Third, the database for analyzing QIs that are supported in the medical record must include substantially more facilities than were available in the medical records database for either of the study states. Finally, the goals and objectives related to linking claims-based QIs with facility deficiencies (F-tags) through the survey process needs to be clearly delineated.

D. DISCUSSION

Despite the limitations listed in the previous section, the analyses conducted in this study clearly demonstrate the utility of basing indicators of quality of nursing home care on Medicaid and

Medicare claims data. The study QIs as a whole were generally better at predicting the absence of a quality issue, suggesting that the negative finding on the quality indicator represented the lack of a quality concern in the nursing home. This finding is desirable for a screening tool, in which it is very valuable to be certain that a certain condition (in this case, a quality issue) is not present. The frequency of the claims-based QIs is quite stable across the two study states despite inevitable utilization variation; regional differences in resident case-mix acuity, facility characteristics, practice patterns; and differences in state nursing home industries and Medicaid programs.

The analyses of QIs and covariant diagnoses has shown that the use of covariant diagnoses may be a useful method in adjusting for the risk of a resident receiving a QI flag. How this information is applied depends on the goals and objectives of the survey operations. For example, one approach could be if a particular covariant diagnosis is flagged for a particular QI, then the QI should not be flagged. Another approach might be to develop different thresholds that must be met for a QI to be flagged based on the presence or absence of covariant diagnoses for specific QIs.

Thus, the stability in the patterns of frequencies for the individual and aggregate-level claims-based QIs, coupled with their patterns of relationship with other resident and facility characteristics, plus the ability to risk adjust for specific covariant diagnoses, strongly suggest that the QIs are capturing systematic processes that could be helpful in focusing annual certification surveys to more effectively assess the quality of care in nursing homes.

Validating the 50 quality indicators revealed some important issues. Both the medical record QI rate and the claims QI rate were low. This was not entirely unexpected, since areas in which care was thought to be less than standard were examined. However, further use and statistical analyses based on each of the 50 indicators may be problematic due to the difficulty in comparing institutions with low-frequency conditions. As a result, a list of 22 of the entire 50 QIs were complied in which (1) prevalence was greater than 0.05, and (2) the positive and negative predictive values of the quality indicator were greater than 0.80. This core group of QIs best addresses the objectives of the QI formation and are most useful in targeting quality issues in the nursing home setting. Despite the decrement from 50 to 22 QIs, the analyses revealed that it might be more effective to aggregate a number of the QIs to more effectively target quality of care issues. Based on the information obtained

through the initial QI screen, the survey team could then further examine the frequency of QI flags at a facility by focusing on the 22 QIs that were identified in the study as being the most reliable, based on medical records validation. This process could assist surveyors in focusing pre-survey activities before entering the facility.

A number of other issues related to the validation and use of claims-based QIs must be raised. First, it is important to examine the appropriateness of the medical record as the "gold standard" given that the QIs' positive rates are so low. It may be that the claims-based QIs are more valid indicators, given their higher level of frequency. Further study is needed to explore this relevant question as it relates to the primary focus of this project.

Second, it was found that the comparison of the claims-based QIs with federal certification survey deficiencies (e.g., F-tags) was also to be important. The QIs behaved well in predicting the absence of an F-tag occurrence, but were not useful in predicting the presence of an F-tag in a given facility. Again, the high NPV is valuable as a screening tool in predicting the absence of a citation. The low PPV of this analysis could be explained by the fact that the F-tag surveillance process includes only a sampling of residents in each facility, rather than a surveillance of each resident. In this analysis, all residents from a given facility were used, so, there were many instances when a QI was present without a corresponding F-tag being cited, possibly because the given resident was not assessed during the survey process. This situation would well explain the low PPV noted in this analysis.

Third, the use of the QIs in the certification survey process as a targeting tool in the pre-survey phase would assist the survey team to more effectively focus their survey activities. However, survey operations staff should be cautioned not to see the QIs as an "expedited method to citing supportable deficiencies" since the QIs theoretically do not guarantee that a problem necessarily exists at a given facility. Rather, the QIs indicate that there is a potential quality issue at a facility that requires further examination.

Finally, when using claims-based QIs, the peculiarities of Medicaid nursing home payment and billing systems in a particular state must be taken into consideration. Medicaid payment and billing

systems can "mask" the true type and frequency of claims-based QIs generated for a facility. Not only does this variation make state comparisons challenging, it also could lead survey operations staff to erroneous conclusions if the payment and billing systems and their affect on the QIs are not clearly understood.

E. IMPLICATIONS FOR FUTURE WORK

The results of this study suggest possible avenues for future investigation and intervention. What are the outcomes for residents given medications which are contraindicated in the elderly? What interventions, such as education, feedback, or administrative changes, are useful in reducing this inappropriate use of medication? How can guidelines on diagnosis and treatment of target conditions, such as congestive heart failure and pain, be applied to this population? How can the QIs be effectively linked to the federal survey certification process to further assist state surveyors in effectively and efficiently assessing the quality of care in provided nursing homes?

The QIs presented in this study could form the framework for an ongoing, automated, quality monitoring system. This system would provide information either on-line or near-line due to its compatibility with electronic billing. This would greatly simply the quality review process and allow for monitoring of currently given care, thereby affecting the resident at the point of service rather than through a six-month retrospective review of care.

This on-line capacity could also serve as a method for improving physician practices in long-term care. Education could be provided through on-line services to the practitioner. Feedback on the physician's performance in reference to his or her peers in long-term care would be helpful in decreasing variation and establishing benchmark practices. Reminders may be helpful in prompting the physician resulting in improved health maintenance and screening procedures, especially when coupled with intervention strategies. Administrative systems could be designed that would monitor inappropriate ordering of medications and immediately alert the physician when dose or duration is at variance with those suggested by the quality indicators. Finally, incentives and penalties to physicians and facilities which are outliers in the community may help to improve care settings.

I. INTRODUCTION

A. BACKGROUND

1. Nursing Home Quality Assurance

It has been estimated that approximately 29 percent of all Americans will become nursing home residents at some point in their lifetime, with almost half spending at least a year in such a long-term care facility. Currently, there are more than 1.5 million individuals residing in nursing facilities in the United States (Ouslander, 1989). An estimated $74.9 billion was spent on nursing home care in 1993, with Medicaid providing the largest share of the cost of any payer (Vladeck and Miller, 1993). Effective methods of measuring the quality of care provided to this population is critical, given the high prevalence of both chronic disease and subacute illness and the overall importance of long-term care industry in the health care delivery system.

For more than 25 years, the monitoring of the quality of care provided by nursing homes has relied upon Federal certification for reimbursement by Medicare, and state licensure for participation in the Medicaid program. Historically, the certification process involved the completion of; (a) a form containing descriptive information related to the nursing facility (e.g., bed size, type of ownership), and (b) a certification survey conducted by state officials on behalf of the federal government in conjunction with the state's own licensing inspection. The focus of these efforts has been on structure and process characteristics of the participating nursing facilities. Moreover, the presumption has been that nursing facilities with adequate facilities, staffing levels, and operating procedures would provide sufficiently high-quality care to their residents (Klingman and Tudor, 1992).

Using an extensive checklist (e.g., the Survey Report Form), state surveyors inspect each facility during scheduled annual visits and note any deficiencies. Nursing facility deficiencies are documented through the use of a series of federal standards or F-tags. If a pre-specified number of deficiencies occur in a given substantive area, the facility must develop a plan of correction. However, the only "real" penalty for failure to comply with the plan of correction has been for a facility to be

decertified from Medicare and Medicaid, which state surveyors have been reluctant to enforce, partly out of concern for the impact of decertification on facility's residents (Klingman and Tudor, 1992).

Only recently has attention begun to focus on the relationship between resident outcomes and the quality of care received in nursing facilities. In part, this lack of attention has been due to the difficulty of measuring resident outcomes. Adverse outcomes of acute care can be measured through such observable events as death, inpatient readmission, surgical complications, iatrogenic illness and continued morbidity (Klingman, 1990). In the area of long-term care, however, such events are not unexpected. Instead, adverse outcomes have become defined in terms of changes in functional status (e.g., Activities of Daily Living, or ADLs) and in terms of avoidable mortality and morbidity, particularly inpatient hospitalization for conditions that could have been prevented through the provision of appropriate care in the nursing home (Zimmerman, 1995; Lewis et., al., 1990; Shaughnessy, Schlenker and Kramer, 1990). Also of interest have been inappropriate treatments, particularly the misuse of pharmaceuticals, that place the resident at risk of experiencing an adverse outcome (Ryther, 1990; Ray et. al., 1987).

In 1986, the National Academy of Science's Institute of Medicine (IOM) published a report related to the inadequacies of the federal certification survey process. In that report, the IOM recommended that a number of nursing home-related reforms be considered for certification including the development of instruments for assessing nursing home care. Moreover, the IOM report stated that "assessing residents' functional, medical and psychosocial status, both upon admission and periodically thereafter, was necessary to provide high-quality care" (Morford, 1988).

In 1987, Congress enacted several nursing home reforms through the passage of the Omnibus Budget Reconciliation Act of 1987 (PL-100-203). These included the requirement of unscheduled and unannounced surveys, the establishment of sanctions for deficiencies, and reorientation of the survey process toward resident outcome as a result of care. Specifically, the new survey process included two major components. The first was a resident-centered survey of a sample of residents (scaled to the size of the facility), including interviews with the sample residents or their proxies and review of their medical and pharmacy records, as well as inspection of the facility. The second was the development of a resident assessment tool that would provide a thorough assessment of the status

of every resident at admission, and once a year thereafter, or after a "significant" change in the resident's status. The tool is the "Resident Assessment Protocol" (RAP) which utilizes a set of required data elements called the "Minimum Data Set" (MDS) (Klingman and Tudor, 1992).

Finally, effective July 1, 1995, the federal survey certification process for nursing facilities was modified once again with the implementation of the *Survey, Certification and Enforcement of Skilled Nursing Facilities and Nursing Home Regulations* promulgated by the Health Standards and Quality Bureau at the Health Care Financing Administration. The new regulations: (a) eliminate the distinction between Level A and Level B participation requirements, (b) make available to HCFA the full range of OBRA enforcement remedies, (c) codify the informal dispute resolutions process with no delay in enforcement, (d) offers one hearing-under either Federal or State procedures, (e) classify seriousness of the deficiencies for the purpose of imposing a remedy through the use of scope and severity, (f) establish and define "substantial compliance," (g) define "substantial quality of care," (h) establish two civil money penalty ranges, (i) explain "repeat deficiencies" for purpose of increasing a civil money penalty when deficiencies are found on a subsequent standard survey, and (j) establish "tie breaker" rules which apply when there are disagreements between HCFA and the State about compliance, choice of remedies or timing of remedies (HCFA HSQ-156-F).

Despite their comprehensive scope, neither the RAP/MDS nor the changes in the survey process through the implementation of the enforcement regulations provide for continuous monitoring of all adverse outcomes (e.g., hospitalizations for specific diagnoses) and inappropriate treatments (e.g., concurrent use of certain medications) for all residents. Although the amendments to the survey process are more resident-oriented than in the past, it gathers comprehensive information only on a sample of residents rather than the entire population. In addition, although the RAP/MDS gathers comprehensive information on all residents, it does so only on admission, when there is a substantial change in a resident's condition and once a year, rather than continuously. Moreover, neither system obtains all of the data elements that can be derived from medical records and claims data concerning inappropriate treatments and adverse outcomes. Therefore, claims data and medical records remain the best sources of data for continuous monitoring of these indicators of nursing home quality of care.

2. Current Research

This study builds upon ongoing work being conducted for HFCA in other research projects. In 1990, Shaughnessy et al., assessed outcome, process, and structural quality measures of swing-bed facilities that discharged patients to independent living arrangements and reduced hospitalization. Data were analyzed on about 2,000 patients in four different primary data samples. Longitudinal analyses were computed on changes in patient status, hospitalization rates, rates of discharge to independent living, services provided, and structural indicators. For patient status, there were 45 indicators, 10 of which were ADLs. Five measurement approaches were used, including changes in status across different points and measures of length of time until an improvement or decline in health status. Moreover, measures of utilization outcome entailed counting the percent of days institutionalized, number of home health visits, emergency room (ER) visits, and physician visits per month. The researchers compared the quality of long-term care in nursing homes to the quality of that provided in swing-bed hospitals. Results showed that nursing homes better served chronic patients with no potential for rehabilitation, while swing-bed hospitals were better for enhancing patient autonomy. Swing-bed hospitals also provided somewhat higher quality services for nursing and near acute ADL services, suggesting that nursing homes provided higher quality care for patients with more traditional, chronic needs.

Under a HCFA cooperative agreement, quality of care indicators (QCIs) were developed using Medicaid claims data from the state of Wisconsin (Ryther, 1990). Validation of the claims-based QCIs, using medical records review of residents who "flagged" on the indicators, was performed during a limited pilot test of the indicators in ten selected nursing homes in two survey districts. The claims-based study also performed limited validation of the QCIs by comparing their results to formal deficiency citations recorded in the state's certification survey data.

The Wisconsin claims-based study also employed extensive involvement by and feedback from state certification surveyors. Indeed, the main focus of the study was to enhance the certification survey process by targeting facilities and individual residents for closer examination. Use of the QCI system in the actual survey process is being tested formally in two Wisconsin survey districts, with comparison between surveyors working with the QCIs and surveyors working without them, in terms

of the number and severity of deficiency citations and enforcement actions as well as surveyor opinions. The Wisconsin study demonstrated that claims-based quality indicators could be computed and provided to surveyors within two months before a facility's annual survey (Klingman and Tudor, 1992).

Significant research has been conducted to evaluate the Minimum Data Set (MDS) (Hawes, 1995; Morris, 1990). The MDS has become a critical part of the resident's nursing home medical record and assessment of resident care. Morris and colleagues (1990) described the instrument's development process and functions. Together with the RAP, its purpose was to "develop a context in which information about residents, their strengths, preferences, and needs is linked to care plan options. Also, it was to include quality of life measures such as dietary status, communication skills, activity preferences, potential for self-care improvement, and medical measures. There was a two-step process of development, entailing the design of a conceptual framework and draft instrument, and testing the reliability of the materials. Important features of the MDS include: (1) assessment of resident performance and function, (2) description of conditions or behaviors, (3) provision of required services after specific levels of intensity have been met, and (4) inclusion of items to support case-mix measurement systems.

Over 60 assessment instruments were considered for inclusion in the MDS. Each instrument was reviewed, and its feasibility and reliability were evaluated. The elements of each instrument were tested in 10 nursing homes in Massachusetts and North Carolina (383 residents). Major criteria for retaining elements included inter-rater reliability, relevance to care planning, and significance as a QI. Of the original elements, forty percent were retained, forty percent were modified, and twenty percent were dropped. The findings showed that the MDS had high levels of reliability and was a good tool to measure quality in nursing facilities. In addition, there was potential for computer-based usage, which would facilitate data collection and analysis. Finally, the researchers proposed that the MDS would increase residents' input in decision-making and "increase their control of their care and treatment."

In a follow-up to this study, Hawes and colleagues (1995) further evaluated the MDS in 13 nursing homes across five states, focusing on measures on functional status. Based on these results,

the researcher further revised certain test items. They also corroborated previous evidence of the instrument's reliability and advantages for use with large populations. For example, the MDS primarily focuses on function, but it also asks questions related to residents' preferences and routines, which are important factors in care planning. Equally important, the MDS is a flexible tool which takes into account the variety of information sources needed for complete information. Because the MDS contains clinical as well as administrative data, staff are more likely to pay attention to accurate data collection. Finally, MDS data can serve many purposes besides quality assurance and program evaluation, including planning and facility management. However, the MDS may also increase administrative burden for staff.

The MDS is also being used to develop a series of quality of care indicators for HCFA's *Multi-State Prospective Case Mix Payment and Quality Assurance Demonstration Project*. The major goal of this demonstration project is to develop and implement a prospective case-mix payment system which would serve as the basis for Medicare and Medicaid payment, and to provide better information on the provision of quality care in nursing homes. Four states (Kansas, Maine, Mississippi, and South Dakota) participated in Medicare and Medicaid demonstrations, while two (New York and Texas) participated in the Medicare-only component.

In a 1995 study conducted by Zimmerman *et al*[3], the researchers developed a series of quality indicators (QIs) within a quality-monitoring system (QMS) and reported on the pilot testing process. The QIs were developed from two data sources, the MDS/RAP and data from HCFA's Multi-State Nursing Home Case Mix and Quality Demonstration. Zimmerman and his colleagues took the concept of the RAP/MDS a step further to better refine indicators of quality (e.g., by designating "either the presence or absence of potential poor care practices or outcomes"). Zimmerman's QIs are unique in that they "represent the first known systematic attempt to longitudinally record the clinical and psychosocial profiles of nursing home residents in a standardized, relatively inexpensive, and regular manner by requiring the expertise of only in-house staff."

[3] Zimmerman, D.R., Karon, S., Arling, G, Clark, B.R., Collins, T., Ross, Richard and Sainfort, F. (1995). Developing and Testing Nursing Home Quality Indicators, **Health Care Financing Review**, Summer,16:4,107-128.

The systematic development process entailed interdisciplinary clinical input, field testing, and empirical analysis. Draft versions were reviewed by national clinical panels related to nursing home care (including nursing, medicine, pharmacy, occupational therapy, and other disciplines), which critiqued and refined test items. One-hundred seventy-five items were divided into 12 domains: accidents, behavioral and emotional patterns, clinical management, cognitive functioning, elimination and continence, infection control, nutrition and eating, physical functioning, psychotropic drug use, quality of life, sensory function and communication, and skin care. They measure both processes of care and outcomes, although the boundaries between the two are often blurred. The measures distinguish between prevalence and incidence.

During the pilot testing process, the QIs were found to have accuracy rates above 85 percent in most testing sites. From these results, further testing of the QMS was used to identify facilities with particular care problems and to focus on the areas of care that needed improvement. One benefit of the system was the ability to monitor facilities' resource use; for example, additional pharmacists could be included in a monitoring team if several medication-related problems were found. The QMS could also be used to structure data collection, monitor reports, and develop standards for monitoring quality. Additionally, a formula was developed to compare risk factors between facilities: Risk = QI minus quality-of-care minus error, with distinctions made between high-risk and low-risk groups. QIs were also used to establish a threshold for performance above which facilities would be targeted for further monitoring. Three types of QIs--general indicators, rare events, and sentinel events--as well as the careful selection of a peer group for monitoring, influence how these thresholds are computed.

The QIs developed by Zimmerman *et al*, were found to lend themselves to several applications, including informing consumer choice and health policy research. Moreover, the QIs could be used individually and/or in the aggregate to assist in distinguishing facilities that provide high-quality care as well as identifying the types of residents served by different facilities.

In another, non-HCFA funded, study, Ouslander and Osterweil (1994) discussed the necessity of integrating nursing home physicians into interdisciplinary teams composed of nurses, therapists, social workers, and other health professionals. This integration is particularly important since physicians can evaluate residents within three admissions contexts--direct admission from home,

admission from an acute care hospital, and readmission after hospitalization. Having teams would better inform physicians about the complex and multidisciplinary nature of resident care treatment protocols by keeping them up to date on residents' conditions. The researchers value the MDS and RAP as useful tools in this process; these instruments help all clinicians to "develop a comprehensive care plan for each resident" by alerting clinicians to areas that need more intensive evaluation. Through these tools, nurse practitioners and physician assistants are well-equipped to evaluate residents' acute and chronic problems; they can, in turn, use this information to update physicians and improve the decision-making process. Nonetheless, additional strategies for improving the quality of care of nursing home residents have been suggested.

Similarly, the effects of a teaching nursing home program on quality have been evaluated. In the study: *Quality of Care in Teaching Nursing Homes: Findings and Implications*, the program's goals were to improve care by establishing affiliations between nursing homes and schools of nursing. The demonstration took place in eight states and the District of Columbia (Shaughnessy et al., 1995). The affiliation agreements took different forms--resident care programs, staffing programs, research, and educational programs. Nurses aides and licensed nursing home staff were able to receive clinical teaching and in-service training from geriatric clinicians, particularly in the areas of resident assessment and care planning. Regardless of program format, all focused on two broad outcomes: reduced hospitalizations and discharges to community residences. There were several other outcomes of interest, including the prevention of falls and the monitoring of drug usage.

Overall, the research showed that teaching nursing homes provided higher quality care than the comparison groups, as manifested by residents' decreased likelihood to experience functional decline, be restrained or sedated. Also, hospitalizations were reduced by up to seven percent across three-month, six-month, and 12-month periods (statistically significant at 12 months), while the rates of community discharge increased by nine percent or higher across the three time periods. Better care was also measured on an array of other items such as how much residents' conditions stabilized or improved. Contributing factors to the teaching programs' success included strong involvement of nurse clinicians and an emphasis on maximizing cognitive and physical functioning. Furthermore, a taxonomy of outcomes was developed from the evaluation. Outcome types were classified as pure, instrumental, and utilization. An example of a pure outcome is a change in a head-injured resident

articulate words over a three-month care episode. The extent of a cardiac resident's compliance with a care program exemplifies an instrumental outcome. Lastly, an instrumental outcome could be a nursing home admission for a moderately cognitively impaired resident receiving home care.

Klingman and Tudor's (1992) study sought to adapt the Wisconsin QCIs to Medicare and Medicaid claims data from additional states. A copy of their final list of QCI's may be found in Appendix I. In contrast with the Wisconsin study, Klingman and Tudor sought to explore more thoroughly the patterns of relationships between those indicators and the deficiency citations and other facility and resident characteristics available through HCFA's Medicare and Medicaid Automated Certification System (MMACS) database, as well as measures of diagnostic case mix derived from the claims data. Specifically, the study employed Medicaid and Medicare claims data from two states (e.g., Tennessee and Michigan) for 1986 and 1987. These two states were selected because their Medicaid claims, enrollment, and provider data were readily available in a uniform format, developed by SysteMetrics[4] under HCFA's "Tape-to-Tape" project. The Tape-to-Tape database also includes California and Georgia, which while not analyzed for the Klingman and Tudor study due to budget constraints, are the two states that were selected for the current MEDSTAT study.

Klingman and Tudor modified the Wisconsin QCIs by reconceptualizing and recategorizing them, altering many of them to fit the Tape-to-Tape and Medicare data, eliminating some of them, modifying others according to suggestions made by the project's Technical Advisory Panel, and adding several new ones. First, the Wisconsin QCIs were originally classified into five categories: Psychotropic Drug Use, Infection Control, Sentinel Health Events, Pain Management, and Other. The researchers felt it was important to emphasize the distinction between treatments and outcomes. Klingman and Tudor (1992) believed that the occurrence of an avoidable, adverse resident outcome can, by itself, constitute *prima facie* evidence of a quality of care problem, regardless of whether the inappropriate treatment that caused the outcome can be precisely identified, if it can be presumed that the outcome must have been caused by such a treatment. Conversely the use of a clearly inappropriate treatment can, by itself, constitute *prima facie* evidence of a quality of care problem, regardless of whether the treatment ultimately led to an adverse resident outcome, if the resident was needlessly put at a

[4]Now the Research and Policy Division of The MEDSTAT Group.

substantially increased risk of experiencing such an outcome. Accordingly, Klingman and Tudor reclassified the quality indicators into three broad categories:

- *Adverse Outcomes:* Hospitalization or emergency room treatment for selected diagnoses (e.g., infections, traumas, nutritional deficiencies, fractures) that are preventable through adequate care, or death within 30 days following such an event. This category encompasses the Wisconsin study's category of "sentinel health events," but adds two types of events: death and emergency room treatment.

- *Lack of therapy* (physical, speech, or occupational) for selected conditions (e.g., multiple sclerosis) for which such care is usually indicated (in the Wisconsin study this was a subcategory under "Other"); and

- *Questionable patterns of pharmaceutical treatment* in the areas of chemical restraints, infection control, pain management for cancer, and other. This encompassed four of the five main categories in the Wisconsin study.

Second, the Wisconsin study focused on the six-month period ending at least two months prior to the facility's certification survey date, so that the surveyors could use the results during the survey. Klingman and Tudor's study assessed the relationship between claims-based indicators and deficiency citations made during the survey process. With this approach, Klingman and Tudor wanted to focus on potential quality problems occurring around the survey date and to capture adverse outcomes occurring within 30 days following that date in order to maximize the chance that the deficiency citations in the MMACS data would reflect the same quality problems captured in the claims data. Accordingly, they shifted the six-month "window" of time to encompass five months before the survey date through one month following it. Lastly, some of the Wisconsin QCIs were:

- Reclassified, e.g., hospital admission for infectious disease was reclassified from Infection Control to Adverse Outcomes/Sentinel Health Events;

- Modified, e.g., use of anti-psychotic drugs in residents without a psychiatric diagnosis was narrowed to focus only on residents with a diagnosis of dementia; or

- Discarded, e.g., use of urinary prophylaxis, hospitalization of otitis media.

In addition to using death and emergency room treatment as well as hospitalization for various conditions as outcome measures, Klingman and Tudor added several new conditions or health events, including decubitus ulcers, falls, external causes, amputation, and attempted suicide. They also added several new pharmaceutical treatment indicators (e.g., percent of Medicaid residents with concurrent use of three or more anticholinergic drugs).

ICD-9-CM diagnosis codes and CPT-4 and CRVS procedure codes were used for developing the QI algorithm. These codes represent either medical or surgical procedures which define the indicator events (e.g., inpatient stay or emergency room visit), the covariant diagnoses or case selection factors.

Finally, Klingman and Tudor's study went beyond the Wisconsin study by examining the patterns of relationship of these indicators (aggregated on the resident and facility-level) with other nursing home characteristics derived from the MMACS database. These characteristics include:

- The number of formal citations for deficiencies in resident care recorded during the certification survey (e.g., F-tags), particularly those that are nursing-related;
- Resident case-mix in terms of functional status (percent of residents with various functional limitations) and pay source (percent of residents on Medicare, Medicaid, or private pay);
- Staffing levels (e.g., residents per nurse, percent RNs); and
- General facility characteristics, such as bed size and type of ownership.

Moreover, controls for resident case-mix in terms of diagnosis were derived from the claims data, (e.g., the percentage of residents with diagnoses (e.g., osteoporosis) that predispose them to experiencing certain kinds of adverse outcomes (e.g., fractures).

In addition to including valuable information on the facility and resident characteristics most closely associated with the quality indicators, Klingman and Tudor examined the relationship of these indicators with the deficiencies data from the certification survey. That is, facilities with more frequent "flags" on the claims-based quality indicators should also receive more numerous citations for deficiencies in resident care, particularly nursing-related ones. However, before the QIs could serve as a basis for continuous quality monitoring of claims as they are being processed, their validity in capturing actual problems of quality of care needed to be thoroughly examined. The best method for establishing the validity of measures based on health-care claims for a given set of residents is through clinical review of the medical records for these same residents. Although such validation was beyond the scope of the Klingman and Tudor study, it remained the next logical step in the development of a system of claims-based quality monitoring of nursing home care.

MEDSTAT's current study seeks to further adapt and modify the Klingman and Tudor quality indicators. Several modifications were made to the list of quality indicators. These modifications have enhanced this study by; (1) further defining the indicators; (2) adding new indicators that were not previously reported; (3) removing indicators that were redundant; and (4) removing indicators that were less than optimally defined to measure overall quality. These measures are based on further review of the emerging literature on quality of care, information on medication use in the nursing home, an area of intensifying concern under the OBRA regulations, and input from the study's Technical Advisory Panel.

Most of the changes focus on the theme of medication use in the long-term care setting. Drug therapy is the most ubiquitous and cost-effective medical intervention, yet medications may also have significant adverse side effects. Among all patients, the elderly are especially sensitive to both the intended and unintended effects of medications. Over 25 percent of all prescription drugs are taken by those over 65 years of age, although this group comprises less than 13 percent of the population (Gurwitz, 1990). The incidence of adverse drug effects increases with age and with the number of drugs taken, and the frail elderly are particularly vulnerable to the toxicity of inadequately monitored and inappropriately prescribed drug regimens (Montamat, 1989).

The aged are at increased risk from medications for a variety of independent reasons: 1) hepatic and renal function often decrease with age, reducing the metabolism and excretion of many drugs; 2) specific end-organs (such as brain) in the aged show increases in sensitivity to some drugs even at "normal" plasma levels, further increasing the possibility of adverse effects; 3) albumin and other plasma proteins are reduced in many chronically ill or malnourished older patients, resulting in potentially dangerous misinterpretations of serum or plasma drug concentrations in such patients; and 4) total body fat is relatively increased at the expense of lean body mass, creating important differences in the volume of distribution (and, therefore the half-life) of most drugs, particularly lipid-soluble psychotropic agents (Montamat, 1989; Shorr, 1994).

In all age groups, non-pharmacokinetic factors can put patients at increased risk of drug-induced illness. Those with multiple chronic illnesses face an increased likelihood of polypharmacy and consequent drug-drug interactions as well as drug-disease interactions. The absence of effective, coordinated primary care for many such patients considerably raises the risk of such polypharmacy. Patients over age 80 have a 300 percent greater incidence of adverse drug reactions than is seen in patients under 50. However, there are few good large-scale studies which compare the frequency and severity of adverse effects among patients exposed to particular drugs with similar data from suitable control populations of non-exposed individuals -- a necessary prerequisite to monitoring and improving care.

The 50 QIs developed in this study were validated using a sample of Medicaid claims and nursing home resident medical record information from the states of California (939 records) and Georgia (894 records) for the period November 1, 1990 through December 31, 1991. Appendix II.1 provides a complete description of the 50 quality indicators used in this study. Appendix II.2 provides the numbering and a brief description of each of the 50 quality indicators. In addition, a series of secondary analyses were conducted using a subgroup of validated quality indicators based on a number of facility-specific characteristics (e.g., ownership type, bed size).

3. State Medicaid Nursing Facility Payment Methods

Although states' Medicaid nursing home payment methods must reflect federal requirements and be described in a state's Medicaid State Plan, state nursing home payment and billing methods can vary significantly from state to state. So, when developing methods to measure nursing home quality based on Medicaid claims data, it is important to understand the key components Medicaid nursing home payment and billing system in a particular state to be sure that the results relate to quality issues and not to an artifact of the payment and/or billing systems. In the following sections, a brief description of the Medicaid payment and billing systems for the states of California and Georgia is provided.

a. California

In 1991, there were 1240 nursing facilities and 117,907 nursing facility beds in the State of California. California reached a settlement agreement with HCFA regarding the implementation of OBRA'87 requirements including the MDS in July 1993. The State independently decided to implement the MDS in 1991, but its implementation was phased in over a 12 month period from June 1991 through July 1992. During the study period, and prior to the state's agreement with HCFA, Medi-Cal paid California nursing homes based on a modified flat rate system. This system computed different per diem rates to facilities in three different geographic regions. Separate rates were also computed for swing beds, distinct part Skilled Nursing Facilities (SNFs), Intermediate Care Facilities (ICFs) and facilities with distinct subacute parts (hospital-based or freestanding or free standing with ventilator-dependent residents or other heavy care patients). That payment method has continued under the approved amendments to the state's Medicaid state plan (Arthur Andersen and HCIA, 1992).

There were 11 Medicaid per diem rates for the Level B Nursing Facilities (NFs) (formerly known as SNFs) in California including two maximum rates for units which were distinct parts of hospitals. For the 1991-1992 rate year, Level B freestanding nursing homes had rates ranging from $69.21 to $81.42 with a weighted average of $71.45. The Medicaid per diem rates for freestanding Level A nursing facilities (formerly known as ICFs) ranged from $49.51 to $55.31, with a weighted average of $51.81. These rates were basically for a minimal set of room and board services and excluded

therapies, a long list of equipment and supplies, drugs, x-rays, and laboratory costs. These items were billed separately by the provider of service. Medi-Cal also used a prior approval process called Treatment Authorization Request (TAR) for therapies, durable medical equipment (DME) and certain drugs and medical supplies. The Medicaid rates for the provision of therapies were reported to be quite low when compared to market rates (Arthur Andersen and HCIA, 1992).

Leave of absence days (e.g., days that a resident can be absent from the facility and paid for by Medicaid without being discharged) were limited to 18 days per year, with an additional 12 days subject to pre-approval. Reserve bed days (e.g., the number of days Medicaid will reserve and pay for a resident's nursing home bed while he or she is hospitalized) were limited to seven days per hospitalization, and a lengthy list of rules exist to control both types of absences. Rates of payment for leave days and reserve days were equal to the regular rates less $3.78 for raw food (arthur Andersen and HCIA, 1992).

Finally, the Medicaid per diem rate structure for Level B subacute distinct parts were somewhat different than for traditional nursing homes. The Medicaid rates differed depending upon whether or not the facility served ventilator dependent residents or not. The Medicaid rates for ventilator dependent residents in the 1991-1992 rate year were $371.45 for hospital-based units and $249.58 for freestanding units, while non-ventilator dependent rates were $351.31 and $229.47, respectively. Most services billed separately by traditional nursing homes were included in the rate for subacute units. These costs included therapies, ventilators, tube feeding equipment and formula, laboratory tests, x-rays and transportation. Drugs were billed separately (Arthur Andersen and HCIA, 1992).

b. Georgia

In 1991, there were 363 nursing facilities and 39,818 nursing facility beds in Georgia. The Georgia Department of Medical Assistance established facility specific, cost-based nursing home rates of payment. The rates were set prospectively without a final settlement. The costs reflected in the rates were grouped and reviewed based on five components: routine and special services; dietary services; laundry and housekeeping; operations and maintenance of the plant; administrative and general; and property and related costs. In calculating the Medicaid per diem rates for nursing

facilities, only the property and related costs component were subject to the minimum occupancy rate of 85 percent. The cost ceilings were set for various groups for the different rate components. Among the characteristics used to separate the groups were level of care and bed size (separating those with 50 beds or more from those with fewer than 50 beds). The property component grouped facilities by age. Ceilings for components ranged from the 70th percentile for administrative and general to the 90th percentile for routine and special services, and property and related costs. Efficiency bonuses were calculated separately for each cost component and are equal to 75 percent of the difference when costs were below the ceiling. The bonus for each component was subject to a daily limit ranging from $0.20 for administrative and general to $0.53 for routine and specialty services (Arthur Andersen and HCIA, 1992).

Therapies (physical, occupational and speech) were included in the per diem nursing home rate and reported in the routine and special services cost component. Prescription drugs were billed outside the Medicaid per diem rate and billed by the service provider directly via the rules and regulations of the State's Pharmacy Program (Arthur Andersen and HCIA, 1992).

Georgia recognized a number of different nursing facility configurations for the purpose of Medicaid reimbursement. A *Level I* nursing facility was one with 60 percent or more of its residents requiring skilled level of care. A *Level II* nursing facility was one in which 59 percent or fewer of the residents require skilled care. Freestanding and hospital-based facilities were treated separately. An *intensity payment*, equal to one percent of all components except property and related costs, was made to facilities in which Medicaid skilled nursing residents account for at least 15 percent of their resident days during a six month period. Level II facilities were required to maintain a minimum average Medicaid skilled occupancy of 15 percent, and thus qualify for the intensity payment (Arthur Andersen and HCIA, 1992).

The average Medicaid nursing home rate in Georgia in 1992 was $61.25, excluding rates to state facilities. Georgia implemented the OBRA'87 requirements, including the MDS, per the federal schedule and the MDS was in place during the study period (11/1/90 - 12/31/91) (Arthur Andersen and HCIA, 1992).

4. Assuring Compliance with Nursing Home Regulations: The Survey Process

Under the current system, all nursing homes are subject to state regulation, while those wishing to qualify for reimbursement under the Medicare and Medicaid programs must also meet federal and state standards. However, determination of compliance with both sets of standards rests with the states.

All states require that nursing homes obtain a license in that state. Licensure is a state function, and each state establishes the criteria that providers must meet in order to obtain a license to operate a nursing facility.

Nursing home providers who wish to participate in the Medicare program must be certified as meeting the minimum criteria established by the federal government through the Health Care Financing Administration (HCFA). State licenses and HCFA certification are each renewed annually and depend upon the results of an on-site inspection of the facility, known as the state survey. HCFA funds states to conduct the certification survey process, and states typically conduct the annual licensing survey concurrent with the certification survey so that providers are subject to only one survey each year.

The purpose of the standard survey is to determine the quality and scope of resident care services provided by the nursing home. The standard survey is unannounced. HCFA requires that the survey teams vary in size from two surveyors for facilities with 50 or fewer beds to four or five surveyors for a nursing home with 151 to 200 beds. HCFA requires that the survey team include at least one RN and suggests that other members of the team might include a social worker, dietician, pharmacist or physician.

The tasks and activities carried out during the on-site survey for Medicare/Medicaid certification/licensure have been specified by HCFA. Surveyors use a wide range of information sources to assess regulatory compliance. These include medical record reviews; resident, family and staff interviews; observations; kitchen inspections; and life safety code inspections.

At the completion of the survey process, the surveyors summarize their findings on a standard form, the HCFA-2567, referred to as the *Statement of Deficiencies* (SODs). The SODs list each of the federal requirements for which the facility was found non-compliant. The federal requirements are listed using a series of F-tags and supported with the documentary evidence. During the period of this study, F-tags could reflect both Level A or Level B deficiencies. Over the past 10 years, HCFA has updated (converted) the F-tags on a periodic basis. For the purpose of this study, HCFA issued an F-tag conversion effective October 1, 1990 and April 1, 1992.

Nursing home providers are required to review the deficiencies cited by the survey team and, on the same SOD submit a Plan of Correction. The Plan of Correction must describe how the facility staff plan to address and "fix" the problems cited by the surveyors. The Plan of Correction must be approved by the survey agency, and must include dates by which the problem(s) must be corrected. The state survey agency will usually conduct a follow-up survey to re-evaluate the specific care and services that were cited as deficient during the original Standard, Extended, or Partial Extended Surveys.

If a facility is found to be seriously noncompliant with the federal regulations, the state can recommend corrective action to the HCFA Regional Office. Two sanctions that were used during the study period were: (1) HCFA could deny payment for new admissions until such time as the infractions had been corrected, or (2) it could terminate the facility's participation in the program, refusing to pay for any services provided by that facility. States also have a wide range of enforcement sanctions available to them. Almost all states use provisional licensure as a means of enforcing compliance with licensure requirements, and many states use monetary fines.

The survey certification process is a broad and multi-faceted investigatory process. A potential use of quality indicators might be to assist the survey team in focussing their investigatory efforts in order to evaluate the quality of care.

II. METHODOLOGY

A. REFINEMENT OF THE CLAIMS-BASED QUALITY INDICATORS

1. Conceptualization and Definition of the Quality Indicators (QIs)

As mentioned earlier, a number of modifications were made to the Klingman and Tudor QIs in the process of conducting this study. As a result, 50 nursing facility indicators have been identified which can be used on a facility and/or resident-specific basis. A list of the QIs used in this study may be found in Appendix II.1. A list of the modifications made to the Klingman and Tudor QIs may be found in Appendix III.

In the process of revising the Klingman and Tudor QIs, the three categories of surveillance (adverse resident outcome, lack of therapy, or inappropriate drug treatment pattern) were retained, but the specific criteria for evaluations were modified. This effort resulted in the identification of 53 quality indicators.

The number of quality indicators was subsequently reduced to 50 as a result of further research and the comments received from the Technical Advisory Panel at a meeting held on June 17, 1996. The quality indicators *Amputations for any diagnosis* and *Poisoning by drugs, medicinal or biological substances* have been eliminated because the methodology was not able to provide meaningful data for these two QIs. The TAP recommended that either QI III.A.9 *Cross Class: Continuous use of psychoactive drugs for more than 120 days without drug holidays or dosage reductions* be kept and and delete QIs III.A.2 and *Antipsychotics: Continuous use of Antipsychotics for more than 120 days without drug holidays or dosage reduction* and III.A.3 *Sedative Hypnotics/Antianxiety Drugs: Long-term sedative hypnotic use: Continuous use of Sedative Hypnotics or antianxiety drugs for more than 120 days without a drug holidays or dosage reduction* be eliminated or eliminate QI III.A.9. After reviewing the options the decision was made to eliminate III.A.9. and retain QIs II.A.2 and 3.

B. SAMPLING PLAN FOR VALIDATION

1. Overview

The objectives of the Validation of Nursing Home Quality Indicators Project were: 1) to determine whether the QIs reflected in the Medicaid claims data were also found in the medical record, and 2) to evaluate whether the claims-based QIs failed to identify issues related to quality of care that were found in the medical record. In order to validate the claims-based QIs by medical record review, a two-stage sampling procedure was employed. The first stage consisted of the selection of nursing homes from the nursing home sampling frame, and the second stage consisted of the selection of nursing home residents from the resident sampling frame for the medical record review.

The sampling frames were based on a universe of nursing homes from California and Georgia that had Medicaid resident claims during 1990 and 1991. A stratified random sampling approach in the selection of nursing homes and residents for medical record review was then used rather than a simple random sampling approach because in order to obtain a representative distribution of facility and resident characteristics in the medical record review samples. In addition, selecting elements from homogeneous subsets of the population through stratified sampling generally produces a smaller sampling error than simple random sampling. Both the methodology and results for the states of Georgia and California are presented in the following sections. A comparison of the nursing home sampling frames and the sample of nursing homes selected from each state for medical record review are presented for each state at the end of this report.

2. Identification of the Nursing Home Sampling Frames

Medicaid claims data available from MEDSTAT's Tape-to-Tape files for the period November 1, 1990 through December 31, 1991 were used to generate a universe of nursing homes for this project for the states of California and Georgia. These files include all inpatient, outpatient, long-term care, and prescription drug claims as well as the enrollment records for all Medicaid residents of nursing homes that are surveyed for federal certification. The nursing home universe included all nursing homes with at least one claim in one of these files. From this initial universe, only nursing homes that

had federal survey certification dates between January 1, 1991 and August 31, 1991 were selected. These data were obtained from matching Medicaid Tape-to-Tape files with HCFA's On Line Survey Certification and Reporting System (OSCAR), a database containing information on facility characteristics and survey certification. Only nursing homes that had a non-ambiguous match with the OSCAR data were retained in the sampling frame. The facility study window, or the observation period for analysis, was identified to include two months prior to the date of the facility's 1991 federal certification survey and four months after the survey date (six consecutive months in total). The final facility counts for the sampling frames were 524 for California and 216 for Georgia. These figures represent 42.5 and 59.5 percent, respectively, of the total number of nursing facilities in each state.

3. Identification of the Resident Sampling Frames

Several criteria for inclusion of nursing home residents into the final resident sampling frame were established. Only residents aged 65 or older by December 31, 1991 were included in the sampling frame, since those younger than 65 differ significantly from those over 65 in their reasons for nursing home care. In addition, only residents who were Medicaid enrollees and who had at least one day of residence in a nursing home during the facility study window were eligible for inclusion. The resident study window was defined as the time period that the resident was in the facility which intersected with the facility's study window. The last possible date of the resident study window could be either the date of death of the resident or December 31, 1991, the last day for which data were available. A resident was excluded from the sampling frame for any of the following reasons:

- The resident either had an inpatient admission or died within seven days of admission to the study facility (It was felt that such a short time period did not provide sufficient evidence of poor nursing home care, and could have been the result of care received prior to nursing home admission or some other factor);
- The resident had significant discontinuous periods of Medicaid enrollment. Gaps greater than one month during the study window would have provided inadequate claims information with which to calculate QIs;

- The resident's study window was less than two months, except for those who died during weeks two through eight of their study window. Most of the QI algorithms require a two-month period of residence for calculation;
- The resident was not enrolled for a full calendar month prior to the start of his or her study window. Calculation of pre-study medical expenses would not have been possible; or
- There were data inconsistencies in matching nursing home residence years across files.

The data, net of exclusions, yielded a total resident sampling frame of 28,999 residents in California and 18,202 residents in Georgia.

4. Selection of Nursing Homes for Medical Record Review

To select a sample of nursing homes from California and Georgia for medical record review from the sampling frames, the nursing home sampling frame was stratified based on the rate of QI flags obtained during the facility study window. This ratio was calculated for each nursing home facility in the sampling frame as the total number of QIs for all eligible residents divided by the total number of years of residence (total resident days divided by 365.25) for these same residents. Facilities with rates at or above the 25th percentile were considered to be high-flagged facilities, those below were considered to be low-flagged facilities. For California, the rate was 2.2 QIs; for Georgia, the 25th percentile was a rate of 3.6 QIs. The final samples consisted of 75 percent high flagged facilities and 25 percent low-flagged facilities. Within each of these two strata, a random proportionate stratified sampling approach was employed. These stratification variables were based on factors that have been found in the literature to be associated with quality of care and health-related outcomes. They were obtained from the OSCAR file and included facility size (large,small), type of ownership (non-profit, for-profit) and type of organization (chain, independent). Facility size refers to the total number of beds in the facility; facilities with over 119 beds were considered large, those with less were considered small. Type of ownership refers to whether the facility was non-profit or for-profit; non-profit homes also included government provider type facilities. Type of organization refers to whether the facility was part of a larger organization (chain) or whether it was independently

owned. Because a fairly high facility refusal rate was expected (50% was generally anticipated), additional facilities within each stratum were drawn. Refusals were replaced with the facilities from this pool which had similar characteristics to their respective stratum.

Several factors determined the final size of the nursing home sample for medical record review. First, due to nursing home policy constraints, the study was permitted to select a maximum of 12 medical records to review from each facility in California and 15 medical records to review from each facility in Georgia. Second, an equal number of high and low-flagged facilities was needed. Within these two strata, a proportionate number of nursing homes within each stratum defined by facility size, type of ownership, and type of organization was sampled. Third, the number of facilities to sample was dictated by a resident target sample size of 856 residents in each state, combined with the per facility sample size of 12 in California and 15 in Georgia (discussed further in the next section). Thus, dividing the total sample of residents by the number of records per facility (856/16 and 856/11, respectively) resulted in a total sample request of 78 facilities in California and 54 facilities in Georgia. Each facility sample size is slightly higher than necessary because of concerns regarding the potential poor quality of medical records and high refusal rates. The study had an initial target of 856 medical records from each state, which were identified and requested. The goal was to obtain 428 residents in high flagged facilities and 428 residents in low-flagged facilities. This number of records was needed to meet final sample size requirements of 384 useable records for the low-flagged group and 384 useable records for the high flagged group. The final facility sample size for medical record review for Georgia resulting from this method was 66; 47 percent of the selected facilities were considered high-flagged facilities. The final facility sample size for California was 90; 47.8 percent of the selected facilities were considered high-flagged facilities.

5. Selection of Residents for Medical Record Review

To sample residents within each of the selected nursing facilities from the resident sampling frame, proportionate stratified random sampling was used. Stratification was achieved by the use of the following three variables: rate of QI flags during the resident study window (any QIs, no QIs), rate of pre-study medical expenses (low, high), and Medicare utilization prior to and during the resident study window (yes,no). The rate of QI flags during the resident study window was calculated such

that if a resident had one or more QIs flagged, they were assigned to the category "any QIs," if they had zero QIs, they were assigned to the category "no QIs." Pre-study medical expenses, used as a proxy for a resident's admission severity of illness, refers to the daily rate of known medical expenditures (Medicaid and those Medicare expenditures reported through Medicaid records) for the one to two month period prior to the resident study window, depending upon when the resident's study window started (i.e., except in cases where the resident study window started on the first day of the month, the pre-study expenses included the part of the two months before the first day of the resident's study window). If the resident's daily rate of pre-study medical expenses met or exceeded the 75th percentile, the case was considered to be high pre-cost, those below were considered to be low pre-cost. For California, the 75th percentile was $96 per day; for Georgia, it was $73 per day. Medicare utilization prior to or during the resident study window refers to whether there were any known Medicare expenditures for the resident for either inpatient or long-term care services between January 1, 1990 through the end of the resident's study window. Residents were assigned to one of two categories: those with known Medicare expenses and those without any such expenses.

It was estimated that a final analytic sample size of 384 residents per facility type (high versus low-flagged facility) or a total sample of 768 residents in 78 facilities in California and 768 residents in 66 facilities in Georgia was necessary to achieve an adequate sample size. The analytic sample was composed of residents who had both an abstractable medical record and claims data. This sample size assumed a 90 percent response rate and the estimation of a percentage within five percentage points of the true percentage with 95 percent confidence. Residents were sampled proportionately within strata defined by QI flags, pre-study medical expenses, and Medicare utilization. Initially, 974 medical records were collected in California and 950 medical records in Georgia. After screening the quality of the medical records in house, approximately six percent could not be abstracted for a variety of reasons. A final sample of 939 medical records (from 90 facilities) was then abstracted for California. Of these 939 records (from 90 facilities), 437 were from high-flagged facilities and 502 were from low-flagged facilities. A final sample of 894 medical records (from 66 facilities) was abstracted in Georgia. Of these, 424 were from high-flagged facilities and 470 were from low-flagged facilities.

The number of medical records abstracted was slightly higher than the number that was calculated for sample size adequacy (856). This was due to rounding and over requesting of records.

In Georgia, one stratum of nursing homes selected for medical record review (low-flagged, large, for-profit, chain facilities) had a significant shortfall of records available. Five of the eight homes in this stratum refused to cooperate so that only 44 abstractable records were obtained from these three cooperating facilities. This resulted in a shortage of 20 records. In response to this, the study specifically over sampled from other strata in Georgia: (1) 15 additional records from the low-flagged, large, for-profit, independent stratum; (2) 20 additional records from the low-flagged, small, not-for-profit, independent stratum; and (3) 25 additional records from the low-flagged, small, for-profit, independent stratum. Since the desired sample for these facilities included obtaining an additional ten percent of medical records, our final analytic sample sizes in Georgia and California are sufficient for the statistical power needed to achieve adequate sample sizes, except in the case of one stratum in Georgia (low-flagged, large, for-profit, chain facilities) where there was a shortfall of 20 records.

6. Comparison of the Sampling Frame and Sample Nursing Homes

a. California

In the low-flagged strata, comparison between the sampling frame and sample of nursing homes revealed similar characteristics. Of the 47 homes in the sample, 72 percent were considered small compared with the sampling frame, where 76 percent of the 132 homes were considered small. Almost half (49%) of the homes in both the sample and the sampling frame were part of a nursing home chain. About 60 percent of the homes in the sample compared with 64 percent of the homes in the sampling frame were for-profit facilities; 83 percent of the homes in the sample and 80 percent in the sampling frame were considered not hospital-based. Within the strata, the stratification variables that were used in random proportionate sampling to create individual stratum (size, type of ownership, and type of organization) resulted in fairly comparable proportionate stratum. For example, 23 percent of the sampling frame homes were represented in the for-profit, small, low-flagged, and chain stratum, compared to 24 percent of the sample homes.

In the high-flagged strata, comparison between the sampling frame nursing homes and the sample nursing homes yielded similar results. There were 43 homes in the sample and 392 homes in the sampling frame; 65 percent of the homes in the sample were considered small compared with 72

percent in the sampling frame. Fifty-one percent of the homes in the sample were part of a chain compared with 55 percent in the sampling frame. Eighty-one percent of the homes in the sample were for-profit facilities, compared with 84 percent of the homes in the sampling frame. Eighty-eight percent of the homes in the sample were not hospital-based, as were 95 percent of the homes in the sampling frame. The individual stratum were distributed proportionately. For example, 26 percent of the sample homes were represented in the high-flagged, small, for-profit, and independent stratum, compared to 27 percent of the sampling frame homes.

b. Georgia

Since the study initially selected a sample of nursing homes for medical record review from the sampling frame based on the rate of QI flags obtained during the facility study window, characteristics of nursing homes were compared within each of the two strata: the low-flagged facilities and the high flagged facilities. In the low-flagged strata, comparison between the sampling frame and sample of nursing homes revealed similar characteristics. Of the 35 homes in the sample, 80 percent were considered small (less than 120 beds) compared with the sampling frame, where 74 percent of the 54 homes were considered small. Almost 50 percent of the homes in the sample were part of a chain, compared with 54 percent of the homes in the sampling frame. About 69 percent of the homes in each sample were for-profit facilities; 80 percent of the homes in each of the samples were considered not hospital-based. Within the strata, the stratification variables that were used in random proportionate sampling to create individual stratum (size, type of ownership, and type of organization) resulted in fairly comparable proportionate stratum. For example, 33 percent of the sampling frame homes were represented in the for-profit, small, low-flagged, and chain stratum, compared to 34 percent of the sample homes.

In the high-flagged strata, comparison between the sampling frame nursing homes and the sample nursing homes also yielded similar results. There were 31 homes in the sample and 162 homes in the sampling frame; in both of these samples, 71 percent of the homes were considered small. Sixty-five percent of the homes in both samples were part of a chain. Seventy-seven percent of the homes in the sample were for-profit facilities, compared with 79 percent of the homes in the sampling frame. Eighty-one percent of the homes in the sample were not hospital-based, as were 86 percent

of the homes in the sampling frame. The individual stratum were distributed proportionately. For example, 13 percent of the sample homes were represented in the high-flagged, small, for-profit, and independent stratum, compared to 14 percent of the sampling frame homes.

C. MEDICAL RECORD REVIEW PROCESS

1. Overview

The validation process was accomplished by reviewing a sample of Medicaid nursing home residents' medical records from the states of Georgia and California for a prescribed observation period. The unit of analysis was both the nursing home and the nursing home resident. The observation period for each nursing home was two months prior to the date of the facility's 1991 federal certification survey and four months after the survey date (six consecutive months in total). The observation period for each resident was the duration of time within the nursing home observation period window that the resident was in the faculty. Thus, the resident observation period was not consistent, and varied from resident to resident.

Medicaid claims, medical records and federal survey certification information were used to complete the medical record validation process. Federal survey certification dates included the period January 1 through August 31, 1991. Medicaid claims and medical records data included the period November 1, 1990 through December 31, 1991. It was decided not to use the Minimum Data Set (MDS) in the medical record review process since the quality and consistency of nursing home residents' MDS information was extremely variable due since its formal implementation on the federal and state levels had only occurred between 1990 and 1991.

2. Medical Records Collection Process

The medical records collection process included a number of tasks. Appendix IV includes a flow chart that describes the steps that were taken to recruit nursing homes in each of the study states. First, the Office of Research and Demonstrations at HCFA sent a letter to the key state health and human services agency(s) introducing them to the project, asking for permission to use the Tape-

to-Tape claims data, and asking for their support and cooperation. MEDSTAT staff then conducted meetings with representatives of the relevant state health and human services agencies and the for-profit and not-for-profit nursing home trade associations to further introduce the project, and to obtain their cooperation and support and to obtain relevant information that might negatively or positively affect the medical records collection portion of the project. In California, it was requested that the project collect no more than 12 records per facility and in Georgia it was requested that no more than 15 records per facility be collected.

Medical records collection staff were recruited each month and participated in an eight hour training program which took place on February 20, 1995. Teams of two staff persons were formed, each with their own photocopy machine and supplies.

Nursing home recruitment began in Georgia on January 2, 1995, and records were collected from March 1 - July 15, 1995. One hundred Georgia facilities were contacted, and 66 agreed to participate, for a response rate of 66 percent.

Nursing home recruitment began in California on April 1, 1995, and the data collection teams were in the field from May 15 to November 15, 1995. One hundred and ninety California nursing homes were contacted and 90 were recruited, for a response rate of 47.4 percent.

3. Three Step Medical Record Review Process

The medical record review process consisted of three steps. The first step of the validation process was to identify the existence of a potential medical "event(s)" or QI flag(s) in the medical record based on the list of study QIs for a sample of residents' medical records for the prescribed observation period. The primary nurse reviewer did not attempt to infer whether an "actual" problematic outcome occurred nor did he or she know whether the QI flagged in the medical record was also flagged in the claims data for a particular resident. Rather, the focus of his or her review was on the process or technical dimensions of the quality assessment--that is, lack of appropriate treatment or therapy was enough to deem the event a QI flag. The primary nurse reviewer examined the medical record for each resident in the sample for the prescribed observation period. The occurrence of the

"event" flagged as a QI served as one method of validation.

The second step of the validation was to verify the presence or absence of a potential medical "event(s)" or QI flag(s) by comparing the findings of the medical record review with the medical "event(s) or QI flag(s) generated by linking the list of QIs with a matching sample of California and Georgia Medicaid nursing home claims for the prescribed observation period. This process was conducted by the supervisory nurse clinician reviewer (SNCR). In the case of discrepancies between the findings of the primary nurse reviewer and the claims data, a second review of the medical record was conducted by the SNCR and, in some cases, a review was also done by the physician reviewer.

This process could yield a number of results. The SNCR might find the identical QI(s) flagged in the resident's claims data. If this occurred the QI(s) was considered "validated" and no further review was necessary.

The SCNR could find that the QI flagged by the primary nurse reviewer was not found in the resident's claims data. If this occurred, the SNCR conducted a secondary review of the resident's medical record. If the secondary review confirmed the absence of the QI(s) in the medical record, the QI algorithm was validated and no further review was necessary. However, if the secondary review determined that the QI(s) was present in the medical record, the record was subjected to a third review by the physician reviewer. If the physician reviewer found that the QI(s) was absent in the medical record, then the QI algorithm was validated. However, if the physician review determined that the QI(s) was present in the medical record, then the QI algorithm was not validated.

Finally, a QI could be found to be absent from a resident's record in the initial medical record review. If the QI was also absent from the claims data when the SNCR makes the comparison, then the QI algorithm was validated and no further review was necessary. However, if a QI is present in the claims data, then the medical record is subject to a secondary review by the SNCR. If the SNCR confirmed the absence of the QI(s) in the medical record, then the QI algorithm was validated and no further review was necessary. However, if the SNCR determines that the QI(s) is present in the medical record, then the record is sent for a third review by the physician reviewer. If the physician review determines that the QI is absent in the medical record, the QI algorithm is not validated.

However, if the physician review confirms that the QI is present in the medical record information, then the QI(s) and the QI algorithm would be validated.

In the third step of the validation process, the primary nurse reviewer examined the resident's medical record in order to identify any other potential quality areas present in the record that might result in additional quality areas that were missed by the QI list. This procedure entailed abstraction of specific data items that were stated in the guidelines identified by Ouslander and Osterweil in the 1994 article "Physician Evaluation and Management of Nursing Home Residents" reported in *Annals of Internal Medicine* (Ouslander, 1994). These included components of the physician evaluation of nursing home residents on admission and on an annual basis. If a potential quality area was identified by the primary nurse reviewer, the SNCR then reviewed the medical record to validate the finding.

This last step had the potential to provide complimentary information to that obtained through the QIs identified by claims data. Appendix V includes a flow chart of the three step medical record review process used in this study and Appendix VI contains the Medical Records Abstraction tool that was used to review the medical records collected in both study states.

4. Specific Protocols and Examples

The primary responsibility for conducting the medical record review process resided with the primary nurse reviewer. The primary nurse reviewer was blinded to all information regarding the claims data. For example, the nurses did not know whether a record was high or low-flagged, or what type of quality indicator was found for a resident. The responsibility of the primary nurse reviewers was simply to abstract data elements that were required to determine the occurrence of the quality indicators in the medical record. It was supervisory nurse clinician reviewer's (SNCR) job to validate the QIs and the QI algorithm by reconciling the QIs found in a resident's medical record with those found in the resident's claims data for the observation period. If a discrepancy between the primary nurse and the findings identified by the SNCR in the claims data, then the medical record was reviewed again by the SNCR and, in some cases, it was also reviewed by the physician review.

An example of determining whether a flagged QI found in the medical record could also be found by the claims algorithm is illustrated in the following:

The medical record was first reviewed by the primary nurse reviewer. Her job was to abstract each resident's medical record and identify any QIs present based on the master list of QIs identified by the study. After the initial medical record review and abstraction was completed, the SNCR compared the findings of the primary nurse reviewer to the QIs flagged in the resident's claims information. If the identical QI(s) were flagged in the claims information, then the QI(s) was validated in that case and no further review was necessary. However, if the QI(s) were not flagged in the resident's claims information, the SNCR reviewed the medical record for a second time to verify the findings of the initial review. If, the SNCR determined that the QI(s) was absent in the medical record, then QI algorithm was validated in that case and no further review was necessary. If the SNCR confirmed that the QI(s) was present in the medical record, the medical record was sent to the physician reviewer for a third review. If the physician reviewer determined that the QI(s) were absent from the medical record, the QI algorithm was validated in that case. However, if the physician confirmed that the QI(s) was present in the medical record, the QI algorithm was not validated in that case.

Appendix VII presents the protocol and the list of criteria that were developed to identify other potential quality "area(s)" that were not identified by the list of QIs for the sample facilities (Ouslander and Osterweil). The selected criteria are common themes which represent an integral part of care of the nursing home resident. They have been divided into sections related to medical history at the time of admission, physical exam at the time of admission and advanced directives at the time of admission. Information from the annual review of residents was also collected, including the medical history over the past year, health maintenance screening and/or consultations over the past year, and advanced directives information over the past year. These criteria were examined in two assessments in the resident's medical record: their admissions assessment and their annual assessment.

As a result of the validation process, the medical record review had the potential to validate the QIs identified from the claims data, to identify any problems associated with linking claims to the QIs and/or to identify new additional QIs for future study.

D. ANALYTIC STRATEGY

1. Overview

There were six major steps in conducting the analysis for this study:

(1) Measurement of inter-rater reliability in the pretest and large study sample;

(2) Determination of the validity of the claims-based QIs by using the medical record as the "gold standard;"

(3) Exploration of the medical record for other potential QI areas not on QI list;

(4) Analysis of quality indicators generated from claims data and medical record abstraction and selected covariant diagnoses;

(5) Secondary analysis using logistic regression modeling and based on the sampling frame for each of the two study states; and

(6) Analysis of federal certification survey deficiencies (F-tags) and the claims-based quality indicators.

Each step is described in the following sections.

2. Measurement of Inter-rater Reliability

a. Pretest

It was important to measure the reliability or the consistency (stability) of the data abstraction instrument when used by several abstractors. A measure of reliability is the degree of agreement among pairs of abstractors, frequently reported as overall percent agreement (e.g., number of cases where the two abstractors agree divided by the total number of cases rated).

A pilot test of inter-rater reliability was completed for a sample of 18 medical records from Georgia nursing homes. The focus of the pilot test was to measure the reliability, or the degree of agreement between the pair of abstractors on each variable. Since each variable often had more than

one component, perfect or complete matches, partial matches and complete mismatches were examined. The total responses can result in a number greater than 18 since each variable may have more than one component (e.g., medications had four levels). However, the total responses could be less than 17 if there were missing data. Matching criteria were developed for hospital diagnosis, emergency diagnosis, covariant diagnoses, medications and creatinine/BUN.

A number of variables had percent agreement rates of lower than 90 percent. These tended to be related to resident-level variables (e.g., sex, observation window start and stop dates, reason for admission status) and the *other potential QI* variables such as physician examination, nutritional status evaluation, list of medications, etc. However, the percent agreement for the 53 original quality indicators was 94.4 percent or better.

As a result of the initial pilot test, the medical record review process was amended and additional training was provided to the abstractors to improve inter-rater reliability in the weak areas, in particular the *other potential QI areas*.

b. Sample

Since the pretest yielded percent agreement levels below 80 percent for some measures (*other* potential QIs and some demographics), inter-rater reliability for a larger sample of medical records from California and Georgia nursing facilities was reassessed by calculating percent agreement each of the original 53 QIs and the other potential quality indicator measures. Appendix VIII includes a description of the key results of the large sample inter-rater reliability test.

Inter-rater reliability was assessed between the two abstractors on the full sample of residents who had both medical records and claims data. There were a total of 106 pairs of data records for the final inter-rater reliability analysis in California and Georgia.

The overall percent agreement between abstractors for the original 50 QIs was generally quite high, and improved from the pilot study. Except for the *other potential QI areas* represented by the physician's assessment variables, percent agreement was 90 percent or higher for most of the QIs.

These results concur with those from the pilot study which showed strong agreement on the original list of 53 QIs and more moderate agreement on the *other potential QI areas*.

As in the pilot study, there were five items that were considered arrays. These were: hospital diagnoses (Q10), emergency room diagnoses (Q13), covariant diagnoses (Q18), medications (Q24), and creatinine/BUN (Q54). For each of these variables, perfect or complete matches, partial matches, and complete mismatches were examined. Since each variable had more than one component (e.g., medications had four types of matches), there could be more than 106 responses (see the pilot study for the definition of matches).

For hospital diagnoses, there were a total of 66 responses and 60 agreements, representing a 90.9 percent agreement rate, slightly lower than the rate found in the pilot study (100%). For emergency room diagnoses, there were a total of 28 responses, with 100 percent agreement between raters. Previously, 100 percent disagreement rate for this variable had been achieved. For covariant diagnoses, there were a total of 363 responses, representing an 81 percent agreement rate. This rate was higher than the rate found in the pilot study (67.5%). For medications, there were a total of 2144 responses, representing an 80.8 agreement rate. This was higher than the 69.3 percent agreement rate found in the pilot study. For creatinine/BUN, there were a total of 250 responses, representing an agreement rate of 58 percent. This was lower than the rate found in the pilot study (97.2%).

Results from this analysis suggested that inter-rater reliability among the original 53 QIs had been improved. However, the reliability between abstractors on the *other* potential quality areas (Q25-52) was still generally moderate. The medical records review staff continued to explore how they could increase reliability in this important area; however, its subjective nature may make near perfect agreement very difficult to achieve.

3. Determining the Validity of the Claims-based QIs by Using the Medical Record as the "Gold Standard

a. Determining Validity Based on Level of Agreement

Several decisions were made regarding the validation of the claims-based QIs with the medical record information. Validation was calculated using percent agreement between the two data sources. Agreement between the claims record (CR) and the medical record (MR) on a QI-level basis (e.g., for which QIs is there a high level of agreement, and for which QIs is there a low level of agreement?) was examined. Initial agreement between the CR and the MR on an individual QI basis (Level 0) was examined.

Depending on the QI, there were different levels of agreement. For example, some QIs were defined as a match if there was agreement on presence or absence in the MR and CR (yes,no). Others, such as the drug QIs, were based on their agreement on presence or absence (yes/no) criteria in *both* the MR and CR, as well as additional criteria (dosage and duration). Appendix IX is a listing of the QIs and anticipated levels of agreement.

In addition, alternative strategies in the calculation and reporting of the individual QIs through aggregations of the QIs into related subsets were investigated. The number of QIs in the *Level 0* aggregation (n = 50) may be cumbersome to implement on a large-scale basis among all screened facilities on a comprehensive basis. Therefore, after input from the TAG, three other aggregation subsets were defined. For the *Level I* analysis, we divided the 50 QIs into 13 different QI categories, based on grouping resident outcomes and pharmaceutical treatments into larger categories. The *Level II* analysis concentrated the resident outcomes and pharmaceutical treatments further by grouping hospital diagnoses for the resident outcomes indicators and the therapeutic indications for the pharmaceutical treatment indicators. This aggregation resulted in eight different QI categories. The *Level III* aggregation divided the 50 QIs into just three QI categories based on resident outcomes, lack of therapy, and pharmaceutical treatments. A detailed description of each of the three QI aggregation levels used in this study is presented in Appendices XI.1 - 3.

By grouping the QIs into fewer categories, the aggregations are likely to be easier to implement for evaluating quality of care. If there is evidence of quality issues based on any of these aggregations then more detailed analyses could be conducted. Consequently, the implementation of individual QIs may be needed as a second step in evaluating quality of care.

b. Determining Positive and Negative Predictive Values of QIs

Because the study was interested in evaluating the nursing home medical record as the "gold standard" for measuring the validity of our claims-based QIs, two additional techniques for measuring validity -- positive and negative predictive value (Rosner, 1986) were used.

The positive predictive value (PPV) of a screening test is defined, in the case of this study, as the probability that a resident has the QI based on the medical record (MR), given that the QI on the claims record (CR) is positive. In other words, the higher the predictive value of the QI (CR), the more likely it is that the QI is present on the MR and that a quality issue is present in the resident's history. The higher the positive predictive value, the more valuable the QI (CR). Ideally, it would be desirable to find a QI with a positive predictive value equal to one. If this were possible, quality issues for each resident based on the CR could be accurately identified without the lengthy medical chart review process.

The negative predictive value (NPV) of a screening test is the probability that a resident does not have the QI indicator based on the MR given that the QI on the claim is negative. In other words, the higher the negative predictive value of the QI (CR), the more likely it is that the QI is absent on the medical record and there is no quality issue in the resident's history. The higher the negative predictive value, the more valuable the QI (CR). Ideally, it would be desirable to find a QI with a negative predictive value equal to one. Then, the absence of quality issues for each resident could be accurately identified based on the claim without the lengthy medical chart review process.

The value for PPV and NPV can range from 0.0 to 1.0. For the purpose of this study, considered a PPV or NPV over 0.80 to be *highly* clinically significant and represent a strong QI

measure. PPV or NPV between 0.60-0.79 were considered to be *somewhat* clinically significant and represent a fair QI measure. A PPV or NPV of less than <0.60 was not considered to be clinically significant and represents a weak QI measure.

For unambiguous QIs, the PPV and NPV was calculated based on presence or absence in the medical record and the claim. For QIs that measure agreement as a percentage, such as the group-based QIs, PPV and NPV was calculated by establishing a threshold percentage (e.g., an a priori level of agreement based on clinical judgment). For QIs for which a generic match is anticipated, as close to 100 percent level of agreement as possible was required; for all other QIs, an 80 percent level of agreement was considered acceptable. Thus, for any values equal to or above these threshold percentages, the MR and CR would be considered to be in agreement; for any values below these percentages, the MR and CR would considered to be in disagreement. Thereby, PPV and NPV analyses were performed on all 50 QIs individually.

4. Exploration of the Medical Record for the Other Potential QI Areas

The methodology used in this study to explore residents' medical records for *other* potential QI areas was based on a study by Ouslander and Osterweil.[5] Physician assessments were used to collect information regarding quality problems based on components of the physician's initial assessment of the resident on admission, and from the physician's annual resident review (nearest the facility's 1991 survey date). The primary interest was in finding out if the relevant information was present in the physicians' notes or in a secondary source of data, such as nurses' notes or therapists' log. Data elements that were required to be collected included: medical history information, physical examination findings, advance directives information, and health maintenance information.

As with the percent agreement between the CR and MR quality indicators, agreement of greater than or equal to 0.80 was considered to be highly clinically significant and represented a strong QI measure. Agreement of 0.60-0.79 percent was considered to be somewhat clinically significant

[5] "Physician Evaluation and Management of Nursing Home Residents," Annals of Internal Medicine, 1994 (Ouslander, 1994).

and representative of a fair quality indicator measure. Agreement of 0.60 was not considered to be clinically significant and represented a weak quality indicator measure.

5. Analysis of Quality Indicators and Covariant Diagnoses

Agreement was considered to be an unambiguous type of match between the QIs generated from claims and those present in the medical records, based on presence or absence of information (yes, no). For example, an unambiguous type of match for a covariant disease indicated that a resident had a claim for a specific covariant disease during the study window, and that there was also MR information regarding this covariant disease during this time period. Matching the claims record and the medical record on co-variant diseases is important since they are an integral part of the QIs, and many empirical studies have found that covariant diseases are generally under coded in administrative databases. Since studies have shown that claims data are an unreliable source of information regarding ICD-9-CM codes (e.g., secondary diagnosis codes are frequently underreported), the medical record represents the best data source for this information.

In addition, two other summary statistics to describe the analysis of the quality indicators and the covariant diagnoses were considered. Specifically, the overall claims-based covariate rate for each of the 11 QIs were measured, with the presence of any of the covariant diagnoses considered as positive for the covariant flag. Next, the overall claims-based QI frequency rates for each of the 11 QIs were calculated. Finally, an adjusted QI rate was calculated based on the presence or absence of the covariant diagnoses. This adjusted QI rate is meant to reflect the presence of a QI in the presence and absence of comorbidity associated with the resident.

6. Secondary Analysis Based on Data from the Sampling Frame for California and Georgia

Secondary analyses were conducted using the complete sampling frames from each state (18,202 residents from Georgia and 28,999 residents from California). The goal of the secondary analyses was to construct multivariate models to test the relationship between the study outcome (presence of a claims-based QI or group of claims-based QIs) and the resident and facility factors

potentially associated with the QI. In exploring the relationship between resident and facility characteristics and the presence of a QI, a multivariate model was chosen to control for potential confounding factors.

The study outcomes for these analysis included:

- *Level 0* aggregation: any QI
- *Level I* aggregation: infectious conditions and non-infectious conditions - inpatient stay or emergency room, hospitalization, death, lack of therapy, pharmaceutical treatments - Antipsychotics, Sedative Hypnotics/Antianxiety, Cross Classes (two types), Antidepressants, Infection Control, Pain Management, Other (See Appendix XI.1);
- *Level II* aggregation: inpatient stay or emergency room, hospitalization; lack of therapy; pharmaceutical treatment (psychoactives); pharmaceuticals outcome (infection control); pharmaceuticals treatment (other) (See Appendix XI.2); and
- *Level III* aggregation: resident outcomes; lack of therapy; and pharmaceutical treatments (See Appendix XI.3).

It was decided not to include the *Level I* aggregation in the multivariate analyses since preliminary analyses revealed that this level of aggregation was not as informative as the others in understanding the frequency of QIs flagged by nursing homes.

Independent variables included in these analyses were resident-specific variables such as: age (65-74, 75-84, 85+), gender, race (white, black, other), medical cost (high, low), Medicare use (any claim from January 1, 1990 through a facility's six-month study interval), and facility-specific variables such as facility size (small 1-80, medium 81-160, large $\geq$ 160), geographic location (inner urban, urban, suburban, rural), profit status (non-profit and government, profit), and corporate affiliation (e.g., chain versus individual ownership). It should be noted that the variable for facility bed size was further refined for the purpose of conducting the secondary analysis from two groups (e.g., 0-119 beds and 120 + beds) to the three groups described above in order to increase the potential of determining meaningful differences.

Binary variables were calculated with a 0/1 classification in all testing (Hosmer, 1989.). Confidence intervals (CIs) for the estimated odds ratios and significance tests for differences from the null value were calculated using the estimated standard errors (Rosner, 1986). Tests for possible interactions among independent variables were performed (Concato, 1993).

7. Analysis of Federal Certification Deficiencies (F-tags) and the Claims-based Quality Indicators

The study's intention was to conduct analyses to determine the relationship between the federal certification survey deficiencies (e.g., F-tags) located in the OSCAR file, and the claims-based QIs identified in this study. This was accomplished by addressing two questions: (1) what is the probability that a facility would have an F-tag cited during survey given that at least one resident had an associated quality indicator flagged and (2) what is the probability that a facility would have a QI generated from claims for at least one resident given that the facility had an associated F-tag cited during a survey during the study period? Positive and negative predictive values (PPVs and NPVs) were computed in a similar manner as those computed to validate the QIs.

In order to accomplish these analyses, one or more relevant F-tags were assigned to 48 of the 50 QIs. The assignments were based on closely related definitions of quality of care and were reviewed and modified by HCFA Region I medical review staff. A crosswalk between the specific QIs and their corresponding F-tags effective for our the study period (November 1, 1990 through December 31, 1991) was then developed. HCFA subsequently implemented a conversion of all F-tags, effective April, 1992. The OSCAR data for the study in the first quarter of 1994 which included the 4/92 conversion, was used to generate a second F-tag crosswalk reflecting HCFA's April, 1992 F-tag conversion for study purposes. Appendix X presents the cross-walk for the F-tags specific to this study.

To address the first question, it was decided that any resident with a QI associated with a given F-tag would be considered "positive" for purposes of the analysis. In the case of the second question, the F-tag was used as the "gold standard." Thus, the probability of detecting a specific F-tag given that the corresponding QI was positive was measured.

The examination of the relationship between the F-tag cite rates and the QI flag rates and of the F-tag as the "gold standard" was somewhat compromised given that F-tags are generated on a facility basis, while the claims-based QIs examined in this study are generated on a resident basis. Moreover, it would have been advantageous to examine this relationship with the QIs were identified in resident's medical records. However, the sample of facilities included in the medical records reviews for California (90) and Georgia (67) was too small to make the analysis a meaningful one. Finally, over 90 percent of the F-tags cited on the OSCAR file for Georgia during the study period were coded as "7s" or *Corrected*, whereas, 82.3 percent of the F-tags for California were coded as "6s" or *Correction Plan*. After discussion with HSQB Central Office staff, it was decided that the analysis would be more reflective of the study period if the analysis were conducted using the California F-tag data.

III. RESULTS

A. FREQUENCIES AND TYPES OF QIs FOUND IN SAMPLING FRAME FOR CALIFORNIA AND GEORGIA

This study repeated the analysis conducted by Klingman and Tudor by examining the frequency and types of claims-based QIs that occurred on facility-and resident-levels in California and Georgia. The rate of QI flags for California and Georgia nursing homes was adjusted by the facility "exposure rate." This rate was computed by calculating the total number of QIs for all eligible residents divided by the total number of years of residence (total resident days within the study window/365.25) for these residents. The rate of QI flags per resident represents the total number of QIs that have been flagged for a resident during the six-month observation window.

1. California

The characteristics of the study population are summarized in Appendix XI.4. The total number of residents in the sampling frame for California was 28,999. The average age of the residents in the sampling frame was 83.6 years. Seventy-five percent were females and 82 percent were white. In terms of resident health services use, 75 percent were considered to be high cost users (> $96/day in California) and 64 percent had Medicare claims from January 1, 1990 through the facility's study interval. Approximately 73 percent were small (less than 120 beds) and the average facility bed size was 102. Further refinement of the bed size variable into three groups found that 19 percent of the facilities sampled were small (1-80 beds), 57 percent were medium-sized (81-160 beds) and 25 percent were large-sized (> 160). Location was predominately inner urban, almost 80 percent of the study population. The inner urban geographic designation was defined as large metropolitan, core county area with a population of 1,000,000 or greater. Ownership was chain-affiliated for 47 percent of facilities, and 79 percent were for-profit (see Appendix XI.4).

Of the 524 facilities in the California nursing home sampling frame, seventy-five percent of the facilities were considered high-flagged facilities--their QI rate (adjusted for exposure rate) was greater than the 25th percentile (2.2 QIs). On the facility-level, the percent of residents within each facility

who had no QIs was 48.4, with 1 QI was 19.3, with 2-3 was 23.3, with 4-6 was 7.6, and the percent with 7 or more QIs was 2.4. The average number of QIs per resident at each facility was 1.2, with a range of 0-3.7 (see Appendix XI.6).

The average number of QIs per resident was 1.2, with a range from 0-11. Almost half of all residents (47.3%) had no QIs flagged, 20.4 percent had only 1 QI; 23.3 percent had 2-3 QIs; 8.0 percent had 4-6 QIs, and 0.9 percent had 7 or more QIs (see Appendix XI.7). The types of QIs that occurred (in descending order of frequency) were: *concurrent use of psychoactive drugs* (22.4%), *use of antipsychotics* (14.3%), *hospitalization occurring more than seven days after admission* (11.5%), *use of anti-infectives* (7.5%), *exceeding maximum dosage of selected antipsychotics* (7.2%), *lack of speech, physical or occupational therapy* (6.1%), *exceeding the maximum dosage of selected antidepressants* (5.8%), *use of certain antidepressants* (5.7%), *continuous use of antipsychotics for greater than 120 days* (4.4%), and *use of drugs such as long half-life benzodiazepines* in 4.2 percent of the residents. Twenty QIs represented 90 percent of all triggered QIs. The table found in Appendix XI.5 presents the frequency of QI flags generated from claims data for California.

The study also found that the distribution of the sample according to the number of QIs per resident was fairly similar according to the claims data compared with the medical records data. On a per resident basis, it was found that, among the sampled residents in California, 53.5 percent of had no QIs, 32.8 percent had 1-2 QIs, 13.4 percent had 3-6 QIs and 0.3 percent had greater than six QIs according to the claims data. The medical records data showed 39.3 percent of the residents having no QIs, 20.3 percent had 1-2 QIs, 18.8 percent had 3-6 QIs and 1.2 percent had greater than six QIs.

2. Georgia

The characteristics of the study population are summarized in Appendix XI.4. The total number of residents in the sampling frame for Georgia was 18,202. The average age of the residents in the sampling frame was 82.6 years. Seventy-eight percent were females and 73 percent were white. Seventy-five percent were considered to be high cost users of health services (> $73/day in Georgia) and 53 percent had Medicare claims during the study interval. Approximately 72 percent were small (e.g., less than 120 beds) and the average bed size was 109. Further refinement of the bed size

variable into three groups found that 17 percent of the facilities sampled were small (1-80 beds), 60 percent were medium-sized (81-160 beds) and 23 percent were large-sized (>160). Location was predominately suburban (42%) and rural (32%). Ownership was chain-affiliated for 63 percent of facilities, and 80 percent were for-profit (see Appendix XI.4).

Of the 216 facilities in the Georgia nursing home sampling frame, seventy-five percent of the facilities were considered high-flagged facilities--their QI rates (adjusted for exposure rate) was greater than the 25th percentile (3.6 QIs). On the facility level, the percent of residents within each facility which had no QIs was 32, with 1 QI was 20.3, with 2-3 QIs was 28.6, with 4-6 QIs was 16.6, and the percent with 7 or more QIs was 2.5. The average number of QIs per resident at each facility was 1.9 and with a range of 0.6-3.5 (see Appendix XI.9)

The average number of QIs per resident was 2.0 with a range of 0-14. Approximately 32 percent of the residents had no QIs flagged; 20.3 percent had only one QI; 28.9 had 2-3 QIs; and 16.5 had 4-6 QIs; and 2.5 had 7 or more QIs flagged (see Appendix XI.10). The types of QIs that occurred (in descending order of frequency) were: *concurrent use of psychoactive drugs for greater than 60 days* (32.6%), *hospitalization* (19.9%), *use of antipsychotics* (16.6%), *use of propoxyphene* (14.0%), *use of anti-infectives greater than 60 days except for treating certain conditions* (13.4%), *exceeding the maximum dosage of antipsychotics* (8.1%), *long-term sedative use* (7.1%), *exceeding the maximum dosage of selected anxiolytics* (6.3%), *use of aminoglycosides without a creatine or BUN test* (5.1%), and *exceeding the maximum dosage of selective antidepressants* (5.0%). Twenty-four QIs represented 88 percent of all triggered QIs. The table included in Appendix XI.8 presents the frequency of QI flags generated from claims data for Georgia.

In Georgia, it was also found that the distribution of the sample by number of QIs per resident was similar in the claims and the medical record data. On a per resident basis, 36.1 percent of the sample had no QIs, 35.6 percent had 1-2 QIs, 26.1 percent had 3-6 QIs and 2.1 percent had greater than six QIs according to the claims data (sampled residents). In the medical record data it was found that 32.6 percent had no QIs, 39.3 percent had 1-2 QIs, 23.7 had 3-6 QIs and 4.4 percent had greater than six QIs.

B. VALIDATION OF QUALITY INDICATORS

1. Quality Indicators Aggregations

Given the large number of QIs explored in the analysis, it was decided to aggregate the 50 QIs into discrete classes. *Level 0* aggregation represents the 50 individual QIs. In computing frequencies for the disaggregated QIs, values over 0.05 for the CR or MR quality indicator for hospitalization, lack of therapy, use of antipsychotics, continuous use of antipsychotics, long term sedative use, concurrent use of psychoactive drugs, maximum dose of selected antipsychotics, and use of propoxyphene for California, with similar quality indicators were found in Georgia (see Appendix XI.11 and Appendix XI.12). *Level I* aggregation represents consolidation of the resident outcomes and pharmaceutical treatments quality indicators into 13 categories, with a hit rate of 0.00 to 0.24 for California and 0.00 to 0.23 for Georgia (see Appendix XI.13 and Appendix XI.14). Level II aggregation represents further consolidation of the pharmaceutical treatments with a total of eight quality measures overall, ranging from 0.00-0.36 in California and 0.00-0.39 in Georgia (see Appendix XI.15 and Appendix XI.16). *Level III* aggregation represents the most concise formulation, with three areas of quality measures noted, ranging from 0.00-0.50 in California and 0.00-0.57 in Georgia (see Appendix XI.17 and Appendix XI.18).

2. Validation Methodology

This study examined validation of the claims-based QIs with the MR information using two methods. First, the percent agreement between the two data sources. Percent agreement was defined on a QI-level basis were examined. QIs were characterized as having a match if they were present in both the MR and in the CR record, or absent in both the MR and the CR. The agreement for the pharmaceutical QIs was based on presence or absence criteria in both data sources as well as the additional criteria of dosage and duration information. A level of 100 percent was perfect agreement, 90-99 percent was considered excellent agreement, and a level of 80-89 percent was considered good agreement. Agreement rates of less than 80 percent was not considered statistically significant, and these indicators were not considered for future analyses.

The second criteria used to determine validity of the claims-based quality indicators was positive predictive value (PPV) and negative predictive value (NPV). The accuracy of the claims data relative to the "gold standard" medical records data was explored by examining PPVs and NPVs of dichotomized QI (presence/absence) information. As stated above, PPV was defined as the probability that the QI was present in the MR given that the QI is present in the CR. NPV was defined as the probability that the QI was absent in the MR given that the QI was absent from the CR. As stated in the Section II, a 0.80 values of PPV and NPV was considered an acceptable measure for most QIs.

3. Percent Agreement Results

Percent agreement between the medical record and the claims data was generally quite high in both California and Georgia. Percent agreement in California ranged from 0.81 to 1.00, with most of the QIs having a 0.90 or higher level of agreement (see Appendix XI.11). Percent agreement in Georgia ranged from a low of 0.81 to a high of 1.00 on several indicators, with most of the QIs showing at least a 0.90 or higher level of agreement (see Appendix XI.12). When the level of agreement was examined more carefully in two by two tables, it became apparent that the agreement was relatively high because there was an absence of the QIs in both the MR and in the CR. Thus, high agreement meant agreement based on the absence of indicators present in the data.

4. Positive and Negative Predictive Values

a. Disaggregated Results

PPV results for California and Georgia were mixed among the 50 QIs, and ranged from 0.00 - 1.00 with a wide variation of results obtained (see Appendix XI.11 and Appendix XI.12). When comparing the two states however, PPV and NPV were very similar for each of the 50 QIs. PPV was greater than 0.80 for the following indicators:

QI Number	QI Description
1	Respiratory infection
2	Skin infection

QI Number	QI Description
4	Urinary tract infection
14	Hospitalization
19	Use of long-term sedatives
20	Use of long half-life benzodiazepines
21	Use of barbiturates and other sedatives
24	Concurrent use of psychoactive drugs > 60 days
25	Maximum single doses for some hypnotics
26	Maximum dosages for selected anxiolytics
28	Maximum dosages of selected antidepressants
29	Use of certain antidepressants
30	Combination antidepressants/antipsychotics
31	Use of atypical anti-infective drugs
34	Use of pediculosides after 7 days following nursing home admission
36	Use of proxyphene
37	Use of pentazocine
38	Use of indomethacin
45	Concurrent potassium supplements and ACE inhibitors
46	Concurrent potassium-sparing diuretics and ACE inhibitors
47	Concurrent use of 2 calcium channel-blocking agents
50	Use of chlorpropamide

To determine the most valuable of the 22 QIs mentioned above, the prevalence (hit rate) for each of the QIs in the sample were considered further. Using the definition as stated above, those QIs with a prevalence of greater than or equal to 0.05 were considered to be clinically significant. Comparing the results from these two analyses, the following eight QIs based on their prevalence and PPV were identified:

QI Number	QI Description
14	Hospitalization
19	Long-term sedative use
20	Long half-life benzodiazepines
25	Maximum single doses for some hypnotices
26	Maximum dosages for selected anxiolytics
28	Maximum dosages of selected antidepressants
29	Use of certain antidepressants
36	Use of proxyphene

In contrast, NPV was greater than or equal to 0.90 for all 50 QIs in both states. Using the same criteria as outlined above, the most valuable 14 QIs based on their prevalence and NPV include:

QI Number	QI Description
14	Hospitalization
16	Lack of therapy
17	Use of antipsychotics
18	Continuous use of antipsychotics
19	Long-term sedative use
20	Long half-life benzodiazepines
23	Concurrent use of psychoactive drugs
25	Maximum single doses for some hypnotics
26	Maximum dosages for selected anxiolytics
27	Maximum dosages for selected antidepressants
28	Maximum dosages of selected antidepressants
29	Use of certain antidepressants
35	Use of any anti-infective > 60 days
36	Use of proxyphene

b. Aggregated Results

When the QIs were aggregated and the PPV and NPV computed, the results shifted somewhat (see Appendix XI.13 - XI.18). Again, the results were similar between the two states. In general, the PPV improved as the aggregation of QIs increased; in the *Level III* aggregation, both resident outcomes and pharmaceutical treatments were close to or above the 0.80 threshold. The QI based on lack of therapy remained a consistently poor indicator. The NPV remained high through the aggregation strategies.

C. OTHER POTENTIAL QI AREA MEASUREMENTS

Two separate measurements outside of the QIs found in the claims and the medical record were examined, with a focus on the medical record, in order to make determinations of the quality of care of delivered to nursing home residents: (1) the resident's admissions assessment and (2) his or her annual assessment. Data elements that were collected from the two assessments included information on the medical history and physical examination as well as advance directives and health maintenance.

In California, admission assessment data on 570 residents was gathered. As presented in Appendix XI.34, there was well-documented data on the resident's reason for admission, active problem list, and past medical history present in the admissions assessment. Information on the resident's current medications, overall review of symptoms, and physical examination were also easily identified in the medical record. Overall functional (e.g., mobility) and cognitive status evaluation data were also performed and documented in high frequency for the residents. However, the medical record was incomplete in other areas, including preventive care as well as evaluation of nutrition, hearing, and vision as well as affect, with less than 10 percent of the residents with adequate care in these areas. Advance directives status was identified in only 24 percent of residents.

Similar results were seen in the population from Georgia (N=292). As presented in Appendix XI.35, well-documented data on the resident's reason for admission, active problem list, past medical history information, current medication list, review of symptoms, and physical examination in the medical record. Functional (e.g., mobility) and cognitive status evaluation were also performed and documented in high frequency for the residents. However, the medical record was incomplete in other areas, including preventive care history and orthostatic blood pressure examination with less than 10 percent of the residents with adequate care in these areas. Finally, advance directive status was identified in only 7.5 percent of residents.

The other area that was examined in the medical record was annual assessment information, as seen in Appendix XI.36. In California, 165 residents with annual follow-up during the study interval were identified. Again, there was evidence of attention to the medical history and acute medical problems, but a lack of attention to ophthalmologic, hearing, dental, and podiatric screening (e.g., less than 33 percent of the population. Advance directive information was present in only 30 percent of the population.

Similar results were found in the Georgia population (N = 60). As presented in Appendix XI.37, there was some evidence of attention to the medical history and acute medical problems (e.g., 49% and 61.2%, respectively), but a lack of attention to current medications, hearing evaluation, and podiatry screening (e.g., less than 20 percent of the population).

D. ANALYSIS OF QUALITY INDICATORS AND COVARIANT DIAGNOSES

Prevalence rates for 21 covariant diagnoses and associated QIs were assessed for both disaggregated covariant diagnoses and diagnoses aggregated for the relevant QI. In aggregating covariant flags by QI, information on comorbidity status for each QI for which associated covariant diagnoses had been assigned was summarized. The aggregated diagnosis flags were then used to "risk adjust" quality indicators. In essence, the risk adjustment constituted computing QI rates given the comorbidity status of the resident. A covariant diagnosis flag value of one was assigned if evidence of *any* covariant diagnosis was found associated with the QI was found, and a value of zero was assigned otherwise.

The covariant diagnosis rates for each of the 21 covariant diagnoses associated with a QI are presented in Appendices XI.19 (California) and XI.20 (Georgia). Rates for both the claims data and the medical record data were computed as the percent of the total number of cases for which a covariant diagnosis associated with a QI was observed (COV = Y/Total).

In California, it was found that the percent of cases with a covariant diagnosis was higher in the medical record sample than in the claims data--except for those QI/covariant diagnosis pairs for which no covariant diagnoses were observed (skin infection/peripheral vascular disease, decubitus

ulcers/peripheral vascular disease, paralytic ileus/peritoneal adhesions, electrolyte imbalance/renal failure, electrolyte imbalance/congestive heart failure, and electrolyte imbalance/hypertension with renal failure or congestive heart failure). In the claims data, covariant diagnosis rates ranged from 0.02 to 10.0; in the medical record data the rates ranged from 0.0 to 15.3.

In Georgia the same pattern was observed, with the exception being the QI/covariant diagnosis pair for which no covariant diagnoses associated with relevant QIs were observed in the medical record data. In the claims data, the covariant diagnosis rate ranged from 0.04 to 7.1 while in the medical record data the rates ranged from 0.0 to 20.9.

The study also assessed the prevalence of covariant diseases, in general, that were identified for the QIs (Appendices XI.21-XI.22). The covariant diagnosis rates presented in these appendices represent an aggregation or summary of each of the possible covariant diagnoses associated with each QI. For example, the *skin infection* QI has covariant diagnoses of diabetes and peripheral vascular disease. Rates computed for the QI/covariant diagnosis pairs in which a covariant diagnosis for *any* of the associated diseases generated a flag. It was expected that rates would be higher for those QIs that had a greater number of associated covariant diagnoses because the greater the number of associated conditions, the higher the probability of flag for covariant diagnosis.

In California, the aggregated covariant rates ranged from 0.02 (paralytic ileus/peritoneal adhesions) to 23.1 (decubitus ulcers/cancer, hemoplegia - paralysis, and peripheral vascular disease) in the claims data. In the sample for which medical record data was collected, the range was broader--0.0 (paralytic ileus/peritoneal adhesions) to 26.11 (decubitus ulcers/cancer, hemiplegia-paralysis, peripheral vascular disease). In Georgia, a similar pattern was observed with the rates ranging from 0.1 (paralytic ileus/peritoneal adhesions) to 11.1 (decubitus ulcers/cancer, hemiplegia-paralysis, peripheral vascular disease) in the claims data. In the medical record data in Georgia, it was found that the rate of covariant diagnoses (aggregated) ranged from 0.0 (paralytic ileus/peritoneal adhesions) to 25.4 (sepsis/diabetes, cancer, HIV).

The study used information on the presence or absence of a covariant diagnosis to "risk adjust" the QI rates. Risk adjustment constituted computing a QI rate, given the status of the covariant

diagnosis, among the cases for which there was evidence of *any* of the covariant diagnoses associated with the QI and among those cases for which there were no covariant diagnoses present. These implied rates can be expressed as:

$$(QI = Y \mid COV = Y)/(COV = Y) \quad \text{and} \quad (QI = Y \mid COV = N)/(COV = N).$$

In general, one would expect that the residents with covariant diseases have a higher risk of receiving a QI. The adjusted rates were computed using both the claims (Appendices XI.23-XI.24) and the medical record (Appendices XI.25-XI.26) data.

In California, it was found that for nearly all of the QI/aggregated covariant diagnosis pairs the adjusted QI rates were higher among the residents who had covariant diseases. The exceptions in the claims data were nutritional deficiencies/cancer, paralytic ileus/peritoneal adhesions, and lack of therapy/osteoporosis. Among the residents who had covariant diagnoses, there were no QI flags for nutritional deficiencies/cancer and paralytic ileus/peritoneal adhesions--the adjusted rates were zero in the claims data. In the medical record data, a lower adjusted QI rate for nutritional deficiencies/cancer was also found among those who had the related covariant diagnosis rather than among those who did not have the diagnosis.

The Georgia data revealed a similar patter. As was expected, in most cases the adjusted QI rate was higher among those who had covariant diseases. In the Georgia claims data, as in the California data, the rate for the QI/covariant diagnosis pairs of nutritional deficiencies/cancer and paralytic ileus/peritoneal adhesions were higher for those without the covariant diseases. In Georgia, it was also found the rate for those without the covariant disease to be higher for fracture of skull, neck-trunk, upper-lower limb/osteoporosis to be higher. The medical record data in Georgia revealed a similar pattern with nearly all adjusted QI rates being higher for the residents with related diseases.

E. SECONDARY ANALYSES - LOGISTIC REGRESSION MODELING

In order to understand the association of the study outcome (presence of any QI for some analyses, or aggregation of the QIs for other analyses) and resident and facility characteristics

potentially associated with each QI, several multivariate analyses were performed to look for independent factors and adjust for confounders. The outcomes were presented in the Methods section, with the main analysis being the presence of any QI, present in 53 percent of the population in California and 68 percent of the population in Georgia.

As seen in Appendix XI.27, factors significantly ($p < 0.05$) associated with this study outcome among the California population include demographic factors such as age (Odds Ratio (OR) 0.70 for residents 75-84 and 0.53 for residents $\geq$ 85 versus the referent 65-74 years of age), gender (males 0.92), and race (OR 0.83 for black versus the referent group white). Use of Medicare services (OR 1.5) was also highly related to the study outcome. Those residents with high cost medical expenditures were no more likely than low-cost residents to have at least one QI, after adjusting for potential confounding.

Similar results were noted in the Georgia population (see Appendix XI.28). Older residents (OR 0.76 for residents 75-84 and 0.55 for residents $\geq$ 85 years of age), male residents (OR 0.86), and black (OR 0.58) residents were less likely to have at least one QI. Use of Medicare services increased the probability of having at least one QI (OR 1.64).

We controlled for facility characteristics by including variables to indicated whether the facility was a medium or large-sized facility, whether the nursing home was a for-profit facility, and whether the nursing home facility was part of a chain. Facility characteristics were also important factors associated with the presence of any QI in the claims based analyses of all study residents. Residents in an urban location (OR 1.1) were more likely than residents in the inner city setting to have at least one QI, as were residents in for-profit homes (OR 1.4) versus those in non-profit homes. Those residents in large sized facilities were significantly less likely (OR 0.86) than residents in small facilities to have a QI, as were residents in a chain facility (OR 0.85) versus independent sites. Similar results were noted in the Georgia population, although residents residing in large-sized facilities in Georgia were more likely (OR 1.1) to have a QI versus small-sized facilities.

The model was repeated using the aggregation scenarios as presented earlier in the Methods section for each study state, concentrating on the Level III aggregation, based on the three QI domains

of: (1) resident outcomes, (2) lack of therapy, and (3) pharmaceutical treatments. These findings were essentially similar to the model focusing on any QI, and there were no significant changes in the interpretation of the study findings or the independent variables of significance (see Appendix XI.29 - XI.33).

F. ANALYSIS OF FEDERAL CERTIFICATION SURVEY DEFICIENCIES (F-TAGS) AND THE CLAIMS-BASED QUALITY INDICATORS

The objective of this portion of the study was to conduct analyses related to the federal F-tags to examine the relationship between federal certification survey deficiencies or F-tags cites and claims-based QI flags rates. This was to be accomplished by addressing two questions: (1) what is the probability that a facility would have an F-tag cited given that at least one resident had a quality indicator flagged in the claims and (2) what is the probability that a facility would have a QI generated from claims for at least one resident given that the facility had an associated F-tag cited as a result of the facility's survey during the study period?

Several factors should be kept in mind when interpreting the results. First, federal certification survey deficiencies (F-tags) are generated on a facility basis (based on surveyors reviewing a sample of residents) while the claims-based QIs examined in this study are generated from Medicaid claims data on a resident basis. Second, it would have been advantageous to examine the relationship of the F-tags with the QIs that were flagged by the claims *and* identified in resident's medical records (e.g., a validated QI). However, the sample of facilities included in the medical records reviews for California (90) and Georgia (67) was too small to make the analysis of QIs found in the medical records a meaningful one.

A third factor to keep in mind regarding this analysis was the status of the F-tags for the study period in each of the study states. F-tags are coded on the OSCAR file using three main codes; (1) as a "6" or *Correction Plan*, (2) as a "7" or *Corrected* and (3) as an "8" for waivers. In examining the status codes for California it was found that 82.3 percent were recorded as status 6 or *Correction Plan* for the study period whereas, over 90 percent of the F-tags identified in Georgia were recorded as status or *Corrected*. These results might be explained in a number of ways. Georgia surveyors

conducted revisits to their facilities and entered the results of the revisits as *Corrected*, whereas, California either conducted fewer revisits or failed to enter the updated corrected information into the OSCAR file. Whatever the reason, there was a significant difference in the two states' methods. After consultation with HSQB staff, it was decided to analyze only the California F-tag data because, (a) there were a greater number of facilities in the sampling frame (524) and in the medical records sample and (b) the majority of the F-tags were in the *Correction Plan* status and thus were more likely to be related to the facility survey conducted during the study period.

An examination of the frequency of F-tag hits for the 524 California nursing homes generated from OSCAR data for the study period showed the most frequently flagged F-tag was related to care planning activities (e.g., F295: Facility must develop a comprehensive care plan for each resident that includes measurable objectives and timetables) with 46.7 percent of the facilities receiving an F-tag. This F-tag was followed by F221: Use of Physical Restraints (35.9%), F221: Dietary/Store, Prepare, Distribute and Serve Food (35.9%), F322: Urinary Incontinence (20.8%) and F261: Housekeeping and Maintenance Service (18.9%). The full list of F-tags by descending frequency for 524 California nursing facilities may be found in Appendix XI.38.

The frequency of a flagged claims-based QI having at least one F-tag cited by the survey team for the facility was also examined. Four hundred thirteen California nursing facilities (78.8%) had at least one resident who received a QI flag for either the *lack of therapy* or *use of antipsychotics* QI and had at least one associated F-tag cited on their federal certification survey during the study period. The lowest percentage of facilities to have a claims-based QI flagged and have at least one related F-tag cited during their 1991 survey was 18.1 percent. This was found for the pharmaceutical related QIs 40 through 50 (e.g., *pain management* and *other pharmaceuticals*) and *paralytic ileus* (0.2%). Appendix XI.39 presents the frequency of facilities having QIs flagged and receiving at least one corresponding F-tag cited during their 1991 federal survey.

The study then examined the probability of a claims-based QI being generated given that a facility had at least one associated F-tag cited during their survey during the study period. When positive and negative predictive values were generated for this analysis, it was found that the positive and negative predictive values were low for the majority of the QI outcomes. Eight QIs were found

to be positive (F-tag present/associated QI present during the study period) with a PPV greater than 0.80). The QI outcomes clustered around the three major QI domains, (1) *resident outcomes*, (2) *lack of therapy* and (3) *pharmaceutical treatments* and the QIs included: QI 14, *hospitalization*, QI 16, *lack of therapy*, QI 19, *use of antipsychotics*, QI 23, *concurrent use of psychoactive drugs for greater than 60 days*, QI 27, *maximum dose of selected antipsychotics*, QI 28, *maximum dose of selected antidepressants*, QI 29, *maximum dose of selected antidepressants* and QI 35, *use of anti-infectives greater than 60 days except for treating certain conditions*.

Seventeen QIs were found to be negative (no F-tag/no associated QI present during the study period) with a NPV of 0.80 or greater. The QI outcomes were clustered around two of the three QI domains: resident outcomes and pharmaceutical treatments (see Appendix XI.40). The QIs with NPV greater than 0.80 were QI 2, *respiratory infection*, QI 5, *decubitus ulcers*, QI 6, *nutritional deficiencies*, QI 7, *paralytic ileus*, QI 9, *endocrine disorders such as diabetic crisis*, QI 11, *injury*, QI 24, *concurrent use of psychoactive drugs for greater than 60 days*, QI 30, *use of combination antidepressants/antipsychotics*, QI 31, *use of atypical anti-infective drugs*, QI 36, *use of propoxyphene*, QI 37, *use of pentazocine*, QI 39, *use of phenylbutazone*, QI 42, *concurrent use of $\geq$ two NSAIDS and histamine-2 antagonists for greater than 60 days*, QI 44, *concurrent use of potassium supplements and potassium-sparing diuretics for greater than 60 days, QI 46, concurrent use of $\geq$ of potassium-sparing diuretics and ACE inhibitors for greater than 60 days*, QI 47, *concurrent use of two calcium channel-blocking agents for greater than 60 days*, and QI 49, *concurrent use of $\geq$ two histamine-2 antagonists for greater than 60 days*. Overall, these results could be due in part to sporadic sampling bias related to the state survey sampling process and that F-tags are based on the conditions of a small sample of residents and the facility at a given point in time (survey period) rather than all residents over an extended period of time (e.g., a year). Ideally, it would be desirable to have found more QIs with PPV and NPVs of 0.80 or greater.

Finally, the probability of a facility having an F-tag cited during their survey given that at least one resident has an associated QI flagged in the claim during the study period was examined. This analysis used the F-tag as the "gold standard" and measured the probability of detecting a specific F-tag given that the associated QI was positive. It was found that the PPVs were less than 0.80 for all the F-tag outcomes (see Appendix XI.41). Thus, it appears that there are times when there is a QI

present when an F-tag is not. In theory, since QIs do not necessarily indicate that there is a problem at the facility, not every QI should generate an F-tag. This result may also be due to the fact that the F-tags are generated for the large part from a sample of residents and the QIs are generated from claims for all Medicaid residents.

The NPV (e.g., if no QI is flagged, then no F-tag is cited) was found to be above 0.80 in all but two F-tags (F295, Care Planning, and F377, Store, Prepare Distribute and Prepare Food). Thus, when the QI was absent in the claim, there was a high probability that the F-tag was not cited during the survey for a given facility (see Appendix XI.41). Since the PPVs were all < 0.80, the NPV results could reflect an artifact and result in low predictability overall. Also, the study did not adjust for facilities that had one flag versus multiple flags for the same QI. The issue of "severity" or frequency of quality issues being present is an important component of the new federal certification survey process that was implemented on July 1, 1995.

IV. STUDY LIMITATIONS

A. ADDRESSING THE KLINGMAN AND TUDOR REPORT

The purpose of the Klingman and Tudor study in 1992 was to examine the quality of care in nursing homes using nursing home claims-based quality indicators. This study continued to use the same basic approach as outlined by Klingman and Tudor by measuring the number of claims-based quality indicators on a facility basis and a resident basis, with the ability to calculate rates across the populations studied. In addition, summary statistics for the frequency of each quality indicator across the populations studied were calculated.

Klingman and Tudor suggested that an empirical review of the claims data would be needed to validate the quality indicators, and that this validation could be accomplished by a thorough review of the nursing home medical records for a sample of residents to determine whether the events indicated in the claims data actually occurred. In addition to accomplishing this task, the current study has added important new information on the validation of the QIs based on a comparison of the claims and medical records data, as well as addressing other quality of care issues that the 50 claims-based QIs and the medical record did not capture. This has been accomplished by selecting items that are common themes in the nursing home setting and represent an integral part of care of the nursing home residents but are generally available only through a review of the medical record. Items included were data on the resident's history at the time of admission, physical exam at the time of admission, and advance directives at the time of admission. Information from the annual review of residents was also collected, including the medical history over the past year, health maintenance screening and/or consultations over the past year, and advance directives information over the past one year. These measures were supported by the emerging literature on quality of care as well as an intensified interest in medication use in the nursing home, an area of increasing concern as evidenced by OBRA regulations.

B. CONCERNS REGARDING THE USE OF MEDICAID CLAIMS DATA

The Medicaid Tape-to-Tape data provide a rich opportunity to evaluate the utilization of services by residents in nursing homes in a systematic and uniform fashion since this information has been collected for payment purposes on an ongoing fashion, it is considerably richer than data generally available in randomized controlled trials. Particularly in the areas of performing drug surveillance, Medicaid data offer important advantages, including the documentation all billable health care service use, without recall bias or incomplete history information. However, the limitations of this claims-based information must be considered, and specific areas of concern are outlined below (Bright, 1989; Fisher, 1992).

With reference to the study limitations addressed in the Klingman report, many of the issues raised continue to be present in the current analysis. Incomplete Medicare data, which may lead to under-reporting of hospital and nursing home-based procedures, such as IP stay/ER stays and lack of therapy QIs used in the current study, is of particular concern. However, QIs were developed in several other areas distinct from this Medicare limitation, and these new QIs can form the basis of comparison among facilities and trends among residents. Another concern affecting the same areas as mentioned above deal with the threshold for hospitalization in the nursing home. However, both under use of the hospital by the treatment of conditions in the supervised setting in the nursing home as well as the lack of interest for aggressive care in these long-term residents is in contrast to the risk of overuse of hospital series among the various facilities according to their ability to provide ongoing care.

Also along the lines suggested by Klingman and Tudor, there are limitations in the methodology such as the use of fiscal codes to describe clinical conditions. These clinical events may not fit into a specific ICD-9 code, yet represent important areas of diagnosis and therapy in the older resident. In addition, performance of a medical service and documentation of such a service or billing for a procedure may seem to be linked processes, clearly there is possibility for uncoupling of these events. This event would disturb the validity of the quality indicator measurement in claims ("CR") and medical records ("MR"), so the results that are present remain conservative and most likely underestimate the true validity of the QIs generated in this study.

Medicaid payment and billing systems for nursing homes can vary significantly by state. For example, some states include direct therapies (a major QI in this study) in the Medicaid nursing home per diem rate (e.g., Georgia). Other states (e.g., California) exclude direct therapies from the Medicaid per diem rate and require them to be billed separately (generating a separate and distinct Medicaid claim). Finally, some states (e.g., Tennessee) may use a hybrid approach. In the case of Tennessee, therapies provided by staff therapists, therapy aides and nursing staff are included in the Medicaid nursing home per diem rate, however, therapy services provided to Medicaid residents by contract therapy staff are billed separately. This makes it difficult to compare QI experience between states. It could also lead to erroneous QI related findings by survey staff if these methods and how they affect the generating of QIs in their state is clearly understood.

C. CONCERNS WITH DRUG USE MEASUREMENT IN NURSING HOMES

This project has focused on the medical record as the constituting "gold standard." For instance, it is possible that for many of the medications evaluated in this study, Per Nursing Need (PRN) medications were given to the resident. While this information would have been captured in our medical records analysis, because only PRN and scheduled medications actually administered to the resident were counted in the study analysis, it is possible that no claim would have been filed under the resident's name. This lack of a filed claim would help explain the discrepancy between the MR-based and the CR-based methods. In fact, for many of the quality indicators, the prevalence was higher in the medical record data source. However, this event would be more prominent in the measurement of sensitivity and specificity test characteristics, and have less effect on the PPV and NPV measured in this study. Fraud and excessive claims filed on the resident's behalf would have reduced the PPV for the QIs in this study. Only ongoing surveillance and audits could detect fraud or errors in such data collection (HCFA, 1992).

D. THE NURSING HOME MEDICAL RECORD AS THE "GOLD STANDARD"

Since it was expected that there would be variability both in the quality of the nursing homes' medical records as well as in the abstractors' ability and experience level, only a subset of both facilities and residents who have complete information present in the medical record (this subset

includes cases which have both admission and annual assessment information present) were examined. By using this approach for the analysis, the issue of not knowing whether the abstractor missed the information or if the data were actually missing from the record was avoided. However, one caveat in using this methodology was that selection bias towards higher quality facilities may occur if in fact more complete documentation in the medical record is representative of higher quality of care.

E. EXTENDING THE QUALITY INDICATORS TO ADDRESS NURSING FACILITY QUALITY CONCERNS

While the quality indicators were designed to be a reliable and valid method for detecting potential quality issues using a claims-based approach, the quality indicators may still represent a surrogate endpoint in the assessment of quality. While some of the QIs are particularly focused on outcomes, for example respiratory infection, many focus on process variables, where the link to outcomes is not as straightforward. Nonetheless, these QIs were developed based on a comprehensive list of strategies supported by extensive literature review, as well as input from experts in long-term care practice, administration, and evaluation. While the quantification of quality may remain elusive, and while this approach does not replace the need for continued on site monitoring of the care provided to the 1.5 million current residents of nursing, it is believed the approach suggested by this study represents a detailed, standardized and objective strategy for quality assessment in the long-term setting.

F. EXTENDING THE QUALITY INDICATORS TO THE FEDERAL CERTIFICATION SURVEY PROCESS

Our examination of the claims-based QIs and their relationship to identifying federal deficiencies (e.g, F-tags) in the federal certification survey process has been a preliminary one. First, there needs to be further refinement of the assignment of F-tags to each QI, with "key" F-tags identified for each QI. Second, a method needs to be developed to analyze the relationship between F-tags and their associated QIs as supported in the medical record. QIs merely indicate that there is an issue at a facility that warrants further investigation. Upon investigation, it may be found that a quality problem does not exist, and no F-tag should be cited. Therefore, in order to validate the QIs in relation to the F-tags, it is important to be able to analyze facilities' F-tags related to QIs that are supported in the

medical record. Third, the database for analyzing QIs that are supported in the medical record must include substantially more facilities than were available in the medical records database for either of the study states. Finally, the goals and objectives related to linking claims-based QIs with facility deficiencies (F-tags) through the survey process needs to be clearly delineated.

V. DISCUSSION

Despite the limitations listed in the previous section, our analyses clearly demonstrate the potential utility of basing indicators of quality of nursing home care on Medicaid and Medicare claims data. Our quality indicators as a whole were generally better at predicting the absence of a quality issue, suggesting that the negative finding on the quality indicator represented the lack of a quality concern in the nursing home. This finding is desirable for a screening tool, in which it is very valuable to be certain that a certain condition (in this case, quality issue) is not present. The frequency of the claims-based QIs is quite stable across the two study states (e.g., California and Georgia), despite inevitable differences in levels of utilization of inpatient, emergency room, and pharmaceutical services that underlie the indicators. These differences stem from regional variations in resident case-mix acuity, facility characteristics and practice style, which in turn arise from even more global factors, such as key provisions of a state's Medicaid program, the structure of its nursing home industry and broader health-care system, and the composition of the elderly population.

Through the use of logistic regression modeling, secondary analyses that identified discernible and meaningful patterns of relationships with other resident and facility characteristics were able to be conducted. For example age, in both study states, resident-specific characteristics such as advanced age (e.g., 75 years and older), being a male and African American ethnicity were significantly associated with a decreased likelihood of receiving at least one identified QI on the claims record. Moreover, increasing age has been correlated with an increase in frailty and need for skilled care.

It was also found that the case-mix acuity of a resident, rather than just the costs associated with a residents care, was a factor that is significantly associated with the presence of at least one QI or an aggregation of QIs. For example, a resident having clinically complex needs (e.g., using

Medicare services before and during the study period) was highly related to the presence of at least one QI (as opposed to just being a high cost resident).

There were also a number of facility characteristics that were found to correlate with the presence of QIs. These characteristics were geographic location, profit/nonprofit status, facility size and chain affiliation. Regarding geographic location, our analysis showed that residents in facilities located in an urban location were more likely than residents in facilities located in inner urban and rural locations to have at least one QI. While the reasons for this finding are unclear, it may have some relation to the facilities' high Medicaid census, provision of only minimal levels of services, and lack of sophistication regarding challenging deficiency citations during the survey process.

The results were split by state for facility size. In California, a resident in a large facility was generally less likely than a resident in a small facility to have at least one QI. This could be a reflection of larger staff and broader range of staff skills available in a large facility that may not be available to a smaller facility. However, in Georgia the results were reversed.

In the case of profit/not-for-profit status, it was found that residents in for-profit facilities were more likely than residents in not-for-profit facilities to have at least one QI or an aggregation of QIs. This is supported by the fact that not-for-profit nursing homes are considered to be utility or output maximizers. As such, they make choices that will maximize the objectives of the facility other than cost minimization and profit. Common objectives of not-for-profit nursing facilities are to maximize their size subject to quality and break even constraints and to provide a social benefit such as serving population that are not readily served by traditional for profit nursing homes (Jacobs, 1991; and McKay, 1991). As a result, not-for-profit facilities are often found to have more direct care staff than for-profit facilities and differ from for-profit facilities in areas of cost and quality (Aaronson, Zinn, and Rosko, 1994).

A final facility characteristic examined was chain affiliation. Our study found that residents residing in chain affiliated facilities were less likely to have at least one QI or an aggregation of QIs than residents in sole proprietary facilities. This is supported, in part, by the fact that facilities that are chain affiliated may be able to achieve multiple-plant level economies due to having more

specialized central staff and the ability to access working capital at competitive rates (McKay, 1991). As a result, these facilities may have more opportunities to access specialized staff (e.g., quality assurance nurse, therapist, nurse practitioner) through a "shared" arrangement with other affiliated facilities than the sole proprietary facility and may allow the chain facilities to respond more efficiently and effectively to changes in the needs of the resident population than the solely proprietary nursing facility.

Our analyses of QIs and covariant diagnoses has shown that the use of covariant diagnoses may be a useful method in adjusting for the risk of a resident receiving a QI flag. How this information is applied depends on the goals and objectives of the survey operations agency. For example, one approach could be if a particular covariant diagnosis is flagged for a particular QI, then the QI should not be flagged. Another approach might be to develop different thresholds that must be met for a QI to be flagged based on the presence or absence of covariant diagnoses for specific QIs.

Thus, the stability in the patterns of frequencies for the individual and aggregate-level claims-based QIs, coupled with their patterns of relationship with other resident and facility characteristics, plus the ability to risk adjust for specific covariant diagnoses, strongly suggest that the QIs are capturing systematic processes that could be helpful in focusing annual certification surveys to more effectively assess the quality of care in nursing homes.

Validating the 50 quality indicators revealed some important issues. Both the medical record QI rate and the claims QI rate were low. This was not entirely unexpected, since areas in which care was thought to be less than standard were being examined. However, further use and statistical analyses based on each of the 50 indicators may be problematic due to the difficulty in comparing institutions with low-frequency conditions. As a result, a list of 22 of the entire 50 QIs in which (1) prevalence was greater than 0.05, and (2) the positive and negative predictive values of the quality indicator were greater than 0.80 have been compiled. It was felt that this core group of QIs best addresses the objectives of the QI formation and are most useful in targeting quality issues in the nursing home setting.

Despite the decrement from 50 to 22 QIs, our analyses revealed that it might be more effective to aggregate a number of the QIs to more effectively target quality of care issues. It was found that the Level II QI aggregation (e.g., eight QIs that include: resident outcome, hospitalization, death, lack of therapy, psychopharmaceuticals, infection control medications, pain medications and other medications) appeared to be the most effective method of using the QIs. Based on the information obtained through the initial QI screen, the survey team could further examine the frequency of QI flags at a facility by focusing on the 22 QIs that were identified in the study as being the most reliable, based on medical records validation. This process could assist surveyors in focusing pre- survey activities before entering the facility.

Discrepancies between the flags generated for the QIs based on the claims versus the medical record were also noted. Possible reasons for this occurrence, particularly where there was a positive medical record flag and a negative claims flag, were also examined more closely. One type of situation in which this could occur was if a PRN medication was counted as positive on the medical record flag whether or not it had actually been given. The study team decided that it was important to retrace our steps in this instance, and to flag those records where there were PRN orders but no claims to match to see whether the medication had actually been given.

To accomplish our objective, two QIs, QI #20 (e.g.,benzodiazepine use) and QI #27 (e.g., maximum dosage of selected antipsychotics) were reviewed. For QI #20, 70 percent of the records (30/48) were reviewed. Twenty (67%) had PRN orders, of which 10 (33%) were not given the actual medication. For QI 27, 78 percent of the records had PRN orders, and 22 percent were not given the prescription. These preliminary results suggest that most medication use in nursing facilities is PRN, and that PRNs are also given frequently. However, in about 22 - 33 percent of cases, PRNs were written but not given, suggesting that the sensitivity results could be improved if these situations were eliminated. Then all the QIs where PRNs could be ordered (QIs 17, 21, 22, 25, 26, 27-31, 36-40, 43 and 50) were tested to see how frequently this occurred throughout the database. For 12 out of 19 PRN drugs, there was no change in the QIs' sensitivity statistic. For the others there was a minimum to moderate positive change.

Based on these observations, a number of other issues related to the validation and use of claims-based QIs must be raised. First, it is important to examine the appropriateness of the medical record as the "gold standard" given that the QIs' positive rates are so low. It may be that the claims-based QIs are more valid indicators, given their higher level of frequency. Further study is needed to explore this relevant question as it relates to the primary focus of this project.

Second, it was found that the comparison of the claims-based QIs with federal certification survey deficiencies (e.g., F-tags) was also to be important. The QIs behaved well in predicting the absence of an F-tag occurrence, but were not useful in predicting the presence of an F-tag in a given facility. Again, the high NPV is valuable as a screening tool in predicting the absence of a citation. The low PPV of this analysis could be explained by the fact that the F-tag surveillance process includes only a sampling of residents in each facility, rather than a surveillance of each resident. In our analysis, all residents from a given facility were used, so, there were many instances when a QI was present without a corresponding F-tag being cited, possibly because the given resident was not assessed during the survey process. This situation would well explain the low PPV noted in this analysis.

Third, the use of the QIs in the certification survey process as a targeting tool in the pre-survey phase would assist the survey team to more effectively focus their survey activities. However, survey operations staff should be cautioned not to see the QIs as an "expedited method to citing supportable deficiencies" since the QIs theoretically do not guarantee that a problem necessarily exists at a given facility. Rather, the QIs indicate that there is a potential quality issue at a facility that requires further examination. For example, a facility might have a QI flagged for psychopharmaceutical use. However, when the survey team investigates the issue at a facility, they may find that the use of these medications resulted in residents performing at a high functioning level rather than being "lethargic and unresponsive" (in other words the administration of the medications had a positive rather than a negative effect on the residents). In this case, it may not be appropriate to cite an F-tag.

Finally, when using claims-based QIs, the peculiarities of Medicaid nursing home payment and billing systems in a particular state must be taken into consideration. For example, therapies can be reimbursed in or out of the per diem rate (e.g., California nursing homes bill for therapies separately and Georgia nursing homes are reimbursed for therapies within the rate). As a result, therapy services

could not be evaluated in Georgia and therapies represent an important component of nursing home care. Thus, Medicaid payment and billing systems can "mask" the true type and frequency of claims-based QIs generated for a facility. Not only does this variation make state comparisons challenging, it also could lead state survey operations staff to erroneous conclusions if the Medicaid payment and billing systems and their affect on the QIs are not clearly understood.

VI. IMPLICATIONS FOR FUTURE WORK

A resident-centered approach should be the foundation for analyzing the quality of care delivered in nursing facilities. The revised nursing facility quality indicators developed in this study represent an efficient way to measure trends across residents in any given facility, as well as facilitating comparisons between facilities, as well as assembling and displaying aggregate data comparing facilities. The methodology data that has already been collected, (Medicaid claims data) and does not require significant additional staff or resources. The successful validation of the quality indicators in this study supports continued faith in the use of claims-based information to produce summary reports on facility quality and can provide a valuable tool to better target areas of concern for future investigation.

The project is the largest to date to evaluate processes of care, (such as medication use) and outcomes of care (such as hospitalization and death). The LTC sector represents an increasingly large and frail population that is potentially at high risk for adverse events. Preliminary data analysis suggests a high use of long-acting benzodiazepines, such as diazepam, by this elderly population. These drugs are generally contraindicated in patients over the age of 65 because of the increased risk of pharmacokinetics and pharmacodynamics reactions in this age group. Use of neuroleptics is also high, prompting investigations into dosages and possible misuse. Preliminary results from this study have been consistent with other smaller trials, and on similar topics, and provides further evidence that the use of a claims-based quality review system exhibits considerable potential for future long-term care research.

Finally, the results of this study suggest possible avenues for future investigation and intervention. What are the outcomes for residents who are given medications which are contraindicated in the elderly? What are the interventions, such as education, feedback, or administrative changes, that may be useful in reducing this inappropriate use of medication? How can guidelines for diagnosis and treatment of target conditions, such as congestive heart failure and pain, be applied to this population? How can the QIs be effectively linked to the federal survey certification process to assist state surveyors in effectively and efficiently assessing the quality of care provided in nursing homes?

The QIs presented in this study could form the framework for an ongoing automated quality monitoring system. This system, particularly in electronic billing environments, would provide information either on-line or near-line. Such an approach could greatly simply the quality review process and allow for monitoring of care as is currently being given, thereby affecting the resident at the point of service rather than through a six-month retrospective review of care.

This on-line capacity could also serve as a potential method for improving physician practices in long-term care settings. As quality indicators are generated, there is an opportunity for intervention through a variety of scenarios (Eisenberg, 1985; Soumerai, 1989). Education could be provided through on-line services for future learning to the practitioner. Feedback on the physician's performance in reference to his or her peers in long-term care would be helpful in decreasing variation and establishing benchmark practices. Reminders could prompt the physician to improve health maintenance and suggest screening procedures, especially when coupled with intervention strategies. Administrative systems could be designed that would alert physicians' of possible contraindication if they attempt to order medications at dose or duration at variance with appropriate benchmarks. Finally, the system could support incentive and penalty programs for physicians and facilities to improve practices in long-term care.

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VALIDATION OF NURSING HOME QUALITY INDICATORS STUDY

APPENDICIES

4/18/97

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APPENDICES

TABLES (continued)

TABLES (continued)

Appendix I

APPENDIX I

LIST OF QUALITY INDICATORS FOR THE HCFA NURSING HOME QUALITY INDICATORS STUDY

SysteMetrics
February 20, 1992

NOTE: The numbers listed in parentheses for a quality indicator are diagnosis codes (ICD-9-CM) or procedure codes (ICD-9-CM, CPT-4, or CRVS) which either (1) represent medical or surgical conditions which define the indicator event (e.g., inpatient stay or emergency room visit for that diagnosis or procedure), (2) "control diagnoses" (e.g., osteoporosis in the indicator for fracture), or (3) case selection factors (e.g., residents with a diagnosis of dementia in the indicator for use of antl-psychotic drugs). "Exclusions" are cases (residents) to be excluded from computation of the subsequent list of indicators. "Applicable standards" (Fxxx) refer to federal certification survey standards ("tag numbers").

I. RESIDENT OUTCOMES

A. INPATIENT STAY OR EMERGENCY ROOM VISIT

1. Infectious Conditions

Exclusions: Any resident admitted to the nursing home within seven days prior to inpatient admission

- *Infectious disease* (001.0-037, 039.0-041.9, 045.00-099.89, 132)

  Control diagnoses: Cancer (140.0-208.9), HIV (042.0-044.9, 795.8)

- *Respiratory infection* (466.0, 480.0-487.8, 507.0)

  Control diagnoses: COPD, chronic/asthmatic bronchitis, emphysema (491.0-492.8, 493.2, 496)

- *Skin infection* (680.0-686.9)

  Control diagnoses: Diabetes (250.00-250.91), peripheral vascular disease (440.2, 443.0, 443.89, 443.9)

- *Sepsis* (038.0-038.9)

  Control diagnoses: Diabetes (250.00-250.91), cancer (140.0-208.9), HIV (042.0-044.9, 795.8)

Applicable standards (for all of the above infectious diseases): F127, F132, F134, F135, F293, F309, F310, F313, F324, F330, F332, F333, F340, F346, F663, F794, F795, F797, F798.

2. Noninfectious Conditions

a. Conditions that may have begun developing prior to nursing home admission:

Exclusions: Any resident admitted to the nursing home within seven days prior to inpatient admission

- *Decubitus ulcers* (707.0)

  Control diagnoses: Cancer (140.0-208.9), hemiplegia/paralysis (342.0-342.9, 344.0-344.9), diabetes (250.00-250.91), peripheral vascular disease (440.2, 443.0, 443.89, 443.9)

  Applicable standards: F127, F128, F129, F136, F139, F795

- *Diabetic crisis*: Acidosis (250.10, 250.11), hyperglycemic coma (250.20, 250.21), hyperosmolar nonketotic coma (250.30, 250.31), hypoglycemic coma (251.0)

  Control diagnoses: None.

  Applicable standards: F105, F126, F179, F198, F199, F207, F210, F211, F224, F231, F669

- *Nutritional deficiencies*: Kwashiorkor (protein malnutrition); nutritional marasmus; other protein/calorie malnutrition; deficiency of vitamin A, thiamine/ niacin, B-complex components, ascorbic acid, vitamin D; other nutritional deficiencies (260.0-269.9)

  Control diagnoses: Cancer (140.0-208.9)

  Applicable standards: F105, F126, F179, F180, F181, F198, F199, F207, F210, F211, F669

- *Electrolyte imbalance*: Hyperosmalility and/or hypernatremia, hyposmolality and hyponatremia, acidosis, alkalosis, mixed acid/base balance disorder, volume depletion, fluid overload, hyperpotassemia, hypopotassemia, electrolyte and fluid disorders not elsewhere classified (276.0-276.9)

  Control diagnoses: Renal failure (584.5-586), congestive heart failure (428.0-428.9), hypertension with RF or CHF (402.01, 402.11, 402.91, 403.01, 403.11, 403.91, 404.01-404.03, 404.11-404.13, 404.91-404.93)

  Applicable standards: F105, F126, F179, F180, F181, F198, F199, F207, F224, F231, F715, F724

- *Grand mal status epilepticus* (345.30, 345.31)

  Control diagnoses: None.

  Applicable standards: F105, F224

- *Paralytic ileus*, impaction of intestine (560.1, 560.30, 560.39, 560.9)

  Control diagnoses: Peritoneal adhesions (560.81, 568.0)

  Applicable standards: F126, F198, F199

- *Fracture* of skull, neck/trunk, upper/lower limb (800.0-829.1)

  Control diagnoses: Osteoporosis (733.00-733.09)

  Applicable standards: F79, F80, F105, F296, F318, F662

- *Amputation* for any diagnosis, using the following *procedure* codes:

  ICD-9-CM: 84.00-84.19, 84.91

  CPT-4: 23900, 23920, 24900, 24920, 24931, 24940, 25900, 25905, 25915, 25920, 25927, 26910, 26951, 26952, 27290, 27295, 27590-27592, 27598, 27880-27882, 27888, 27889, 28800-28825, 69120

  CRVS: 23900, 23920, 24900, 24920, 24931, 24940, 25900, 25920, 25927, 26910, 26951, 26952, 27290, 27295, 27590-27592, 27598, 27880, 27881, 27888, 27889, 28800-28825, 69120

  Control diagnoses: Cancer (140.0-208.9), osteomyelitis (730.00-730.99), gangrene (785.4), diabetes (250.00-250.91), peripheral vascular disease (440.2, 443.0, 443.89, 443.9)

  Applicable standards: F105, F662

b. Conditions that probably reflect care in the nursing home:

Exclusions: None.

- *Injury*: Dislocation; sprain/strain; intracranial injury (excluding skull fracture); internal injury of chest, abdomen, pelvis; open wound; injury to blood vessels; late effects of injuries, poisonings, toxic effects; superficial injury; contusion with intact skin surface; crushing injury; foreign body; burns; injury to nerves/spinal cord; trauma complications (830.0-959.9)

  Control diagnoses: None.

  Applicable standards: F79, F80, F105, F130, F296, F318, F662

- *Poisoning* by drugs, medicinal, and biological substances (960.0-979.9, 999.4-999.8); toxic effects of substances chiefly nonmedicinal as to source (980.0-989.9)

  Control diagnoses: None.

  Applicable standards: F105, F126, F186, F191, F224, F715, F724

- *External causes*: Cold, heat, immersion, hunger, thirst, exhaustion, motion, asphyxiation (991.0-992.9, 994.1-994.8)

  Control diagnoses: None.

  Applicable standards: F662

- *Attempted suicide* (E950.0-E959)

  Control diagnoses: None.

  Applicable standards: F105, F662

B. DEATH

Death of a Medicaid resident within 30 days following any of the events listed in I.A. above.

Applicable standards: All listed in I.A. above.

II. LACK OF THERAPY

Occurrence of at least one claim containing any of the diagnoses listed below in any of the Medicaid or Medicare files, but with *no* Medicaid outpatient claim for speech therapy, occupational therapy, or physical therapy within 30 days following the ending date of service on the diagnosis claim:

- Cerebrovascular accident (430-434.9, 436)
- Fracture (800.0-805.9, 807.0-829.1)
- Amputation (887.0-887.7, 896.0-897.7)

Applicable standards: F126, 173, F706, F708

III. PHARMACEUTICAL TREATMENTS

A. CHEMICAL RESTRAINTS

1. *Use of anti-psychotics without psychosis:* For residents without a previous diagnosis of psychosis (ICD-9-CM codes 293.0-293.9, 295.0-298.9) or dementia (see below), use of one or more anti-psychotics. Dementia includes:

   - Senile and presenile psychotic conditions (290.0-290.9)
   - Amnestic syndrome (294.0)
   - Dementia (294.1)
   - Other specified chronic organic brain syndrom (294.8)
   - Unspecified organic brain syndrome (294.9)
   - Organic personality syndrome (310.1)
   - Alzheimer's disease (331.0).
   - Pick's disease (331.1)
   - Senile degeneration of brain (331.2)
   - Cerebral degeneration, unspecified (331.9)

   Applicable standards: F80, F191, F224, F611, F613

2. *Use of anti-psychotics with dementia*: For residents with no diagnosis of psychosis but with a diagnosis of dementia (see #1, above), use of one or more anti-psychotics

   Applicable standards: F80, F191, F224, F611, F613

3. *Continuous use of anti-psychotics for more than 120 days* among residents without a previous diagnosis of psychosis (see #1, above)

   Applicable standards: F80, F191, F224, F613

4. *Concurrent use of psychoactive drugs within same therapeutic class for more than 60 days*: Concurrent use of more than one psychoactive drug within the same therapeutic class for more than 60 days. The therapeutic classes include:

   - Anti-depressants
   - Anti-anxiety drugs
   - Sedative hypnotics
   - Anti-psychotics
   - Muscle relaxants
   - Drugs of special concern (e.g., amitriptyline)

   Applicable standards: F80, F191, F224, F715, F724

5. *Concurrent use of psychoactive drugs between therapeutic classes for more than 60 days*: Concurrent use of more than one psychoactive drug in different therapeutic classes for more than 60 days. The therapeutic classes include:

   - Anti-anxiety drugs
   - Sedative hypnotics
   - Anti-psychotics
   - Combination drugs (containing drugs for more than one class, e.g., perphenazine)

   Applicable standards: F80, F191, F224, F715, F724

6. *Long-term sedative hypnotic use*: Continuous use of sedative hypnotics for more than 120 days

   Applicable standards: F80, F191, F224, F611, F613, F715, F724

7. *Exceeding recommended maximum dose of anti-psychotics*: For residents with a previous diagnosis of psychosis (see #1, above), receipt of a maximum dosage of any of the anti-psychotics listed below that exceeded the recommended dose during the resident's period of use of the drug. The resident's dosage is calculated as the strength of the drug times the quantity of the prescription divided by the number of days in the resident's period of use of the drug (last claim date minus first claim date).

Recommended maximum daily dose	Age 65 and over	Age less than 65
Chlorpromazine (Thorazine)	800	1600
Thioridazine (Mellaril)	400	800
Loxapine (Loxitane)	125	250
Haloperidol (Haldol)	50	100
Trifluperazine (Stelazine)	40	80
Thiothizene (Navane)	30	60
Mesoridazine (serentil)	400	800
Fluphenazine (Prolixin)	32	64
Chlorprothizine (Taractan)	800	1600
Molidone (Moban)	112	225

Applicable standards: F80, F191, F224, F611, F715, F724,

8. *Concurrent use of anticholinergics*

   Applicable standards: F80, F191, F224, F715, F724

9. *Use of long half-life benzodiazepines*

   Applicable standards: F80, F191, F224, F715, F724

B. INFECTION CONTROL

1. *Use of unusual anti-infectives drugs* (e.g., Fulvicin)

   Applicable standards: F134, F191, F224, F663, F794, F795, F797, F798

2. *Use of four or more anti-infectives within a 60-day period*

   Applicable standards: F134, F191, F224, F663, F794, F795, F797, F798

3. *Use of aminoglycosides without a creatinine or BUN test*: Use of aminoglycosides without a creatinine blood level test (CPT-4 code 82565) or BUN test (CPT-4 code 84520 or 84525) taken within 30 days

   Applicable standards: F134, F191, F224

4. *Use of pediculicides* after seven days following admission to the nursing home

   Applicable standards: F134, F191, F224

C. PAIN MANAGEMENT WITH CANCER

1. *No narcotic analgesics*: For residents with a pain-prone cancer diagnosis (ICD-9-CM codes 140.0-239.9)[1], absence of any claims for selected analgesics

   Applicable standards: F191, F224

2. *Meperidine use*: For residents with a pain-prone cancer diagnosis (see #1, above), presence of one or more claims for meperidine

   Applicable standards: F191, F224, F715, F724

D. OTHER

1. *Use of more than six therapeutic classes of drugs per month*

   Applicable standards: F191, F224, F715, and F724

2. *Occurrence of more than eight drug claims per month* (excluding over-the-counter substances)

   Applicable standards: F191, F224, F715, and F724

3. *Concurrent use of potassium supplements and potassium-sparing diuretics for more than 60 days*

   Applicable standards: F191, F224, F715, F724, and F170

4. *Concurrent use of histamine antagonists and nonsteroidal anti-inflammatory drugs (NSAIDS) for more than 60 days*

   Applicable standards: F191, F224, F715, F724

[1] A separate list of specific pain-prone cancer diagnoses has been developed.

Appendix II

APPENDIX II.1

ANNOTATED VERSION

APPENDIX II.1

LIST OF QUALITY INDICATORS FOR THE HCFA VALIDATION OF NURSING HOME QUALITY INDICATORS STUDY

Cooperative Agreement No. 18-C-90090/01

The MEDSTAT Group
December 31, 1996

NOTE: The numbers listed in parentheses for a quality indicator are diagnosis codes (ICD-9-CM) or procedure codes (ICD-9-CM, CPT-4, or CRVS), which either represent (1) medical or surgical conditions which define the indicator event (e.g., inpatient stay or emergency room visit for that diagnosis or procedure), (2) "covariant diagnoses" (e.g., osteoporosis in the indicator for fracture), or (3) case selection factors (e.g., residents with a diagnosis of dementia in the indicator for use of antipsychotic drugs). "Exclusions" are cases (residents) to be excluded from computation of the subsequent list of indicators. "Applicable standards" (Fxxx) refer to federal certification survey standards ("tag numbers") effective for the 4/1/92 conversion.

I. RESIDENT OUTCOMES

A. INPATIENT STAY OR EMERGENCY ROOM VISIT

1. Infectious Conditions

Exclusions: Any resident admitted to the nursing home within seven days prior to inpatient admission.

- *Respiratory infection* (466.0, 480.0-487.8, 507.0)

  Covariant diagnoses:COPD,chronic/asthmatic bronchitis, emphysema (491.0-492.8, 493.2, 496)

- *Skin infection* (680.0-686.9)

  Covariant diagnoses: Diabetes (250.00-250.91), peripheral vascular disease (440.2, 443.0, 443.89, 443.9)

- *Sepsis* (038.0-038.9)

  Covariant diagnoses: Diabetes (250.00-250.91), cancer (140.0-208.9), HIV (042.0-044.9, 795.8)

- *Urinary tract infection* (590.00, 590.01, 590.10, 590.11, 590.2, 590.80, 590.81, 595.89, 595.0, 595.1, 595.2, 595.4, 595.89, 595.9, 597.0, 598.00, 598.01, 599.0)

  Covariant diagnoses: Diabetes (250.00-250.91), Quadraplegia (344.0), Paraplegia (344.1) or Coma (780.0)

  Applicable standards (for all of the above infectious diseases): F261, F321, F322, F328, F377, F440-A, F441, F442, F443, F444, F445, F446, F447.

2. Noninfectious Conditions

a. Conditions that may have begun developing prior to nursing home admission:

Exclusions: Any resident admitted to the nursing home within seven days prior to inpatient admission.

- *Decubitus ulcers* (707.0)

  Covariant diagnoses: Cancer (140.0-208.9), hemiplegia/paralysis (342.0-342.9, 344.0-344.9), diabetes (250.00-250.91), peripheral vascular disease (440.2, 443.0, 443.89, 443.9).

  Applicable standards: F319, F320.

- *Nutritional deficiencies*: Kwashiorkor (protein malnutrition); nutritional marasmus; other protein/calorie malnutrition; deficiency of vitamin A, thiamine/niacin, B-complex components, ascorbic acid, vitamin D; other nutritional deficiencies (260.0-269.9)

  Covariant diagnoses: Cancer (140.0-208.9)

  Applicable standards: F277, F331, F332, F333, F354, F369, F370, F371, F372, F373, F374, F375.

- *Paralytic ileus*, impaction of the intestine, (560.1, 560.30, 560.39, 560.9)

  Covariant diagnoses: Peritoneal adhesions (560.81, 568.0)

  Applicable standards: F204.

- *Electrolyte imbalance*: Hyperosmality and/or hypernatremia, hyposmality and hyponatremia, acidosis, alkalosis, mixed acid/base balance disorder, volume depletion, fluid overload, dehydration, hyperpotassemia, hypopotassemia, electrolyte and fluid disorders not elsewhere classified (276.0-276.9)

  Covariant diagnoses: Renal failure (584.5-586), congestive heart failure (428.0-428.9), hypertension with RF or CHF (402.01, 402.11, 402.91, 403.01, 403.11, 403.91, 404.01-404.03, 404.11-404.13, 404.91-404.93)

  Applicable standards: F331, F332, F333, F335, F354, F369, F370, F375, F430, F431, F517, F524.

- *Endocrine disorders* such as *diabetic crisis:* Acidosis (250.10, 250.11), hyperglycemic coma (250.20, 250.21) hyperosmolar nonketonic coma (250.30, 250.31), hypoglycemic coma (251.0) or thyrotoxicosis with thyrotoxic crisis or storm (242.01, 242.11, 242.21, 242.31, 242.41, 242.81, 242.91)

  Covariant diagnoses: None

  Applicable standards: F331, F332, F369, F372, F373, F374, F430, F431.

- *Fracture of skull*, neck/trunk, upper/lower limb (800.0-829.1)

  Covariant diagnoses: Osteoporosis (733.00-733.09)

  Applicable standards: F221, F222, F223, F331, F482.

b. Conditions that probably reflect care in the nursing home:

  Exclusions: None

- *Injury*: Dislocation; sprain/strain intracranial injury (excluding skull fracture); internal injury of chest, abdomen, pelvis; open wound; injury to blood vessels; late effects of injuries, poisonings, toxic effects; superficial injury; contusion with intact skin surface; crushing injury; foreign body; burns; injury to nerves/spinal cord; trauma complications (830.0-959.9)

  Control diagnoses: None

  Applicable standards: F221, F222, F223, F331, F482.

- *External causes*: Cold, heat, immersion, hunger, thirst, exhaustion, motion, asphyxiation (991.0-992.9, 994.1-994.8)

  Covariant diagnoses: None

  Applicable standards: None

- *Attempted suicide* (E950.0-E959)

  Covariant diagnoses: None

  Applicable standards: None

B. HOSPITALIZATION

Number of hospitalizations that occur more than seven days after being admitted to the facility.

C. DEATH

Death of a Medicaid resident within 30 days following any of the events listed in I.A., above.

Applicable standards: All listed in I.A., above.

II. LACK OF THERAPY

Occurrence of at least one claim containing any of the diagnoses listed below in any of the Medicaid or Medicare files, but with *no* Medicaid outpatient claim (evaluation or treatment) for

speech therapy, occupational therapy, or physical therapy within 30 days following the ending date of service on the diagnosis claim:

- Cerebrovascular accident (430-434.9, 436)
- Traumatic hip fracture (820.0-820.9)
- Amputation (887.0-887.7, 896.0-897.7)

Covariant Diagnoses: Osteoporosis (733.0 - 733.09).

Applicable standards: F253, F272, F283, F311, F312, F313, F314, F315, F316, F317, F323, F324, F341, F405-A, F407, F458.

III. PHARMACEUTICAL TREATMENTS

A. PSYCHOACTIVES

Antipsychotics

1. *Use of antipsychotics*: For residents without a previous diagnosis of psychosis (ICD-9-CM codes 293.0-293.9, 295.0-298.9) or dementia (see below), use of one or more antipsychotics. Dementia includes:

   - Senile and presenile psychotic conditions (290.0-290.9)
   - Amnestic syndrome (294.0)
   - Dementia (294.1)
   - Other specified chronic organic brain syndrome (294.8)
   - Unspecified organic brain syndrome (294.9)
   - Organic personality syndrome (310.1)
   - Alzheimer's disease (331.0)
   - Pick's disease (331.1)
   - Senile degeneration of brain (331.2)
   - Cerebral degeneration, unspecified (331.9)
   - Multi-infarct dementia (290.40)

   Applicable standards: F221, F222, F430, F431.

2. *Continuous use of antipsychotics for more than 120 days* without drug holidays or dosage reductions.

   Applicable standards: F221, F222, F430, F431.

Sedative Hypnotics/Antianxiety Drugs

3. *Long-term sedative hypnotic use*: Continuous use of sedative hypnotics or antianxiety drugs for more than 120 days without a drug holidays or dosage reductions.

   Applicable standards: F221, F222, F430.

4. *Drugs such as long half-life benzodiazepines* should be not be used with the elderly.

   Applicable standards: F221, F222, F430, F431.

5. *Drugs such as barbiturate agents and other selected sedatives* should be used with the elderly.

   Applicable standards: F430, F431.

6. *Use of anticholinergics.* These drugs should not be used with the elderly.

   Applicable standards: F221, F222, F430, F431.

Cross Classes

7. *Concurrent use of psychoactive drugs within same therapeutic class for more than 60 days*: Concurrent use of more than one psychoactive drug within the same therapeutic class for more than 60 days. The therapeutic classes include:

   - Antidepressants
   - Antianxiety drugs
   - Sedative hypnotics
   - Antipsychotics

   Applicable standards: F221, F222, F430.

8. *Concurrent use of psychoactive drugs between therapeutic classes for more than 120 days*: Concurrent use of more than one psychoactive drug in different therapeutic classes for more than 120 days. The therapeutic classes include:

   - Antianxiety drugs
   - Sedative hypnotics
   - Antipsychotics

   Applicable standards: F221, F222, F430.

9. *Exceeding recommended maximum dose of Psychoactives*: For any residents, receipt of a maximum dosage of any of the psychoactives listed below that exceeded the recommended dose during the resident's period of use of the drug. The resident's dosage is calculated as the strength of the drug times the quantity of the prescription divided by the number of days in the resident's period of use of the drug (last claim date minus first claim date).

   - Receipt of a maximum dosage of any drug listed below that exceeded the recommended dose during the resident's period of use of the drug.

     Applicable standards: F222, F348, F349, F430, F431.

Maximum Single Doses for Some Hypnotic Drugs

Drug	Dosing Limits per Day, Adults All Ages[1,6]	Dosing Limits per Day, Adults Over 65[1,4-7]	OBRA Dosing Limits[2,3]
Chloral hydrate	2000 mg	2000 mg	500 mg
Flurazepam	30 mg	Should not be used	15 mg
Triazolam	.5 mg	.25 mg	.125 mg
Temazepam	60 mg	30 mg	15 mg

1 USP DI, 13th Edition (1994), U.S. Pharmacopeal Convention
2 Guidance to Surveyors - Long Term Cere Manual
3 OBRA dosing limits ere specific to ell gerietric petients.
4 Beers MH, Ouslender JG, Rollinger I, Reubeen DB, Brooks J, Beck JC. Explicit criteria for determining inappropriate medication use in nursing home residents. Arch Intern Med 1991;151:1825-1832
5 Shader RI, Greenblett DJ. Use of benzodiezepines in enxiety disorders. N Engl J Med 1993;328(19):1398-1405.
6 Shorr RI, Robin DW. Retional use of benzodiezepines in the elderly. Drugs & Aging 1994;4(1):9-20.
7 Salzmen C (eds). Clinicel Gerietric Psychophermecology. Beltimore: Williems end Wilkins, 1992.

Maximum Dosages of Selected Anxiolytics:

Drug	Dosing Limits per Day, Adults All Ages[1,5]	Dosing Limits per Day, Adults Over 65[1,3-6]	OBRA Dosing Limits[2]
Alprazolam	4 mg	2 mg	.75 mg
Chlordiazepoxide	100 mg	Should not be used	N/A
Clorazepate	90 mg	30 mg	15 mg
Diazepam	40 mg	Should not be used	5 mg
Halazepam	160 mg	40 mg	40 mg
Lorazepam	10 mg	5 mg	2 mg
Oxazepam	120 mg	60 mg	30 mg
Prazepam	60 mg	15 mg	15 mg

1 USP DI, 13th Edition (1994), U.S. Pharmacopeel Convention
2 Guidance to Surveyors - Long Term Cere Menuel
3 Beers MH, Ouslander JG, Rollinger I, Reubeen DB, Brooks J, Beck JC. Explicit criteria for determining inappropriate medicetion use in nursing home residents. Arch Intern Med 1991;151:1825-1832.
4 Shader RI, Greenblatt DJ. Use of benzodiezepines in enxiety disorders. N Engl J Med 1993;328(19):1398-1405.
5 Shorr RI, Robin DW. Rational use of benzodiezepines in the elderly. Drugs & Aging 1994;4(1):9-20.
6 Salzman C (eds). Clinical Geriatric Psychophermecology. Beltimore: Williems end Wilkins, 1992.

Maximum Dosages of Selected Antipsychotics

Drug	Dosing Limits per Day, Adults All Ages[1,6,8,9]	Dosing Limits per Day, Adults Over 65[1,4-9]	OBRA Dosing Limits[2,3]
Acetophenazine	300 mg	400 mg	20 mg
Chlorpromazine	1600 mg	400 mg	75 mg
Chlorprothixene	1600 mg	400 mg	20 mg
Fluphenazine	40 mg	20 mg	5 mg
Haloperidol	150 mg	6 mg	5 mg
Loxapine	250 mg	100 mg	10 mg
Mesoridazine	150 mg	200 mg	25 mg
Molindone	225 mg	100 mg	10 mg
Perphenazine	64 mg	32 mg	8 mg
Phenelzine	90 mg	45 mg	N/A
Piperacetazine	160 mg	80 mg	N/A
Prochlorperazine	150 mg	50 mg	10 mg
Thiothixene	60 mg	30 mg	7 mg
Trifluoperazine	80 mg	20 mg	8 mg
Triflupromazine	200 mg	100 mg	20 mg
Thioridazine	800 mg	300 mg	75 mg

1 USP DI, 13th Edition (1994), U.S. Pharmecopeel Convention
2 Guidence to Surveyors - Long Term Care Menuel
3 OBRA dosing limits ere specific to petients with orgenic brein syndrome.
4 Avorn J, Monene M. Documenting understending end fixing psychoective drug use in the nursing home. In: Rowe JW, Ahronheim JC (eds). Annuel Review of Gerontology end Geriatrics: Focus on Medicetions end the Elderly. New York: Springer, 1992;12:163-182.
5 Ray WA, Federspiel CF, Scheffner W. A study of entipsychotic drug use in nursing homes: Epidemiologicel evidence suggesting misuse. Am J Public Health 1980;70:485-491.
6 Kene JM, Evens DL, Fiester SJ, Mirin SM, Pincus HA, Schetzberg AC, Cole JC, Popper CW. Psychophermacologicel screening criteria. J Clin Psychietry 1992;53:184-196.
7 Selzmen C (eds). Clinical Gerietric Psychophermecology. Beltimore: Williems end Wilkins, 1992.
8 Schwertz JT, Brotman AW. A clinicel guide to entipsychotic drugs. Drugs 1992;44(6):981-992.
9 Beers MH, Ouslender JG, Osterwell D. Physicien eveluation end menegement of nursing home residents. Arch Intern Med 1994;121:584-592.

Maximum Dosages of Selected Antidepressants:

Drug	Dosing Limits per Day, Adults All Ages[1]	Dosing Limits per Day, Adults Over 65[1,3,4]	OBRA Dosing Limits[2]
Amitriptyline	300 mg	Should not be used	N/A
Amoxapine	600 mg	150 mg	N/A
Desipramine	300 mg	150 mg	N/A
Doxepin	300 mg	150 mg	N/A
Imipramine	300 mg	Should not be used	N/A
Maprotiline	300 mg	150 mg	N/A
Nortriptyline	150 mg	100 mg	N/A
Protriptyline	60 mg	30 mg	N/A
Trazodone	600 mg	400 mg	N/A
Trimipramine	300 mg	Should not be used	N/A

1 USP DI, 13th Edition (1994, U.S. Pharmacopeal Convention

2 Guidance to Surveyors - Long Term Cere Manual

3 Beers MH, Ouslander JG, Rollinger I, Reuben DB, Brooks J, Becks JC. Explicit criteria for determining inappropriate medication use in nursing home residents. Arch Intern Med 1991;151:1825-1832.

4 Salzman C (eds). Clinical Geriatric Psychopharmacology. Baltimore: Williams and Wilkins, 1992.

5 Fitten LJ, Morley JE, Gross PL, Petry SD, Cole KD. Depression (UCLA geriatric grand rounds). J Amer Geriatr Soc 1989;37:459-472.

Antidepressant

10. *Amitriptyline, imipramine, protriptyline* and *trimipramine* should not be used with the elderly.

    Applicable standards: F325, F326, F430, F431.

11. *Use of combination antidepressants/antipsychotics such as amitriptyline/perphenazine.*

    Applicable standards: F325, F326, F431.

B. **INFECTION CONTROL**

1. *Use of atypical anti-infective drugs.*

   Applicable standards: F440-A, F441-F447.

2. *Use of four or more anti-infectives within a 60-day period*

   Applicable standards: F343, F440-A, F441-447.

3. *Use of aminoglycosides without a creatinine or BUN test*: Use of aminoglycosides without a creatinine blood level test (CPT-4 code 82565) or BUN test (CPT-4 code 84520 or 84525) taken within 60 days.

   Applicable standards: F430, F431, F440-A.

4. *Use of pediculicides* after seven days following admission to the nursing home.

   Applicable standards: F430, F431, F440-A.

5. *Use of any anti-infectives for greater than 60 days* except when treating osteomyelitis, prostatitis, tuberculosis, endocarditis, or a urinary tract infection.

   Applicable standards: F430, F431, F442, F443.

C. PAIN MANAGEMENT

1. *Propoxyphene* should not be used with the elderly.

   Applicable standards: F430, F431.

2. *Pentazocine* should not be used with the elderly.

   Applicable standards: F430, F431.

3. *Indomethacin* should not be used with the elderly.

   Applicable standards: F430, F431.

4. *Phenylbutazone* should not be used with the elderly.

   Applicable standards: F430, F431.

5. *Muscle relaxants or antispasmodics*, such as cyclobenzaprine, orphenadrine, methocarbamol, and carisprodol should not be used with the elderly.

   Applicable standards: F430, F431.

6. *Concurrent use of nonsteroidal anti-inflammatory drugs (NSAIDs) and histamine-2 antagonists for more than 60 days.*

   Applicable standards: F430, F431.

7. *Concurrent use of two or more nonsteroidal anti-inflammatory drugs for more than 60 days.*

   Examples include: Choline magnesium trisalicylate, diclofenac (Voltaren), diflunisal (Dolobid), extended release ASA (ZorPRIN).

   Applicable standards: F430, F431.

D. **OTHER**

1. *Occurrence of more than 12 drug claims per month* (excluding over-the-counter substances).

   Applicable standards: F430, F431.

2. *Concurrent use of potassium supplements and potassium-sparing diuretics for more than 60 days.*

   Examples include potassium chloride (KCL, K^+10) and hydrochlorothiazide/triamterene (dyazide).

   Applicable standards: F430, F431.

3. *Concurrent use of potassium supplements and ACE inhibitors for more than 60 days.*

   Examples include captopril (Capoten), enalapril (Vasotec), and lisinopril (prinivil, Zestril), and potassium chloride (KCL, K^+10).

   Applicable standards: F295, F430, F431.

4. *Concurrent use of potassium-sparing diuretics and ACE inhibitors for more than 60 days.*

   Applicable standards: F430, F431.

   Examples include hydrochlorothiazide/triamterene (dyazide) and captopril (Capoten), enalapril (Vasotec), and lisinopril (prinivil, Zestril).

5. *Concurrent use of two or more calcium channel-blocking agents for more than 60 days.*

   Examples include: diltiazem (Cardizem), isradipine (DynaCirc), nicardipine (Cardene), nifedipine (Procardia).

   Applicable standards: F430, F431.

6. *Concurrent use of two or more angiotensin-converting enzyme (ACE) inhibitors for more than 60 days.*

   Examples include: captopril (Capoten), enalapril (Vasotec), lisinopril (Prinivil, Zestril).

   Applicable standards: F430, F431.

7. *Concurrent use of two or more histamine-2 antagonists for more than 60 days.*

   Examples include: cimetidine (Tagamet), famotidine (Pepcid), nizatidine (Axid), ranitidine (Zantac).

   Applicable standards: F430, F431.

8. *Use of chlorpropamide* should not be used with the elderly.

   Applicable Standards: F430, F431.

APPENDIX II.2

NUMBER AND BRIEF DESCRIPTION ON EACH OF THE 50 QIs

APPENDIX II.2

NUMBER AND BRIEF DESCRIPTION OF THE FINAL 50 CLAIMS-BASED NURSING HOME QUALITY INDICATORS

QI NUMBER	QI DESCRIPTION
1	Respiratory Infection
2	Skin Infection
3	Sepsis
4	Urinary Tract Infection (UTI)
5	Decubitus Ulcer
6	Nutritional Deficiencies
7	Paralytic Ileus
8	Electrolyte Imbalance
9	Endocrine Disorders such as Diabetic Crisis
10	Fracture of Skull, Neck/Trunk, Upper/Lower Limb
11	Injury
12	External Causes: Cold, heat, immersion, hunger, thirst, exhaustion, motion, and asphyxiation.
13	Attempted suicide
14	Hospitalization
15	Death within 30 days following any of the QIs #1-16.
16	Lack of Therapy
17	Use of antipsychotics
18	Continuous use of antipsychotics for >120 days
19	Long-term sedative use
20	Use of drugs such as long half-life benzodiazepines
21	Use of drugs such as barbituate agents and other selected sedatives
22	Use of anticholingergics
23	Concurrent use of psychoactive drugs for >60 days
24	Concurrent use of psychoactive drugs for >120 days
25	Maximum single doses for some hypnotic drugs
26	Maximum dosage of selected anxiolytics
27	Maximum dosage of selected antipsychotics
28	Maximum dosage of selected antidepressants
29	Use of certain antidepressants (amitriptyline, imipramine, protriptyline and trimipramine)
30	Use of combination antidepressants/antipsychotics
31	Use of atypical anti-infective drugs
32	Use of four or nore anti-infectives within a 60 day period
33	Use of aminoglycosides without a creatinine or BUN test
34	Use of peduculicides after 7 days following a nursing home admission
35	Use of any anti-infectives > 60 days except for treating certain conditions
36	Use of propoxyphene

APPENDIX II.2 (continued)

QI NUMBER	QI DESCRIPTION
37	Use of pentazocine
38	Use of indomethacin
39	Use of phenylbutazone
40	Use of muscle relaxants or antispasmodics
41	Concurrent use of NSAIDS and histamine-2 antagonists for > 60 days
42	Concurrent use of $\geq$ 2 NSAIDS for > 60 days
43	More than 12 drug claims per month, excluding OTCs
44	Concurrent use of potassium supplements and potassium-sparing diuretics for > 60 days
45	Concurrent use of potassium-sparing diuretics and ACE inhibitors for > 60 days
46	Concurrent use of $\geq$ of potassium-sparing diuretics and ACE inhibitors for > 60 days
47	Concurrent use of 2 calicium channel-blocking agents for > 60 days
48	Concurrent use of $\geq$ 2 ACE inhibitors for > 60 days
49	Concurrent use of $\geq$ 2 histimine-2 antagonists for > 60 days
50	Use of chlorpropamide

APPENDIX III

REFINEMENTS TO KLINGMAN AND TUDOR's 1992 LIST OF CLAIMS-BASED NURSING HOME QUALITY INDICATORS

I. Resident Outcomes[1,2,3,4,5,6]

Section A1: Here as in other sections, we have modified control diagnosis to covariant diagnosis, as these covariant diagnoses may be seen as correlated with the quality indicators of interest and will be treated as potential confounders. The term control diagnosis (as in case-control studies) is not relevant here.

We have eliminated the diagnosis of infectious disease as it is redundant with the other diagnoses listed.

To this list of infectious conditions, we have added urinary tract infections which account for a higher incidence of infection than skin infections or sepsis.

Section A2: Under Non-Infectious Conditions, we have eliminated the use of grand mal status epilepticus (since this reflects an acute condition).

To this list we have added endocrine disorders such as hyperthyroidism (242) and diabetes (250).

Section B: We have added a new indicator, hospitalization, to further reflect inpatient stay as a quality indicator.

II. Lack of Therapy

Traumatic hip fracture has been used to replace fracture as a quality indicator. The F-tag list has been expanded, and a covariant diagnosis has been added as well.

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[1] Brooks S, Washaw G, Hasse L, Kues JR: The physician decision making process in transferring nursing home patients to the hospital. Arch Inter Med 1994; 154: 902-908

[2] Libow LS, Starer P: Care of the nursing home patient. New Eng J of Med 1989; 321 (no.2): 93-96

[3] Connelly K, Cohen PK, Walsh DC: Periodic medical review: Assessing the quality and appropriateness of care in skilled nursing home facilities. New Eng J of Med. 1977; 296(no.15): 878-880.

[4] Ouslander JG, Osterwell D: Physician evaluation and management of nursing home residents. Arch Intern Med. 1994; 121: 584-592

[5] Zimmer JG. Needed: Acute care in the nursing home. Patient Care; 59-68. November 30, 1993

[6] Zimmer JG, Eggert GM, Treat A, Bordowa B, Hyg MS: Nursing homes as acute care providers. J Amer Geriatric Soc. 1988; 36: 124-129.

III. Pharmaceutical Treatments[7,8,9,10,11,12]

Section A: The section on Chemical Restraints has been renamed to Psychoactives, in order to better reflect the indications for use of these medications. This section now includes information on Antipsychotics, Sedative-Hypnotics/Antianxiety Drugs, Cross Classes, and Antidepressants.

Section A1: In this section, we have expanded the definition of dementia to include multi-infarct dementia (ICD 290.40) which is not listed.[13,14,15]

Section A2: This criterion is unclear and has been eliminated. Information on the use of antipsychotics in dementia has now been incorporated into A1.

Section A3: This information is now included in indicator A2. In addition, the criterion in this section has been expanded to include all residents taking these medications, and now includes information on dosage reductions and drug holidays in indicator A9.

Section A4: This criterion is very appropriate and represents an important indicator. It has been moved to A7 because it encompasses more than antipsychotics.

Section A5: This criterion may be a little bit too strict, as there are many residents who are maintained on both an antipsychotic agent as well as sedative-hypnotic agents. In a recent study by Beers et al., multiple residents were taking more than one psychoactive medication at one time.[16] This indicator has been moved to A8 and now includes a 120 day interval (instead of 60 days).

Section A6: This section on long-term sedative-hypnotic use is very appropriate and nicely summarized.[17,18,19] This indicator has now been moved to A3, and a new section called Sedative-Hypnotics/Antianxiety Drugs has been added.

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[7] Beers MH, Ouslander JG, Fingold SF, et al. Inappropriate medication prescribing in skilled-nursing facilities. Ann Intern Med. 1992; 117: 684-689.

[8] Avorn J, Gurwitz JG: Principles of pharmacology, in Cassel C, Risenberg (eds). Textbook of Geriatric Medicine. New York: Springer-Verlag, 1990, pp. 66-77.

[9] Avorn J, Monane M: Documenting, understanding and fixing psychoactive drug use in the nursing home. In Rowe JW, Ahronheim JC (eds): Annual Review of Gerontology and Geriatrics: Focus on Medications and the Elderly. New York: Springer, 12: 163-182, 1992.

[10] Beers MH, Ouslander JG, Rollingher I, et al. Explicit criteria for determining inappropriate medication use in nursing home residents. Arch Intern Med. 1991; 151: 1825-1832.

[11] Soumerai SB, Avorn J: Improving medication prescribing and utilization in the nursing home. J Amer Geriatr Soc. 1990; 38: 542-552.

[12] Montamat SC, Cusack BJ, Vestal RE: Management of drug therapy in the elderly. New Eng J of Med. 1989; 321 (no.5): 303-309.

[13] Ibid, pp. 303-309.

[14] Burke, WJ. Neroleptic drug use in the nursing home. The impact of OBRA. AFP 1991; 43 (no.6): 2125-2130.

[15] Ray WA, Griffin MR, Schaffner W, Baugh DK, Mellon LJ. Psychotropic drug use and the risk of hip fracture. New Eng J of Med. 1987; 316: 363-369.

[16] Beers MH, Avorn J, Soumerai SB, Everitt DE, Sherman DB, Salem S: Psychotropic medication use in intermediate-care facility residents. JAMA 1988; 260: 3016-3020.

[17] Shader RI, Greenblatt DJ. Use of nezodiazepines in anxiety disorders. New Eng J of Med. 1993: 328 (19): 1398-1405.

[18] Shorr RI, Robin DW. Rational use of benziodiazepines in the elderly. Drugs & Aging. 1994; 4(1): 9-20.

[19] Monane M. Insomnia in the elderly. J Clin Psychiatry. 1992: 53 (suppl): 23-28.

Section A7: The title of the section should be "Exceeding Recommended Maximum Dose of Psychoactives," and this criterion should be applied to all nursing home residents, not just residents with a previous diagnosis of psychosis. The list of tables marked attachments A, B, C, and D have been modified according to recommendations from the current literature.[20,21] This indicator has now been labeled A10.

Section A9: This criterion on the use of long half-life benzodiazepines is appropriate, and has been moved to A4.

Section A8: Drugs with strong anticholinergic properties should not be used in general in the elderly, so concurrent use is not relevant in the nursing home setting. The indicator A6 reflects this information.

Addendum to Section A: Other psychoactive medications indicators were included.

Under sedative-hypnotics, drugs such as barbiturates should be avoided in the elderly in general. This indicator is A5.

Under the antidepressants, amitriptyline use should be avoided as well (indicator A11) as use of combination antidepressants/antipsychotics such as amitriptyline/perphenazine (indicator A12).

Section B: Infection Control

Section B1: This section includes the use of unusual anti-effective drugs, which have been re-classified as atypical.

Addendum to Section IIIB:

We added quality indicator B5 on oral antibiotics, in which therapy greater than four weeks should be avoided except when treating osteomyelitis, prostatitis, tuberculosis, endocarditis, or urinary tract infection.

Section C: Pain Management with Cancer

Section C1: The use of non-narcotic analgesia in a resident with a pain-prone cancer may not represent poor care, as the resident may not be complaining of pain and the term "pain prone cancer diagnosis" is a relatively subjective one. This indicator has been eliminated.

Section C2: Similar to the issue of non-narcotic analgesia explained above, the presence of one or more claim for meperidine again associated with pain-prone cancer diagnosis does not imply good or poor care: the use of meperidine may be seen in some places where cancer may not be considered "pain prone" or the absence of meperidine use can be found in residents with cancers which are considered "pain prone." The drug is a

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[20] Salzman C (eds). Clinical Geriatric Psychopharmacology. Baltimore, Williams and Wilkins, 1992.

[21] Kane JM, Evans DL, Fiester SJ, et al. Psychopharmacological screening criteria. J Clin Psychiatry. 1992; 53: 184-186.

marker therefore of physician choice and resident characteristics. This indicator has been eliminated.

Addendum to Section IIIC:

Section C has been re-titled "Pain Management" not "Pain Management with Cancer" as this represents an unnecessary sub-classification in evaluating the quality of care in nursing home residents.

We have added information on the use of propoxyphene, in which all use should be avoided as other analgesics are safer and more effective (indicator C1). In addition, the drug pentazocine should be avoided as well as other narcotics are more effective and safer (indicator C2).

Under a subtitle nonsteroidal anti-inflammatory drugs, indomethacin should be avoided due to its powerful prostaglandin inhibitor effects (indicator C3). The drug phenylbutazone should be avoided as well (indicator C4).

Muscle relaxants or antispasmodics such as cyclobenzaprine, orphenidrate, methocarbamol, and carisoprodol should be avoided.[22,23] This information is now delineated in indicator C5.

Section D: Other

Section D1
Section D2:

These sections represent probably the most challenging and controversial areas in drug therapy in the elderly. Section D1 refers to the use of more than six therapeutic classes and Section D2 expresses a related theme in referring to eight drug claims per month. Both these instances may represent either excessive therapy in the elderly, commonly referred to as polypharmacy which is not beneficial to therapeutic outcome and may lead to adverse drug outcomes due to drug-to-drug interactions, versus polymedicine which represents an appropriate use of multiple medications in the elderly due to the presence of multiple concurrent conditions in the same individual. As the goal of these criteria are to set standards which would not lead to excessive alarms, we have increased the number of drug claims to 12 per month (new Indicator D1). In addition, we have eliminated Section D1 as it is difficult to pigeon-hole many drugs into specific drug classes and organize them in consistent fashion.

Section D3: This section on concurrent use of potassium supplements and potassium sparing diuretics is most appropriate (indicator D2) and was expanded to include the concurrent use of potassium supplements with ACE inhibitors (indicator D3) as well as the concurrent use of potassium sparing diuretics and ACE inhibitors (indicator D4).

Section D4: In this section on concurrent use of histamine antagonists and nonsteroidal drugs, there

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[22] Beers MH, Ouslander JG, Rollingher I, et al. pp.1825-1832.
[23] Burke WJ., pp. 2125-2130.

is absolutely no indication for the use of these two medications at the same time. Nonsteroidal anti-inflammatory drugs exert their toxic effects by blocking prostaglandin synthesis and H2 antagonists do little to relieve this effect. An important combination in drug therapy may be the use of nonsteroidal anti-inflammatory drugs and a drug like misoprostol, as this latter agent is able to counteract the prostaglandin inhibition due to the nonsteroidal drug use. This indicator has been moved to the Pain Management Section, indicator C6.

Section D5: In this section on two or more nonsteroidal agents, there is never an indication for concurrent use of two drugs and as mentioned before. Indomethacin should be not be used in the elderly. The statement on NSAID plus sustained release indomethacin is redundant as indomethacin is an NSAID. Use of two NSAIDS has been moved to the Pain Management section, indicator C7.

Section D6 and
Section D7: These sections are very appropriate.

Section D8: This section on concurrent use of ACE inhibitors represents a valuable criterion, as suggested earlier in this review. I would move Section D8 to be closer to Section D3 on potassium supplements and potassium-sparing diuretics. This indicator is now included as indicator D6.

Section D9: In this section on concurrent use of H2 antagonists, there is never an indication for the concurrent use of these two medications for either more or less than 31 days. This indicator is now D7.

Addendum to Section D, OTHER

This section should include information on other medications as outlined below.

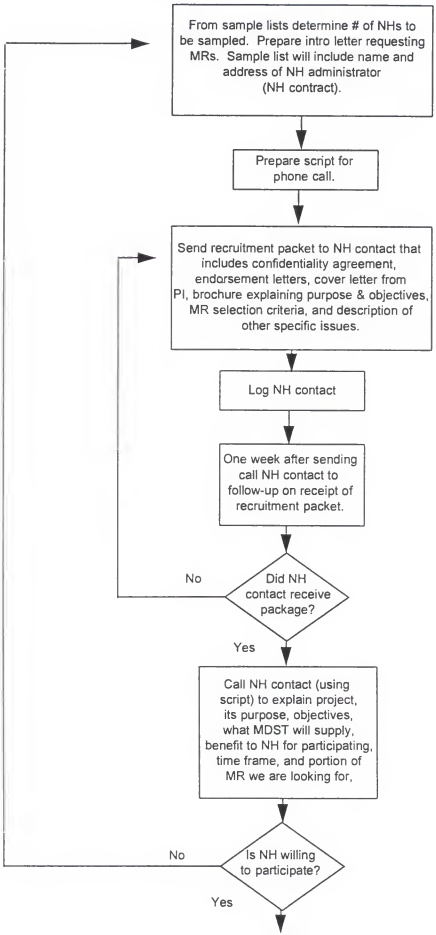
There is no indication for the concurrent use of two calcium-channel blocking agents.

This information is now included in indicator D5.

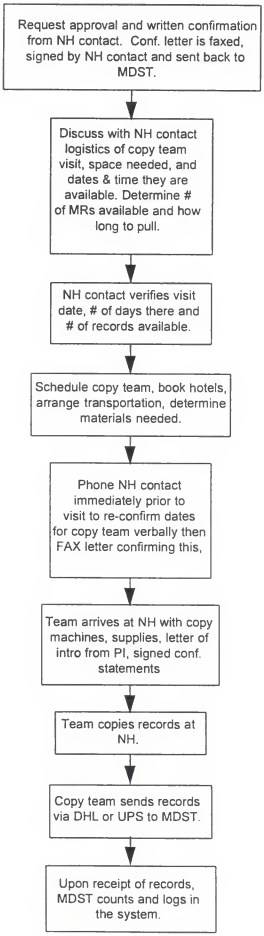
Oral hypoglycemics such as chlorpropamide should be avoided in the elderly. This agent is long-acting, and safer agents are available. This information is included in indicator D8.

APPENDIX IV

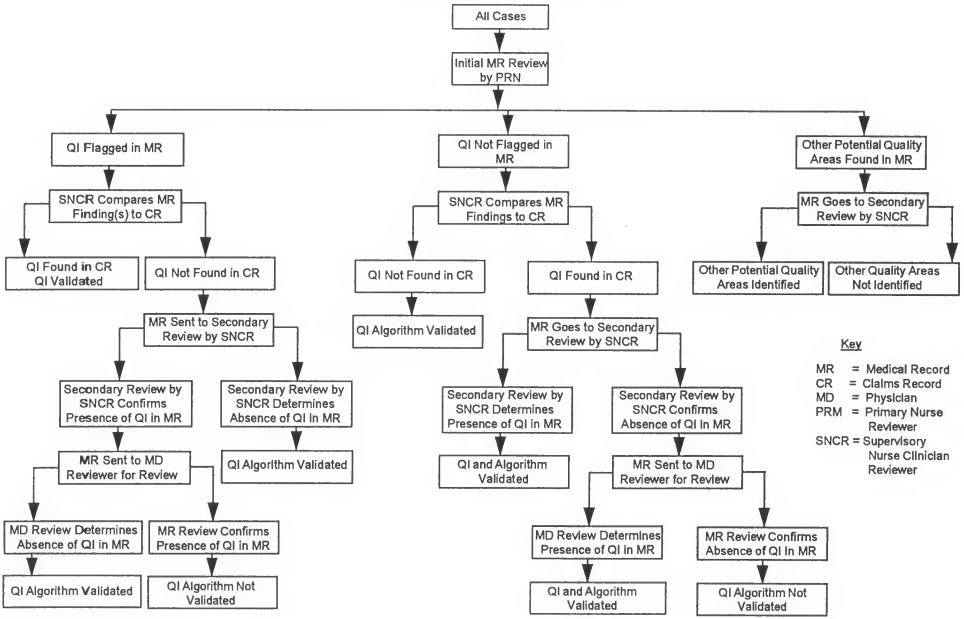
NURSING HOME QUALITY INDICATORS PROJECT
NURSING HOME RECRUITMENT PROCESS



APPENDIX IV (continued)



Appendix V
Medical Record Review Process



Nursing Home Quality Indicator Study
Guidelines for Medical Record Abstraction

July 10, 1995
Revised: September 28, 1995

Sandra Tillisch, R.N., Nurse Clinician
The MEDSTAT Group

The computer program is accessed on the LAN on the P:\ drive. At the C:\ prompt, type P:\ and press <ENTER>. At the P:\ prompt type CD (space) HPR\NHQI\ABSTRACT and press <ENTER>. At the prompt, type MC and press <ENTER>.

The MASTER MENU screen appears as below:

Version: 1.7

NHQI Audit Project

MASTER MENU

Abstract Resident Records
Press "A" or highlight "Abstract Resident Records" & press <ENTER>
Listing / Add Abstracts
Comparison Study Menu
Reports Menu
Maintenance Menu
Display Colors for Monitor
Printer Setup
Information About Program
Set Bell ON/OFF
To turn off any noise , press "S" or highlight "Set Bell" & press <ENTER>
Exit Program
To exit the program, press "X" or highlight "Exit Program" & press <ENTER>

After pressing "A" or highlighting "Abstract Resident Records" & pressing <ENTER> the following box will appear on the screen.

Password Required for this program.

Enter your LAST name:
<ENTER>
Please enter your Password (Your name will appear)
Your Password:
<ENTER>

If you make an error in entering your name or password, re-type it.

Abstract Resident Records

Enter Your Abstractor Code:	**Enter the code number assigned to you <ENTER>**
Enter Your Password:	**Enter the password you have chosen <ENTER>**
Date of Abstraction:	**Computer automatically defaults <ENTER>**
Select Study to Abstract:	**Enter "1" (Computer automatically moves down)**
Record Number to Abstract:	**Enter the record number and press <ENTER>**
Facility Number:	**Computer automatically defaults. Verify that number matches the hospital number on record. If it does not, DO NOT ABSTRACT RECORD. <ENTER>**
State:	**Computer automatically defaults. Verify that state is correct. If it does not, DO NOT ABSTRACT RECORD. <ENTER>**
Social Security Number:	**Computer automatically defaults. DO NOT CHANGE THIS NUMBER EVEN IF IT DOES NOT MATCH THE RECORD. <ENTER>**
Medicaid number:	**Computer automatically defaults. DO NOT CHANGE THIS NUMBER EVEN IF IT DOES NOT MATCH THE RECORD.<ENTER>**

Indicate below if Completing or Reviewing an abstract.
Complete an Abstract (Y/N)
You would enter <Y> for Abstracting a Record.

Reviewing Completed Abstract (Y/N)
Supervisory Review Only (Y/N)

After completing the above steps, a message box will ask if all of the above are correct. If you respond YES, you arrive at the MENU page of the abstraction form.

INVENTORY CHECKLIST

To access the desired section enter the letter (A-P) or highlight the section and press <ENTER>

Section A: DEMOGRAPHIC DATA

Before reviewing ANY of the record, check to see if physician orders are part of the record. If there are no orders, the record is to be EXCLUDED. Write "EXCLUDED" across the front of the face sheet with a brief reason and place the record in a red folder and place in the box found on Meme Barrett's desk.

MEDICAL RECORD NUMBER:
State ID: __ __ CA/GA
Facility ID: __ __ __ (Assigned by MEDSTAT)
Medical record: __ __ __ (Assigned by computer)

If any part of ther record number is incorrect, do not abstract the record. Identify the incorrect part of the number on a yellow sticky and place in the box on Meme Barrett's desk. She will correct the data base and return the record as quickly as possible.

Social Security Number: **(If incorrect, flag the descrepant SS number, make note on the front of the record, and place in box on Meme Barrett's desk after abstracting .)**

Medicaid Number: **(If incorrect, flag the descrepant Medicaid number, make note on the front of the record, and place in box on Meme Barrett's desk after abstracting.)**

1. Birth Date: __ __/__ __/__ __
mm/ dd / yy
(If incorrect, flag the descrepant birth date, make note on the front of the record, and place in box on Meme Barrett's desk after abstracting.)

2. Sex: 1=Male 2=Female 9=No Data

3. Sampled Time Window START date: __ __/__ __/__ __
mm/ dd / yy

4. Sampled Time Window STOP date: __ __/__ __/__ __
mm/ dd / yy

5. Survey Certification Date: __ __/__ __/__ __
mm/ dd / yy

6. Was resident 65 years or older by 12/31/91?
1=Yes 2=No 9=No Data

Response = 2 or 9, record will be excluded

7. Was resident still residing in the facility at the time the medical record was copied?
1=Yes 2=No 9=No Data

END OF SECTION

Section B: HOSPITAL ADMISSIONS-NUMBER

8. Was there a HOSPITAL ADMISSION during the sampled time window?

Respond YES only if hospital admission occurred *EIGHT DAYS OR LONGER after admission* to the Nursing Home

If the resident goes to the ER and then is admitted, this is counted as *BOTH* an ER visit and a hospital admission.

1=Yes 2=No

Response = NO will end section. Go to section D

9. Give number of hospitalizations that occurred during the sampled time window: _____

END OF SECTION

Section C: HOSPITAL ADMISSIONS

When you enter this section the screen below will be present. You will enter all hospital admissions for which the PDX is found on the pick list. As you enter this section you will see the following windows:

DX Given Resident

Code	Dx	Dx Date
	No Records in Database Press any key to continue	

<ENTER>

Screen as it appears after pressing <ENTER>

DX Used

Add Dx from List

List/Edit Resident Dx
Delete Resident Dx
Return to Checklist

To begin entering the diagnosis for the first hospital admission, highlight *"Add Dx from List".*

Dx USED

Add Dx from List

List/Edit Resident Dx
Delete Resident Dx
Return to Checklist

When you have chosen "***Add Dx from list***" you will access the diagnoses listed on the pick list. A pick list of diagnoses will appear on the right hand side of the page.

DX LIST: (As it appears when you choose "*Add a Dx from list*")

590	Abcess, Nephrotic
590	Abcess, Perirenal
595	Abcess, Bladder

You should type the **FIRST TWO LETTERS OF THE DIAGNOSIS** that you want to enter. That will take you to the alphabetical section for that specific diagnosis. You can now scroll through the diagnoses list in that alphabetical section or add another letter from the name of the diagnosis. Verify that the diagnosis is on the list. If the diagnosis is on the list, **highlight the diagnosis and <ENTER>**. For example, if the reason for the hospital admission is a fractured hip, you would enter "Fr" (for fracture) and the following changes would appear on the diagnosis list

DX LIST: (As it appears when you chose "***Add a diagnosis from list***" and type "Fr")

Fracture, femur
Fracture, fibula
Fracture, foot
Fracture, head of femur
Fracture, hip
Fracture, humerus

Highlight the diagnosis (in this example, Fracture, hip) and press <Enter>.

A new pop-up screen will appear with the diagnosis that you have highlighted. You will **enter the admit and discharge date of the hospitalization.**. Be sure that the hospitalization occurred on the EIGHTH DAY OR LONGER following admission to the nursing facility.

Code:
Diagnosis; Fracture, hip
Hospital admission date: __ __/__ __/__ __
mm/ dd/ yy
Hospital discharge date: __ __/__ __/__ __
mm/ dd/ yy

If the diagnosis is not on the pick list, we are **not** interested in collecting information about the hospitalization If there is another hospitalization, repeat the process, entering the admission and discharge date of the hospitalization only if the PDX for that admission is found on the pick list.

After entering the hospitalizations occuring during the sampled time window with diagnoses on the pick list, **highlight the choice *"List/Edit Resident Dx"*.** You should review the list of diagnoses and the date entered, PAYING CAREFUL ATTENTION TO THE YEAR, to be sure that you have included the correct diagnoses and dates.

TO List THE RESIDENT Dx LIST for review:

Highlight *"List/Edit..."* <ENTER>

Add Dx from List

List/Edit Resident Dx
Delete Resident Dx
Return to Checklist

The following is an example of the list that will appear for you to review:

Diagnosis List

Code	Dx	Admit Date	Discharge Date
826	Fracture, hip	3/1/91	3/13/91

If any errors have occurred, the following is the process to either edit a diagnosis or the dates that you have entered.

Highlight "List/Edit... <ENTER>

Add Dx from List

List/Edit Resident Dx
Delete Resident Dx
Return to Checklist

Highlight diagnosis to edit, press <ENTER>, and the following screen will appear:

(You may edit all the information except ***"Diagnosis Code"*** which you will not be able to access.)

Dx Code:
Diagnosis:
Admit date:
Discharge Date:

If any errors have occurred that require deleting a hospitalization from the list because the diagnosis is incorrect or the admission was not within the appropriate time window, the following is the process to delete the entire entry for that diagnosis.

Highlight *"Delete Resident Dx"*... <ENTER>

Add Dx from List

List/Edit Resident Dx
Delete Resident Dx
Return to Inventory Checklist

Highlight the hospitalization that you wish to delete, press <ENTER>, and the message will ask if you want to delete the admission. **Respond YES, press <ENTER>** and hospitalization will be deleted from list.

If the PDX IS NOT ON THE PICK LIST, DO NOT ENTER THE HOSPITALIZATION. Go to next hospitalization that occurred during the sampled time window and repeat the process. When the hospitalization PDX is on the pick list, enter the date of admission and discharge, PAYING PARTICULAR ATTENTION TO THE YEAR THAT YOU HAVE ENTERED.

List hospital admission only if occurred on the eighth day or longer following admission to the nursing facility.

Repeat entry until all hospitalizations are entered

END OF SECTION

Section D: EMERGENCY ROOM VISITS-NUMBER

11. Was there an EMERGENCY ROOM VISIT during the sampled time window?

Respond YES only if emergency room visit occurred *EIGHT DAYS OR LONGER* after admission to the Nursing Home

Respond YES if there is a visit to an URGENT CARE facility

If the resident goes to the ER and then is admitted, this is counted as *BOTH* an ER visit and a hospital admission.

1=Yes 2=No

Response = NO will end section. Go to section F

12. Give the number of EMERGENCY ROOM VISITS that occurred during the sampled time window:_____

END OF SECTION

Section E: EMERGENCY ROOM VISITS

When you enter this section the screen below will be present. You will enter all emergency room visits for which the PDX is found on the pick list. As you enter this section you will see the following windows.

DX Given Resident

Code	Dx	Dx Date
	No Records in Database Press any key to continue	

<ENTER>

Screen as it appears after pressing <ENTER>.

DX Used

Add Dx from List

List/Edit Resident Dx
Delete Resident Dx
Return to Checklist

To begin entering the diagnosis for the first visit to the emergency room, **highlight** ***"Add Dx from List"*** **<ENTER>**.

Dx **USED**

Add Dx from List
List/Edit Resident Dx
Delete Resident Dx
Return to Checklist

When you have chosen "***Add Dx from list***" you will access the diagnosesd listed on the pick list. A pick list of diagnoses will appear on the right hand side of the page.

DX LIST: (As it appears when you choose "*Add a Dx from list*")

590	Abcess, Nephrotic
590	Abcess, Perirenal
595	Abcess, Bladder

You should type the **FIRST TWO LETTERS OF THE DIAGNOSIS** that you want to enter. That will take you to the alphabetical section for that specific diagnosis. You can now scroll through the diagnosis list in that alphabetical section or add another letter from the name of the drug. Verify that the diagnosis is on the list. If the diagnosis is on the list, **highlight the diagnosis and <ENTER>.** For example, if the reason for the emergency room visit is a broken hip, you would **enter "Fr" (for fracture)** and the following changes would appear on the diagnosis list:

DX LIST: (As it appears when you chose "***Add a diagnosis from list***" and type **"Fr"**)

Fracture, femur
Fracture, fibula
Fracture, foot
Fracture, head of femur
Fracture, hip
Fracture, humerus

Highlight the diagnosis (in this example, Fractured) and press <Enter>.

A new pop-up screen will appear with the diagnosis that you have highlighted. You will **enter the date** of the emergency room visit.. **BE SURE THAT THE EMERGENCY ROOM VISIT OCCURRED ON THE EIGHTH DAY OR LONGER FOLLOWING ADMISSION TO THE NURSING HOME.**

Code:
Diagnosis;Fracture, arm
ER Visit Date: __ __/__ __/__ __
MM/ DD/ YY

If the diagnosis is not on the pick list, we are not interested in collecting information about the emergency room visit. If there is another emergency room visit, repeat the process, entering the date of the emergency room visit only if the PDX for that visit is found on the pick list.

After entering the emergency room visits occuring during the sampled time window with diagnoses on the pick list, **highlight the choice "*List/Edit Resident Dx*".** You should review the list of diagnoses and the date entered, **PAYING CAREFUL ATTENTION TO THE YEAR**, to be sure that you have included the correct diagnoses and dates.

TO List THE RESIDENT Dx LIST for review:

Highlight "List/Edit..." <ENTER>

Add Dx from List
List/Edit Resident Dx
Delete Resident Dx
Return to Checklist

The following is an example of the list that will appear for you to review:

Diagnosis GIVEN RESIDENT

Code	Dx	Dx Date
826	Fracture, r	3/3/91

If any errors have occurred, the following is the process to either edit a diagnosis or the date that you have entered.

Highlight "List/Edit... <ENTER>

Add Dx from List
List/Edit Resident Dx
Delete Resident Dx
Return to Checklist

Highlight the diagnosis to edit, press <ENTER>, and the following screen will appear.

You may edit all the information except ***"Diagnosis Code"*** which you will not be able to access.

Dx Code:
Diagnosis:
ER visit date:

If any errors have occurred that require deleting an emergency room visit from the list because the diagnosis is incorrect or the visit was not within the appropriate time window, the following is the process to delete the entire entry for that diagnosis.

Highlight "Delete Resident Dx"... <ENTER>

Add Dx from List
List/Edit Resident Dx
Delete Resident Dx
Return to Inventory Checklist

Highlight the emergency room visit that you wish to delete, press <ENTER>, and the message will ask if you want to delete the visit. **Respond YES, press <ENTER>** and visit will be deleted from list.

If the **PDX IS NOT ON THE LIST, DO NOT ENTER THE VISIT.** Go to the next Emergency room visit and repeat the process. When the visit PDX is on the pick list, enter the date of the visit.

List visit only if occurred on the *EIGHTH DAY OR LONGER FOLLOWING ADMISSION* to the nursing home.

Repeat entry until all emergency room visits are entered

END OF SECTION

LIST OF DIAGNOSES: (Same for Hopital Admission and Emergency Room Visits)

Infectious Condition, includes:

Respiratory, acute problems *(466.0, 480.0-487.8, 507.0)*

Bronchitis, acute
Tracheobronchitis, acute
Pneumonia, viral
Viral Pneumonia
Pneumonia, pneumococcal
Pnuemococcal Pneumonia
Influenza (Flu)

Pneumonitis due to food or vomitus
Pneumonia, aspiration
Aspiration Pnuemonia
Flu (Influenza)
Pneumonia
Bronchopneumonia

Sepsis *(038.0-038.9)* Septicemia

Skin *(680.0-686.9)*

Carbuncle, skin
Furuncle
Cellulitis
Abscess, skin
Lymphadenitis, acute
Impetigo
Pyoderma
Dermatitis, purulent
Dermatitis, septic
Dermatitis, suppurative

Dermatitis, vegetans
Pyogenic granuloma
Granuloma, pyogenic
Granuloma, septic
Granuloma, suppurative
Granuloma, telangiectaticum
Bacterid (pustular)
Ecthyma
Perleche
Fistula of skin
(not from internal organ)

Urinary tract infection

Kidney Infection
pyelonephritis, acute or chronic
pyelitis, acute or chronic
pyonephrosis, acute or chronic
Abscess, renal
Renal Abscess
Abscess, perinephric
Abscess, kidney
Kidney abscess
Abscess, nephritic
Carbuncle, kidney
Abscess, perirenal
Abscess, Urethral
Abscess, bulbourethral gland
Abscess, Littre's gland
Abscess, periurethral
Cellulitis, periurethral
Pyuria

Cystitis, acute or chronic
Cystitis, interstitial, chronic
Interstital Cystitis, chronic
Hunner's Ulcer
Bladder Fibrosis, Panmural
Cystitis, submucous
Abscess, bladder
Cystitis bullous
Bullous Cystitis
Cystitis, Emphysematous
Emphysematous, cystitis
Cystitis, Glandularis
Cystitis, Glandularis
Glandularis cystitis
Abscess, Cowper's gland
Stricture, Infectious Urethral
Bacteriuria

Non-infectious condition, includes:

Fracture

Fracture, Skull
Fracture, Nasal Bone
Fracture, Mandible
Fracture, Jaw
Fracture, Facial Bones
Fracture, Multiple Facial Bone
Fracture, Vertebral Column
Fracture, Multiple Vertebral
Fracture, Cervical spine
Fracture, Dorsal/Thoracic spine
Fracture, Lumbar Spine
Fracture, Sacrum/Coccyx
Fracture, Ribs
Fracture, Sternum
Flail Chest
Fracture, Pelvis
Fracture, Acetabulum
Fracture, Pubis
Fracture, Ilium
Fracture, Ischium
Fracture, Multiple Pelvic
Fracture, Clavicle (Collar Bone)
Fracture, Scapula (Shoulder Blade)
Fracture, Humerus
Fracture, Foot
Fracture, Multiple of leg(s)
Fracture, Spine
Fracture, Radius
Fracture, Ulna
Fracture, Carpal Bone(s)-Wrist
Fracture, arm
Fracture, wrist
Fracture, finger(s) and/or thumb
Fracture, Metacarpal Bone(s)-Hand
Fracture, Phalanges of hand (fingers)
Fracture, Multiple Fracture of hand
Fracture, Multple fractures-Upper Limb
Fracture, Neck of Femur
Fracture, Intracapsular
Fracture, Epiphysis
Fracture, Femur
Fracture, Head of Femur
Fracture, Trochanteric
Fracture, Intertrochanteric
Fracture, Subtrochanteric
Fracture, Hip
Fracture, Knee
Fracture, Patella
Fracture, Tibia
Fracture, Fibula
Fracture, Ankle
Fracture, Toe(s)
Fracture, leg

Ileus

Ileus, Paralytic: (exclude gallstone ileus)
Ileus, Paralytic: (exclude gallstone ileus)
Ileus, Adynamic (exclude gallstone ileus)
Ileus (exclude gallstone & PostOp ileus)
Impaction of the intestine, (colon)
Intestinal Obstruciton

Fluid/Electrolyte Imbalance *(276.0-276.9)*

Hyperosmolality
Hypernatremia
Hyposmolality
Hyponatremia
Acidosis
Alkalosis
Acid/base balance disorder, mixed
Volume depletion
Fluid overload
Dehydration
Hyperpotassemia
Hypopotassemia
Potassium (K) excess
Potassium (K) overload
Hypokalemia
Hypopotassemia
Potassium (K) deficiency
Acidosis, Lactic
Hypochloremia
Hyperchloremia
Sodium (NA) excess
Sodium (NA) overload
Sodium (NA) deficiency
Hypovolemia
Fluid Retention
Potassium (K) intoxication

Endocrine disorders

Diabetic crisis
Ketoacidosis,diabetic
Diabetic Ketoacidosis
Acidosis, diabetic *(250.10, 250.11)*
Diabetic Acidosis
Ketosis, diabetic
Hypersmolar Coma, diabetic
Nonketotic Coma
Coma, diabetic with Ketoacidosis
Coma, diabetic

Diabetic Coma
Coma, Hypoglycemic *(251.0)*
Hypoglycemic Coma
Coma, Insulin
Insulin Coma
Thyrotoxic Crisis
Crisis, Thyrotoxic
Thyrotoxic Storm
Storm, Thyrotoxic

Nutritional deficiencies

Kwashiorkor (protein malnutrition)
Nutritional marasmus
Nutritional atrophy
Calorie Deficiency, Severe
Malnutrition
Malnutrition, Protein-Calorie
Vitamin A deficiency
Deficiency, Vitamin A
Thiamin Deficiency
Deficiency, Thiamin
Niacin Deficiency
Deficiency, Niacin
Beriberi
Pellagra
B-complex component deficiency

Deficiency,B-complex component
Ariboflavinosis
Ascorbic Acid Deficiency
Deficiency, Ascorbic acid
Scurvy
Vitamin D Deficiency
Deficiency, Vitamin D
Rickets
Osteomalacia
Vitamin K deficiency
Deficiency, Vitamin K
Vitamin Deficiency
Deficiency, Vitamin
Mineral Deficiency
Deficiency, Mineral

Injury

Frostbite, any area of body
Hypothermia *(991.0-992.9, 994.1-994.8)*
Heat Stroke
Sunstroke
Heat Syncope
Heat Cramps
Heat Exhaustion
Heat Fatigue
Heat Edema
Lightning, Effects of

Drowning
Submersion, nonfatal
Starvation
Exhaustion due to exposure
Asphyxiation *(991.0-992.9, 994.1-994.8)*
Suffocation
Electrocution
Suicide
Suicide attempted *(E950.0-E959)*
Self-inflicted Injury

Injury: Dislocation or tear (830.0-959.9)

Dislocation, jaw
Dislocation, shoulder
Dislocation, wrist
Dislocation, finger
Dislocation, hip

Dislocation, knee
Dislocation, ankle
Dislocation, foot
Dislocation, vertebra
Tear, Cartilage or meniscus

Injury: Sprain/strain (830.0-959.9)

Strain, shoulder&/upper arm
Sprain, shoulder&/upper arm
Strain, elbow &/forearm
Sprain, elbow &/forearm
Strain, wrist &/hand
Sprain, wrist &/hand
Strain, hip &/thigh
Sprain, hip&/thigh
Strain, knee &/leg
Sprain, knee &/leg
Strain, ankle&/foot
Sprain, ankle&/foot
Strain, sacroiliac region
Sprain, sacroiliac region
Strain, neck
Sprain, neck
Strain, back
Sprain, back
Strain, jaw
Sprain, jaw
Strain, rib
Sprain, rib
Sprain, chondrocostal (joint)
Strain, pelvis
Sprain, pelvis

Injury: Head Injury

Concussion
Cerebral Lacereation
Cerebral Contusion
Laceration, cerebral
Contusion, cerebral
Head Injury

Injury: Brain Injury

Intracranial injury
Subarachnoid hemorrhage after injury
Subdural hemorrhage after injury
Extradural hemorrhage after injury
Intracranial hemorrhage after injury
Brain Injury

Internal injury of chest, abdomen, pelvis (830.0-959.9)

Pneumothorax, traumatic
Hemothorax, traumatic
Injury (traumatic), Heart
Injury (traumatic), Lung
Injury (traumatic), Intrathorax
Injury (traumatic), Diaphragm
Injury (traumatic), Bronchus
Injury (traumatic), Esophagus
Injury (traumatic), Stomach
Injury (traumatic), GI Tract
Injury (traumatic), Small Intestine
Injury (traumatic), Duodenum
Injury (traumatic), Colon
Injury (traumatic), Rectum
Injury (traumatic), Pancreas
Injury (traumatic), Liver
Injury (traumatic), Spleen
Injury (traumatic), Kidney
Injury (traumatic), Bladder
Injury (traumatic), Urethra
Injury (traumatic), Ureter
Injury (traumatic), Uterus
Injury (traumatic), Gallbladder
Injury (traumatic), Bile Duct
Injury (traumatic), Peritoneum
Injury (traumatic), Retroperitoneum
Injury (traumatic), Intra-Abdominal

Injury: Miscellaneous

Injury, Amputation (Traumatic)
Traumatic Amputation
Amputaion, traumatic
Puncture Wound
Laceration
Animal Bite
Injury (traumatic), Blood Vessel

Section F: DEATH

This section will be answered only if there was a hospital admission or ER visit during the sampled time window.

14. Was there death **within 30 days** following **ANY** HOSPITAL ADMISSION or ER VISIT during the sampled time window?
    1=Yes, admission or visit with PDX on pick list
    2=No
    3=Yes, admission or visit PDX **NOT** on pick list

Response = NO will end section

15. Give date of death: __ __/__ __/__ __
    mm/ dd / yy (01/01/01 = date not available)

16. Is cause of death listed: 1=Yes 2=No

17. List cause of death: (50 characters)

Do NOT include cardiac failure as cause of death unless resident died following an acute cardiac episode or had congestive heart failure. Do NOT include diagnoses preceeded by "possible, questionable, R/O" unless you have confirmed it with the supervisor.

END OF SECTION

Section G: CO-MORBID CONDITIONS

18. Enter ALL ***ACTIVE*** **DIAGNOSIS/CONDITIONS** that are documented during the **study time frame** and are **found on the pick list**. If the diagnosis is not on the pick list, we are not interested.

If on the pick list, enter the date of diagnosis. Use the date of beginning of the sampled time window if the diagnosis is present at that time. If the diagnosis is made during the sample time window, use that date. If the diagnosis is made after the final date of the sampled time window, do NOT include the diagnosis. A history of cancer should NOT be entered as CANCER unless the disease is still active.

Additional DIAGNOSIS/CONDITIONS: (Pick List)

Adhesion, peritoneal
Affective disorders
AIDS
Alzheimer's Disease (331.0)
Amnestic syndrome (294.0)
Arteriosclerotic dementia
Bipolar affective disorders
Bronchitis, chronic
Bronchitis, asthmatic
Cancer
Cerebral degeneration (331.9)
Chronic organic brain syndrome (294.8)
Coma
Congestive heart failure
COPD
Delirium
Dementia (294.1)
Depressive disorders
Diabetes
Emphysema
Endocarditis
Gangrene
Hemiplegia
HIV
Jakob-Creutzfeldt disease
Manic disorders
Multi-infarct dementia (290.40)
Organic brain syndrome (294.9)
Organic personality syndrome (310.1)
Organic Psychotic Conditions
Osteoporosis
Osteomyelitis
Paralysis
Paranoid disorders
Paraplegia
Peripheral vascular disease
Pick's disease of the brain (331.0)
Presenile dementia
Prostatitis
Psychosis
Quadriplegia
Renal failure
Schizophrenia
Senile degeneration of brain (331.2)
Senile dementia
Tuberculosis
Urinary tract infection

END OF SECTION

Section H: LACK OF THERAPY

19. Did the resident have any of the following just prior to or during the sampled window?
Amputation of leg and/or foot
CVA
Hip Fracture
Amputation of arm and/or hand

1=Yes 2=No

Respond YES if the resident was admitted or returned to the nursing home following the occurrence of any of the above during the sampled time window.

Response = NO will end section

20. Date of ADMISSION or RETURN to nursing home after incident:
__ __/__ __/__ __
mm/ dd/ yy (01/01/01 = no date available)

21. Did the resident receive **OUTPATIENT** speech therapy, occupational therapy or physical therapy or an evaluation for therapy within **30 days** of admission or return to the nursing home?
1=Yes, outpatient therapy or evaluation performed within 30 days
2=No

22. Give date of first evaluation for therapy or therapeutic encounter: __ __/__ __/__ __
mm/ dd/ yy

END OF SECTION

Section I: MEDICATIONS GIVEN

23. Were any medications found on the picklist prescribed or given during the time sample window?

1=Yes 2=No 9=No Data

Respond NO DATA only if no physician orders or medication sheets present in record

Response = 2 or 9 will end section. Go to section K

24. Used for medication list.

END OF SECTION

Section J: MEDICATIONS

When you enter this section the screen below will be present. You will enter medications given to the resident in the nursing home during the sampled time window; including PRN drugs, that are found on the pick list. **DO NOT INCLUDE MEDICATIONS GIVEN DURING ANY HOSPITALIZATION OR EMERGENCY ROOM VISIT UNLESS THE DRUG WAS CONTINUED TO BE ADMINISTERED IN THE NURSING HOME. ENEMAS, AND ORAL LIQUID NUTRITIONAL SUPPLEMENTS GIVEN PER PEG, NG TUBE, OR ORALLY ARE TO BE EXCLUDED.**

As you enter this section you will see the following windows.

Screen as it appears when you enter section

MEDS USED

Add Drug from List
Add Drug NOT on List
List/Edit Resident Drugs
Delete Resident Drug
Return to Inventory Checklist

DRUGS GIVEN RESIDENT

Name	Dose	Frequency	PRN given	Start date	Stop date

No Records in Database
Press any key to continue

General Rules for Entering Medications

1. Go to the physician orders that are closest to the beginning of the sampled time window.

2. Begin entering the drugs with the earliest start date.

3. The start date is the date ordered to be given, not the date first given.

4. If the start date of the drug is **prior** to the sampled time window, use the **beginning date** of the **sampled time window as** the start date. For example, if the drug was first ordered 7/12/90 and the sampled time window is 12/20/90-6/20/91, the start date for that drug would be 12/20/91.

5. If the drug is **not** discontinued prior to the last day of the sampled time window, use the **end date** of the **sampled time window** for the stop date. For example, if the drug is discontinued on 7/4/91 and the sampled time window is 12/20/90-6/20/91, the stop date for that drug would be 6/20/91.

6. If the resident dies during the sampled time window be sure that you use that date as the stop date and NOT the final day of the sampled time window.

7. If you find an order to discontinue a medication but the order is not dated, use 01/01/01. If you can determine the month and year but not the day, use" 01" for the missing date.

8. Use the specific dose if available. For example, if aspirin is ordered in 5 grain tablets and the physician orders 2 tablets to be given, record the dose as 10 grains rather than 2 tablets.

9. Do NOT enter PRN drugs unless they are on the pick list.

10. PRN Drugs: an additional piece of information is required concerning whether the PRN drug was **given continuously**. If given **continuously for more than 60 days respond 1,** if given **sporadically or continuously for 60 days or less, respond 2=No,** if given **continuously for more than 90 days respond 3,** if given **continuously for more than 120 days respond 4**.

11. If a drug is given routinely, e.g., b.i.d., and ordered PRN, enter the drug as a routine order (b.i.d.), NOT PRN.

12. Do not include medications given during any hospitalization or emergency room visit unless the drug was continued to be administered in the nursing home.

13. **EXCLUDE** enemas and oral liquid nutritional supplements given per PEG, NG tube, or orally.

14. If two drug names are listed in one order, use a drug book to determine if the physician order lists both the generic and trade name or is actually ordering two different drugs to be given.

15. Please **CHECK OFF THE DRUGS ON THE MD ORDERS** as you enter them into the database to avoid duplication or missing a drug.

To begin entering the drugs ordered for the resident, **highlight *"Add Drug from List"***.

MEDS USED

Add Drug from List
Add Drug NOT on List
List/Edit Resident Drugs
Delete Resident Drug
Return to Inventory Checklist

When you have chosen "***Add a Drug from List***" you will access the drugs listed on the pick list.

A pick list of drugs will appear on the right hand side of the page.

DRUG LIST: (As it appears when you choose "***Add a drug from list***")

00812	4-Way Cold Tablet
00404	5-FC
00559	A-200 Pyrinate
00003	Acetophenazine Maleate

You should type the **FIRST TWO LETTERS OF THE DRUG** that you want to enter. That will take you to the alphabetical section for that specific drug. You can now scroll through the drug list in that alphabetical section or add another letter from the name of the drug. Verify that the drug is on the list, **highlight that drug and <ENTER>.** For example, if the physician ordered Vistaril for the resident you would enter **"VI"** and the following changes would appear on the drug list

DRUG LIST: (As it appears when you choose "***Add a drug from list***" and type "VI")

Vibra-Tabs
Vibramycin
Vistacon
Vistaject
Vistaquel
Vistaril

Highlight the drug (in this example, Vistaril) and press <Enter>.

A new pop-up screen will appear.

Drug Time, Dose, Units, Method, Date

Drug Code:	An automatic computer default.
Drug Name:	Should be the name of the drug you chose.
Dose Size:	Enter the dose ordered by the physician. Do NOT use tablet as a designation if there is a specific dose (e.g., mg or mEq). If no specific dose is given, e.g., one tablet ordered with no specific dose, enter "9" until reaching the decimal. Leave the space to the right of the decimal zero filled.

If drug given as an admixture, calculate mg/cc to report dose. Divide the mg of the drug ordered by the number of cc's of the solution in which the drug is to be diluted. Then calculate the mg/cc. If the drug is to be given IV piggy back or IV bolus (IVPB) it is not necessary to calculate the dose/cc.

Unit Code:	Choose the appropriate unit, e.g., mg, teaspoon, tablet. There is a pop-up screen that you can access by pressing ENTER. This screen lists the options available.
Method Code:	Choose the appropriate method, e.g., oral, injectable, suppository . There is a pop-up screen that you can access by pressing ENTER. This screen lists the options available.
Frequency:	Choose the appropriate frequency, e.g., bid, q4h. There is a pop-up screen that you can access by pressing <enter>. This screen lists the options available.
Start date:	Enter the date ordered to be given by the physician.
Stop date:	Enter the date ordered to be discontinued by the physician

ENTER NEW START AND STOP DATE WITH EVERY DOSE CHANGE AND EVERY TIME THE DRUG IS STOPPED AND RESTARTED.

PRN Given Cont. (Continuously): This item asks if a PRN drug was given continuously between the start and stop date. Response options are 1 = >60 days, 2= No or 60 days or less, 3=>90 days, and 4=>120 days.

Below are the pop-up screens that list the choices available.

Unit Choices

1 mcg
2 mg
3 ml/cc
4 mEq
5 Gram
6 Teaspoon or tablespoon
7 Puff / inhalation
8 Tablet
9 Not specified or grain or units or not otherwise included in the above list

Method Choices

1 Oral (PO) / sublingual
2 Nebulizer / updraft / aerosol **(Nebulizer abbreviations: HHN, SVN)**
3 Metered dose inhaler/inhaler
4 Injectable (IM, subcutaneous, sq, sc)
5 Drops
6 IV **(includes drip, continuous, IVPB)**
7 Topical
8 Suppository
9 Not specified or not otherwise listed above

Frequency Choices

1 qd / q24h **Use if drug given one time only**
2 bid / q12h
3 tid / q8h
4 qid / q6h
5 Weekly
6 2-6 days per week
7 Monthly
8 Every other day (qod)
9 PRN

TO List THE RESIDENT DRUG LIST for review:

Highlight "List/Edit..." <ENTER>

Add Drug from List
Add Drug NOT on List
List/Edit Resident Drugs
Delete Resident Drug
Return to Inventory Checklist

The following is an example of the list that will appear for you to review:

DRUGS GIVEN RESIDENT

Code	Name	Time	Dose	Units	Method
826	Decadron Respihaler	1220	1.00	mcg	Nebulizer Updraft

If any errors have occurred, the following is the process to either edit a drug that you have entered.

Highlight "List/Edit... <ENTER>

Add Drug from List
Add Drug NOT on List
List/Edit Resident Drugs
Delete Resident Drug
Return to Inventory Checklist

Highlight drug to edit, press <ENTER>, and the following screen will appear:

You may edit all the information except **"Drug Code"** which you will not be able to access.

Drug Code:
Drug Name:
Dose Size:
Unit Code:
Method Code:
Frequency:
Start date:
Stop date:
PRN given cont.:

When editing drug entry, use the guidelines to determine responses to Unit, Method, Frequency choices. You will not be able to access the pop-up screens in the edit mode.

If any errors have occurred that require deleting a drug from the list, the following is the process to delete the entire entry for that drug.

Highlight "Delete Resident Drug"... <ENTER>

Add Drug from List
Add Drug NOT on List
List/Edit Resident Drugs
Delete Resident Drug
Return to Inventory Checklist

Highlight drug to delete, press <ENTER>, and message will ask if you want to delete the drug. **Respond YES, press <ENTER>** and drug will be deleted from list.

Medications Included on the Drug List:

Pick list of antipsychotics (B + BI):

acetophenazine maleate
chlorpromazine hydrochloride
chlorprothixene
clozapine
Clozaril
droperidol
Etrafon
fluphenazine
Haldol
haloperidol
Haloperon
Inapsine
Innovar
loxapine
Loxitane
Mellaril
mesoridazine besylate
Moban
molindone hydrochloride
Navane
Orap
Permitil
perphenazine
pimozide
prochlorperazine
Prolixin
promazine hydrochloride
Serentil
Sparine
Stelazine
Suprazine
Taractan
thioridazine hydrochloride
thiothixene or thiothixene hydrochloride
Thor-Pram
Thorazine
Tindal
Triavil
trifluoperazine hydrochloride
Trilafon

List of sedative-hypnotics: (C + CD + CE)

4-Way Cold Tablets
Allent
Alurate
amobarbital
Amytal
aprobarbital
Aquachloral Supprettes
Atrohist
Barbased
Barbita
Benadryl
Brexin
Bromarest
Bromfed
brompheniramine maleate
Bufferin AF Nite-Time
BuSpar
buspirone hydrochloride
butabarbital sodium
Butalan
Buticaps
Butisol
Cerose
Chlorafed
chloral hydrate
chlorpheniramine
Codimal
Comhist
Comtrex
Dallergy
Dalmane
Deconamine
dexchlopheriramine maleate
Dimetane
diphenhydramine
Donatussin
Doral
Doriden
Doriglute
Dristan
Drize
Dura-Tap
Dura-Vent
Durapam
Dytuss
Endal-HD
estazolam
ethchlorvynol
Excedrin PM
Extendryl
flurazepam hydrochloride
glutethimide
Halcion
Histafed

List of sedative-hypnotics continued: (C + CD + CE)

Histamic
Histor-D
Histussin
Hycomine
Kronofed-A
Levoprome
methotrimeprazine hydrochloride
methyprylon
midazolam hydrochloride
Mitran
Naledcon
Nembutal
Noctec
Nolamine
Noludar
Novafed A
Novahistine DH
Ornade Spansule
Par-Decon
paraldehyde
PediaCare
Pediacof
pentobarbital sodium
phenobarbital sodium
Placidyl
Polaramine
Poly-Histine
Protid
quazepam
Quelidrine
R-Tannate
Reposans
Restoril
Rhinolar
Ru-Tuss
Rynatan
Rynatuss
Sarisol No. 2
secobarbital sodium
Seconal Sodium
Sereen
Sinulin
Solfoton
Teldrin
Temaz
temazepam
Tri-Barbs
triazolam
Triotan
Tuinal
Tussar DM
Tussionex Extended Release
Tylenol Allergy-Sinus
Tylenol Cold
Tylenol Cold Night Time
Tylenol PM Extra Strength
Unisom Dual Relief Night-time
Vanex Forte
Vanex HD
Versed

List of antianxiety drugs (G + GD + GE)

alprazolam
Alzapam
Anxanil
Atarax
Ativan
Atozine
Centrax
chlordiazepoxide
Chlordiazepoxide & Amitriptyline
clorazepate dipotassium
diazepam
Diazepam Intensol
Durrax
E-Vista
Equagesic
Equanil
Gen-Xene
halazepam
Hy-Pam
Hydroxacen
hydroxyzine (hydrochloride, pamoate)
Hyzine-50
Librax
Libritabs
Librium
Limbitrol
Loraz
lorazepam
Meditran
meprobamate
Menrium
Meprospan
Milprem
Miltown
Neuramate
oxazepam

List of antianxiety drugs (G + GD + GE)

Paxipam
PMB
prazepam
Q-Pam
Quiess
Sedabamate
Serax
Tranmep
Tranxene (SD, T-Tab)
Valium
Valrelease
Vamate
Vazepam
Vistaject
Vistakon
Vistaquel
Vistaril
Vistazine
Xanax
Zetran

List of Antidepressants (F + FH + FI)

Adapin
Amitril
amitriptyline hydrochloride
amoxapine
Anafranil
Asendin
Aventyl
bupropion hydrochloride
clomipramine hydrochloride
desipramine hydrochloride
Desyrel
doxepin hydrochloride
Elavil
Emitrip
Endep
Enovil
fluoxetine hydrochloride
imipramine hydrochloride
isocarboxazid
Janimine
Limbitrol
Ludiomil
maprotiline hydrochloride
Marplan
Nardil
Norpramin
nortriptyline hydrochloride
Pamelor
Parnate
Pertofrane
phenelzine sulfate
protriptyline hydrochloride
Prozac
Sinequan
Surmontil
Tofranil
tranylcypromine sulfate
trazodone hydrochloride
Trazon
Trialodine
trimipramine maleate
Tipramine
Vivactil
Wellbutrin

List of benzodiazepines (GD + CD)

chlordiazepoxide
Dalmane
diazepam
flurazepam
Librium
Valium

List of meprobamate (GE)

Deprol
Equagesic
Equanil
Meditran
Meprospan
Milprem
Miltown
Neuramate
PMB
Sedabamate
Tranmep

List of barbiturates (CE):

Alurate
amobarbital
Amytal
aprobarbital
Barbased
Barbita
butabarbital
Butalan
Buticaps
Butisol
Nembutal
pentobarbital
phenobarbital
Sarisol No. 2
secobarbital
Seconal
Solfoton

List of Amitriptyline, Imipramine, Protriptyline, Trimipramine (FH)

Amitril
amitriptyline
Elavil
Emitrip
Endep
Enovil
Etrafon
imipramine
Janimine
Limbitrol
protriptyline
Surmontil
Tipramine
Tofranil
Triavil
trimipramine
Vivactil

List of anticholinergics (J)

Anaspaz
anisotropine methylbromide
Antispas
Antrenyl
atropine sulfate
Banthine
Barbidonna
Belladenal
belladonna leaf
Belladonna
Bellafoline
Bemote
Bentyl
Buscopan
Byclomine
Cantil
Chardonna
clidinium bromide
Cystospaz
Darbid
Daricon
Dibent
dicyclomine hydrochloride
Di-Cyclonex
Dilomine
Di-Spaz
Donnata
glycopyrrolate
hexocyclium methylsulfate
hyoscyamine
isopropamide iodide
Kinesed
levorotatory alkaloids of belladonna
Levsin
Levsinex Timecaps
Librax
mepenzolate bromide
methantheline bromide
methscopolamine bromide
Neoquess
Neoquess Injection
Norpanth
Or-Tyl
oxyphencyclimine hydrochloride
oxyphenonium bromide
Pamine
Pathilon
Pro-Banthine
propantheline bromide
Quarzan
Robinul
scopolaminee)
Spasmoject
Tral Filmtabs
tridihexethyl
Valpin
Vistrax

Atypical anti-infective drug list (LK):

aminosalicylate sodium
Capastat
capreomycin sulfate
cycloserine
DOW-Isoniazid
ethambutol hydrochloride
ethionamide
isoniazid
Laniazid
Myambutol
Nydrazid
pyrazinamide
Rifadin
Rifamate
rifampin
rifampin/isoniazid
Rimactane
Rimactane/INH
Seromycin
Trecator-SC
Urobiotic

Anti-Infectives Drug List (L + LK):

5-FC
Achromycin
Aerosporin
Amcill
amdinocillin
amikacin sulfate
Amikin
aminosalicylate sodium
amox tr/k clavulanate
amoxicillin
Amoxil
amphotericin B
ampicillin
Ancef
Ancobon
Anspor
Augmentin
Azactam
Azlin
azlocillin sodium
Azo Gantanol
Azo Gantrisin
Azo Sulfisoxazole
aztreonam
Azulfidine (EN-tabs)
bacampicillin hcl
Bactocill
Bactrim
Beepen-VK
Betapen-VK
Biaxin
Bicillin L-A
Biltricide
Bristacycline
Capastat
capreomycin sulfate
carbenicillin
Ceclor
cefaclor
cefadroxil monohydrate
Cefadyl
cefamandole nafate
cefazolin sodium
cefixime
Cefizox
cefmetazole sodium
Cefobid
cefonicid sodium
cefoperazone sodium
ceforanide
Cefotan
cefotaxime sodium
cefotetan disodium
cefoxitin sodium
ceftazidime
Ceftin
ceftizoxime sodium
ceftriaxone sodium
cefuroxime
cephalexin monohydrate
cephalothin sodium
cephapirin sodium
cephradine
chloramphenicol
Chloromycetin (Palmiate)
chloroquine
Cinobac
cinoxacin
Cipro
ciprofloxacin
Claforan
clarithromycin
Cleocin
clindamycin
clofazimine
clotrimazole
cloxacillin sodium
Cloxapen
co-trimoxazole
colistimethate sodium
colistin sulfate
Coly-Mycin M
Coly-Mycin S
Cotrim
Crysticillin
cyclacillin
Cyclopar
cycloserine
Cystex
D-Amp
Dalacin C Phosphate
Declomycin
demeclocycline hydrochloride
dicloxacillin sodium
Diflucan
DOW-Isoniazid
Doxy
Doxy-Lemmon
Doxy-Tabs
Doxychel
doxycycline
Duracillin A.S.
Duricef
Dycill

Anti-Infectives Drug List continued (L + LK):

Dynapen
E.E.S.
E.P. Mycin
E-Mycin
eflornithine hydrochloride
emetine hydrochloride
Ery-Tab
Eryc
Erypar
EryPed
Erythrocin
erythromycin
erythromycin/sulfisoxazole
ethambutol hydrochloride
ethionamide
Flagyl
Floxin
fluconazole
flucytosine
Fortaz
Fulvicin P/G
Fungizone
Furadantin
Furalan
Furan
Furanite
furazolidone
Furoxone
Gantanol
Gantrisin
Garamycin
Gentafair
gentamicin sulfate
Geocillin
Geopen
Gris-PEG
Grisactin Ultra
griseofulvin
hetacillin potassium
Hexalol
Humatin
Ilosone
Ilotycin
imipenem/cilastatin sodium
iodoquinol
isoniazid
Jenamicin
kanamycin sulfate
Kantrex
Keflet
Keflex
Keflin
Keftab
Kefurox
Kefzol
Kesso-Tetra
ketoconazole
Klebcil
Lamprene
Laniazid
Ledercillin VK
Lincocin
lincomycin hydrochloride
Lipo Gantrisin
Macrodantin
Mandameth
Mandelamine.
Mandol
Mebiquine
Mefoxin
Megacillin
meth/benz acid/salol/atp/hyos
meth/me blue/ba/salol/atp/hyos
meth/me blue/salol/sodium/hyos
meth/meth blue/salol/ca/hyoscy
methacycline hydrochloride
methenamine
methenamine/hyoscyamine
methenamine/phenazopyridine
methenamine/sal-amide/bella
methenamine/salol/atrop
methenamine/sodium biphosphate
methenamine/sodium phosphate
methicillin sodium
methionine
Metizol
metronidazole
Metryl
Mezlin
mezlocillin sodium
miconazole
Microsulfon
Minocin
minocycline hydrochloride
Monistat
Monocid
moxalactam disodium
Moxam
Myambutol
Mycifradin
Mycostatin
Nafcil
nafcillin sodium
nalidixic acid

Anti-Infectives Drug List continued (L + LK):

Nallpen
Nebcin
NebuPent
NegGram
neomycin sulfate
netilmicin sulfate
Netromycin
Nilstat
Nitrofan
nitrofurantoin
Nizoral
Nor-Tet
norfloxacin
Noroxin
novobiocin sodium
Nydrazid
nystatin
Nystex
ofloxacin
Omnipen
Ornidyl
oxacillin sodium
oxy-tcn/sulfamethiz/azo
oxytetracycline
oxytetracycline hydrochloride
Panmycin
paromomycin sulfate
Pathocil
PCE Dispersatabs
Pediamycin
Pediazole
pen g procaine/pen g benz
pen g procaine/probenecid
Pen Vee K,
Penamp 500
Penapar VK
penicillin g
penicillin v potassium
Pentam 300
pentamidine isethionate
Pentids
Pfizerpen
Pfizerpen-AS
piperacillin sodium
Pipracil
Polycillin
polymyxin b sulfate
praziquantel
Precef
Primaxin
Principen
Principen with Probenecid
Principen-500
Proloprim
Prostaphlin
Protostat
Pyopen
pyrazinamide
Renoquid
Rifadin
rifampin
rifampin/isoniazid
Rimactane
Robicillin VK
Robimycin
Robitet
Rocephin
Sarocycline
SAS (Enteric)
Septra
Seromycin
SMZ-TMP
spectinomycin dihydrochloride
Spectrobid
Staphcillin
streptomycin sulfate
Suldiazo
sulfacytine
sulfadiazine
sulfamethizole
sulfamethizole/phenazopyridine
Sulfamethoprim
sulfamethox/phenazopyridine
sulfamethoxazole
sulfamethoxazole/trimethoprim
sulfapyridine
sulfasalazine
sulfathiazole
sulfisoxazole
sulfisoxazole/phenazopyridine
Sulmeprim
Sumycin
Suprax
Tao
Tazicef
Tazidime
Teebacin
Tegopen
Terramycin
Tetracap
tetracycline
Tetracyn
Tetralan
Thiacide

Anti-Infectives Drug List continued (L + LK):

Thiosulfil
Ticar
ticarcillin
ticarcillin/tobramycin sulfate
Timentin
Totacillin
Trac Tabs
Trecator-SC
trimethoprim
Trimox
Trimpex
Triple Sulfa
trisulfapyrimidines
Trobicin
troleandomycin
Ultracef
Unasyn
Unipen
Urex
Urisedamine
Uro-phosphate
Uroplus
Uroquid-Acid
Utimox
V-Cillin K
Vancocin
vancomycin hydrochloride
VC-K
Velosef
Versapen
Vibra-Tabs
Vibramycin
VoSol Otic
Wyamycin
Wycillin
Wymox
Yodoxin
Zefazone
Zinacef

Aminoglycoside drug list (drugs found on the anti-infective list (L):

amikacin
Amikin
Garamycin
Gentafair
gentamicin
Jenamicin
kanamycin
Kantrex
Klebcil
Mycifradin
Nebcin
neomycin
netilmicin
Netromycin
streptomycin
tobramycin

Pediculicides (N):

A-200 Pyrinate
Barc
crotamiton
Elimite
Eurax
Kwell
lindane
malathion
Nix
Ovide
permethrin
piperonyl butoxide/pyrethrins
Prioderm
Pyrinyl
RID
Scabene
TISIT
Triple X

List of propoxyphene (O):

Bexophene
Cotanal-65
Darvocet-N
Darvon
Darvon compound-65
Darvon with ASA
Darvon-N
Dolene
Doraphen
Doxaphene
Doxaphene Compound
Genegesic
Margesic A-C
Novopropoxyn Compound
Pro-pox
Propacet
propoxyphene
Wygesic

List of pentazocine (P):

Fortal
pentazocine
Talwin

List of indomethacin (Q):

Indameth
Indo-Lemmon
Indochron E-R
Indocin
indomethacin
Novomethacine
Zendole

List of phenylbutazone (R):

Azolid
Butatab
Butazolidin
Butazone
Cotylbutazone
phenylbutazone

List of skeletal muscle relaxant (S):

baclofen
Banflex
carisoprodol
chlorphenesin carbamate
chlorzoxazone
cyclobenzaprine
Dantrium
dantrolene sodium
Delaxin
Flexeril
Flexoject
Flexon
K-Flex
Lioresal
Maolate
Marbaxin-750
Marflex
metaxalone
methocarbamol
Mio-Rel
Myolin
Neocyten
Noradex
Norflex
Norgesic Forte
O-Felx
Orflagen
Orphegesic
orphenadrine citrate
Orphenate
Paraflex
Parafon Forte DSC
Rela
Robaxin
Robaxisol
Robomol
Skelaxin
Sodol
Soma
Soma Compound
Soma Compound with Codeine
Soprodol
Soridol
Strifon Forte DSC

List of antispasmodics:

carisprodol
cyclobenzaprine
Flexeril
methocarabamol
Methocarbamol/Aspirin
Mio-Rel
Norflex
Norgesic
Norgesic Forte
orphenadrine
Orphengesic
Robaxisal
Roboxin
Soma
Soma Compound
Soma Compound with Codeine

List of NSAIDS (U):

Aches-N-Pain
Advil
Amersol
Anaprox
Ansaid
Arthra-G
Arthropan
Artria SR
ASA (Enseals)
Aspergum
aspirin
aspirin/butalbital
aspirin/caffeine/butalbital
Axotal
Azolid
Bayer Aspirin
Butazolidin
Butazone
Cap-Profen
choline magnesium trisalicylate
choline salicylate
Clinoril
Cotylbutazone
diclofenac sodium
diflunisal
Disalcid
Doan's
Dolobid
Easprin
Ecotrin
Empirin
Etodolac
Farbital
Feldene
fenoprofen calcium
Fiorinal
flurbiprofen
Genpril
Haltran
Ibuprin
ibuprofen
Indameth
Indochron
Indocin
Indomed
indomethacin
Isobutal
Isolly Improved
ketoprofen
ketorolac tromethamine
Laniroif
Lanorinal
Lodine
Magan
magnesium salicylate
Marnal
Measurin
meclofenamate
Meclomen
Medipren
mefenamic acid
Midol-200
Mobidin
Mono-Gesic
Motrin
Motrin IB
Nalfon
Naprosyn
naproxen
Norwich Aspirin
Novomethacin
Nuprin
Orudis
oxyphenbutazone
Pamprin
phenylbutazone
piroxicam
Ponstel
Rufen
Salflex
Salgesic
salsalate
Salsitab
sodium salicylate
sulindac
Tolectin
tolmetin sodium
Toradol
Trendar
Trilisate
Uracel-5
Voltaren
Zendole
ZORprin

H2 Antagonists (V):

Axid
cimetidine
famotidine
nizatidine
Pepcid
ranitidine
Tagamet
Zantac

Potassium supplements (W):

K+10
K+Care
K+Care ET
K-G Elixir
K-Lease
K-Lor
K-lyte
K-Norm
K-Tab
Kaochlor 10%
Kaochlor EFF
Kaon
Kato Powder
Kay Ciel
Kayliker
Klor-10%
Klor-con
Klorvess
Klotrix
Kolyum
Micro-K Extencaps
Neutra-phos
NuLYTELY
potassium acetate
potassium bicarbonate
potassium chloride
potassium gluconate
Rum-K
SK-Potassium Chloride
Slow-K
Ten-K
Twin-K-Cl

Potassium-sparing Diuretics (X):

Alazide
Aldactazide
Aldactone
Altexide
amiloride hydrochloride
Dyazide
Dyrenium
Maxzide
Midamor
Moduretic
spironolactone
spironolactone + hydrochlorothiazide (HCTZ)
Spirozide
triamterene
triamterene + hydrochlorothiazide (HCTZ)

ACE Inhibitors (Y):

Altace
benazepril hydrochloride
Capoten
Capozide
captopril
captopril and HCTZ
enalapril
fosinopril
lisinopril
Lotensin
Monopril
Prinivil
ramipril
Vaseretic
Vasotec
Zestril

Calcium Channel Blockers (Z):

Adalat
Apo-Nifed
bepridil hydrochloride
Calan
Cardene
Cardizem
diltiazem
DynaCirc
felodipine
Isoptin
isradipine
nicardipine
nifedipine
nimodipine
Nimotop
Novo-Nifedin
Plendil
Procardia
Vascor
verapamil

List of chlorpropamide (A):

chlorpropamide
Diabinese
Glucamide

END OF SECTION

Section K: ADMISSION ASSESSMENT

25. Is an assessment performed on admission to the nursing facility available in the medical record? **RESPOND YES only if there is assessment information from the *admitting physician* documented *within 30 days* of the admission to the nursing facility. You may use information documented during the hospitalization from which the resident was admitted to the nursing facility or that occurred *within 30 days of the admission*.**

1=Yes 9=Insufficient/No data

Response = No will end section

26. Was the reason(s) for the admission to the nursing facility noted in the admission assessment?
1=Yes, MD assessment

Response = YES, go to next question

2=Not in MD or nursing assessment
3=Yes, nursing assessment

27. Was the status of active medical problems noted in the admission evaluation?
1=Yes, MD assessment

Response = YES, go to next question

2=Not in MD or nursing assessment
3=Yes, nursing assessment

28. Was documentation of the past medical history (e.g., chronic medical conditions and surgical procedures) noted in the admission assessment?
1=Yes, MD assessment

Response = YES, go to next question

2=Not in MD or nursing assessment
3=Yes, nursing assessment

29. Was a history of preventive care (e.g., vaccinations, dental, optometric, podiatric care) noted in the admission assessment?
1=Yes, MD assessment

Response = YES, go to next question

2=Not in MD or nursing assessment
3=Yes, nursing assessment

30. Was a list of current medications noted in the admission assessment?
1=Yes, MD assessment

Response = YES, go to next question

2=Not in MD or nursing assessment
3=Yes, nursing assessment
4=Receiving no medications on admission

31. Was a review of symptoms noted in the admission assessment?
1=Yes, MD assessment

Response = YES, go to next question

2=Not in MD or nursing assessment
3=Yes, nursing assessment

32. Was a physical examination noted in the admission assessment?
1=Yes, MD assessment

Response = YES, go to next question

2=Not in MD or nursing assessment
3=Yes, nursing assessment

33. Was a measurement of orthostatic changes in blood pressure noted in the admission assessment?
1=Yes, MD assessment

Response = YES, go to next question

2=Not in MD or nursing assessment
3=Yes, nursing assessment

34. Was an evaluation of nutritional status noted in the admission assessment?
1=Yes, MD assessment

Response = YES, go to next question

2=Not in MD or secondary assessment
3=Yes, secondary data

Secondary data would include an assessment by the dietician, nutritionist, or nurse.

35. Was an evaluation for hearing problems noted in the admission assessment?
1=Yes, MD assessment

Response = YES, go to next question

2=Not in MD or secondary assessment
3=Yes, secondary data

Secondary data would include an assessment by the audiologist or nurse.

36. Was an evaluation of visual capabilities noted in the admission assessment?
1=Yes, MD assessment

Response = YES, go to next question

2=Not in MD or secondary assessment
3=Yes, secondary data

Secondary data would include an assessment by an optometrist, opthalmologist or nurse.

37. Was an evaluation of mobility (direct observation of ability to walk or transfer) noted in the admission assessment?
1=Yes, MD assessment

Response = YES, go to next question

2=Not in MD or secondary assessment
3=Yes, secondary data

Secondary data would include an assessment by the physical therapist or nurse.

38. Was an evaluation of cognitive function noted in the admission assessment?

Cognitive function addresses degree of alertness, orientation

1=Yes, MD assessment

Response = YES, go to next question

2=Not in MD or secondary assessment
3=Yes, secondary data

Secondary data would include an assessment by a therapist or nurse.

39. Was an evaluation of affective status noted in the admission assessment?

Affective status addresses mood, e.g., depression.

1=Yes, MD assessment

Response = YES, go to next question

2=Not in MD or secondary assessment
3=Yes, secondary data

Secondary data would include an assessment by a therapist or nurse.

40. Were advance directives (e.g., designation of proxy, decision maker, intensity of care desired (DNR order, etc.)) included as part of the admission information?
1=Yes, MD assessment

Response = YES, go to next question

2=No advance directives
3=Yes, secondary data assessment

END OF SECTION

Section L: ANNUAL ASSESSMENT

41. Was an ANNUAL assessment of the resident available in the medical record?
RESPOND YES only if there is assessment information *from the physician* within *60 days of the anniversary date of admission* to the nursing facility. You may use information documented during a hospitalization if one occurred at the time the annual assessment was due.
1=Yes 9=Insufficient/No data

Response = No will end section

42. Was a medical history noted in the annual assessment?
1=Yes, MD assessment

Response = YES, go to next question

2=Not in MD or nursing assessment
3=Yes, nursing assessment

43. Was a description of acute medical conditions that occurred in the past year noted in the annual assessment?

An acute condition is defined as an illness described by the physician as acute or one arising during the sampled time window and prior to the date of the annual assessment that is expected to resolve without sequelae or recurrence.

1=Yes, MD assessment

Response = YES, go to next question

2=Not in MD or nursing assessment
3=Yes, nursing assessment
4=No acute medical problems

44. Were comments on results of laboratory tests done to monitor active medical problems noted in the annual assessment?

Active includes both acute and chronic conditions.

1=Yes, MD assessment

Response = YES, go to next question

2=Not in MD or nursing assessment
3=Yes, nursing assessment
4=No laboratory tests performed

45. Was a summary of symptoms relevant to **active** medical problems noted in the annual assessment?

Active includes both acute and chronic conditions.

1=Yes, MD assessment

Response = YES, go to next question

2=Not in MD or nursing assessment
3=Yes, nursing assessment
4=No active medical problems

46. Was a list of current medications noted in the annual assessment?
1=Yes, MD assessment

Response = YES, go to next question

2=Not in MD or nursing assessment
3=Yes, nursing assessment
4=Receiving no medications

47. Was a review of the results of audiologic screening noted in the annual assessment?

This question refers to functional status. For example, there should be a comment on ability to hear, not just a physical description of the ear canal. Respond YES if the physician or nurse reports decreased hearing and a need for further screening.

1=Yes, MD assessment

Response = YES, go to next question

2=Not in MD or nursing assessment
3=Yes, nursing assessment
4=No audiologic screening performed

48. Was a review of ophthalmologic/optometric screening noted in the annual assessment?

This question refers to functional status. For example, there should be a comment on visual acuity, not just a physical description of the fundus. Respond YES if the physician or nurse reports visual problems and a need for further screening.

1=Yes, MD assessment

Response = YES, go to next question

2=Not in MD or nursing assessment
3=Yes, nursing assessment
4=No screening performed

49. Was a review of dental screening noted in the annual assessment?

This question refers to the physical and possibly the functional status. Respond YES if you find statements such as "good dentition," "dentures fit well and in good condition," "no dental caries."

1=Yes, MD assessment

Response = YES, go to next question

2=Not in MD or nursing assessment
3=Yes, nursing assessment
4=No screening performed

50. Was a review of podiatric screening noted in the annual assessment?

This question refers to physical status.

1=Yes, MD assessment

Response = YES, go to next question

2=Not in MD or nursing assessment
3=Yes, nursing assessment
4=No screening performed

51. Was a review of tuberculosis testing noted in the annual assessment?
1=Yes, MD assessment

Response = YES, go to next question

2=Not in MD or nursing assessment
3=Yes, nursing assessment
4=TB testing not performed

52. Were advanced directives (e.g., identification of proxy, whether the resident can still make or participate in decisions about his or her health care, intensity of care (no CPR, living will, etc.)) noted in the annual assessment?
1=Yes, MD assessment

Response = YES, go to next question

2=Not in MD or secondary data
3=Yes, secondary data
4=No directives in medical record

END OF SECTION

Section M: LAB STUDIES

53. Were a creatinine level or BUN ordered?
1=Yes
2=No, neither test performed

Response = YES, enter study and dates in section N

Response = NO, skip to section P, Check Blank Questions

END OF SECTION

Section N: BUN & CREATININE DATES

54. Enter all BUNs and creatinines and dates when tests were performed during the sampled time period.

END OF SECTION

Section O: SUPERVISORY REVIEW

Queries will be written and reports will be run to determine the answers to the following questions. This section will be answered based on these reports and the response entered by a clerk.

55. Was the resident treated with antipsychotics?
1=Yes 2=No 9=No Data

Response = NO DRUG INFORMATION this will end section

Response = NO will skip to question 60

Pick list of antipsychotics (B + BI + BS):

acetophenazine maleate
chlorpromazine hydrochloride
chlorprothixene
clozapine
Clozaril
droperidol
Etrafon
fluphenazine
Haldol
haloperidol
Haloperon
Inapsine
Innovar
loxapine
Loxitane
Mellaril
mesoridazine besylate
Moban
molindone hydrochloride
Navane
Orap
Permitil
perphenazine
pimozide
prochlorperazine
Prolixin
promazine hydrochloride
Serentil
Sparine
Stelazine
Suprazine
Taractan
thioridazine hydrochloride
thiothixene or thiothixene hydrochloride
Thor-Pram
Thorazine
Tindal
Triavil
trifluoperazine hydrochloride
Trilafon

QUERY:

56. Was there continuous use of antipsychotics for **MORE THAN 120 DAYS** without drug holidays or dosage reductions?
1=Yes 2=No

Drug Holiday = 14 continuous days off the drug
Dosage reduction=20%

QUERY:

57. Was there concurrent use of MORE THAN ONE antipsychotic for MORE THAN 60 days?
1=Yes 2=No

QUERY:

58. Did the dosage for ANY prescribed antipsychotics exceed the maximum recommended dosage listed in the table below?
1=Yes, greater than dose in column A , but less than column B
2=No, equal to or less than dose in column A
3=Yes, greater than dose in column B

Maximum Dosages for Selected Antipsychotics

Drug	Column A OBRA Dosing Limits[2,3]	Column B Dosing Limits per Day, Adults Over 65[1,4-9]
acetophenazine (Tindal)	20 mg	100 mg
chlorpromazine (Thorazine, Thor-Pram)	75 mg	400 mg
chlorprothixene (Taractan)	75 mg	400 mg
fluphenazine (Prolixin, Permitil)	4 mg	20 mg
haloperidol (Haldol, Haloperon)	4 mg	6 mg
loxapine (Loxitane)	10 mg	150 mg
mesoridazine (Serentil)	25 mg	200 mg
molindone (Moban)	10 mg	100 mg
perphenazine (Trilafon)	8 mg	32 mg
piperacetazine	N/A	80 mg
prochlorperazine (Compazine)	10 mg	40 mg
thioridazine (Mellaril)	75 mg	300 mg
thiothixene (Navane)	7 mg	30 mg
trifluoperazine (Stelazine, Suprazine)	8 mg	20 mg
trifluprornazine	20 mg	100 mg

QUERY:

59. Did the resident NOT have a diagnosis of psychosis or dementia PRIOR TO FIRST ORDER for antipsychotic?
1=Yes 2=No

List of included conditions:

Alzheimer's Disease (331.0)
Amnestic syndrome (294.0)
Arteriosclerotic dementia
Cerebral degeneration (331.9)
Chronic organic brain syndrome (294.8)
Dementia (294.1)
Jakob-Creutzfeldt disease
Multi-infarct dementia (290.40)
Organic brain syndrome (294.9)
Organic personality syndrome (310.1)
Pick's disease of the brain (331.0)
Presenile dementia
Senile degeneration of brain (331.2)
Senile dementia

QUERY:

60. Was the resident treated with sedative-hypnotics?
1=Yes 2=No

Response = NO will skip to question 64

List of sedative-hypnotics: (C + CD + CE)

4-Way Cold Tablets
Allent
Alurate
amobarbital
Amytal
aprobarbital
Aquachloral Supprettes
Atrohist
Barbased
Barbita
Benadryl
Brexin
Bromarest
Bromfed
brompheniramine maleate
Bufferin AF Nite-Time
BuSpar
buspirone hydrochloride
butabarbital sodium
Butalan
Buticaps
Butisol
Cerose
Chlorafed
chloral hydrate
chlorpheniramine
Codimal
Comhist
Comtrex
Dallergy
Dalmane
Deconamine
dexchlopheriramine maleate
Dimetane
diphenhydramine
Donatussin
Doral
Doriden
Doriglute
Dristan
Drize
Dura-Tap
Dura-Vent
Durapam
Dytuss
Endal-HD
estazolam
ethchlorvynol
Excedrin PM
Extendryl
Fedahist
flurazepam hydrochloride
glutethimide
Halcion
Histafed
Histamic

List of sedative-hypnotics continued: (C + CD + CE)

Histor-D
Histussin
Hycomine
Kronofed-A
Levoprome
methotrimeprazine hydrochloride
methyprylon
midazolam hydrochloride
Mitran
Naledcon
Nembutal
Noctec
Nolamine
Noludar
Novafed A
Novahistine DH
Ornade Spansule
Par-Decon
paraldehyde
PediaCare
Pediacof
pentobarbital sodium
phenobarbital sodium
Placidyl
Polaramine
Poly-Histine
ProSom
Protid
quazepam
R-Tannate
Reposans
Restoril
Rhinolar
Ru-Tuss
Rynatan
Rynatuss
Sarisol No. 2
secobarbital sodium
Seconal Sodium
Sereen
Sinulin
Solfoton
Teldrin
Temaz
temazepam
Tri-Barbs
triazolam
Triotan
Tuinal
Tussar DM
Tussionex Extended Release
Tylenol Allergy-Sinus
Tylenol Cold
Tylenol Cold Night Time
Tylenol PM Extra Strength
Unisom Dual Relief Night-time
Vanex Forte
Vanex HD
Versed

QUERY:

61. Was the resident treated continuously with sedative hypnotics for MORE THAN **120** DAYS without a drug holiday or dosage reduction?
1=Yes 2=No

QUERY:

62. Was there concurrent use of more than one sedative-hypnotic for MORE THAN **60** days?
1=Yes 2=No

QUERY:

63. Did the dosage for ANY prescribed sedative-hypnotic exceed the maximum recommended dosage listed in the table below?

1=Yes, greater than dose in column A , but less than column B
2=No, equal to or less than dose in column A
3=Yes, greater than dose in column B

Maximum Dosages for Selected Sedative-Hypnotic Drugs

Drug	Column A OBRA Dosing Limits[2,3]	Column B Dosing Limits per Day, Adults Over 65[1,4-7]
chloral hydrate (Aquachloral Suppreettes, Noctec)	500 mg	2000 mg
flurazepam (Dalmane)	15 mg	Should not be used
temazepam (Restoril)	15 mg	30 mg
triazolam (Halcion)	.125 mg	.25 mg

QUERY:

64. Was the resident treated with antianxiety drugs?
1=Yes 2=No

Response = NO will skip to question 67

List of antianxiety drugs (G + GD + GE)

alprazolam
Alzapam
Anxanil
Atarax
Ativan
Atozine
Centrax
chlordiazepoxide
Chlordiazepoxide & Amitriptyline
clorazepate dipotassium
diazepam
Diazepam Intensol
Durrax
E-Vista
Equagesic
Equanil
Gen-Xene
halazepam
Hy-Pam
Hydroxacen
hydroxyzine (hydrochloride, pamoate)
Hyzine-50
Librax
Libritabs
Librium
Limbitrol
Loraz
lorazepam
Meditran
Menrium
meprobamate
Meprospan
Milprem
Miltown
Neuramate
oxazepam
Paxipam
PMB
prazepam
Q-Pam
Quiess
Sedabamate
Serax
Tranmep
Tranxene (SD, T-Tab)
Valium
Valrelease
Vamate
Vazepam
Vistaject
Vistakon
Vistaquel
Vistaril
Vistazine
Xanax
Zetran

QUERY:

65. Was there concurrent use of MORE THAN ONE antianxiety drug for **MORE THAN 60** days?
1=Yes 2=No

QUERY:

66. Did the dosage for ANY prescribed antianxiety drug exceed the maximum recommended dosage listed in the table below?

1=Yes, greater than dose in column A , but less than column B
2=No, equal to or less than dose in column A
3=Yes, greater than dose in column B

Maximum Dosages of Selected Antianxiety Drugs:

Drug	Column A OBRA Dosing Limits2	Column B Dosing Limits per Day, Adults Over 651,3-6
alprazolam (Xanax)	.75 mg	2 mg
chlordiazepoxide (Libritabs, Librium)	N/A	Should not be used
clorazepate (Gen-Xene, Tranxene)	15 mg	30 mg
diazepam (Diazepam Intensol, Q-Pam, Valium, Valrelease, Vazepam, Zetran)	5 mg	Should not be used
halazepam (Paxipam)	40 mg	40 mg
lorazepam (Alzapam, Ativan, Loraz)	2 mg	5 mg
oxazepam (Serax)	30 mg	60 mg
prazepam (Centrax)	15 mg	15 mg

QUERY:

67. Was the resident treated with antidepressants?
1=Yes 2=No

Response = NO will skip to question 70

List of Antidepressants (F + FH + FI)

Adapin
Amitril
amitriptyline hydrochloride
amoxapine
Anafranil
Asendin
Aventyl
bupropion hydrochloride
clomipramine hydrochloride
desipramine hydrochloride
Desyrel
doxepin hydrochloride
Elavil
Emitrip
Endep
Enovil
fluoxetine hydrochloride
imipramine hydrochloride
isocarboxazid
Janimine
Limbitrol
Ludiomil
maprotiline hydrochloride
Marplan
Nardil
Norpramin
nortriptyline hydrochloride
Pamelor
Parnate
Pertofrane
phenelzine sulfate
protriptyline hydrochloride
Prozac
Sinequan
Surmontil
Tofranil
tranylcypromine sulfate
trazodone hydrochloride
Trazon
Trialodine
trimipramine maleate
Tipramine
Vivactil
Wellbutrin

QUERY:

68. Was there concurrent use of MORE THAN ONE antidepressant drug for MORE THAN 60 days?
1=Yes 2=No

QUERY:

69. Did the dosage for ANY prescribed antidepressant exceed the maximum recommended dosage listed in the table below?
1=Yes, greater than dose in column A
2=No, equal to or less than dose in column A

Maximum Dosages of Selected Antidepressants:

Drug	Column A Dosing Limits per Day, Adults Over 65[1,3-5]
amitriptyline (Amitril, Elavil, Emitrip, Endep, Enovil)	Should not be used
amoxapine (Asendin)	150 mg
desipramine (Norpramin, Pertofrane)	150 mg
doxepin (Adapin, Sinequan)	150 mg
imipramine (Janimine, Tipramine, Tofranil)	Should not be used
maprotiline (Ludiomil)	150 mg
nortriptyline (Pamelor)	100 mg
phenelzine (Nardil)	45 mg
protriptyline (Vivactil)	30 mg
trazodone (Desyrel, Trazon, Trialodine)	400 mg
trimipramine (Surmontil)	Should not be used

QUERY:

70. Was the resident treated with benzodiazepines?
1=Yes 2=No

List of benzodiazepine (GD + CD)

chlordiazepoxide
Dalmane
diazepam
flurazepam
Librium
Lipoxide
Mitran
Reposans
Serene
Valium

QUERY:

71. Was the resident treated with meprobamate?
1=Yes 2=No

List of meprobamate (GE)

Deprol
Equagesic
Equanil
Meditran
Meprospan
Milprem
Miltown
Neuramate
PMB
Sedabamate
Tranmep

QUERY:

72. Was the resident treated with barbiturates?
1=Yes 2=No

List of barbiturates (CE):

Alurate
amobarbital
Amytal
aprobarbital
Barbased
Barbita
butabarbital
Butalan
Buticaps
Butisol
Nembutal
pentobarbital
phenobarbital
Sarisol No. 2
secobarbital
Seconal
Solfoton

QUERY:

73. Was the resident given combination antidepressants/antipsychotics?
1=Yes 2=No

Combination antidepressants/antipsychotics drug list (I +BI + FI):

amitriptyline and perphenazine
chlordiazepoxide and amitriptyline
Etrafon
Limbitrol
Triavil

QUERY:

74. Was the resident treated continuously with antianxiety drugs for MORE THAN 120 DAYS without a drug holiday or dosage reduction?
1=Yes 2=No

QUERY:

75. Was there concurrent use of psychoactive drugs **between therapeutic classes** (Antianxiety drugs, Sedative hypnotics, Antipsychotics) for MORE THAN **120** DAYS days?
1=Yes, antianxiety and sedative-hypnotics given concurrently
2=No
3=Yes, antianxiety and antipsychotics given concurrrently
4=Yes, sedative-hypnotics and antipsychotics given concurrently
5=Yes, all three therapeutic classes given concurrently

QUERY:

76. Was amitriptyline, imipramine, protriptyline or trimipramine used?
1=Yes 2=No

Amitriptyline, Imipramine, Protriptyline Trimipramine (FH)

Amitril
amitriptyline
Elavil
Emitrip
Endep
Enovil
Etrafon
imipramine
Janimine
Limbitol
protriptyline
Surmontil
Tipramine
Tofranil
Triavil
trimipramine
Vivactil

QUERY:

77. Was the resident treated with anticholinergics?
1=Yes 2=No

List of anticholinergics (J)

Anaspaz
anisotropine methylbromide
Antispas
Antrenyl
atropine sulfate
Banthine
Barbidonna
Belladenal
belladonna leaf
Belladonna
Bellafoline
Bemote
Bentyl
Buscopan
Byclomine
Cantil
Chardonna
clidinium bromide
Cystospaz
Darbid
Daricon
Dibent
dicyclomine hydrochloride
Di-Cyclonex
Dilomine
Di-Spaz
Donnata
glycopyrrolate
hexocyclium methylsulfate
hyoscyamine
isopropamide iodide
Kinesed
levorotatory alkaloids of belladonna
Levsin
Levsinex Timecaps
Librax
mepenzolate bromide
methantheline bromide
methscopolamine bromide
Neoquess
Neoquess Injection
Norpanth
Or-Tyl
oxyphencyclimine hydrochloride
oxyphenonium bromide
Pamine
Pathilon
Pro-Banthine
propantheline bromide
Quarzan
Robinul
scopolaminee)
Spasmoject
Tral Filmtabs
tridihexethyl
Valpin
Vistrax

QUERY:

78. Were **ATYPICAL** anti-infectives given?
1=Yes 2=No

Atypical anti-infective drug list (On anti-infective drug list) (LK):

aminosalicylate sodium
Capastat
capreomycin sulfate
cycloserine
DOW-Isoniazid
ethambutol hydrochloride
ethionamide
isoniazid
Laniazid
Myambutol
Nydrazid
pyrazinamide
Rifadin
Rifamate
rifampin
rifampin/isoniazid
Rimactane
Rimactane/INH
Seromycin
Trecator-SC
Urobiotic

QUERY:

79. Were four or more anti-infectives ordered/given within a 60 day period?
1=Yes 2=No

Anti-Infectives Drug List (L + LK):

0Duracillin A.S.
5-FC
Achromycin
Aerosporin
Amcill
amdinocillin
amikacin sulfate
Amikin
aminosalicylate sodium
amox tr/k clavulanate
amoxicillin
Amoxil
amphotericin B
ampicillin
Ancef
Ancobon
Anspor
Augmentin
Azactam
Azlin
azlocillin sodium
Azo Gantanol
Azo Gantrisin
Azo Sulfisoxazole
aztreonam
Azulfidine (EN-tabs)
bacampicillin hcl
Bactocill
Bactrim
Beepen-VK
Betapen-VK
Biaxin
Bicillin L-A
Biltricide
Bristacycline
Capastat
capreomycin sulfate
carbenicillin
Ceclor
cefaclor
cefadroxil monohydrate
Cefadyl
cefamandole nafate
cefazolin sodium
cefixime
Cefizox
cefmetazole sodium
Cefobid
cefonicid sodium
cefoperazone sodium
ceforanide
Cefotan
cefotaxime sodium
cefotetan disodium

Anti-Infectives Drug List continued (L + LK):

cefoxitin sodium
ceftazidime
Ceftin
ceftizoxime sodium
ceftriaxone sodium
cefuroxime
cephalexin monohydrate
cephalothin sodium
cephapirin sodium
cephradine
chloramphenicol
Chloromycetin (Palmiate)
chloroquine
Cinobac
cinoxacin
Cipro
ciprofloxacin
Claforan
clarithromycin
Cleocin
clindamycin
clofazimine
clotrimazole
cloxacillin sodium
Cloxapen
co-trimoxazole
colistimethate sodium
colistin sulfate
Coly-Mycin M
Coly-Mycin S
Cotrim
Crysticillin
cyclacillin
Cyclopar
cycloserine
Cystex
D-Amp
Dalacin C Phosphate
Declomycin
demeclocycline hydrochloride
dicloxacillin sodium
Diflucan
DOW-Isoniazid
Doxy
Doxy-Lemmon
Doxy-Tabs
Doxychel
doxycycline
Duricef
Dycill
Dynapen
E-Mycin
E.E.S.
E.P. Mycin
eflornithine hydrochloride
emetine hydrochloride
Ery-Tab
Eryc
Erypar
EryPed
Erythrocin
erythromycin
erythromycin/sulfisoxazole
ethambutol hydrochloride
ethionamide
Flagyl
Floxin
fluconazole
flucytosine
Fortaz
Fulvicin P/G
Fungizone
Furadantin
Furalan
Furan
Furanite
furazolidone
Furoxone
Gantanol
Gantrisin
Garamycin
Gentafair
gentamicin sulfate
Geocillin
Geopen
Gris-PEG
Grisactin Ultra
griseofulvin
hetacillin potassium
Hexalol
Humatin
Ilosone
Ilotycin
imipenem/cilastatin sodium
iodoquinol
isoniazid
Jenamicin
kanamycin sulfate
Kantrex
Keflet
Keflex
Keflin

Anti-Infectives Drug List continued (L + LK):

Keftab
kanamycin sulfate
Kantrex
Keflet
Keflex
Keflin
Keftab
Kefurox
Kefzol
Kesso-Tetra
ketoconazole
Klebcil
Lamprene
Laniazid
Lendercillin VK
Lincocin
lincomycin hydrochloride
Lipo Gantrisin
Macrodantin
Mandameth
Mandelamine.
Mandol
Mebiquine
Mefoxin
Megacillin
meth/benz acid/salol/atp/hyos
meth/me blue/ba/salol/atp/hyos
meth/me blue/salol/sodium/hyos
meth/meth blue/salol/ca/hyoscy
methacycline hydrochloride
methenamine
methenamine/hyoscyamine
methenamine/phenazopyridine
methenamine/sal-amide/bella
methenamine/salol/atrop
methenamine/sodium biphosphate
methenamine/sodium phosphate
methicillin sodium
methionine
Metizol
metronidazole
Metryl
Mezlin
mezlocillin sodium
miconazole
Microsulfon
Minocin
minocycline hydrochloride
Monistat
Monocid
moxalactam disodium
Moxam
Myambutol
Mycifradin
Mycostatin
Nafcil
nafcillin sodium
nalidixic acid
Nallpen
Nebcin
NebuPent
NegGram
neomycin sulfate
netilmicin sulfate
Netromycin
Nilstat
Nitrofan
nitrofurantoin
Nizoral
Nor-Tet
norfloxacin
Noroxin
novobiocin sodium
Nydrazid
nystatin
Nystex
ofloxacin
Omnipen
Ornidyl
oxacillin sodium
oxy-tcn/sulfamethiz/azo
oxytetracycline
oxytetracycline hydrochloride
Panmycin
paromomycin sulfate
Pathocil
PCE Dispersatabs
Pediamycin
Pediazole
pen g procaine/pen g benz
pen g procaine/probenecid
Pen Vee K,
Penamp 500
Penapar VK
penicillin g
penicillin v potassium
Pentam 300
pentamidine isethionate
Pentids
Pfizerpen
Pfizerpen-AS
piperacillin sodium
Pipracil
Polycillin

Anti-Infectives Drug List continued (L + LK):

polymyxin b sulfate
praziquantel
Precef
Primaxin
Principen
Principen with Probenecid
Principen-500
Proloprim
Prostaphlin
Protostat
Pyopen
pyrazinamide
Renoquid
Rifadin
rifampin
rifampin/isoniazid
Rimactane
Robicillin VK
Robimycin
Robitet
Rocephin
Sarocycline
SAS (Enteric)
Septra
Seromycin
SMZ-TMP
spectinomycin dihydrochloride
Spectrobid
Staphcillin
streptomycin sulfate
Suldiazo
sulfacytine
sulfadiazine
sulfamethizole
sulfamethizole/phenazopyridine
Sulfamethoprim
sulfamethox/phenazopyridine
sulfamethoxazole
sulfamethoxazole/trimethoprim
sulfapyridine
sulfasalazine
sulfathiazole
sulfisoxazole
sulfisoxazole/phenazopyridine
Sulmeprim
Sumycin
Suprax
Tao
Tazicef
Tazidime
Teebacin
Tegopen
Terramycin
Tetracap
tetracycline
Tetracyn
Tetralan
Thiacide
Thiosulfil
Ticar
ticarcillin
ticarcillin/tobramycin sulfate
Timentin
Totacillin
Trac Tabs
Trecator-SC
trimethoprim
Trimox
Trimpex
Triple Sulfa
trisulfapyrimidines
Trobicin
troleandomycin
Urisedamine
Uro-phosphate
Uroplus
Uroquid-Acid
Utimox
Ultracef
Unasyn
Unipen
Urex
V-Cillin K
VC-K
Vancocin
vancomycin hydrochloride
Velosef
Versapen
Vibra-Tabs
Vibramycin
VoSol Otic
Wyamycin
Wycillin
Wymox
Yodoxin
Zefazone
Zinacef

QUERY:

80. Were aminoglycosides given without monitoring with a creatinine or BUN within 60 days of starting the drug therapy?
1=Yes 2=No

Aminoglycoside drug list (drugs found on the anti-infective list (L):

amikacin
Amikin
Garamycin
Gentafair
gentamicin
Jenamicin
kanamycin
Kantrex
Klebcil
Mycifradin
Nebcin
neomycin
netilmicin
Netromycin
streptomycin
tobramycin

QUERY:

81. Was there use of any anti-infectives for MORE THAN 60 days except when treating osteomyelitis, prostatitis, tuberculosis, endocarditis, or a urinary tract infection?
1=Yes 2=No

QUERY:

82. Were pediculicides used after seven days following admission to the nursing home?
1=Yes 2=No

Pediculicides (N):

A-200 Pyrinate
Barc
crotamiton
Elimite
Eurax
Kwell
lindane
malathion
Nix
Ovide
permethrin
piperonyl butoxide/pyrethrins
Prioderm
Pyrinyl
RID
Scabene
TISIT
Triple X

QUERY:

83. Was there use of propoxyphene?
1=Yes 2=No

List of propoxyphene (O):

Bexophene
Cotanal-65
Darvocet-N
Darvon
Darvon compound-65
Darvon with ASA
Darvon-N
Dolene
Doraphen
Doxaphene
Doxaphene Compound
Genegesic
Margesic A-C
Novopropoxyn Compound
Pro-pox
Propacet
propoxyphene
Wygesic

QUERY:

84. Was there use of pentazocine?
1=Yes 2=No

List of pentazocine (P):

Fortal
pentazocine
Talwin

QUERY:

85. Was there use of indomethacin?
1=Yes 2=No

List of indomethacin (Q):

Indameth
Indo-Lemmon
Indochron E-R
Indocin
indomethacin
Novomethacine
Zendole

QUERY:

86. Was there use of phenylbutazone?
1=Yes 2=No

List of phenylbutazone (R):

Azolid
Butatab
Butazolidin
Butazone
Cotylbutazone
phenylbutazone

QUERY:

87. Was there use of muscle relaxants?
1=Yes 2=No

List of skeletal muscle relaxant (S):

baclofen
Banflex
carisoprodol
chlorphenesin carbamate
chlorzoxazone
cyclobenzaprine
Dantrium
dantrolene sodium
Delaxin
Flexeril
Flexoject
Flexon
K-Flex
Lioresal
Maolate
Marbaxin-750
Marflex
metaxalone
methocarbamol
Mio-Rel
Myolin
Neocyten
Noradex
Norflex
Norgesic Forte
O-Felx
Orflagen
Orphegesic
orphenadrine citrate
Orphenate
Paraflex
Parafon Forte DSC
Rela
Robaxin
Robaxisol
Robomol
Skelaxin
Sodol
Soma
Soma Compound
Soma Compound with Codeine
Soprodol
Soridol
Strifon Forte DSC

QUERY:

88. Was there use of antispasmodics?
1=Yes 2=No

List of antispasmodics:

carisprodol
cyclobenzaprine
Flexeril
methocarabamol
Methocarbamol/Aspirin
Mio-Rel
Norflex
Norgesic
Norgesic Forte
orphenadrine
Orphengesic
Robaxisal
Roboxin
Soma
Soma Compound
Soma Compound with Codeine

QUERY:

89. Was there concurrent use of histamine 2 antagonists and NSAIDs for **MORE THAN 60** days?

1=Yes 2=No

List of NSAIDS (U):

Aches-N-Pain
Advil
Amersol
Anaprox
Ansaid
Arthra-G
Arthropan
Artria SR
ASA (Enseals)
Aspergum
aspirin
aspirin/butalbital
aspirin/caffeine/butalbital
Axotal
Azolid
Bayer Aspirin
Butazolidin
Butazone
Cap-Profen
choline magnesium trisalicylate
choline salicylate
Clinoril
Cotylbutazone
diclofenac sodium
diflunisal
Disalcid
Doan's
Dolobid
Easprin
Ecotrin
Empirin
Etodolac
Farbital
Feldene
fenoprofen calcium
Fiorinal
flurbiprofen
Genpril
Haltran
Ibuprin
ibuprofen
Indameth
Indochron
Indocin
Indomed
indomethacin
Isobutal
Isolly Improved
ketoprofen
ketorolac tromethamine
Laniroif
Lanorinal
Lodine
Magan
magnesium salicylate
Marnal
Measurin
meclofenamate
Meclomen
Medipren
mefenamic acid
Midol-200
Mobidin
Mono-Gesic
Motrin
Motrin IB
Nalfon
Naprosyn
naproxen
Norwich Aspirin
Novomethacin
Nuprin
Orudis
oxyphenbutazone
Pamprin
phenylbutazone
piroxicam
Ponstel
Rufen
Salflex
Salgesic
salsalate
Salsitab
sodium salicylate
sulindac
Tolectin
tolmetin sodium
Toradol
Trendar
Trilisate
Uracel-5
Voltaren
Zendole
ZORprin

H2 Antagonists (V):

Axid
cimetidine
famotidine
nizatidine

Pepcid
ranitidine
Tagamet
Zantac

QUERY:

90. Was there concurrent use of two or more non-steroidal; anti-inflammatory drugs for **MORE THAN 60** days?
1=Yes 2=No

QUERY:

91. Were there more than twelve drug claims per month? (Excluding OTC substances)
1=Yes 2=No

QUERY:

92. Was there concurrent use of potassium supplements and potassium-sparing diuretics for **MORE THAN 60** days.
1=Yes 2=No

Potassium supplements (W):

K+10
K+Care
K+Care ET
K-G Elixir
K-Lease
K-Lor
K-lyte
K-Norm
K-Tab
Kaochlor 10%
Kaochlor EFF
Kaon
Kato Powder
Kay Ciel
Kayliker
Klor-10%
Klor-con
Klorvess
Klotrix
Kolyum
Micro-K Extencaps
Neutra-phos
NuLYTELY
potassium acetate
potassium bicarbonate
potassium chloride
potassium gluconate
Rum-K
SK-Potassium Chloride
Slow-K
Ten-K
Twin-K-Cl

Potassium-sparing Diuretics (X):

Alazide
Aldactazide
Aldactone
Altexide
amiloride hydrochloride
Dyazide
Dyrenium
Maxzide
Midamor
Moduretic
spironolactone
spironolactone + hydrochlorothiazide (HCTZ)
Spirozide
triamterene
triamterene + hydrochlorothiazide (HCTZ)

QUERY:

93. Was there concurrent use of angiotensin-converting enzyme (ACE) inhibitors and potassium supplements for **MORE THAN 60** days?
1=Yes 2=No

ACE Inhibitors (Y):

Altace
benazepril hydrochloride
Capoten
Capozide
captopril
captopril and HCTZ
enalapril
fosinopril
lisinopril
Lotensin
Monopril
Prinivil
ramipril
Vaseretic
Vasotec
Zestril

QUERY:

94. Was there concurrent use of potassium-sparing diuretics and ACE inhibitors for **MORE THAN 60** days?.
1=Yes 2=No

QUERY:

95. Was there concurrent use of two or more (ACE) inhibitors for **MORE THAN 60** days?
1=Yes 2=No

QUERY:

96. Was there concurrent use of two or more calcium channel blocking agents for **MORE THAN 60** days?
1=Yes 2=No

Calcium Channel Blockers (Z):

Adalat
Apo-Nifed
bepridil hydrochloride
Calan
Cardene
Cardizem
diltiazem
DynaCirc
felodipine
Isoptin
isradipine
nicardipine
nifedipine
nimodipine
Nimotop
Novo-Nifedin
Plendil
Procardia
Vascor
verapamil

QUERY:

97. Was there concurrent use of two or more H2 antagonists for **MORE THAN 60** days?
1=Yes 2=No

QUERY:

98. Was there use of chlorpropamide?
1=Yes 2=No

List of chlorpropamide (A):

chlorpropamide
Diabinese
Glucamide

QUERY:

END OF SECTION

Section P: Blank Answer Check

Before leaving the abstraction form, you must check for blank answers. Each blank answer that remains must be checked and answered. There should be **NO** remaining blank answers when you leave the abstraction form.

END OF ABSTRACT

Appendix VII

APPENDIX VII

CRITERIA USED TO IDENTIFY OTHER POTENTIAL QUALITY ISSUES

I. Current List of Quality Indicators

II. Components of physician evaluation of nursing home residents on admission

- History
    - Reason(s) for seeking admission
    - Status of active medical problems
    - Past medical history
        - Chronic medical conditions
        - Surgical procedures
    - Preventive care
        - Vaccinations
        - Dental, optometric, podiatric care
    - Medications
    - Review of symptoms
- Physical examination
  In addition to traditional systems approach include:
    - Orthostatic changes in blood pressure
    - Nutritional status
    - Screening for hearing problems
    - Visual capabilities
    - Mobility (direct observation of ability to walk or transfer)
    - Cognitive function
    - Affective status
- Advance directives
    - Designation of proxy decision maker
    - Intensity of care desired

III. Components from the annual physician review of long-term nursing home residents

- Medical history
    a. Description of acute medical conditions that have occurred in the past year
    b. Comment on results of laboratory tests done to monitor active medical problems
    c. Summarize symptoms relevant to active medical problems
    d. List of current medications

- Health maintenance

    a. Review the results of screening evaluations, including:

        (1) Audiologic
        (2) Opthamologic/optometric
        (3) Dental
        (4) Podiatric
        (5) Tuberculosis testing

- Advanced directive

    a. Existence of directive

    b. Identification of proxy

    c. Whether the resident can still make or participate in decisions about his or her health care

    d. Intensity of care (no CPR, living will, etc.)

Note: These criteria will be evaluated by the reviewer in terms of being documented/ undocumented in the resident's medical record for the facility's prescribed six month observation period.

APPENDIX VIII

LARGE SAMPLE INTER-RATER RELIABILITY TEST RESULTS

Variable		Number of Responses	Percent Agreement
Q1.	Birthdate	106	99.1%
Q2.	Sex	106	98.1%
Q3.	Window start date	106	99.1%
Q4.	Window stop date	106	98.1%
Q5.	Survey certificate date	106	100.0%
Q6.	Age of resident	106	100.0%
Q7.	Resident alive at time of data collection	106	98.1%
Q8.	Hospital admission	106	96.2%
Q9.	Number of hospitalizations	106	96.2%
Q11.	Emergency room visit	106	95.3%
Q12.	Number of emergency room visits	106	92.5%
Q14.	Death within 30 days	26	76.9%
Q15.	Date of death	5	80.0%
Q16.	Cause of death	5	80.0%
Q19.	Lack of therapy	106	100.0%
Q20.	Date of admission/ return	2	100.0%
Q21.	Outpatient therapy	2	50.0%
Q22.	Evaluation date for therapy	2	50.0%
Q23.	Medications on pick list	106	99.1%
Q25.	Admission assessment	57	96.2%
Q26.	Reason for admission	57	96.2%
Q27.	Admission status	57	70.2%
Q28.	Documentation of past medical history	57	63.2%
Q29.	History of preventive care	57	80.0%
Q30.	List of medications	57	76.5%
Q31.	Review of symptoms	57	80.7%
Q32.	Physical examination	57	80.7%

APPENDIX VIII (continued)

Variable	Number of Responses	Percent Agreement
Q33. Measurement of blood pressure changes	57	93.0%
Q34. Nutritional status evaluation	57	75.4%
Q35. Hearing problem evaluation	57	66.7%
Q36. Visual capabilities	57	86.2%
Q37. Mobility evaluation	57	63.2%
Q38. Cognitive function evaluation	58	46.7%
Q39. Affective status	57	44.8%
Q40. Advanced directives	58	86.2%
Q41. Annual assessment	106	93.4%
Q42. Medical history	15	46.7%
Q43. Acute medical conditions	15	13.3%
Q44. Comments on lab tests	15	46.7%
Q45. Summary of symptoms	15	93.0%
Q46. Current medications	15	53.3%
Q47. Review of audiologic screening	15	46.7%
Q48. Review of ophthalmologic screening	15	46.7%
Q49. Review of dental screening	15	46.7%
Q50. Review of podiatric screening	15	53.3%
Q51. Review of TB testing	15	46.7%
Q52. Advanced directives	15	33.3%
Q53. Creatinine or BUN	106	89.6%
Q55. Antipsychotics	106	99.1%
Q56. Continuous use	106	99.1%
Q57. Concurrent use	106	99.1%
Q58. Dosage	106	92.1%
Q59. Diagnosis of psychosis/dementia	106	98.1%
Q60. Sedative treatment	106	99.1%
Q61. Continuous use of sedatives	106	96.2%
Q62. Concurrent use	106	100.0%

APPENDIX VIII (continued)

Variable	Number of Responses	Percent Agreement
Q63. Dosage—sedative	106	97.2%
Q64. Antianxiety drugs	106	99.1%
Q65. Concurrent use of antianxiety drugs	106	100.0%
Q66. Dosage—antianxiety	106	99.1%
Q67. Antidepressants treatment	106	99.1%
Q68. Concurrent use of antidepressants	106	100.0%
Q69. Dosage—antidepressants	106	98.1%
Q70. Benziodiazeprine treatment	106	100.0%
Q71. Meprobamate	106	100.0%
0Q72. Barbiturates	106	100.0%
Q73. Antidepressants/antipsychotics	106	99.1%
Q74. Continuous treatment	106	99.1%
Q75. Concurrent use of psychoactive drugs	106	98.1%
Q76. Amitriptyline	106	99.1%
Q77. Anticholinergics	106	100.0%
Q78. Atypical antiinfectives	106	100.0%
Q79. Antiinfectives ordered	106	99.1%
Q80. Aminoglycosides	106	100.0%
Q81. Antiinfectives	106	100.0%
Q82. Pediculicides	106	100.0%
Q83. Propoxyphene	106	100.0%
Q84. Pentazocine	106	99.1%
Q85. Indomethacin	106	100.0%
Q86. Phenylbutazone	106	100.0%
Q87. Muscle relaxants	106	100.0%
Q88. Antispasmodics	106	100.0%
Q89. Concurrent use of histamine	106	100.0%
Q90. Concurrent use of non-steroidal	106	99.1%
Q91. Drug claims (number)	106	99.1%

APPENDIX VIII (continued)

Variable	Number of Responses	Percent Agreement
Q92. Concurrent use of potassium	106	100.0%
Q93. Concurrent use/ACE	106	99.1%
Q94. Concurrent use/potassium and ACE	106	100.0%
Q95. Concurrent use ACE (+2)	106	100.0%
Q96. Concurrent use Calcium	106	100.0%
Q97. Concurrent use	106	100.0%
Q98. Chlorpropramide	106	100.0%

APPENDIX IX

ANTICIPATED LEVELS OF AGREEMENT FOR 50 CLAIMS-BASED QUALITY INDICATORS

I. Resident Outcomes - QIs 1-15

Agreement was defined as a match between the CR and the MR based on presence or absence of information (yes, no). We can refer to this type of match as "unambiguous"- the information is either there or not there. For example, a hospitalization match between the CR and the MR will indicate that a resident has a claim for some hospitalization during the study window, and that there is also MR information regarding hospitalization for this resident during this time period.

II. Lack of Therapy - QI 16

Agreement was be defined in the same way as QIs 1-17.

III. Pharmaceutical Treatments - QIs 17-50

There where three types of matches between the CR and the MR for drug treatments: 1) generic entity agreement, 2) generic entity and dose agreement, and 3) generic entity and duration agreement (duration will be calculated from claims data based on quantity of the drug that is dispensed). Generic entity is considered the primary match; however, if agreement calls for generic and some other match criterion, both criteria must be present in order for the CR and the MR to be considered in agreement. Thus, partial matches (i.e., no generic agreement but agreement between doses) were not be considered matches between the CR and the MR. The following is a listing of the types of matches between the MR and the CR that we anticipate examining for each of the drug QIs:

QI 17 - generic match (and no disease present)
QI 18 - generic and duration match
QI 19 - generic and duration match
QI 20 - generic match
QI 21 - generic match
QI 22 - generic match
QI 23 - generic and duration match
QI 24 - generic and duration match
QI 25 - generic and dose match
QI 26 - generic and dose match
QI 27 - generic and dose match
QI 28 - generic and dose match
QI 29 - generic match
QI 30 - generic match
QI 31 - generic match
QI 32 - generic and duration match (and number of generics and duration for each)

QI 33 - generic and duration match
QI 34 - generic match
QI 35 - generic and duration match (and no disease present)
QI 36 - generic match
QI 37 - generic match
QI 38 - generic match
QI 39 - generic match
QI 40 - generic match
QI 41 - generic (for both drugs) and duration match for both
QI 42 - generic (for both drugs) and duration match for both
QI 43 - generic and duration match
QI 44 - generic and duration match (both classes)
QI 45 - generic and duration match (both classes)
QI 46 - generic and duration match (both classes)
QI 47 - generic and duration match (2 or more generics)
QI 48 - generic and duration match (2 or more generics)
QI 49 - generic and duration match (2 or more generics)
QI 50 - generic match

APPENDIX X

CONVERSION OF F-TAGS APPLICABLE TO STUDY QIs FROM 10/1/90 VERSION TO 4/1/92 VERSION

F-Tags Effective 10/1/90	F-Tags Effective 4/1/92	Description
F198	F204	Timing of the notice of transfer/discharge
F203	F221	Physical restraints
F204	F222	Chemical restraints
F205	F223	Right to be free from abuse
F223	F253	Right to accommodations of individual needs and preferences
F232	F261	Housekeeping and maintenance service
F234	F261	Housekeeping and maintenance service
F241	F272 *	Comprehensive assessment
F246	F277	Assessment includes nutritional status and requirements
F252	F283	Assessment includes rehabilitation potential
F262	F295 *	Facility must develop a comprehensive care plan for each resident that includes measurable objectives and timetables
F273	F311	Bathe, dress, and groom
F274	F312	Transfer and ambulate
F275	F313	Toilet
F276	F314	Eat
F277	F315	Use speech, language, or other functional communication systems
F278	F316	Appropriate treatment and services to maintain or improve ADLs
F279	F317	Receives the necessary services to maintain good nutrition, grooming, and personal and oral hygiene
F280	F317	Receives the necessary services to maintain good nutrition, grooming, and personal and oral hygiene
F281	F317	Receives the necessary services to maintain good nutrition, grooming, and personal and oral hygiene
F283	F319	Resident does not develop pressure sores
F284	F320	Pressure sores
F285	F322	Urinary incontinence
F286	F321	Resident's clinical condition demonstrates catheterization necessary
F287	F322	Urinary incontinence
F288	F323	No reduction in range of motion
F289	F324	Range of motion
F290	F325 *	Psychosocial remotivation
F291	F326	Resident's clinical condition demonstrates pattern was unavoidable
F293	F328	Tube feeding/prevention
F296	F331	Acceptable parameters of nutritional status
F297	F332	Therapeutic diet
F298	F333	Hydration
F300	F335	Parenteral and enteral fluids

F-Tags Effective 10/1/90	F-Tags Effective 4/1/92	Description
F306	F341	Prostheses care
F307		Eliminated
F308	F348 *	Antipsychotic drugs not given unless necessary to treat a specific condition
F309	F349 *	Gradual dose reductions
F332	F369	Food substitutes offered
F333	F370	Therapeutic diets
F334	F371	Three meals daily, at regular times
F335	F372	No more than 14 hours between a substantial evening meal and breakfast
F336	F373	Snacks at bedtime
F337	F374	Residents influence meal times secondary to bedtime snacks
F338	F375	Assistive devices for eating
F340	F377	Store, prepare, distribute, and serve food
F356	F405-A	Specialized rehabilitative services
F358	F407	Specialized rehab must be provided under written order of physician
F373	F430	Monthly drug regimen review
F374	F431	Report any irregularities to the attending physician and the director of nursing
F378	F440-A	Establish and maintain infection control program
F379	F441	Investigates, controls/prevents infection
F380	F442	Decides what procedures should be applied to resident
F381	F443	Maintains record of actions related to infections
F382	F444	Isolation of resident
F383	F445	Employees with communicable disease no direct contact
F384	F446	Hand washing/infection control
F385	F447	Linens/infection control
F389	F458	Sufficient space and equipment: dining, health, program areas
F413	F482	Corridors equipped with handrails
F445	F517	Promptly notify physician of findings 483.75(j)(2)(ii)
F452	F524	Promptly notify physician of findings 483.75(k)(2)(ii)
F490	F204	Timing of the notice of transfer/discharge
F500	F272 *	Comprehensive assessment
F505	F354	24 hour nursing services
F669		Eliminated

* Tags marked with (*) contain new or revised requirements.

APPENDIX XI.1

AGGREGATION STRATEGIES - LEVEL I DEFINITIONS

APPENDIX XI.1

DEFINITIONS: QI LEVEL I AGGREGATION

- **INDIA1: Resident Outcomes, Inpatient Stay or Emergency Room Visit**

  Infectious Conditions: Respiratory Infection, Skin Infection, Sepsis, Urinary Tract Infection

- **INDIA2: Resident Outcomes, Inpatient Stay or Emergency Room Visit**

  Non-Infectious Conditions: Decubitus Ulcers; Nutritional Deficiencies; Paralytic Ileus; Electrolyte Imbalance; Endoctrine Disorders; Fracture of Skull, Neck/Trunk, Upper/Lower Limb; Injury; External Causes; Attempted Suicide

- **INDIB: Hospitalization**

  Number hospitlizations that occur > 7 days after Nursing Home admission

- **INDIC: Death**

  Death within 30 days following any of events listed in 1.A.1-16

- **INDII: Lack of Therapy**

  Listed Dx without outpateint claim for therapy within 30 days after end date of service on Dx claim

- **INDIIIA1: Pharmaceutical Treatments, Psychoactives -- Antipsychotics**

  Use of Antipsychotics, Continuous Use of Antipsychotics for more than 120 days

- **INDIIIA2: Pharmaceutical Treatments, Psychoacitves -- Sedative Hypnotics/Antianxiety Drugs**

  Use of Long-Term Sedative Hypnotic Use: Use of drugs such as Long Half-Life Benzodiazepines; Use of Anticholinergics

- **INDIIIA3: Pharmaceutical Treatments, Psychoactives -- Cross Classes**

  Concurrent Use of Psychoactive drugs within same therapeutic class > 60 days; Concurrent use of Psychoactive drugs within same therapeutic classes > 120 days

- **INDIIIA4: Pharmaceutical Treatments, Psychoactives -- Cross Classes**

  Maximum single doses for some Hypnotic drugs; Maximum dosages of selected Anxiolytics; Maximum dosages of selected Antipsychotics; Maximum dosages of selected Antidepressants

- **INDIIIA5: Pharmaceutical Treaments, Antidepressants**

  Use of Antidepressant; Use of combination Antidepressants/Antipsychotics

- **INDIIIB: Pharmaceutical Treatments, Infection Control**

  Use of atypical Anit-Infective drugs; Use of 4 or more Anti-Infectives within 60 days, Use of Aminoglycosides without Creatinine or BUN text; Use of Pediculicides after 7 days following Nursing Home admission; Use of Anti-Infectives for >60 days except for certain conditions

- **INDIIIC: Pharmaceutical Treatments, Pain Management**

  Use of Propxyphene; Use of Pentazocine; Use of Indeomethacin; Use of Phenylbutazone; Use of Muscle Relaxants or Antispasmodics; Concurrent use of NSAIDS and Histamine-2 Antagonists for >60 days; Concurrent use of 2 or more NSAIDS for >60 days

- **INDIID: Pharmaceutical Treatments, Other**

  More than 21 drug claims per month; Concurrent use of Potassium Supplements and Potassium-Sparing Diuretics for >60 days; Concurrent use of Potassium Supplements and ACE Inhibitors for more than 60 days; Concurrent use of Potassium-Sparing Diuretics and ACE inhibitors for more than 60 days; Concurrent use of 2 or more Calcium Channel-Blocking Agents for more than 60 days; Concurrent use of 2 or more ACE Inhibitors for more than 60 days; Concurrent use of 2 or more Histamine-2 Antagonists for more than 60 days; Use of Chlorpropamide

APPENDIX XI.2

AGGREGATION STRATEGIES - LEVEL II DEFINITIONS

APPENDIX XI.2

DEFINITIONS: QI LEVEL II AGGREGATION

- **INDIA: Resident Outcomes, Inpatient Stay or Emergency Room Visit**

  Infectious Conditions: Respiratory Infection, Skin Infection, Sepsis, Urinary Tract Infection

  Non-Infectious Conditions: Decubitus Ulcers; Nutritional Deficiencies; Paralytic Ileus; Electrolyte Imbalance; Endocrine Disorders; Fracture of Skull, Neck/Trunk, Upper/Lower Limb; Injury; External Causes; Attempted Suicide

- **INDIB: Hospitalization**

  Number hospitalizations that occur >7 days after Nursing Home admission

- **INDIC: Death**

  Death within 30 days of any of events listed in 1.A.1-16

- **INDII: Lack of Therapy**

  Listed Dx without outpatient claim for therapy within 30 days after end date of service on Dx claim

- **INDIIIA: Pharmaceutical Treatments, Psychoactives -- Antipsychotics, Sedative Hypnotics/Antianxiety Drugs, Cross Classes, and Antidepressants**

  Use of Antipsychotics; Continuous use of Antipsychotics for more than 120 days

  Use of Long-Term Sedative Hypnotic use; Use of drugs such as Long Half-Life Benzodiazepines; Use of Anticholinergics

  Concurrent use of Psychoactive drugs within same therapeutic class >60 days; Concurrent use of Psychoactive drugs within same therapeutic class >120 days

  Maximum single doses for some Hypnotic drugs; Maximum dosages of selected Anxiolytics; Maximum dosages of selected Antipsychotics; Maximum dosages of selected Antidepressants

  Use of Antidepressant; Use of combination Antidepressants/Antipsychotics

- **INDIIIB: Pharmaceutical Treatments, Infective Control**

  Use of atypical Anti-Infective Drugs; Use of 4 or more Anti-Infectives within 60 days; Use of Aminoglycosides without Creatinine or BUN text; Use of Pediculicides after 7 days following Nursing Home admission; Use of an Anti-Infective for >60 days except for certain conditions

- **INDIIIC: Pharmaceutical Treatments, Pain Management**

  Use of Proxoxyphene; Use of Pentazocine; Use of Indomethacin; Use of Phenylbutazone; Use of Muscle Relaxants or Antispasmodics; Concurrent use of NSAIDS and Histamine-2 Antagonists for >60 days; Concurrent use of 2 or more NSAIDS for >60 days

- **INDIIID: Pharmaceutical Treatments, Other**

  More than 12 drug claims per month; Concurrent use of Potassium Supplements and Potassium-Sparing Diuretics for >60 days; Concurrent use of Potassium Supplements and ACE Inhibitors for more than 60 days; Concurrent use of Potassium-Sparing Diuretics and ACE inhibitors for more than 60 days; Concurrent use of 2 or more Calcium Channel-Blocking Agents for more than 60 days; Concurrent use of 2 or more ACE Inhibitors for more than 60 days; Concurrent use of 2 or more Histamine-2 Antagonists for more than 60 days; Use of chloropropamide

APPENDIX XI.3

AGGREGATION STRATEGIES - LEVEL III DEFINITIONS

APPENDIX XI.3

DEFINITIONS: QI LEVEL III AGGREGATION

- **INDI: Resident Outcomes, Inpatient Stay or Emergency Room Visit, Hospitilization, Death**

  Infectious Conditions: Repiratory Infection, Skin Infection, Sepsis, Urinary Tract Infection

  Non-Infectious Conditions: Decubitus Ulcers; Nutritional Deficiencies; Paralytic Ileus; Electrolyte Imbalance; Endocrine Disorders, Fracture of Skull, Neck/Trunk, Upper/Lower Limb; Injury; External Causes; Attempted Suicide

  Number hospitalizations that occur >7 days after Nursing Home admission

  Death within 30 days following any of events listed in 1.A.1-16

- **INDII:** Lack of Therapy

  Listed Dx without outpatient claim for therapy within 30 days after end date of service on Dx claim

- **INDIII:** Pharmaceutical Treatments

  Use of Antipsychotics; Continuous use of Antipsychotics for more than 120 days

  Use of Long-Term Sedative Hypnotic Use; Use of drugs such as Long Half-Life Benzodiazepines; Use of Anticholinergics

  Concurrent use Psychoactive drugs within same therapeutic class >60 days; Concurrent use of Psychoactive drugs within same therapeutic class >120 days

  Maximum single doses for some Hypnotic drugs; Maximum dosages of selected Anxiolytics; Maximum dosages of selected Antipsychotics; Maximum dosages of selected Antidepressants

  Use of Antidepressant; Use of combination Antidepressants/Antipsychotics

  Use of atypical Anti-Infective Drugs; Use of 4 or more Anti-Infectives within 60 days; Use of Aminoglycosides without Creatinine or BUN text; Use of Pediculicides after 7 days following nursing home admission; Use of an Anti-Infective for >60 days except for certain conditions

  Use of Proxoxyphene; Use of Pentazocine; Use of Indomethacin; Use of Phenylbutazone;

Use of Muscle Relaxants or Antispasmodics; Concurrent use of NSAIDS and Histamine-2 Antagonists for >60 days; Concurrent use of 2 or more NSAIDS for >60 days

More than 12 drug claims per month; Concurrent use of Potassium Supplements and Potassium-Sparing Diuretics for >60 days; Concurrent use of Potassium Supplements and ACE Inhibitors for more than 60 days; Concurrent use of Potassium-Sparing Diuretics and ACE inhibitors for more than 60 days; Concurrent use of 2 or more Calcium Channel-Blocking Agents for more than 60 days; Concurrent use of 2 or more ACE Inhibitors for more than 60 days; Concurrent use of 2 or more Histamine-2 Antagonists for more than 60 days; Use of chloropropamide.

Appendix XI.4

APPENDIX XI.4

CHARACTERISTICS OF STUDY POPULATION

Variable Name		California N = 28,999 Residents N = 216 Facilities	Georgia N = 18,202 Residents N = 524 Facilities
Age	65-74	17%	17%
	75-84	34%	40%
	85+	49%	43%
Average Age		83.6 yrs	82.6 yrs
Gender	Female	75%	78%
	Male	25%	22%
Race	White	82%	73%
	Black	12%	24%
	Other	6%	3%
Medical Costs	Low	25%	25%
	High	75%	75%
Medicare Costs	No	36%	53%
	Yes	64%	47%
Beds	1-119	73%	72%
	120+	27%	28%
	1-80	19%	17%
	81-160	57%	60%
	160+	24%	23%
Average Bed Size		102 beds	109 beds
Ownership	Non-Profit	21%	23%
	Profit	79%	77%
Chain	No	53%	38%
	Yes	47%	62%
Geographic Location	Inner Urban	79%	13%
	Urban	10%	13%
	Suburban	10%	42%
	Rural	1%	32%

APPENDIX XI.5

QUALITY INDICATOR FREQUENCY
CLAIMS DATA - CALIFORNIA

APPENDIX XI.5

FREQUENCY OF QUALITY INDICATOR FLAGS GENERATED FROM CLAIMS DATA FOR 28,999 CALIFORNIA NURSING HOME RESIDENTS

QI Number	Residents with Triggered QI	Percent of All Residents	Percent of All Triggered QIs
1	811	2.8%	2.3%
2	63	0.2%	0.2%
3	259	0.9%	0.7%
4	392	1.4%	1.1%
5	56	0.2%	0.2%
6	8	0.0%	0.0%
7	7	0.0%	0.0%
8	186	0.6%	0.5%
9	30	0.1%	0.1%
10	278	1.0%	0.8%
11	142	0.5%	0.4%
12	2	0.0%	0.0%
13	0	0.0%	0.0%
14	3,344	11.5%	9.6%
15	320	1.1%	0.9%
16	1,772	6.1%	5.1%
17	4,159	14.3%	11.9%
18	1,264	4.4%	3.6%
19	660	2.3%	1.9%
20	1,222	4.2%	3.5%
21	655	2.3%	1.9%
22	152	0.5%	0.4%
23	6,489	22.4%	18.6%
24	125	0.4%	0.4%
25	483	1.7%	1.4%
26	162	0.6%	0.5%
27	2,077	7.2%	5.9%
28	1,693	5.8%	4.8%
29	1,656	5.7%	4.7%
30	136	0.5%	0.4%
31	115	0.4%	0.3%
32	384	1.3%	1.1%
33	701	2.4%	2.0%
34	728	2.5%	2.1%
35	2,170	7.5%	6.2%
36	50	0.2%	0.1%
37	8	0.0%	0.0%
38	154	0.5%	0.4%
39	0	0.0%	0.0%
40	436	1.5%	1.2%
41	206	0.7%	0.6%
42	7	0.0%	0.0%
43	606	2.1%	1.7%
44	129	0.4%	0.4%
45	228	0.8%	0.7%
46	75	0.3%	0.2%
47	28	0.1%	0.1%
48	171	0.6%	0.5%
49	4	0.0%	0.0%
50	177	0.6%	0.5%
Total Triggered QIs	34,980		

Ranked by Hit Rate			
QI Number	Residents with Triggered QI	Percent of All Residents	Percent of All Triggered QIs
23	6,489	22.4%	18.6%
17	4,159	14.3%	11.9%
14	3,344	11.5%	9.6%
35	2,170	7.5%	6.2%
27	2,077	7.2%	5.9%
16	1,772	6.1%	5.1%
28	1,693	5.8%	4.8%
29	1,656	5.7%	4.7%
18	1,264	4.4%	3.6%
20	1,222	4.2%	3.5%
1	811	2.8%	2.3%
34	728	2.5%	2.1%
33	701	2.4%	2.0%
19	660	2.3%	1.9%
21	655	2.3%	1.9%
43	606	2.1%	1.7%
25	483	1.7%	1.4%
40	436	1.5%	1.2%
4	392	1.4%	1.1%
32	384	1.3%	1.1%
15	320	1.1%	0.9%
10	278	1.0%	0.8%
3	259	0.9%	0.7%
45	228	0.8%	0.7%
41	206	0.7%	0.6%
8	186	0.6%	0.5%
50	177	0.6%	0.5%
48	171	0.6%	0.5%
26	162	0.6%	0.5%
38	154	0.5%	0.4%
22	152	0.5%	0.4%
11	142	0.5%	0.4%
30	136	0.5%	0.4%
44	129	0.4%	0.4%
24	125	0.4%	0.4%
31	115	0.4%	0.3%
46	75	0.3%	0.2%
2	63	0.2%	0.2%
5	56	0.2%	0.2%
36	50	0.2%	0.1%
9	30	0.1%	0.1%
47	28	0.1%	0.1%
6	8	0.0%	0.0%
37	8	0.0%	0.0%
7	7	0.0%	0.0%
42	7	0.0%	0.0%
49	4	0.0%	0.0%
12	2	0.0%	0.0%
13	0	0.0%	0.0%
39	0	0.0%	0.0%
Total Triggered QIs	34,980		

APPENDIX XI.6

PERCENT OF RESIDENTS WITHIN EACH FACILITY WITH QIs
FACILITY-LEVEL
CALIFORNIA

APPENDIX XI.6

PERCENT OF RESIDENTS WITHIN EACH FACILITY WITH QIs

FACILITY-LEVEL DATA

CALIFORNIA

N = 28,999 RESIDENTS
524 FACILITIES

Quality Indicators Per Resident	Percent of Residents
0	48.4
1	19.8
2	13.3
3	10.0
4	4.4
5	2.2
6	1.0
7+	0.9
Average Resident QI Rate	1.2
Range	0-3.7

APPENDIX XI.7

QUALITY INDICATORS PER RESIDENT
RESIDENT LEVEL
CALIFORNIA

APPENDIX XI.7

QUALITY INDICATORS PER RESIDENT

RESIDENT-LEVEL DATA

CALIFORNIA

N = 28,999 RESIDENTS
524 FACILITIES

Quality Indicators Per Resident	Percent of Sample
0	47.3
1	20.4
2	13.4
3	9.9
4	4.6
5	2.3
6	1.1
7+	0.9
Average QIs per Resident	1.2
Range	0-11

APPENDIX XI.8

QUALITY INDICATOR FREQUENCY
CLAIMS DATA - GEORGIA

APPENDIX XI.8

FREQUENCY OF QUALITY INDICATOR FLAGS GENERATED FROM CLAIMS DATA FOR 18,202 GEORGIA NURSING HOME RESIDENTS

QI Number	Residents with Triggered QI	Percent of All Residents	Percent of All Triggered QIs
1	686	3.8%	2.0%
2	87	0.5%	0.3%
3	206	1.1%	0.6%
4	623	3.4%	1.8%
5	90	0.5%	0.3%
6	41	0.2%	0.1%
7	40	0.2%	0.1%
8	553	3.0%	1.6%
9	25	0.1%	0.1%
10	179	1.0%	0.5%
11	44	0.2%	0.1%
12	2	0.0%	0.0%
13	0	0.0%	0.0%
14	3,622	19.9%	10.6%
15	302	1.7%	0.9%
16	270	1.5%	0.8%
17	3,003	16.5%	8.8%
18	801	4.4%	2.3%
19	1,292	7.1%	3.8%
20	707	3.9%	2.1%
21	476	2.6%	1.4%
22	161	0.9%	0.5%
23	5,941	32.6%	17.4%
24	255	1.4%	0.7%
25	819	4.5%	2.4%
26	1,147	6.3%	3.4%
27	1,468	8.1%	4.3%
28	910	5.0%	2.7%
29	886	4.9%	2.6%
30	131	0.7%	0.4%
31	108	0.6%	0.3%
32	552	3.0%	1.6%
33	926	5.1%	2.7%
34	472	2.6%	1.4%
35	2,435	13.4%	7.1%
36	2,542	14.0%	7.4%
37	138	0.8%	0.4%
38	228	1.3%	0.7%
39	14	0.1%	0.0%
40	483	2.7%	1.4%
41	320	1.8%	0.9%
42	63	0.3%	0.2%
43	427	2.3%	1.2%
44	123	0.7%	0.4%
45	367	2.0%	1.1%
46	43	0.2%	0.1%
47	19	0.1%	0.1%
48	60	0.3%	0.2%
49	2	0.0%	0.0%
50	95	0.5%	0.3%
Total Triggered QIs	34,184		

Ranked by Hit Rate			
QI Number	Residents with Triggered QI	Percent of All Residents	Percent of All Triggered QIs
23	5,941	32.6%	17.4%
14	3,622	19.9%	10.6%
17	3,003	16.5%	8.8%
36	2,542	14.0%	7.4%
35	2,435	13.4%	7.1%
27	1,468	8.1%	4.3%
19	1,292	7.1%	3.8%
26	1,147	6.3%	3.4%
33	926	5.1%	2.7%
28	910	5.0%	2.7%
29	886	4.9%	2.6%
25	819	4.5%	2.4%
18	801	4.4%	2.3%
20	707	3.9%	2.1%
1	686	3.8%	2.0%
4	623	3.4%	1.8%
8	553	3.0%	1.6%
32	552	3.0%	1.6%
40	483	2.7%	1.4%
21	476	2.6%	1.4%
34	472	2.6%	1.4%
43	427	2.3%	1.2%
45	367	2.0%	1.1%
41	320	1.8%	0.9%
15	302	1.7%	0.9%
16	270	1.5%	0.8%
24	255	1.4%	0.7%
38	228	1.3%	0.7%
3	206	1.1%	0.6%
10	179	1.0%	0.5%
22	161	0.9%	0.5%
37	138	0.8%	0.4%
30	131	0.7%	0.4%
44	123	0.7%	0.4%
31	108	0.6%	0.3%
50	95	0.5%	0.3%
5	90	0.5%	0.3%
2	87	0.5%	0.3%
42	63	0.3%	0.2%
48	60	0.3%	0.2%
11	44	0.2%	0.1%
46	43	0.2%	0.1%
6	41	0.2%	0.1%
7	40	0.2%	0.1%
9	25	0.1%	0.1%
47	19	0.1%	0.1%
39	14	0.1%	0.0%
12	2	0.0%	0.0%
49	2	0.0%	0.0%
13	0	0.0%	0.0%
Total Triggered QIs	34,184		

APPENDIX XI.9

PERCENT OF RESIDENTS WITHIN EACH FACILITY WITH QIs
FACILITY-LEVEL
GEORGIA

APPENDIX XI.9

PERCENT OF RESIDENTS WITHIN EACH FACILITY WITH QIs

FACILITY-LEVEL DATA

GEORGIA

N = 18,202 RESIDENTS
216 FACILITIES

Quality Indicators Per Resident	Percent of Residents
0	31.9
1	20.3
2	15.5
3	13.1
4	8.9
5	5.1
6	2.6
7+	2.5
Average QIs per Resident	1.9
Range	0.6 - 3.5

APPENDIX XI.10

QUALITY INDICATORS PER RESIDENT
RESIDENT-LEVEL
GEORGIA

APPENDIX XI.10

QUALITY INDICATORS PER RESIDENT

RESIDENT-LEVEL DATA

GEORGIA

N = 18,202 RESIDENTS
216 FACILITIES

Number of Quality Indicators Per Person	Percent of Sample
0	31.7
1	20.3
2	15.9
3	13.0
4	8.9
5	4.9
6	2.7
7+	2.5
Average QI per Resident	2.0
Range	0-14

APPENDIX XI.11

QI VALIDATION
DISAGGREGATED QI - CALIFORNIA

APPENDIX XI.11

QUALITY INDICATOR VALIDATION RESULTS: DISAGGREGATED QUALITY INDICATORS

CALIFORNIA: 939 SAMPLED RESIDENTS

	Quality Indicator	Claims QI Yes Rate	Medical Record QI Yes Rate	Medical Record and Claims Agreement Rate	Positive Predictive Value	Negative Predictive Value
1	Respiratory Infection	0.022	0.038	0.980	0.905	0.981
2	Skin Infection	0.003	0.010	0.994	1.000	0.994
3	Sepsis	0.006	0.015	0.983	0.333	0.987
4	Urinary Tract Infection	0.007	0.031	0.977	1.000	0.976
5	Decubitus Ulcers	0.001	0.002	0.997	0.000	0.998
6	Nutritional Deficiencies	0.000	0.001	0.999	--	0.999
7	Paralytic Ileus	0.002	0.003	0.997	0.500	0.998
8	Electrolyte Imbalance	0.002	0.011	0.989	0.500	0.990
9	Endocrine Disorders such as Diabetic Crisis	0.000	0.001	0.999	--	0.999
10	Fracture of Skull, Neck/Trunk, Upper/Lower Limb	0.006	0.012	0.990	0.667	0.992
11	Injury	0.000	0.017	0.983	--	0.983
12	External causes: Cold, heat, immersion, hunger, thirst, exhaustion, motion, asphyxiation	0.001	0.000	0.999	0.000	1.000
13	Attempted suicide	0.000	0.001	0.999	--	0.999
14	Hospitalization	0.070	0.117	0.951	0.985	0.948
15	Death within 30 days following any of the QI # 1-16 events	0.007	0.011	0.982	0.000	0.989
16	Lack of therapy	0.055	0.000	0.945	0.000	1.000
17	Use of antipsychotics	0.148	0.029	0.859	0.122	0.988
18	Continuous use of antipsychotics for > 120 days	0.035	0.080	0.940	0.788	0.946
19	Long term sedative use	0.019	0.102	0.910	0.833	0.912
20	Use of drugs such as long half-life benzodiazepines	0.035	0.066	0.958	0.848	0.962
21	Use of drugs such as barbiturate agents and other selected sedatives	0.026	0.029	0.997	1.000	0.997
22	Use of anticholingergics	0.007	0.006	0.997	0.714	0.999
23	Concurrent use of psychoactive drugs for > 60 days	0.193	0.012	0.808	0.033	0.993
24	Concurrent use of psychoactive drugs for >120 days	0.001	0.027	0.974	1.000	0.974
25	Maximum single doses for some hypnotic drugs	0.021	0.061	0.952	0.800	0.955

	Quality Indicator	Claims QI Yes Rate	Medical Record QI Yes Rate	Medical Record and Claims Agreement Rate	Positive Predictive Value	Negative Predictive Value
26	Maxium dosages of selected anxiolytics	0.005	0.067	0.936	0.800	0.937
27	Maximum dosages of selected antipsychotics	0.050	0.108	0.915	0.723	0.925
28	Maximum dosages of selected antidepressants	0.048	0.056	0.983	0.911	0.987
29	Use of certain antidepressants (amitriptyline, imipramine, protriptyline, and trimipramine)	0.047	0.055	0.985	0.932	0.988
30	Use of combination antidepressants/antipsychotics	0.002	0.003	0.999	1.000	0.999
31	Use of atypical anti-infective drugs	0.003	0.003	1.000	1.000	1.000
32	Use of four or more anti-infectives within a 60-day period	0.006	0.049	0.953	0.667	0.955
33	Use of aminoglycosides without a creatinine or BUN test	0.023	0.002	0.974	0.000	0.998
34	Use of pediculicides after 7 days following nursing home admission	0.011	0.044	0.963	0.800	0.964
35	Use of any anti-infectives > 60 days except for treating certain conditions	0.073	0.007	0.928	0.058	0.997
36	Use of propoxyphene	0.001	0.057	0.945	1.000	0.945
37	Use of pentazocine	0.001	0.003	0.998	1.000	0.998
38	Use of indomethacin	0.007	0.006	0.999	0.857	1.000
39	Use of phenylbutazone	0.000	0.000	1.000	--	1.000
40	Use of muscle relaxants or antispasmodics	0.005	0.009	0.990	0.400	0.994
41	Concurrent use of NSAIDS and histamine-2 antagonists for > 60 days	0.003	0.023	0.978	0.667	0.979
42	Concurrent use of $\geq$ 2 NSAIDS for > 60 days	0.000	0.006	0.994	--	0.994
43	More than 12 drug claims per month, excluding OTCs	0.017	0.032	0.977	0.750	0.980
44	Concurrent use of potassium supplements and potassium-sparing diuretics for > 60 days	0.000	0.012	0.988	--	0.988
45	Concurrent use of potassium supplements and ACE inhibitors for > 60 days	0.013	0.031	0.978	0.833	0.980
46	Concurrent use of potassium-sparing diuretics and ACE inhibitors for > 60 days	0.001	0.002	0.999	1.000	0.999
47	Concurrent use of 2 calcium channel-blocking agents for > 60 days	0.001	0.001	1.000	1.000	1.000
48	Concurrent use of $\geq$ 2 ACE inhibitors for > 60 days	0.004	0.000	0.996	0.000	1.000
49	Concurrent use of $\geq$ 2 histamine-2 antagonists for > 60 days	0.000	0.001	0.999	--	0.999
50	Use of chlorpropamide	0.006	0.006	0.998	0.833	0.999

APPENDIX XI.12

QI VALIDATION
DISAGGREGATED QI - GEORGIA

APPENDIX XI.12

QUALITY INDICATOR VALIDATION RESULTS: DISAGGREGATED QUALITY INDICATORS

GEORGIA: 894 SAMPLED RESIDENTS

	Quality Indicator	Claims QI Yes Rate	Medical Record QI Yes Rate	Medical Record and Claims Agreement Rate	Positive Predictive Value	Negative Predictive Value
1	Respiratory Infection	0.026	0.038	0.980	0.905	0.981
2	Skin Infection	0.006	0.010	0.994	1.000	0.994
3	Sepsis	0.011	0.015	0.983	0.333	0.987
4	Urinary Tract Infection	0.031	0.031	0.977	1.000	0.976
5	Decubitus Ulcers	0.002	0.002	0.997	0.000	0.998
6	Nutritional Deficiencies	0.000	0.001	0.999	--	0.999
7	Paralytic Ileus	0.002	0.003	0.997	0.500	0.998
8	Electrolyte Imbalance	0.023	0.011	0.989	0.500	0.990
9	Endocrine Disorders such as Diabetic Crisis	0.000	0.001	0.999	--	0.999
10	Fracture of Skull, Neck/Trunk, Upper/Lower Limb	0.013	0.012	0.990	0.667	0.992
11	Injury	0.002	0.017	0.983	--	0.983
12	External causes: Cold, heat, immersion, hunger, thirst, exhaustion, motion, asphyxiation	0.000	0.000	0.999	0.000	1.000
13	Attempted suicide	0.000	0.001	0.999	--	0.999
14	Hospitalization	0.161	0.117	0.951	0.985	0.948
15	Death within 30 days following any of the QI # 1-16 events	0.012	0.011	0.982	0.000	0.989
16	Lack of therapy	0.011	0.000	0.945	0.000	1.000
17	Use of antipsychotics	0.147	0.029	0.859	0.122	0.988
18	Continuous use of antipsychotics for > 120 days	0.036	0.080	0.940	0.788	0.946
19	Long term sedative use	0.055	0.102	0.910	0.833	0.912
20	Use of drugs such as long half-life benzodiazepines	0.040	0.066	0.958	0.848	0.962
21	Use of drugs such as barbiturate agents and other selected sedatives	0.022	0.029	0.997	1.000	0.997
22	Use of anticholingergics	0.008	0.006	0.997	0.714	0.999
23	Concurrent use of psychoactive drugs for > 60 days	0.289	0.012	0.808	0.033	0.993
24	Concurrent use of psychoactive drugs for >120 days	0.009	0.027	0.974	1.000	0.974
25	Maximum single doses for some hypnotic drugs	0.029	0.061	0.952	0.800	0.955

		Claims QI Yes Rate	Medical Record QI Yes Rate	Medical Record and Claims Agreement Rate	Positive Predictive Value	Negative Predictive Value
26	Maxium dosages of selected anxiolytics	0.060	0.067	0.936	0.800	0.937
27	Maximum dosages of selected antipsychotics	0.076	0.108	0.915	0.723	0.925
28	Maximum dosages of selected antidepressants	0.044	0.056	0.983	0.911	0.987
29	Use of certain antidepressants (amitriptyline, imipramine, protriptyline, and trimipramine)	0.043	0.055	0.985	0.932	0.988
30	Use of combination antidepressants/antipsychotics	0.009	0.003	0.999	1.000	0.999
31	Use of atypical anti-infective drugs	0.004	0.003	1.000	1.000	1.000
32	Use of four or more anti-infectives within a 60-day period	0.028	0.049	0.953	0.667	0.955
33	Use of aminoglycosides without a creatinine or BUN test	0.054	0.002	0.974	0.000	0.998
34	Use of pediculicides after 7 days following nursing home admission	0.013	0.044	0.963	0.800	0.964
35	Use of any anti-infectives > 60 days except for treating certain conditions	0.129	0.007	0.928	0.058	0.997
36	Use of propoxyphene	0.138	0.057	0.945	1.000	0.945
37	Use of pentazocine	0.004	0.003	0.998	1.000	0.998
38	Use of indomethacin	0.012	0.006	0.999	0.857	1.000
39	Use of phenylbutazone	0.000	0.000	1.000	--	1.000
40	Use of muscle relaxants or antispasmodics	0.028	0.009	0.990	0.400	0.994
41	Concurrent use of NSAIDS and histamine-2 antagonists for > 60 days	0.013	0.023	0.978	0.667	0.979
42	Concurrent use of ≥ 2 NSAIDS for > 60 days	0.001	0.006	0.994	--	0.994
43	More than 12 drug claims per month, excluding OTCs	0.016	0.032	0.977	0.750	0.980
44	Concurrent use of potassium supplements and potassium-sparing diuretics for > 60 days	0.009	0.012	0.988	--	0.988
45	Concurrent use of potassium supplements and ACE inhibitors for > 60 days	0.018	0.031	0.978	0.833	0.980
46	Concurrent use of potassium-sparing diuretics and ACE inhibitors for > 60 days	0.003	0.002	0.999	1.000	0.999
47	Concurrent use of 2 calcium channel-blocking agents for > 60 days	0.000	0.001	1.000	1.000	1.000
48	Concurrent use of ≥ 2 ACE inhibitors for > 60 days	0.002	0.000	0.996	0.000	1.000
49	Concurrent use of ≥ 2 histamine-2 antagonists for > 60 days	0.000	0.001	0.999	--	0.999
50	Use of chlorpropamide	0.003	0.006	0.998	0.833	0.999

APPENDIX XI.13

QI VALIDATION
AGGREGATED QI - LEVEL I
CALIFORNIA

APPENDIX XI.13

QUALITY INDICATOR VALIDATION RESULTS: LEVEL I AGGREGATION

CALIFORNIA: 939 SAMPLED RESIDENTS

	Claims QI Yes Rate	Medical Record QI Yes Rate	Medical Record and Claims Agreement Rate	Positive Predictive Value	Negative Predictive Value
Resident Outcomes, Inpatient Stay or Emergency Room Visit: Infectious Conditions	0.037	0.067	0.964	0.914	0.966
Resident Outcomes, Inpatient Stay or Emergency Room Visit: Non-Infectious Conditions	0.012	0.045	0.963	0.818	0.964
Hospitalization	0.070	0.117	0.951	0.985	0.948
Death	0.007	0.011	0.982	0.000	0.989
Lack of Therapy	0.055	0.000	0.945	0.000	1.000
Pharmaceutical Treatments, Psychoactives -- Antipsychotics	0.166	0.105	0.867	0.417	0.957
Pharmaceutical Treatments, Psychoactives -- Sedative Hypnotics/Antianxiety Drugs	0.078	0.165	0.898	0.904	0.897
Pharmaceutical Treatments, Psychoactives -- Cross Classes, Concurrent Use	0.193	0.034	0.814	0.105	0.983
Pharmaceutical Treatments, Psychoactives -- Cross Classes, Maximum Doses	0.111	0.240	0.835	0.837	0.835
Pharmaceutical Treatments, Antidepressants	0.047	0.055	0.985	0.932	0.988
Pharmaceutical Treatments, Infection Control	0.102	0.101	0.869	0.354	0.928
Pharmaceutical Treatments, Pain Management	0.018	0.096	0.912	0.706	0.915
Pharmaceutical Treatments, Other	0.037	0.078	0.945	0.800	0.950

APPENDIX XI.14

QI VALIDATION
AGGREGATED QI - LEVEL I
GEORGIA

APPENDIX XI.14

QUALITY INDICATOR VALIDATION RESULTS: LEVEL I AGGREGATION

GEORGIA: 894 SAMPLED RESIDENTS

	Claims QI Yes Rate	Medical Record QI Yes Rate	Medical Record and Claims Agreement Rate	Positive Predictive Value	Negative Predictive Value
Resident Outcomes, Inpatient Stay or Emergency Room Visit: Infectious Conditions	0.063	0.117	0.927	0.857	0.932
Resident Outcomes, Inpatient Stay or Emergency Room Visit: Non-Infectious Conditions	0.039	0.138	0.884	0.771	0.888
Hospitalization	0.161	0.234	0.923	0.986	0.911
Death	0.012	0.034	0.972	0.727	0.975
Lack of Therapy	0.011	0.000	0.989	0.000	1.000
Pharmaceutical Treatments, Psychoactives -- Antipsychotics	0.157	0.128	0.890	0.557	0.952
Pharmaceutical Treatments, Psychoactives -- Sedative Hypnotics/Antianxiety Drugs	0.115	0.224	0.867	0.893	0.863
Pharmaceutical Treatments, Psychoactives -- Cross Classes, Concurrent Use	0.289	0.063	0.754	0.182	0.986
Pharmaceutical Treatments, Psychoactives -- Cross Classes, Maximum Doses	0.171	0.209	0.915	0.863	0.926
Pharmaceutical Treatments, Antidepressants	0.043	0.054	0.987	0.974	0.987
Pharmaceutical Treatments, Infection Control	0.178	0.092	0.865	0.377	0.970
Pharmaceutical Treatments, Pain Management	0.179	0.215	0.935	0.919	0.939
Pharmaceutical Treatments, Other	0.044	0.078	0.959	0.923	0.960

APPENDIX XI.15

QI VALIDATION
AGGREGATED QI - LEVEL II
CALIFORNIA

APPENDIX XI.15

QUALITY INDICATOR VALIDATION RESULTS: LEVEL II AGGREGATION

CALIFORNIA: 939 SAMPLED RESIDENTS

	Claims QI Yes Rate	Medical Record QI Yes Rate	Medical Record and Claims Agreement Rate	Positive Predictive Value	Negative Predictive Value
Resident Outcomes, Inpatient Stay or Emergency Room Visit	0.048	0.102	0.941	0.956	0.941
Hospitalization	0.070	0.117	0.951	0.985	0.948
Death	0.007	0.011	0.982	0.000	0.989
Lack of Therapy	0.055	0.000	0.945	0.000	1.000
Pharmaceutical Treatments, Psychoactives	0.316	0.361	0.791	0.741	0.815
Pharmaceutical Treatments, Infection Control	0.102	0.101	0.869	0.354	0.928
Pharmaceutical Treatments, Pain Management	0.018	0.096	0.912	0.706	0.915
Pharmaceutical Treatments, Other	0.037	0.078	0.945	0.800	0.950

APPENDIX XI.16

QI VALIDATION
AGGREGATED QI - LEVEL II
GEORGIA

APPENDIX XI.16

QUALITY INDICATOR VALIDATION RESULTS: LEVEL II AGGREGATION

GEORGIA: 894 SAMPLED RESIDENTS

	Claims QI Yes Rate	Medical Record QI Yes Rate	Medical Record and Claims Agreement Rate	Positive Predictive Value	Negative Predictive Value
Resident Outcomes, Inpatient Stay or Emergency Room Visit	0.083	0.190	0.875	0.892	0.873
Hospitalization	0.161	0.234	0.923	0.986	0.911
Death	0.012	0.034	0.972	0.727	0.975
Lack of Therapy	0.011	0.000	0.989	0.000	1.000
Pharmaceutical Treatments, Psychoactives	0.388	0.387	0.836	0.787	0.867
Pharmaceutical Treatments, Infection Control	0.178	0.092	0.865	0.377	0.970
Pharmaceutical Treatments, Pain Management	0.179	0.215	0.935	0.919	0.939
Pharmaceutical Treatments, Other	0.044	0.078	0.959	0.923	0.960

APPENDIX XI.17

QI VALIDATION
AGGREGATED QI - LEVEL III
CALIFORNIA

APPENDIX XI.17

QUALITY INDICATOR VALIDATION RESULTS: LEVEL III AGGREGATION

CALIFORNIA: 939 SAMPLED RESIDENTS

Quality Indicator: Aggregation	Claims QI Yes Rate	Medical Record QI Yes Rate	Medical Record and Claims Agreement Rate	Positive Predictive Value	Negative Predictive Value
Resident Outcomes, Inpatient Stay or Emergency Room Visit, Hospitalization, Death	0.073	0.142	0.930	0.986	0.925
Lack of Therapy	0.055	0.000	0.945	0.000	1.000
Pharmaceutical Treatments	0.403	0.499	0.705	0.754	0.672

APPENDIX XI.18

QI VALIDATION
AGGREGATED QI - LEVEL III
GEORGIA

APPENDIX XI.18

QUALITY INDICATOR VALIDATION RESULTS: LEVEL III AGGREGATION

GEORGIA: 894 SAMPLED RESIDENTS

Quality Indicator: Aggregation	Claims QI Yes Rate	Medical Record QI Yes Rate	Medical Record and Claims Agreement Rate	Positive Predictive Value	Negative Predictive Value
Resident Outcomes, Inpatient Stay or Emergency Room Visit, Hospitalization, Death	0.161	0.279	0.880	0.933	0.859
Lack of Therapy	0.011	0.000	0.989	0.000	1.000
Pharmaceutical Treatments	0.576	0.572	0.812	0.833	0.784

APPENDIX XI.19

COVARIANT DIAGNOSES RATES - CALIFORNIA

APPENDIX XI.19

COVARIANT DIAGNOSES RATES

CALIFORNIA

Quality Indicator/Covariant Diagnosis	Percent with Covariant Diagnosis (Claims Data)	Percent with Covariant Diagnosis (Med Rec Data)
Respiratory Infection/COPD	6.07	14.59
Skin Infection/Diabetes	10.00	15.34
Skin Infection/Peripheral Vascular Disease	8.16	0.00
Sepsis/Diabetes	10.00	15.34
Sepsis/Cancer	4.31	7.99
Sepsis/HIV	0.04	0.11
Urinary Tract Infection/Diabetes	10.00	15.34
Urinary Tract Infection/Quadraplegia	0.13	0.43
Urinary Tract Infection/Paraplegia	0.17	0.43
Urinary Tract Infection/Coma	0.43	0.43
Decubitus Ulcers/Cancer	4.31	7.99
Decubitus Ulcers/Hemiplegia-Paralysis	2.27	5.43
Decubitus Ulcers/Diabetes	10.00	15.34
Decubitus Ulcers/Peripheral Vascular Disease	8.16	0.00
Nutritional Deficiencies/Cancer	4.31	7.99
Paralytic Ileus/Peritoneal Adhesions	0.02	0.00
Electrolyte Imbalance/Renal Failure	1.27	0.00
Electrolyte Imbalance/Congestive Heart Failure	9.15	0.00
Electrolyte Imbalance/Hypertension with RF or CHF	0.09	0.00
Fracture of Skull, Neck/Trunk, Upper/Lower Limb/Osteoporosis	1.40	9.37
Lack of Therapy (Speech, Occupational, or Physical)/Osteoporosis	1.40	9.37

APPENDIX XI.20

COVARIANT DIAGNOSES RATES - GEORGIA

APPENDIX XI.20

COVARIANT DIAGNOSES RATES

GEORGIA

Quality Indicator/Covariant Diagnosis	Percent with Covariant Diagnosis (Claims Data)	Percent with Covariant Diagnosis (Med Rec Data)
Respiratory Infection/COPD	3.59	14.32
Skin Infection/Diabetes	7.14	20.92
Skin Infection/Peripheral Vascular Disease	14.70	0.00
Sepsis/Diabetes	18.03	20.92
Sepsis/Cancer	7.77	5.82
Sepsis/HIV	0.07	0.00
Urinary Tract Infection/Diabetes	18.03	20.92
Urinary Tract Infection/Quadraplegia	0.24	0.22
Urinary Tract Infection/Paraplegia	0.31	0.45
Urinary Tract Infection/Coma	0.78	0.22
Decubitus Ulcers/Cancer	7.77	5.82
Decubitus Ulcers/Hemiplegia-Paralysis	4.09	4.47
Decubitus Ulcers/Diabetes	18.03	20.92
Decubitus Ulcers/Peripheral Vascular Disease	1.02	0.00
Nutritional Deficiencies/Cancer	7.77	5.82
Paralytic Ileus/Peritoneal Adhesions	0.04	0.00
Electrolyte Imbalance/Renal Failure	2.30	0.00
Electrolyte Imbalance/Congestive Heart Failure	16.49	0.00
Electrolyte Imbalance/Hypertension with RF or CHF	0.15	0.00
Fracture of Skull, Neck/Trunk, Upper/Lower Limb/Osteoporosis	2.52	6.15
Lack of Therapy (Speech, Occupational, or Physical)/Osteoporosis	2.52	6.15

APPENDIX XI.21

COVARIANT DIAGNOSES (AGGREGATED) RATES - CALIFORNIA

APPENDIX XI.21

COVARIANT DIAGNOSES (AGGREGATED) RATES

CALIFORNIA

Quality Indicator/Covariant Diagnosis	Percent with Covariant Diagnosis (Claims Data)	Percent with Covariant Diagnosis (Med Rec Data)
	(Cov=Y/Total)	(Cov=Y/Total)
Respiratory Infection/COPD	6.07%	14.59%
Skin Infection/Diabetes, Peripheral Vascular Disease	17.72%	15.34%
Sepsis/Diabetes, Cancer, HIV	13.90%	22.26%
Urinary Tract Infection/Diabetes, Quadraplegia, Paraplegia, Coma	10.62%	16.29%
Decubitus Ulcers/Cancer, Hemiplegia-Paralysis, Peripheral Vascular Disease	23.13%	26.09%
Nutritional Deficiencies/Cancer	4.31%	7.99%
Paralytic Ileus/Peritoneal Adhesions	0.02%	0.00%
Electrolyte Imbalance/Renal failure, Congestive heart failure, Hypertension with RF or CHF	10.17%	0.00%
Fracture of Skull, Neck/Trunk, Upper/Lower Limb/Osteoporosis	1.40%	9.37%
Lack of Therapy (Speech, Occupational, or Physical)/Osteoporosis	1.40%	9.37%

APPENDIX XI.22

COVARIANT DIAGNOSES (AGGREGATED) RATES - GEORGIA

APPENDIX XI.22

COVARIANT DIAGNOSES (AGGREGATED) RATES

GEORGIA

Quality Indicator/Covariant Diagnosis	Percent with Covariant Diagnosis (Claims Data)	Percent with Covariant Diagnosis (Med Rec Data)
	(Cov=Y/Total)	(Cov=Y/Total)
Respiratory Infection/COPD	3.59%	14.32%
Skin Infection/Diabetes, Peripheral Vascular Disease	8.00%	20.92%
Sepsis/Diabetes, Cancer, HIV	9.67%	25.39%
Urinary Tract Infection/Diabetes, Quadraplegia, Paraplegia, Coma	7.32%	21.81%
Decubitus Ulcers/Cancer, Hemiplegia-Paralysis, Peripheral Vascular Disease	11.11%	28.97%
Nutritional Deficiencies/Cancer	2.46%	5.82%
Paralytic Ileus/Peritoneal Adhesions	0.10%	0.00%
Electrolyte Imbalance/Renal failure, Congestive heart failure, Hypertension with RF or CHF	6.71%	0.00%
Fracture of Skull, Neck/Trunk, Upper/Lower Limb/Osteoporosis	0.19%	6.15%
Lack of Therapy (Speech, Occupational, or Physical)/Osteoporosis	0.19%	6.15%

APPENDIX XI.23

QI RATES ADJUSTED FOR COVARIANT DIAGNOSIS GENERATED FROM CLAIMS DATA CALIFORNIA

APPENDIX XI.23

QUALITY INDICATOR RATES ADJUSTED FOR COVARIANT DIAGNOSIS

CLAIMS DATA

CALIFORNIA

Quality Indicator/Covariant Diagnosis	Quality Indicators: Unadjusted Rate	Risk Adjusted Quality Indicator Rates	
	(QI=Y/Total)	Yes|Cov=Y Cov=Yes	Yes|Cov=N Cov=No
Respiratory Infection/COPD	2.74%	6.07%	2.53%
Skin Infection/Diabetes, Peripheral Vascular Disease	0.23%	0.45%	0.18%
Sepsis/Diabetes, Cancer, HIV	0.87%	1.16%	0.82%
Urinary Tract Infection/Diabetes, Quadraplegia, Paraplegia, Coma	1.36%	2.12%	1.27%
Decubitus Ulcers/Cancer, Hemiplegia-Paralysis, Peripheral Vascular Disease	0.07%	0.09%	0.16%
Nutritional Deficiencies/Cancer	0.03%	0.00%	0.04%
Paralytic Ileus/Peritoneal Adhesions	0.02%	0.00%	0.02%
Electrolyte Imbalance/Renal failure, Congestive heart failure, Hypertension with RF or CHF	0.65%	1.17%	0.59%
Fracture of Skull, Neck/Trunk, Upper/Lower Limb/Osteoporosis	0.97%	1.74%	0.96%
Lack of Therapy (Speech, Occupational, or Physical)/Osteoporosis	6.04%	3.05%	6.08%

APPENDIX XI.24

QI RATES ADJUSTED FOR COVARIANT DIAGNOSIS GENERATED FROM CLAIMS DATA GEORGIA

APPENDIX XI.24

QUALITY INDICATOR RATES ADJUSTED FOR COVARIANT DIAGNOSIS

CLAIMS DATA

GEORGIA

Quality Indicator/Covariant Diagnosis	Quality Indicator: Unadjusted Rate	Risk Adjusted Quality Indicator Rates	
	(QI=Y/Total)	Yes|Cov=Y Cov=Yes	Yes|Cov=N Cov=No
Respiratory Infection/COPD	3.77%	8.56%	3.59%
Skin Infection/Diabetes, Peripheral Vascular Disease	0.48%	0.62%	0.47%
Sepsis/Diabetes, Cancer, HIV	1.13%	1.19%	1.13%
Urinary Tract Infection/Diabetes, Quadraplegia, Paraplegia, Coma	3.42%	4.05%	3.37%
Decubitus Ulcers/Cancer, Hemiplegia-Paralysis, Peripheral Vascular Disease	0.49%	0.90%	0.45%
Nutritional Deficiencies/Cancer	0.23%	0.22%	0.23%
Paralytic Ileus/Peritoneal Adhesions	0.22%	0.00%	0.22%
Electrolyte Imbalance/Renal failure, Congestive heart failure, Hypertension with RF or CHF	3.04%	4.09%	2.96%
Fracture of Skull, Neck/Trunk, Upper/Lower Limb/Osteoporosis	0.98%	0.00%	0.99%
Lack of Therapy (Speech, Occupational, or Physical)/Osteoporosis	1.48%	2.94%	1.48%

APPENDIX XI.25

QI RATES ADJUSTED FOR COVARIANT DIAGNOSIS GENERATED FROM MEDICAL RECORDS DATA CALIFORNIA

APPENDIX XI.25

QUALITY INDICATOR ADJUSTED FOR COVARIANT DIAGNOSIS

MEDICAL RECORD DATA

CALIFORNIA

Quality Indicator/Covariant Diagnosis	Quality Indicator; Unadjusted Rate	Risk Adjusted Quality Indicator Rates	
	(QI=Y/Total)	Yes|Cov=Y Cov=Yes	Yes|Cov=N Cov=No
Respiratory Infection/COPD	3.83%	9.49%	2.87%
Skin Infection/Diabetes, Peripheral Vascular Disease	0.96%	2.78%	0.63%
Sepsis/Diabetes, Cancer, HIV	1.49%	2.39%	1.23%
Urinary Tract Infection/Diabetes, Quadraplegia, Paraplegia, Coma	3.09%	7.19%	2.29%
Decubitus Ulcers/Cancer, Hemiplegia-Paralysis, Peripheral Vascular Disease	0.21%	0.41%	0.14%
Nutritional Deficiencies/Cancer	0.11%	0.00%	0.12%
Paralytic Ileus/Peritoneal Adhesions	0.32%	--	0.32%
Electrolyte Imbalance/Renal failure, Congestive heart failure, Hypertension with RF or CHF	1.06%	--	1.06%
Fracture of Skull, Neck/Trunk, Upper/Lower Limb/Osteoporosis	1.17%	5.68%	0.71%
Lack of Therapy (Speech, Occupational, or Physical)/Osteoporosis	0.00%	0.00%	0.00%

APPENDIX XI.26

QI RATES ADJUSTED FOR COVARIANT DIAGNOSIS GENERATED FROM MEDICAL RECORDS DATA GEORGIA

APPENDIX XI.26

QUALITY INDICATOR RATES ADJUSTED FOR COVARIANT DIAGNOSIS

MEDICAL RECORD DATA

GEORGIA

Quality Indicator/Covariant Diagnosis	Unadjusted Rate	Rates	
	(QI=Y/Total)	Yes|Cov=Y Cov=Yes	Yes|Cov=N Cov=No
Respiratory Infection/COPD	5.48%	9.38%	4.83%
Skin Infection/Diabetes, Peripheral Vascular Disease	1.34%	2.14%	1.13%
Sepsis/Diabetes, Cancer, HIV	1.79%	3.08%	1.35%
Urinary Tract Infection/Diabetes, Quadraplegia, Paraplegia, Coma	7.38%	14.36%	5.44%
Decubitus Ulcers/Cancer, Hemiplegia-Paralysis, Peripheral Vascular Disease	0.45%	1.16%	0.16%
Nutritional Deficiencies/Cancer	0.67%	3.85%	0.48%
Paralytic Ileus/Peritoneal Adhesions	0.78%	--	0.78%
Electrolyte Imbalance/Renal failure, Congestive heart failure, Hypertension with RF or CHF	5.15%	--	5.15%
Fracture of Skull, Neck/Trunk, Upper/Lower Limb/Osteoporosis	4.14%	10.91%	3.69%
Lack of Therapy (Speech, Occupational, or Physical)/Osteoporosis	0.00%	0.00%	0.00%

APPENDIX XI.27

LOGISTIC REGRESSION MODEL
OUTCOME: ANY QI
CALIFORNIA

APPENDIX XI.27

LOGISTIC REGRESSSION RESULTS: PROBABILITY OF RECEIVING ANY QUALITY INDICATOR

CALIFORNIA

Dependent Variable: Any Quality Indicator			
Regressor *(X)*	**Coefficient**	**Standard Error**	**Odds Ratio**
Intercept	0.137 **	0.054	1.147
75-84 years of age	-0.354 *	0.037	0.702
≥ 85 years of age	-0.642 *	0.036	0.526
Male	-0.089 *	0.029	0.915
Black	-0.184 *	0.050	0.832
Other race	-0.072	0.038	0.930
Urban county	0.125 *	0.039	1.133
Suburban county	0.036	0.042	1.037
Rural county	0.167	0.127	1.182
High medical cost patient	0.002	0.029	1.002
Medicare enrolled	0.405 *	0.026	1.499
Medium size nursing home facility	0.007	0.033	1.007
Large nursing home facility	-0.149 *	0.038	0.862
For profit nursing home facility	0.349 *	0.035	1.418
Nursing home facility part of chain	-0.160 *	0.025	0.853
- 2 Log L		38,787.74	
Chi-Square Statistic		747.64	
P Value		0.0001	
N		28,583	

* $p < .01$; ** $p < .05$

Excluded categories: Ages 65-74 years, White, Female, Inner Urban, Low Cost, Small Facility, Non-Profit, Independent

APPENDIX XI.28

LOGISTIC REGRESSION MODEL
OUTCOME: ANY QI
GEORGIA

APPENDIX XI.28

LOGISTIC REGRESSION RESULTS: PROBABILITY OF RECEIVING ANY QUALITY INDICATOR

GEORGIA

Dependent Variable: Any Quality Indicator			
Regressor *(X)*	**Coefficient**	**Standard Error**	**Odds Ratio**
Intercept	0.744 *	0.084	2.103
75-84 years of age	-0.271 *	0.050	0.763
≥ 85 years of age	-0.591 *	0.049	0.554
Male	-0.153 *	0.040	0.858
Black	-0.544 *	0.038	0.580
Other race	-0.083	0.090	0.920
Urban county	0.159	0.062	1.172
Suburban county	0.168 *	0.049	1.182
Rural county	0.372 *	0.053	1.458
High medical cost patient	0.013	0.039	1.013
Medicare enrolled	0.496 *	0.035	1.642
Medium size nursing home facility	0.125 **	0.046	1.133
Large nursing home facility	0.125 **	0.056	1.133
For profit nursing home facility	0.037	0.043	1.038
Nursing home facility part of chain	0.027	0.036	1.027
- 2 Log L	22,004.21		
Chi-Square Statistic	635.34		
P Value	0.0001		
N	18,128		

* $p < .01$; ** $p < .05$

Excluded categories. Ages 65-74 years, White, Female, Inner Urban, Low Cost, Small Facility, Non-Profit, Independent

APPENDIX XI.29

LOGISTIC REGRESSION MODEL
OUTCOME: RESIDENT OUTCOME
CALIFORNIA

APPENDIX XI.29

LOGISTIC REGRESSION RESULTS: PROBABILITY OF RECEIVING A RESIDENT OUTCOMES QUALITY INDICATOR

CALIFORNIA

Dependent Variable: *Resident Outcomes* Quality Indicator			
Regressor *(X)*	Coefficient	Standard Error	Odds Ratio
Intercept	-3.124 *	0.093	0.044
75-84 years of age	-0.200 *	0.053	0.819
≥ 85 years of age	-0.280 *	0.052	0.755
Male	0.183 *	0.042	1.200
Black	0.262 *	0.072	1.299
Other race	0.300 *	0.054	1.350
Urban county	-0.013	0.063	0.987
Suburban county	-0.263 *	0.071	0.769
Rural county	-0.309	0.230	0.734
High medical cost patient	0.044	0.042	1.045
Medicare enrolled	1.678 *	0.056	5.352
Medium size nursing home facility	-0.089	0.051	0.915
Large nursing home facility	-0.249 *	0.060	0.780
For profit nursing home facility	0.299 *	0.058	1.348
Nursing home facility part of chain	-0.299 *	0.038	0.742
- 2 Log L		19,692.54	
Chi-Square Statistic		1,453.99	
P Value		0.0001	
N		28,583	

* p < .01; ** p < .05

Excluded categories: Ages 65-74 years, White, Female, Inner Urban, Low Cost, Small Facility, Non-Profit, Independent

APPENDIX XI.30

LOGISTIC REGRESSION MODEL
OUTCOME: RESIDENT OUTCOME
GEORGIA

APPENDIX XI.30

LOGISTIC REGRESSION RESULTS: PROBABILITY OF RECEIVING A RESIDENT OUTCOMES QUALITY INDICATOR

GEORGIA

Dependent Variable: *Resident Outcomes* Quality Indicator			
Regressor *(X)*	**Coefficient**	**Standard Error**	**Odds Ratio**
Intercept	-2.852 *	0.110	0.058
75-84 years of age	-0.034	0.060	0.967
≥ 85 years of age	0.056	0.060	1.057
Male	0.147 *	0.048	1.159
Black	-0.049	0.048	0.952
Other race	0.193	0.111	1.212
Urban county	-0.163 **	0.080	0.850
Suburban county	0.091	0.064	1.095
Rural county	0.078	0.067	1.081
High medical cost patient	-0.103 **	0.046	0.903
Medicare enrolled	2.197 *	0.049	8.994
Medium size nursing home facility	0.104	0.057	1.109
Large nursing home facility	-0.018	0.072	0.982
For profit nursing home facility	-0.007	0.054	0.993
Nursing home facility part of chain	-0.029	0.045	0.971
- 2 Log L	15,362.68		
Chi-Square Statistic	2,767.15		
P Value	0.0001		
N	18,128		

* $p < .01$, ** $p < .05$

Excluded categories: Ages 65-74 years, White, Female, Inner Urban, Low Cost, Small Facility, Non-Profit, Independent

APPENDIX XI.31

LOGISTIC REGRESSION MODEL
OUTCOME: LACK OF THERAPY
CALIFORNIA

APPENDIX XI.31

LOGISTIC REGRESSION RESULTS: PROBABILITY OF RECEIVING A LACK OF THERAPY QUALITY INDICATOR

CALIFORNIA

Dependent Variable: *Lack of Therapy* Quality Indicator			
Regressor (*X*)	**Coefficient**	**Standard Error**	**Odds Ratio**
Intercept	-3.388 *	0.120	0.034
75-84 years of age	-0.031	0.073	0.970
≥ 85 years of age	-0.130	0.072	0.878
Male	-0.063	0.059	0.939
Black	0.227 **	0.098	1.254
Other race	0.085	0.077	1.089
Urban county	0.098	0.080	1.103
Suburban county	0.340 *	0.079	1.404
Rural county	-0.049	0.299	0.952
High medical cost patient	-0.001	0.060	0.999
Medicare enrolled	0.289 *	0.056	1.336
Medium size nursing home facility	-0.051	0.068	0.950
Large nursing home facility	-0.152	0.080	0.859
For profit nursing home facility	0.415 *	0.082	1.514
Nursing home facility part of chain	0.291 *	0.054	1.337
- 2 Log L	13,001.49		
Chi-Square Statistic	127.05		
P Value	0.0001		
N	28,583		

* $p < .01$; ** $p < .05$

Excluded categories: Ages 65-74 years, White, Female, Inner Urban, Low Cost, Small Facility, Non-Profit, Independent

APPENDIX XI.32

LOGISTIC REGRESSION MODEL
OUTCOME: PHARMACEUTICAL TREATMENT
CALIFORNIA

APPENDIX XI.32

LOGISTIC REGRESSION RESULTS: PROBABILITY OF RECEIVING A PHARMACEUTICAL TREATMENT QUALITY INDICATOR

CALIFORNIA

Dependent Variable: *Pharmaceutical Treatment* Quality Indicator			
Regressor *(X)*	Coefficient	Standard Error	Odds Ratio
Intercept	0.059	0.054	1.060
75-84 years of age	-0.371 *	0.036	0.690
≥ 85 years of age	-0.700 *	0.035	0.496
Male	-0.141 *	0.029	0.869
Black	-0.303 *	0.051	0.739
Other race	-0.210 *	0.038	0.811
Urban county	0.128 *	0.039	1.137
Suburban county	0.045	0.042	1.046
Rural county	0.253	0.126	1.288
High medical cost patient	-0.001	0.029	0.999
Medicare enrolled	0.119 *	0.026	1.127
Medium size nursing home facility	0.023	0.033	1.024
Large nursing home facility	-0.102 **	0.038	0.903
For profit nursing home facility	0.293 *	0.036	1.341
Nursing home facility part of chain	-0.154 *	0.025	0.857
- 2 Log L		38,583.06	
Chi-Square Statistic		628.56	
P Value		0.0001	
N		28,583	

* $p < .01$; ** $p < .05$

Excluded categories: Ages 65-74 years, White, Female, Inner Urban, Low Cost, Small Facility, Non-Profit, Independent

APPENDIX XI.33

LOGISTIC REGRESSION MODEL
OUTCOME: PHARMACEUTICAL TREATMENT
GEORGIA

APPENDIX XI.33

LOGISTIC REGRESSION RESULTS: PROBABILITY OF RECEIVING A PHARMACEUTICAL TREATMENT QUALITY INDICATOR

GEORGIA

Dependent Variable: *Pharmaceutical Treatment* Quality Indicator			
Regressor (*X*)	Coefficient	Standard Error	Odds Ratio
Intercept	0.606 *	0.080	1.834
75-84 years of age	-0.295 *	0.047	0.745
≥ 85 years of age	-0.662 *	0.047	0.516
Male	-0.170 *	0.038	0.844
Black	-0.616 *	0.037	0.540
Other race	-0.146	0.086	0.864
Urban county	0.278 *	0.060	1.321
Suburban county	0.203 *	0.047	1.226
Rural county	0.450 *	0.051	1.569
High medical cost patient	0.095 **	0.037	1.100
Medicare enrolled	0.012	0.032	1.012
Medium size nursing home facility	0.100 **	0.044	1.105
Large nursing home facility	0.145 **	0.053	1.156
For profit nursing home facility	0.080	0.041	1.084
Nursing home facility part of chain	0.059	0.034	1.060
- 2 Log L		23,540.84	
Chi-Square Statistic		602.26	
P Value		0.0001	
N		18,128	

* $p < .01$; ** $p < .05$

Excluded categories: Ages 65-74 years, White, Female, Inner Urban, Low Cost, Small Facility, Non-Profit, Independent

APPENDIX XI.34

OTHER POTENTIAL QUALITY MEASUREMENT
ADMISSION ASSESSMENT
CALIFORNIA

APPENDIX XI.34

ADMISSION ASSESSMENT: CALIFORNIA

N = 570 RESIDENTS

Assessment Information Variable	Percent Recorded (Y/N)
Reason for Admission	0.770
Active Problem List	0.919
Past Medical History Information	0.910
Preventive Care History	0.133
Current Medication List	0.607
Review of Symptoms	0.780
Physical Exam Findings	0.994
Orthostatic Blood Pressure Examination	0.004
Nutritional Status Evaluation	0.560
Hearing Evaluation	0.670
Vision Evaluation	0.635
Mobility Evaluation	0.767
Cognitive Function Evaluation	0.919
Affective Status Evaluation	0.658
Advance Affective Status	0.242

APPENDIX XI.35

OTHER POTENTIAL QUALITY MEASUREMENT
ADMISSION ASSESSMENT
GEORGIA

APPENDIX XI.35

ADMISSION ASSESSMENT: GEORGIA

N = 292 RESIDENTS

Assessment Information Variable	Percent Recorded (Y/N)
Reason for Admission	0.880
Active Problem List	0.890
Past Medical History Information	0.966
Preventive Care History	0.034
Current Medication List	0.805
Review of Symptoms	0.788
Physical Exam Findings	0.983
Orthostatic Blood Pressure Examination	0.003
Nutritional Status Evaluation	0.599
Hearing Evaluation	0.644
Vision Evaluation	0.709
Mobility Evaluation	0.836
Cognitive Function Evaluation	0.925
Affective Status Evaluation	0.658
Advance Affective Status	0.075

APPENDIX XI.36

OTHER POTENTIAL QUALITY MEASUREMENT
ANNUAL ASSESSMENT
CALIFORNIA

APPENDIX XI.36

ANNUAL ASSESSMENT: CALIFORNIA

N = 165 RESIDENTS

Assessment Information Variable	Percent Recorded (Y/N)
Medical History	0.491
Acute Medical Problems	0.612
Lab Test Summary	0.315
Review of Symptoms	0.327
Current Medications	0.170
Hearing Evaluation	0.018
Opthamology/Optometry Screening	0.030
Dental Screening	0.036
Podiatry Screening	0.103
Tuberculosis Testing	0.085
Advance Directives	0.370

APPENDIX XI.37

OTHER POTENTIAL QUALITY MEASUREMENT
ANNUAL ASSESSMENT
GEORGIA

APPENDIX XI.37

ANNUAL ASSESSMENT: GEORGIA

N = 60 RESIDENTS

Assessment Information Variable	Percent Recorded (Y/N)
Medical History	0.783
Acute Medical Problems	0.850
Lab Test Summary	0.933
Review of Symptoms	0.883
Current Medications	0.600
Hearing Evaluation	0.067
Opthamology/Optometry Screening	0.067
Dental Screening	0.017
Podiatry Screening	0.000
Tuberculosis Testing	0.017
Advance Directives	0.150

APPENDIX XI.38

FREQUENCY OF F-TAG HITS GENERATED FROM OSCAR DATA FOR 524 CALIFORNIA NURSING HOMES BY DESCENDING ORDER OF FREQUENCY CALIFORNIA

FREQUENCY OF F-TAG HITS GENERATED FROM OSCAR DATA FOR 524 CALIFORNIA NURSING FACILITIES RANKED BY DESCENDING ORDER OF FREQUENCY

4/92 F-TAG NUMBER	F-TAG DESCRIPTION	FACILITIES WITH F-TAGS	PERCENT OF ALL FACILITIES
F295	Facility must develop a comprehensive care plan for each resident that includes measurable objectives and timetables	243	46.4%
F221	Physical restraints	188	35.9%
F377	Store, prepare, distribute and serve food	126	24.0%
F322	Urinary incontinence	109	20.8%
F261	Housekeeping and maintenance service	99	18.9%
F441	Investigates, controls/prevents infection	94	17.9%
F324	Range of motion	81	15.5%
F431	Report any irregularities to the attending physician and the director of nursing	78	14.9%
F317	Receives the necessary services to maintain good nutrition, grooming, and personal and oral hygiene	77	14.7%
F253	Right to accommodations of individual needs and preferences	70	13.4%
F312	Transfer and ambulate	62	11.8%
F320	Pressure sores	62	11.8%
F447	Linens/infection control	58	11.1%
F319	Resident does not develop pressure sores	55	10.5%
F348	Antipsychotic drugs not given unless necessary to treat a specific condition	55	10.5%
F446	Hand washing/infection control	54	10.3%
F222	Chemical restraints	50	9.5%
F331	Acceptable parameters of nutritional status	50	9.5%
F349	Gradual dose reductions	46	8.8%
F314	Eat	33	6.3%
F369	Food substitutes offered	33	6.3%
F325	Psychosocial remotivation	32	6.1%
F328	Tube feeding/prevention	32	6.1%
F272	Comprehensive assessment	31	5.9%
F333	Hydration	30	5.7%
F430	Monthly drug regimen review	26	5.0%
F316	Appropriate treatment and services to maintain or improve ADLs	22	4.2%
F458	Sufficient space and equipment: dining, health, program areas	22	4.2%
F370	Therapeutic diets	21	4.0%

APPENDIX XI.38 (continued)

4/92 F-TAG NUMBER	F-TAG DESCRIPTION	FACILITIES WITH F-TAGS	PERCENT OF ALL FACILITIES
F277	Assessment includes nutritional status and requirements	20	3.8%
F313	Toilet	20	3.8%
F354	24 hour nursing services	19	3.6%
F375	Assistive devices for eating	17	3.2%
F332	Therapeutic diet	16	3.1%
F311	Bathe, dress and groom	15	2.9%
F315	Use speech, language, or other functional communication systems	13	2.5%
F373	Snacks at bedtime	13	2.5%
F321	Resident's clinical condition demonstrates catherization necessary	12	2.3%
F442	Decides what procedures should be applied to resident	11	2.1%
F444	Isolation of resident	11	2.1%
F482	Corridors equipped with handrails	11	2.1%
F223	Right to be free from abuse	10	1.9%
F283	Assessment includes rehabilitation potential	9	1.7%
F323	No reduction in range of motion	9	1.7%
F326	Resident's clinical condition demonstrates catherization necessary	8	1.5%
F440	Establish and maintain infection control program	8	1.5%
F443	Maintains record of actions related to infections	8	1.5%
F335	Parenteral and enteral fluids	6	1.1%
F341	Prostheses care	3	0.6%
F407	Specialized rehab must be provided under written order of physician	3	0.6%
F445	Employees with communicable disease no direct contact	3	0.6%
F371	Three meals daily, at regular times	2	0.4%
F204	Timing of the notice of transfer/discharge	1	0.2%
F374	Residents influence meal times secondary to bedtime snacks	1	0.2%
F405	Specialized rehabilitative services	1	0.2%
F524	Promptly notify physician of findings	1	0.2%
F372	No more than 14 hours between a substantial evening meal and breakfast	0	0.0%
F517	Promptly notify physician of findings	0	0.0%

APPENDIX XI.39

FREQUENCY OF F-TAG GROUP FLAGS BY THE CORRESPONDING QUALITY INDICATOR
CALIFORNIA

APPENDIX XI.39

FREQUENCY OF F-TAG GROUP FLAGS BY CORRSPONDING QI FOR 524 CALIFORNIA NURSING FACILITIES BY DESCENDING ORDER OF FREQUENCY

QI #	QI Name	# Facilities with an F-Tag Flagged for Corresponding QI	Percent of 524 CA Facilities
16	Lack of therapy	413	78.8%
17	Use of antipsychotics	413	78.8%
3	Sepsis	293	55.9%
47	Concurrent use of 2 calcium channel-blocking agents for > 60 days	285	54.4%
4	Urinary Tract Infection	278	53.1%
18	Continuous use of antipsychotics	252	48.1%
19	Long term sedative use	252	48.1%
20	Use of drugs such as long half-life benzodiazepines	252	48.1%
22	Use of anticholingergics	252	48.1%
24	Concurrent use of psychoactive drugs for > 120 days	252	48.1%
1	Respiratory Infection	241	46.0%
2	Skin Infection	241	46.0%
10	Fracture of Skull, Neck/Trunk, Upper/Lower Limb	237	45.2%
12	External causes: Cold, heat, immersion, hunger, thirst, exhaustion, motion, asphyxiation	237	45.5%
21	Use of drugs such as barbiturate agents and other selected sedatives	213	40.6%
25	Maximum single doses for some hypnotic drugs	213	40.6%
26	Maximum dosages of selected anxiolytics	213	40.6%
8	Electrolyte Imbalance	194	37.0%
34	Use of pediculicides after 7 days following nursing home admission	182	34.7%
28	Maximum dosages of selected antidepressants	174	33.2%
29	Use of certain antidepressants (amitriptyline, impramine, protriptyline, trimipramine)	174	33.2%
30	Use of combination antidepressants/antipsychotics	174	33.2%
31	Use of atypical anti-infective drugs	174	33.2%

QI #	QI Name	# Facilities with an F-Tag Flagged for Corresponding QI	Percent of 524 CA Facilities
9	Endocrine Disorders such as Diabetic Crisis	163	31.1%
6	Nutritional Deficiencies	150	28.9%
32	Use of four or more anti-infectives within a 60-day period	123	23.5%
33	Use of aminoglycosides without a creatinine or BUN test	107	20.5%
37	Use of pentazocine	105	19.5%
35	Use of anti-infectives > 60 days except for treating certain conditions	102	34.7%
36	Use of propoxyphene	102	19.5%
5	Decubitus Ulcers	99	18.9%
23	Concurrent use of psychoactive drugs for > 60 days	95	18.1%
38	Use of indomethacin	95	20.0%
39	Use of phenylbutazone	95	18.1%
40	Use of muscle relaxants or antispasmodics	95	18.1%
41	Concurrent use of NSAIDS and histamine-2 antagonists for > 60 days	95	18.1%
42	Concurrent use of ≥ 2 NSAIDS for > 60 days	95	18.1%
43	More than 12 drug claims per month, excluding OTCs	95	18.1%
44	Concurrent use of potassium supplements and potassium-sparing diuretics for > 60 days	95	18.1%
45	Concurrent use of potassium supplements and ACE inhibitors for > 60 days	95	18.1%
46	Concurrent use of potassium-sparing diuretics and ACE inhibitors for > 60 days	95	18.1%
48	Concurrent use of ≥ ACE inhibitors for > 60 days	95	18.1%
49	Concurrent use of ≥ 2 histamine-2 antagonists for > 60 days	95	18.1%
50	Use of chlorpropamide	95	18.1%
7	Paralytic Ileus	1	0.2%

APPENDIX XI.40

F-TAG ANALYSIS RESULTS: PROBABILITY OF A CLAIMS-BASED QUALITY INDICATOR BEING FLAGGED GIVEN A FEDERAL SURVEY DEFICIENCY (F-TAG) CITED IN 524 CALIFORNIA NURSING FACILITIES

APPENDIX XI.40

F-TAG ANALYSES: PROBABILITY OF A CLAIMS-BASED QI BEING FLAGGED
GIVEN A SURVEY DEFICIENCY (F-TAG) CITED IN 524 CALIFORNIA NURSING FACILITIES

	Quality Indicator	F-Tag Group QI: Yes Rate	Claims QI Yes Rate	F-Tag and Claims Agreement Rate	Positive Predictive Value	Negative Predictive Value
1	Respiratory Infection	0.460	0.542	0.578	0.631	0.534
2	Skin Infection	0.460	0.111	0.540	0.120	0.898
3	Sepsis	0.559	0.292	0.492	0.307	0.727
4	Urinary Tract Infection	0.531	0.384	0.571	0.457	0.699
5	Decubitus Ulcers	0.189	0.092	0.754	0.091	0.908
6	Nutritional Deficiencies	0.286	0.015	0.710	0.020	0.987
7	Paralytic Ileus	0.002	0.013	0.985	0.000	0.987
8	Electrolyte Imbalance	0.370	0.250	0.590	0.284	0.770
9	Endocrine Disorders such as Diabetic Crisis	0.311	0.055	0.664	0.049	0.942
10	Fracture of Skull, Neck/Trunk, Upper/Lower Limb	0.452	0.382	0.544	0.418	0.648
11	Injury	0.452	0.193	0.561	0.228	0.836
14	Hospitalization	0.788	0.887	0.748	0.903	0.171
15	Death within 30 days following any of the QI # 1-16 events	0.788	0.363	0.445	0.378	0.694
16	Lack of therapy	0.481	0.788	0.559	0.861	0.279
17	Use of antipsychotics	0.481	0.914	0.510	0.940	0.110
18	Continuous use of antipsychotics for > 120 days	0.481	0.689	0.513	0.710	0.331
19	Long term sedative use	0.406	0.592	0.502	0.615	0.424
20	Use of drugs such as long half-life benzodiazepines	0.481	0.708	0.532	0.750	0.331
21	Use of drugs such as barbiturate agents and other selected sedatives	0.181	0.597	0.435	0.589	0.401
22	Use of anticholingergics	0.481	0.221	0.469	0.179	0.739
23	Concurrent use of psychoactive drugs for > 60 days	0.406	0.929	0.435	0.948	0.084
24	Concurrent use of psychoactive drugs for >120 days	0.406	0.179	0.590	0.216	0.846
25	Maximum single doses for some hypnotic drugs	0.332	0.424	0.576	0.500	0.614
26	Maximum dosages of selected anxiolytics	0.332	0.231	0.628	0.287	0.797
27	Maximum dosages of selected antipsychotics	0.332	0.784	0.433	0.828	0.237
28	Maximum dosages of selected antidepressants	0.332	0.798	0.427	0.839	0.223
29	Use of certain antidepressants (amitriptyline, imipramine, protriptyline, and trimipramine)	0.235	0.796	0.366	0.846	0.219
30	Use of combination antidepressants/antipsychotics	0.204	0.187	0.693	0.206	0.818
31	Use of atypical anti-infective drugs	0.347	0.149	0.626	0.176	0.865

	Quality Indicator	F-Tag Group QI: Yes Rate	Claims QI Yes Rate	F-Tag and Claims Agreement Rate	Positive Predictive Value	Negative Predictive Value
32	Use of four or more anti-infectives within a 60-day period	0.347	0.397	0.592	0.484	0.649
33	Use of aminoglycosides without a creatinine or BUN test	0.195	0.571	0.490	0.657	0.450
34	Use of pediculicides after 7 days following nursing home admission	0.195	0.336	0.641	0.441	0.690
35	Use of any anti-infectives > 60 days except for treating certain conditions	0.200	0.851	0.315	0.914	0.165
36	Use of propoxyphene	0.181	0.069	0.769	0.053	0.928
37	Use of pentazocine	0.181	0.013	0.817	0.032	0.991
38	Use of indomethacin	0.181	0.221	0.681	0.232	0.781
39	Use of phenylbutazone	0.181	0.000	0.819	0.000	1.000
40	Use of muscle relaxants or antispasmodics	0.181	0.477	0.506	0.453	0.517
41	Concurrent use of NSAIDS and histamine-2 antagonists for > 60 days	0.181	0.288	0.634	0.284	0.711
42	Concurrent use of ≥ 2 NSAIDS for > 60 days	0.181	0.013	0.805	0.000	0.984
43	More than 12 drug claims per month, excluding OTCs	0.181	0.513	0.531	0.621	0.510
44	Concurrent use of potassium supplements and potassium-sparing diuretics for > 60 days	0.544	0.198	0.479	0.204	0.808
45	Concurrent use of potassium supplements and ACE inhibitors for > 60 days	0.181	0.315	0.634	0.358	0.695
46	Concurrent use of potassium-sparing diuretics and ACE inhibitors for > 60 days	0.181	0.130	0.761	0.200	0.886
47	Concurrent use of 2 calcium channel-blocking agents for > 60 days	0.181	0.053	0.777	0.032	0.942
48	Concurrent use of ≥ 2 ACE inhibitors for > 60 days	0.181	0.244	0.677	0.284	0.765
49	Concurrent use of ≥ 2 histamine-2 antagonists for > 60 days	0.181	0.008	0.811	0.000	0.991
50	Use of chlorpropamide	0.181	0.265	0.630	0.211	0.723

APPENDIX XI.41

F TAG ANALYSIS RESULTS:
PROBABILITY OF A FEDERAL SURVEY DEFICIENCY (F-TAG) BEING CITED
GIVEN A CLAIMS-BASED QUALITY INDICATOR BEING FLAGGED IN
524 CALIFORNIA NURSING FACILITIES

F-TAG ANALYSES RESULTS: PROBABILITY OF A FEDERAL SURVEY DEFICIENCY (F-TAG) BEING CITED GIVEN A CLAIMS-BASED QUALITY INDICATOR FLAG IN 524 NURSING FACILITIES

F-TAG		QI Group Yes Rate	F-Tag: Yes Rate	QI Group and F-Tag Agreement Rate	Positive Predictive Value	Negative Predictive Value
204	Timing of the notice of transfer/discharge	0.887	0.002	0.115	0.002	1.000
221	Physical restraints	0.969	0.359	0.378	0.364	0.813
222	Chemical restraints	0.971	0.095	0.124	0.098	1.000
223	Right to be free from abuse	0.889	0.019	0.130	0.021	1.000
253	Right to accommodations of individual needs and preferences	0.788	0.134	0.315	0.150	0.928
261	Housekeeping and maintenance service	0.887	0.189	0.275	0.198	0.881
272	Comprehensive assessment	0.788	0.059	0.256	0.065	0.964
277	Assessment includes nutritional status and requirements	0.877	0.038	0.139	0.037	0.949
283	Assessment includes rehabilitation potential	0.788	0.017	0.225	0.019	0.991
295	Facility must develop a comprehensive care plan for each resident that includes measurable objectives and timetables	0.198	0.464	0.513	0.442	0.531
311	Bathe, dress and groom	0.788	0.029	0.237	0.034	0.991
312	Transfer and ambulate	0.788	0.118	0.292	0.126	0.910
313	Toilet	0.788	0.038	0.235	0.039	0.964
314	Eat	0.788	0.063	0.263	0.073	0.973
315	Use speech, language, or other functional communication systems	0.788	0.025	0.225	0.024	0.973
316	Appropriate treatment and services to maintain or improve	0.788	0.042	0.254	0.053	1.000
317	Receives the necessary services to maintain good nutrition, grooming, and personal and oral hygiene	0.788	0.147	0.332	0.169	0.937
319	Resident does not develop pressure sores	0.889	0.105	0.197	0.107	0.914
320	Pressure sores	0.889	0.118	0.210	0.122	0.914
321	Resident's clinical condition demonstrates catherization necessary	0.887	0.023	0.132	0.024	0.983
322	Urinary incontinence	0.887	0.208	0.294	0.219	0.881
323	No reduction in range of motion	0.788	0.017	0.229	0.022	1.000
324	Range of motion	0.788	0.155	0.336	0.177	0.928
325	Psychosocial remotivation	0.796	0.061	0.239	0.060	0.935
326	Resident's clinical condition demonstrates pattern was unavoidable	0.796	0.015	0.208	0.012	0.972
328	Tube feeding/prevention	0.887	0.061	0.166	0.065	0.966
331	Acceptable parameters of nutritional status	0.889	0.095	0.198	0.103	0.968
332	Therapeutic diet	0.887	0.031	0.143	0.034	1.000
333	Hydration	0.887	0.057	0.162	0.060	0.966
335	Parenteral and enteral fluids	0.877	0.011	0.124	0.013	1.000

F-TAG		QI Group Yes Rate	F-Tag: Yes Rate	QI Group and F-Tag Agreement Rate	Positive Predictive Value	Negative Predictive Value
341	Prostheses care	0.788	0.006	0.218	0.007	1.000
348	Antipsychotic drugs not given unless necessary to treat a specific condition	0.905	0.105	0.185	0.108	0.920
349	Gradual dose reductions	0.905	0.088	0.176	0.093	0.960
354	24 hour nursing services	0.887	0.036	0.145	0.039	0.983
369	Food substitutes offered	0.887	0.063	0.164	0.065	0.949
370	Therapeutic diets	0.887	0.040	0.149	0.043	0.983
371	Three meals daily, at regular times	0.887	0.004	0.116	0.004	1.000
372	No more than 14 hours between a substantial evening meal and breakfast	0.887	0.000	0.113	0.000	1.000
373	Snacks at bedtime	0.887	0.025	0.137	0.028	1.000
374	Residents influence meal times secondary to bedtime snacks	0.887	0.002	0.115	0.002	1.000
375	Assistive devices for eating	0.887	0.032	0.137	0.032	0.966
377	Store, prepare, distribute and serve food	0.887	0.240	0.296	0.239	0.746
405	Specialized rehabilitative services	0.788	0.002	0.214	0.002	0.982
407	Specialized rehabilitation must be provided under written order of physician	0.788	0.006	0.210	0.002	0.982
430	Monthly drug regimen review	0.977	0.050	0.073	0.051	1.000
431	Report any irregularities to the attending physician and the director of nursing	0.977	0.149	0.172	0.152	1.000
440	Establish and maintain infection control program	0.922	0.015	0.094	0.017	1.000
441	Investigates, controls/prevents infection	0.895	0.179	0.269	0.192	0.927
442	Decides what procedures should be applied to resident	0.945	0.021	0.073	0.020	0.966
443	Maintain record of actions related to infections	0.945	0.015	0.071	0.016	1.000
444	Isolation of resident	0.895	0.021	0.126	0.023	1.000
445	Employees with communicable disease no direct contact	0.895	0.006	0.111	0.006	1.000
446	Hand washing/infection control	0.895	0.103	0.200	0.111	0.964
447	Linens/infection control	0.895	0.111	0.200	0.115	0.927
458	Sufficient space and equipment; dining, health, program areas	0.788	0.042	0.239	0.044	0.964
482	Corridors equipped with handrails	0.889	0.021	0.132	0.024	1.000
517	Promptly notify physician of findings 483.75 (j)(2)(ii)	0.887	0.000	0.113	0.000	1.000
524	Promptly notify physician of findings 483.75 (k)(2)(ii)	0.887	0.002	0.115	0.002	1.000