Staffing and Facility Case Mix Effects on a Statewide Assessment of Quality of Care in Texas Nursing Facilities

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1. Executive Summary

This reanalysis of the relationships between staffing and appropriateness of care was based on resident data from the department’s FY2000 report *A Statewide Assessment of Quality of Care, Quality of Life and Consumer Satisfaction in Texas Nursing Facilities* (Rider-32 report) using more recent and reliable staffing data. These analyses also addressed the effects of resident severity of illness and facility case mix on appropriateness of care. The key conclusions are summarized below.

Concerning the Association of Staffing Levels and Quality

The use of contemporaneous staffing data and case mix adjustments revealed relationships between staffing and appropriateness of care not noted in the Rider-32 report.

- Residents in facilities with either higher total direct care staff or nurse aide time per resident were more likely to have appropriate toileting plans.
- Residents who had both cognitive impairment and behavioral symptoms were at greater risk of being prescribed antipsychotics without an OBRA-87 indication if they resided in facilities with lower nurse aide or total staff time per resident.

Concerning the Association of Facility Case Mix and Quality

- Higher overall facility case mix was associated with a lower likelihood that needed toileting care plans were provided,
- Higher overall facility case mix was associated with a lower likelihood that residents attained needed physical and social activity, and
- Higher overall facility case mix was associated with a higher likelihood of prescribing of antipsychotic medications without an OBRA-87 indication particularly in facilities with higher nursing and ADL impairment indices.

Concerning the Association of Resident Severity of Impairment and Quality

- Mirroring findings in the Rider-32 report, more severely impaired residents were less likely to receive care meeting the study criteria for appropriate care.
  o Higher levels of cognitive impairment and a greater number of mood symptoms were associated with higher likelihood of being prescribed antipsychotic medication without a valid OBRA-87 indication.
  o Greater cognitive or ADL impairment was associated with lower likelihood of having a needed toileting plan for incontinence.
  o Greater cognitive or ADL impairment was associated with lower likelihood of attaining adequate social and physical activity.
- Residents with greater nursing needs were less likely to attain appropriate levels of social and physical activity.

The resulting picture is one in which higher overall levels of resident need within a facility are associated with lower levels of effectiveness in providing appropriate care in...
the care domains examined. This association suggests that individual residents are less likely to get appropriate care if they are more severely impaired. Analyses confirmed this association for the types of care examined. In addition, while the case mix indices did explain 11% of the variance in facility staffing, it appeared that this increase in staffing resources did not improve the appropriateness of toileting, activity and acceptable use of antipsychotics among more severely impaired residents.

The finding that antipsychotics were prescribed to cognitively impaired residents with behavioral symptoms and without a recognized OBRA-87 indication more often in facilities with lower staffing levels tends to support the position of those who argue that these medications are sometimes used as chemical restraints when staffing levels are inadequate. Nonetheless, this particular association accounted for a relatively small proportion of all antipsychotic prescribing that deviated from OBRA-87 guidelines suggesting that staffing levels were but one factor among others leading to such deviations.

The existing Texas nursing facility reimbursement model, the Texas Index for Level of Effort (TILE) system, is a local case mix reimbursement system that has been recently supplemented with staffing and performance incentives at the direction of the Texas Legislature. In light of the findings presented here and of the findings presented from other case mix research, it may be worthwhile to consider preserving those specific incentives if Texas redesigns its nursing facility reimbursement methodology or adopts a national case mix model to replace the TILE system.
2. Introduction

In providing this report, the Texas Department of Human Services (TDHS) addresses some questions posed by and left unanswered in the Rider-32 report to the 77th Texas Legislature (Cortés, Montgomery, Morrow, Monroe, 2000). These questions are:

1. Would more reliable staffing data that was contemporaneous with the on-site quality review process show relationships between staffing levels and appropriateness of care that were not included in the Rider-32 report?
2. Would adjusting for the overall severity of resident impairment in each facility (a case mix adjustment) show relationships between staffing levels and appropriateness of care that were not included in the Rider-32 report?

These questions are addressed here not only because the department committed to doing so in the original Rider-32 report but also because answers to these and related questions can help to inform the on-going discussion concerning changes to the existing Texas nursing facility reimbursement methodology. The Institute of Medicine (IOM), in its recent report, *Improving the Quality of Long Term Care* (IOM, 2001), summarized the results of previous research examining the complex relationships between reimbursement and quality. Some of this research concluded that particular aspects of quality such as specific outcomes related to personal care were insensitive to reimbursement. Other research cited in the IOM report concluded that,

“…the effects of higher cost or reimbursement levels on staffing and of staffing on outcomes were not large enough for cost or reimbursement to have a statistically significant impact on quality as measured by outcomes.”

The IOM report authors emphasized that while the potential for improving quality by increasing existing levels of reimbursement did not appear substantial, the risk of eroding quality by decreasing existing levels of reimbursement did.

As Texas considers alternatives to the TILE system such as moving to a Resource Utilization Group (RUG) -based model for the reimbursement of nursing facility services, it is worthwhile to anticipate the potential effects of those alternatives on access and quality. While case mix reimbursement should make providers indifferent to a resident’s severity of impairment and care needs thereby improving access to care, it also has the potential to create perverse financial incentives. These include the following: 1) to forego resident rehabilitation in order to maintain higher reimbursement, 2) to misreport resident conditions and problems in order to receive higher reimbursement, and 3) to accept sicker residents but provide them no more care than is provided to less sick residents.

Research literature that has examined the case mix reimbursement systems used in several states is summarized in the IOM report, and it suggests that all of these do sometimes occur under case mix reimbursement systems. The findings in those studies provide little reason to believe that case mix reimbursement models themselves lead to improved quality.
Therefore, the following two questions are also discussed in this report.

1. Were those residents who had greater impairments or care needs less likely to receive appropriate care in the three care domains examined?
2. Is there reason to preserve specific staffing enhancement provisions and performance rewards such as those currently in effect at the direction of the 76th and 77th Texas Legislatures?

2.1 Importance of Facility Staffing and Case Mix Data

The Rider-32 on-site assessment process was conducted during the last quarter of 1999, and the data analyses included an examination of the effects of staffing levels on appropriateness of resident care in the domains of physical and social activity, appropriate toileting, and antipsychotic drug usage. Unlike the analyses that the Centers for Medicare and Medicaid Services (CMS) (formerly the Health Care Financing Administration), undertook to examine the possible threshold effects of staffing on quality (Feuerberg, 2000), the Rider-32 study found only weak evidence that variations in staffing levels were related to variations in observed appropriateness of care.

Examining clinical outcomes such as hospitalization and pressure ulcers, the CMS study found significant relationships between facility staffing levels that were below certain thresholds and resident outcomes. Because the CMS analyses addressed facility case mix and the Rider-32 study did not, it seemed possible that the Rider-32 study may have failed to recognize relationships that did exist. Moreover, the Rider-32 sources of staffing data were proxies for actual 1999 staffing levels. Inadequate proxies, like failure to address facility case mix, would tend to obscure some relationships. Thus, both the quality of the staffing data and the absence of case mix adjustments in the original Rider-32 work might have obscured some important relationships between staffing levels and appropriateness of care.

2.2 Staffing Data Used in the Rider-32 Report

The staffing analyses for the original Rider-32 report were performed using two distinct sources of staffing data. Shortcomings in both data sets were identified and explained in the report. The first source of staffing data, self-reported staffing obtained directly from facilities at the time that the assessment process was conducted, was found to have some obvious errors. Moreover, this self-reported staffing information was not subjected to an independent audit for factual accuracy.

The second set of data, staffing levels calculated from the 1998 Cost Reports, while more reliable, were not contemporaneous with the Rider-32 assessment process. Thus, 1998 staffing data were used as a proxy for actual 1999 data that were not available at the time of the Rider-32 project. In order to address these concerns surrounding the staffing data...
used in the Rider-32 report, all of the analyses addressing staffing levels and appropriateness of care in the present report were based on staffing levels calculated from 1999 Cost Reports.

### 2.3 Descriptive Comparison of the Three Staffing Data Sets

The Rider-32 report addressed staffing by examining direct care staff categories similar to those used in the CMS staffing study. These categories were Nurse Aide, LVN, LVN+RN, RN, and total direct care staff.

Staffing data from the 1998 and 1999 Cost Reports showed similar overall figures for staffing in these five direct care staff categories. Self-reported staffing data collected during the Rider-32 assessment process showed lower figures.

Table 1: Number of hours of staff time per resident for each of the staff categories

<table>
<thead>
<tr>
<th>Staff Category</th>
<th>1999 Cost Reports</th>
<th>1998 Cost Reports</th>
<th>Rider-32 (self-report)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Std. Dev.</td>
<td>Mean</td>
</tr>
<tr>
<td>CNA</td>
<td>1.73</td>
<td>0.36</td>
<td>1.78</td>
</tr>
<tr>
<td>LVN</td>
<td>0.75</td>
<td>0.21</td>
<td>0.73</td>
</tr>
<tr>
<td>RN + LVN</td>
<td>0.92</td>
<td>0.23</td>
<td>0.89</td>
</tr>
<tr>
<td>RN</td>
<td>0.17</td>
<td>0.13</td>
<td>0.16</td>
</tr>
<tr>
<td>TOTAL</td>
<td>2.66</td>
<td>0.48</td>
<td>2.67</td>
</tr>
</tbody>
</table>

### 2.4 Description of the Severity of Impairment and Case Mix Indices

#### 2.4.1 Resident Severity of Impairment Scores

Indices that characterize the severity of an individual resident’s illness or impairment and hence the resident’s need for direct care services can be derived from Minimum Data Set (MDS) assessments. The MDS-based indices in common use are the following:

1. Cognitive Performance Scale (CPS) score,
2. Activities of Daily Living (ADL) score,
3. Mood symptom score,
4. Resource Utilization Group (RUG) Nursing Index, and
5. RUG Rehabilitation Index.

The seven steps in the CPS scale proceed from zero (cognitively intact) to six (severe cognitive impairment). The CPS score has been shown to correlate moderately well with other clinical measures of cognitive impairment (Hartmaier, Sloane, Guess, Koch, Mitchell, Phillips, 1995).
The ADL scale has a possible range of zero to 18 with higher values indicating greater ADL impairment. Like the CPS scale, the ADL scale has been shown to correlate moderately well with other clinical measures of impairment of activities of daily living (Snowden, McCormick, Russo, Srebnik, Comtois, Bowen, Teri, Larson, 1999).

The mood symptom score counts the number of MDS items that reflect symptoms of depression, anxiety or sad mood; higher values indicate more symptoms. Unlike the CPS and ADL scores, the mood symptom score is descriptive without necessarily providing usable diagnostic or performance information. For instance, it is not reasonable to conclude that higher mood scores necessarily imply a greater need for nursing attention. While diagnostic scales can be constructed from these and other MDS data items, some work suggests that inter-observer variations can lead to large facility score differences that do not necessarily reflect actual facility differences (Schnelle, Wood, Schnelle, Simmons, 2001).

The RUG nursing and rehabilitation indices reflect nursing and rehabilitation needs, and are based on studies of the actual staff time required to attend to the needs of residents. In general, higher index values indicate greater amounts of time needed for resident care. The determination of resident nursing and rehabilitation needs are based on a resident classification system that recognizes 44 distinct categories of need and explains 55% of the variance of total nursing and therapy time recorded at the resident level (Fries, Schneider, Foley, Gavazzi, Burke, Cornelius, 1994). Recent international work continues to show that these indices explain a large portion (59%) of the variance in resident-level staff time (Topinkova, Neuwirth, Mellanova, Stankova, Haas, 2000).

All resident-level indices were calculated from each resident’s most recent MDS assessment (relative to the time of the Rider-32 on-site facility visit) using Stepwise Systems Inc. RUG-III V5.12 Dynamic Link Library. The hierarchical 44-group RUG-III model was used to determine each resident’s RUG classification. For the analyses of resident characteristics such as gender, ethnicity and age, resident’s individual scores were used. Analyses of appropriateness of care were performed using both resident-level and facility level case mix indices.

2.4.2 Facility Case Mix Indices

Indices used to characterize the severity of impairment in individual residents may be used to characterize facility case mix through a process of averaging. For this report, facility-level case mix indices were calculated as the average for each severity index across all residents whose assessments would have been included in a facility’s Quality Indicator report (calculated on an eight month baseline) had one been performed on the date that the facility was visited for Rider-32 assessment purposes.

In the analyses presented here, the principal case mix adjustments were for facility-specific nursing, ADL and CPS indices. The rehabilitation index was not explored simply because a very small fraction of long term care residents had a non-zero index. Therefore, statistical findings concerning differences seen only in that small population are not reported.

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mood index was not included because it did not have a strong association with staffing or with the outcome measures. In addition, marginally significant results were not reported except where doing so showed a change of significance in a relationship when it was examined using two different kinds of case mix adjustments.

3. Resident Characteristics and Severity of Impairment

Severity of impairment was examined in the context of resident gender, ethnicity, and age. These analyses were performed from MDS data alone, and the conclusions are drawn from assessments of 86,000 residents whose MDS data qualified for inclusion in quality indicator calculations.

The following associations were significant:

- Female and male residents differed significantly in every severity index ($p < .001$).
  - Female residents showed a greater number of mood symptoms, a higher level of cognitive impairment, and greater ADL impairment.
  - Male residents had a higher nursing index.

- Analyses by age group yielded mixed results.
  - Both the oldest old (over age 100) and the youngest residents (under age 65) tended to have higher nursing index values ($p < .001$).
  - In general, the severity of both ADL and cognitive impairment increased with age ($p < .001$).
  - The number of mood symptoms decreased with age ($p < .001$).

- Severity of impairment also varied according to ethnicity ($p < .001$).
  - White residents tended to have lower nursing index values as well as less ADL and cognitive impairment than other groups.
  - Black non-Hispanics had the greatest ADL impairments.
  - Asian Americans had the greatest cognitive impairment.
  - White residents had significantly more mood symptoms, while Black residents had significantly fewer.
4. Relationship of Case Mix Indices and Facility Attributes

Facility case mix indices were examined in the context of the following facility attributes: facility size, rural vs. urban location, reimbursement streams, and type of ownership.

The following associations were significant:

- With respect to type of ownership:
  - For-profit facilities tended to have a higher nursing \((p< .05)\) index.
  - Non-profit facilities tended to have a higher mood symptom index \((p< .05)\).

- Urban facilities had higher nursing indices \((p< .01)\).

- With respect to increasing facility size: \((p< .05)\)
  - Nursing and ADL impairment indices increased.
  - Facility mood symptom index decreased.

- With respect to facility reimbursement streams:
  - Facilities with a greater percentage of private pay residents showed lower nursing and higher ADL case mix indices \((p< .05)\).
  - Facilities with a greater percentage of Medicaid residents showed a lower ADL case mix index \((p< .01)\).

Given the associations between resident characteristics and severity of impairment scores as well as the associations between facility case mix indices and facility attributes, it is clear that facilities could differ greatly with respect to the needs of their residents, and therefore, in staffing requirements to meet those needs. Table 2 shows the range of facility case mix values observed among the Rider-32 facilities.

Table 2: Variation of facility case mix among Rider-32 facilities

<table>
<thead>
<tr>
<th>Case Mix Item</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nursing Index</td>
<td>.59</td>
<td>1.08</td>
<td>.731</td>
<td>.05</td>
</tr>
<tr>
<td>Rehabilitation Index</td>
<td>.00</td>
<td>.81</td>
<td>.035</td>
<td>.05</td>
</tr>
<tr>
<td>Composite Nursing and Rehabilitation</td>
<td>.38</td>
<td>.99</td>
<td>.484</td>
<td>.04</td>
</tr>
<tr>
<td>ADL</td>
<td>6.54</td>
<td>15.05</td>
<td>10.51</td>
<td>1.12</td>
</tr>
<tr>
<td>CPS</td>
<td>1.11</td>
<td>4.89</td>
<td>3.07</td>
<td>.52</td>
</tr>
<tr>
<td>MOOD</td>
<td>.00</td>
<td>4.63</td>
<td>1.08</td>
<td>.78</td>
</tr>
</tbody>
</table>
5. Direct Care Staff Time per Resident and Facility Case Mix

Facility staffing levels were determined using 1999 Cost Report data and the same approach described in the Rider-32 report. The associations between staff time per resident and facility case mix indices were analyzed.

The following relationships were evident:

- As the facility nursing index increased, so did RN, LVN, and CNA resident time per patient.
- Facility-level CPS and LVN time per resident were inversely related. That is, as the average severity of resident cognitive impairment increased, there was less LVN time per resident (p< .05).

These and other correlations between staff time per resident and facility case mix indices appear in Table 3 below. This analysis was based on 826 facilities for which complete data were available.

Table 3: Correlations of facility case mix indices and facility staffing levels

<table>
<thead>
<tr>
<th>Case Mix Item</th>
<th>RN</th>
<th>LVN</th>
<th>CNA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nursing Index</td>
<td>.182**</td>
<td>.072*</td>
<td>.110**</td>
</tr>
<tr>
<td>Rehabilitation Index</td>
<td>.119**</td>
<td>.011</td>
<td>-.011</td>
</tr>
<tr>
<td>RUG Composite Index</td>
<td>.181**</td>
<td>.057</td>
<td>.075**</td>
</tr>
<tr>
<td>ADL</td>
<td>.108**</td>
<td>.053</td>
<td>.199**</td>
</tr>
<tr>
<td>CPS</td>
<td>-.040</td>
<td>-.074**</td>
<td>.055</td>
</tr>
<tr>
<td>Mood symptom score</td>
<td>-.011</td>
<td>.029</td>
<td>-.018</td>
</tr>
</tbody>
</table>

* Correlation is significant at the .05 level (2-tailed).
** Correlation is significant at the .01 level (2-tailed).

Residents’ needs for direct care, as reflected by the facility-specific nursing, ADL and CPS case mix indices, together explained about 11% of the variation in RN, LVN and nurse aide staffing levels. This seems reasonable for a facility-level finding given that these indices explain 50-60% of actual staff time use observed at the resident level. Thus, when viewed at the level of facility staffing, residents’ aggregate needs for direct care services, as reflected by these three indices, accounted for some but not the majority of the observed differences in staffing levels that existed in these 826 facilities.
6. Facility Case Mix, Staffing Levels and Appropriateness of Care

The Rider-32 quality review process addressed the appropriateness of resident care in three specific domains: continence promotion, resident activity, and the use of antipsychotic medications. These determinations of quality in the care of 1,985 Rider-32 residents were reanalyzed in light of new case mix and 1999 Cost Report staffing data.

In the findings that follow, for the sake of brevity, the expression high-risk refers to residents whose MDS assessments indicated the presence of both cognitive impairment and behavioral symptoms in the absence of a psychosis or related condition. The expression low-risk refers to residents who had no psychosis or related condition and who were not high-risk. Of the residents in the Rider-32 sample, 70 high-risk residents were receiving antipsychotics, and the total number of residents on antipsychotics in the absence of a psychosis or related condition was 499.

The term inappropriate as it is used here in relation to antipsychotic medication indicates the lack of an OBRA-87 recognized prescribing indication for these agents, and the term appropriate refers to having such an indication. This is an important detail because this judgment of appropriateness is based on a widely recognized regulation regarding the use of antipsychotics in the nursing home setting rather than on controlled studies that show that a particular treatment approach produces better clinical results or has a better risk/benefit profile than antipsychotics in those situations where OBRA-87 does not recognize antipsychotics as a valid treatment. Nonetheless, where there is insufficient experimental evidence to serve as a basis for a policy or regulation, consensus (clinical or social or both) often serves as a rational alternative until scientific study can replace it.

6.1 Facility Case Mix and Appropriateness of Care

The following relationships were significant:

- Residents who had appropriate toileting plans tended to reside in facilities with lower overall ADL and cognitive impairment indices (p< .01)
- Residents achieving adequate social activity tended to reside in facilities with lower nursing, ADL, cognitive impairment, and mood symptom indices (p< .01)
- Residents achieving adequate physical activity tended to reside in facilities with lower nursing, ADL, and cognitive impairment indices (p< .01)

Thus, facilities with lower overall levels of resident impairment were more likely to provide appropriate continence promotion. And, residents were more likely to attain adequate activity in facilities in which the overall level of resident impairment or overall level of nursing care need was lower.

A similar relationship between facility case mix and appropriateness of care was not observed with respect to the inappropriate use of antipsychotic medications.
• Among low-risk residents who received antipsychotics, appropriate antipsychotic prescribing was more likely in facilities that had a higher overall cognitive impairment index (p<.01).

• Among all residents who received antipsychotics, appropriate antipsychotic prescribing was more likely in facilities that had a higher overall ADL impairment index (p<.01).

• Comparing between residents prescribed antipsychotics and residents not prescribed antipsychotics:
  o Appropriate prescribing was more likely in facilities with a higher overall cognitive impairment index (p<.01).
  o Inappropriate prescribing was more likely in facilities with a higher overall ADL impairment index (p<.01)

6.2 Staffing Levels and Appropriateness of Care

6.2.1 1999 Cost Report Staffing Data - No Case Mix Adjustment

The original Rider-32 staffing conclusions were based on analyses that did not account for facility case mix. The conclusions below are based on similar analyses making no case mix adjustment but using 1999 Cost Report staffing data.

• Residents in facilities with less LVN time per resident (p<.05) and less total direct care staff time per resident (p<.05) were more likely to get adequate physical activity.

• In facilities that had more total staff direct care time (p<.05) per resident; nurse aide time (p<.01) per resident, residents were more likely to have appropriate toileting plans.

• Among high-risk residents, both lower nurse aide and total staff time per resident (p<.05) were associated with a higher likelihood of inappropriate antipsychotic use.

These results were generally consistent with those previously reported in the Rider-32 report.

6.2.2 1999 Cost Report Staffing Data - Nursing Index Adjustment

Using the facility-specific nursing index, it was possible to test whether staff time per resident predicted appropriate care after adjusting for facility staffing differences attributable to differences in their residents’ overall nursing needs.

The following associations were observed:

• The formerly identified inverse relationship between greater LVN and total staff time per resident and lower likelihood of attaining adequate physical activity weakened in statistical significance (p=.08).
Greater total direct care staff time was associated with appropriate toileting plans for residents who needed them (p< .05). Nurse aide time per resident and appropriate toileting were similarly related (p< .01).

Residents who resided in facilities with greater nursing needs were less likely to receive toileting (p< .05).

Facility case mix adjustment clarified that the inverse relationship between increased staffing and lower physical activity was the result of higher severity of illness requiring higher staffing rather than lower physical activity being the result of higher staffing. The findings with respect to appropriateness of toileting plans were consistent with those found from analysis without case mix adjustment.

6.2.4 1999 Cost Report Staffing Data - ADL Index Adjustment

Using the facility-specific ADL index, it was possible to test whether staff time per resident predicted appropriate care after adjusting for facility staffing differences attributable to differences in their residents' overall level of ADL impairment.

The following associations were observed:

- Total staff time was inversely related to attaining adequate physical activity (p< .05).
- RN staff time and attainment of adequate social activity appeared marginally related (p=.08); as RN staffing increased, residents appeared more likely to attain adequate social activity.
- Greater total direct care staff time was associated with appropriate toileting plans for residents who needed them (p< .05). Nurse aide time per resident and appropriate toileting were similarly related (p< .01).

Again, the apparent inverse relationship of staff time to adequate physical activity appeared to be the result of the fact that the ADL index failed to account for greater nursing care needs when those were present. The nursing index adjustment showed that this inverse relationship was only marginally significant. The effect of staffing on adequate social activity had uncertain practical significance. The effect of staffing on appropriate toileting continued to be clearly apparent.

6.2.4 1999 Cost Report Staffing Data - CPS Index Adjustment

Using the facility-specific cognitive impairment index, it was possible to test whether staff time per resident predicted appropriate care after adjusting for facility staffing differences attributable to differences in their residents' overall severity of cognitive impairment.

The following were observed:

- Residents in facilities with greater total staff time per resident were less likely to receive adequate activity (p< .05).
Residents in facilities with more nurse aide or total direct care staff time per resident were more likely to have appropriate toileting plans (p< .01 and p< .05 respectively).

High-risk residents residing in facilities with less nurse aide or total staff time per resident were more likely to be prescribed antipsychotics inappropriately (p< .05).

No staffing category time per resident was significantly related to inappropriate antipsychotic prescribing among residents other than those identified as high-risk by their MDS assessments.

7. Resident Impairment and Appropriateness of Care

The Rider-32 report suggested that resident-specific conditions could also be associated with inappropriate care. In the original report, a clear relationship between a resident’s level of mobility and the appropriateness of both planning for toileting and activity was noted. The greater a resident’s mobility impairment, the less likely it was that the resident received appropriate toileting or activity. Therefore, the following analyses were undertaken to address the effect of each resident’s severity of impairment, as characterized by the resident’s MDS severity of impairment scores, on the quality of care that the resident received.

The following findings emerged:

- Residents who received appropriate toileting had less ADL impairment ($\bar{x}$=10.69, p< .01) and less cognitive impairment ($\bar{x}$=3.03, p< .01) than residents who did not receive toileting ($\bar{x}$= 11.82 and 3.59, respectively).
- Residents who obtained adequate social activity had a lower nursing care index ($\bar{x}$=.68, p< .001), less ADL impairment ($\bar{x}$= 8.95, p< .001), lower levels of cognitive impairment ($\bar{x}$=2.54, p< .001). They also had fewer mood symptoms ($\bar{x}$=.96, p< .001) than residents who did not obtain adequate social activity ($\bar{x}$=.74, 11.12, 3.25, and 1.04, respectively).
- Residents who received adequate physical activity had a lower nursing care index ($\bar{x}$=.68, p< .001), had less ADL impairment ($\bar{x}$= 9.00, p< .001), and had lower levels of cognitive impairment ($\bar{x}$=2.54, p< .001) than residents who did not obtain adequate physical activity ($\bar{x}$=.74, 11.17, and 1.05, respectively).
- Among residents whose antipsychotic medications were not reported in the MDS and for whom there was an appropriate indication for an antipsychotic medication, the nursing care index was higher ($\bar{x}$=.75, p< .01), ADL impairment was greater ($\bar{x}$= 10.85, p< .05) and mood symptom scores were higher ($\bar{x}$= 2.16, p< .05) than among residents who received an antipsychotic medication without an appropriate indication ($\bar{x}$=.68, 9.13, and 1.46, respectively).
- Residents prescribed antipsychotics, regardless of the appropriateness of the prescription, had higher mood symptom and cognitive impairment scores than those who had no antipsychotic prescription (p< .01).
- Residents who were prescribed antipsychotic medication without an appropriate indication had significantly greater cognitive impairment and higher mood symptom scores (p< .01) than residents who received no antipsychotic medication.
8. Discussion

Findings from the forgoing analyses of the associations between staffing levels and quality, accounting for facility case mix differences expand upon what was reported in the initial Rider-32 report. Case mix adjustment and contemporaneous staffing data together revealed additional relationships between direct care staffing levels and appropriateness of care. They also helped to clarify the some of the relationships between appropriateness of physical activity and staffing levels.

Among the new findings, that antipsychotic prescribing without a recognized OBRA-87 indication is more likely among cognitively impaired residents who exhibit behavioral symptoms and reside in facilities with lower staffing levels is notable. It suggests that such facilities do not cope well with the additional care needs that such residents have. That physicians appear to prescribe antipsychotics outside OBRA-87 recommendations more often when staffing levels are low tends to support the argument that medication is used in these cases as a form of chemical restraint. And, to avoid undesirable side-effects of such medicines, at least some would argue that a more appropriate response would be add staff or provide additional training for existing staff to help them deal more effectively with the needs of such residents.

To put this observation into better perspective, it important to understand that a relatively small proportion of all inappropriate antipsychotic prescribing was explained by staffing. Because the majority of inappropriate antipsychotic prescriptions seemed to occur in circumstances where there was no relationship to staffing levels, it appears that staffing levels were but one factor among others influencing physicians’ prescribing practices. Such factors may include: 1) lack of objective evidence that non-drug treatment of behavioral symptoms in the cognitively impaired yields better resident outcomes than do antipsychotics, 2) a relative paucity of data concerning the efficacy of non-antipsychotic medications that are potential alternatives for residents who have cognitive impairments and/or behavioral symptoms, 3) lack of a strong accountability process for physician prescribing practices in nursing facilities, and 4) inadequate or ineffective medication review processes. The present analysis cannot address the relative importance of any of these or other possible factors.

The analyses of appropriateness of care with respect to resident-specific needs as characterized by residents’ severity of impairment scores also added valuable information. In the Rider-32 report, the level of a resident’s physical independence appeared to be a strong predictor of the appropriateness of toileting plans and resident activities. In the current analyses, it was plain that the greater a resident’s cognitive impairment, physical impairment or need for nursing attention, the greater was the likelihood that the resident would not receive appropriate care. This finding is consistent with the IOM’s suggestion that case mix reimbursement is more effective in creating access to care for residents with high needs than it is in ensuring that such residents actually receive the services that they require. Thus, the existing Texas nursing facility reimbursement incentives that are tied to facility staffing levels and performance criteria have the potential to promote quality improvement in a manner that case mix reimbursement alone does not.
The observations and conclusions in both the original Rider-32 report and this Addendum were meant to add to what is known about certain aspects of the quality of care and life in Texas nursing homes. While that has been accomplished, it would not be reasonable to conclude that the same finding would be revealed in other aspects of quality such as the prevention of pressure ulcers or the appropriateness of immunizations. Rather, it is clear that statewide quality may be poor in some aspects and far better in others. Similarly, it would not be reasonable to conclude that the relationships noted here regarding staffing and appropriateness of care or severity of illness and appropriateness of care must also hold in other domains. The nature and strength of such relationships should be expected to vary depending on the specific aspect of quality being examined.

9. References


