A Forensic Audit of Staffing and Census in a Long-Term Care Facility

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This article illustrates how a forensic audit of reported staffing and census levels was conducted in a long-term care (LTC) facility to improve the quality and accuracy of daily staffing and census (number of patients) reports. Butler Long-Term Care (BLTC) was a 60-bed nursing home certified to provide care to residents requiring a substantially greater quantity and quality of skilled nursing care compared to residents at ordinary nursing homes. BLTC is a fictitious name assigned to maintain confidentiality. The Federal government audited BLTC and concluded that inflated invoices had been submitted for patient services because BLTC was inadequately staffed as required in statutory and regulatory requirements. The government sued BLTC, alleging that for four years (1997-2000) BLTC knowingly presented claims for payment to the Medicare and Medicaid programs, for care, and goods or services not rendered, that were inadequate or worthless, or that were rendered in violation of applicable statutes and regulations. The government also claimed that BLTC systematically and routinely understaffed the facility. This action led to the authors’ involvement in designing, conducting and presenting the results of a staffing and census audit.

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Since this case involved potential recording errors, a brief consideration of the health care sector will provide some context for our audit planning. Health care providers are often accused of being in the “Dark Ages” with respect to information technology and the use of technology-assisted decision aids. Data-entry keystrokes at the New York Stock Exchange were recently reduced from 45 million to 20 million per day (Lucchetti, WSJ, 2007, p. 1). In contrast, the nursing home we audited required less than 5 million keystrokes each year to record its payroll and census data! To record and track census and nursing hours, BLTC used manual processes and manual data entry.

Data recorded and transmitted in the medical environment are often dependent on manual input and record-keeping. Documentation is bound by the constraints of the human body (i.e., speed, accuracy, efficiency). Studies show that the introduction of factors such as fatigue, increased workload in terms of hours worked or increased patient census, as well as nurses’ pressures due to clinical and offsite work may compromise their work performance.

The medical literature devoted to reporting errors has naturally been patient-centric. Concern for patient safety is of tantamount importance in any medical setting. Consequently, it is not surprising that any literature search addressing errors in the long-term care (LTC) environment yields studies identifying medical errors which potentially jeopardize patient or employee safety. Clerical errors have been discussed in the context of other errors, but reporting errors based on staffing and census have not been a major focus in the accounting or health literature.
Purpose and Scope

The purpose of our audit at Butler Long-Term Care (BLTC) was to reconstruct and recalculate the staffing levels (hours worked) for the period 1997-2000, subject to data availability. The primary focus was on direct nursing hours to identify the actual hours worked each day by direct nursing staff at BLTC. We recalculated actual nursing hours using daily time sheets and reconciled our bi-weekly total nursing hours to the hours paid as recorded by the external payroll services vendor. We then compared the actual corrected hours per patient day (PPD) with the hours PPD reported on the Master Staffing Report (MSR) which had been used by the government auditors in reaching their conclusions. The hours per patient day staffing ratio is computed as follows:

\[
PPD \text{ Staffing Ratio} = \frac{\text{Direct Nursing Hours Worked}}{\text{Patient Census}}
\]

This ratio will be understated if the hours worked are understated and/or if the patient census is overstated (and vice versa). The PPD ratio does not have a direct impact on government payments for nursing home services, but it is often used by regulators as a proxy for nursing quality. As such, it is monitored by both State and Federal nursing home inspectors.

Census, as the denominator in the daily nursing hours PPD ratio, does directly impact Medicaid payments. Facilities are reimbursed on the basis of patient census and patients' health care needs. Since census directly impacts revenue, there is a risk that census counts might be inflated. In order to correspondingly increase Medicaid revenues, nursing homes have an incentive to increase their
patient census. Therefore, fraud auditors must consider whether census data is accurate.

The MSR used in the government audit was a daily summary of staffing and census levels prepared for review by managers in the facility and at corporate headquarters. It was prepared by a variety of personnel (clerks, nurses, aides, etc.) using manual census and staffing data. It was not reviewed or reconciled with any payroll data, or adjusted to reflect corrections to staffing or census data. The MSR is similar to management reporting tools used by many facilities as a contemporaneous daily or weekly performance indicator for internal management use. These reports, however, are often introduced as evidence in public policy or regulatory or other LTC litigation.

The initial objective was to test the accuracy of the reported nursing hours by reconstructing the underlying payroll data. A second objective was to verify and, if necessary, recalculate census data used in the denominator of the “nursing hours per patient day” (PPD) calculation. A third objective was to use the results of these analyses to recalculate the nursing hours PPD daily ratios.

The rationale for this analysis was to determine whether the Master Staffing Report was inaccurate or accurate in reporting BLTC’s nursing hours PPD. Potential inaccuracies could, and did, arise because:

- temporary (pool) staff hours were not properly recorded,
- salary hours were not included, or not fully included,
- new (or terminated) employee time was not accurately recorded,
- double or partial shifts were not reflected on the proper days,
- payroll corrections were often not finalized for weeks or months,
- the MSR data were rarely updated to include corrections,
- almost all payroll corrections resulted in more reported hours (& pay),
- some census counts included arithmetic errors, and
hospital or family leave days were often included in census data.

The effect of including BLTC patients who were hospitalized or on leave would reduce the reported hours PPD (because the reported census was overinflated). The effects of not including the correct number of hours worked by nurses would also be to lower the reported PPD results. Obviously, any mistakes in either the census or the hours worked should be corrected to obtain the most accurate hours PPD.

**Background**

We are concerned with how reporting errors have been addressed in the nursing and accounting literature. The lack of prior studies quantifying staff reporting errors necessitated an expanded search, covering fields other than medical fields, to examine studies addressing data entry, reporting errors, etc. This search proved fruitless in the recent accounting literature. The lack of evidence on the incidence of reporting errors, especially in a health care context, justifies the publication and dissemination of our results.

In the nursing literature, researchers are most concerned with medical errors. Scott, et al. (2006a) reported that fatigue was a major factor in compromised work performance; it affects patient care, errors, and near-errors. 18% of identified errors were procedural, 12% were due to charting mistakes, and 6% were transcription mistakes (pp.90-91). These “work performance” errors are subject to the same drivers that give rise to mistakes in recording staffing hours and census data.

In a related study, Scott, et al. (2006b) also found similar results concluding that the industry’s regular use of 12-hour shifts affects nurses’ work performance. They also identify a link between fatigue and accuracy in reporting. Most of the
nurses in their sample worked overtime or extra shifts—often beyond their scheduled assignments. As with their (2006a) study, the scheduling of 12-hour shifts and overtime produced comparable error rates including errors in reporting: “The majority of the errors (56.5%) and the near errors (28.2%) involved administration of medications. Other errors reported were procedural (19.6%), charting (1%), and transcription (0.8%) mistakes (Scott, 2006b, p. 34).”

The most recent study of nursing hours PPD reporting errors was reported by Kash, et. al., (The Gerontologist, 2007). These authors compared staffing levels reported in Texas Nursing Facility Cost Reports (Medicaid) vs. staffing data reported under Online Survey Certification and Reporting (OSCAR). While the average difference was only 3%, these differences were highly variable across different staff types. For example, “the OSCAR staffing reports showed 38% higher mean levels of staffing for RNs … and 4% higher CNA staffing … than the Medicaid cost reports” (p. 484). On the other hand, “the average LVN hprd [hours per resident day] in the OSCAR were about 9% lower (emphasis added) than the average LVN hprd in the Medicaid Cost Report” (ibid.). These results dramatically underscore the importance and statewide distribution of nurse staffing reporting errors in long-term care facilities. Kash emphasizes that the OSCAR data are unaudited and self-reported, while the Medicaid Cost Reports are audited and verified under a strict regulatory processes. These authors conclude that it is essential to “improve the process of reporting, collecting, and verifying data on staffing” and that alternative staffing databases must be “tied more closely to payroll and cost report data” (p. 489).
Healy et al. (2004) reported the effects of data-entry accuracy as a result of fatigue: “With prolonged work, error rates increased (i.e. accuracy declined)…suggesting deterioration in performance as a result of fatigue...” (p. 190). Their study finds that as fatigue increases, additional erroneous entries were made. They identified a “speed-accuracy tradeoff” and its association with fatigue.

Kapp (2003) conducted a comprehensive study of nursing errors and asserted that the regulatory and litigious cultures of our society reduce the likelihood that errors will be reported. Kapp listed the types of errors that occur in nursing homes as medication errors, avoidable pressure ulcers and resident falls, etc. Kapp distinguished between errors due to system failures rather than discrete mistakes attributable to a specific person. Kapp suggested that most reporting errors in nursing homes occur at the system or process-level.

Error disclosure, according to Kapp, is the key to correcting prior errors and minimizing future errors. Kapp lists some barriers to error disclosure (pp.61-74):

- Apprehension and mistrust, fear of punitive intervention.
- Perception of regulatory antagonism, subjective standards and enforcement.
- Increased threat of criminal prosecution stemming from resident injury and fraud claims under the Federal False Claims Act.
- Satisfying the ‘octopus’ of licensing agencies and review boards.
- Frequently strained relations with residents or their families.
- Financial uncertainty due to constraints under the Balanced Budget Act.
- Increasingly aggressive competition for customers from other nursing homes and assisted-living facilities.

Forensic auditors must consider these “barriers” as they search to identify the best evidence available to them in LTC engagements. Kapp asserted that nursing homes provide a “fertile environment for error” (p.76). While error disclosure
is vital to redesigning the underlying systems generating errors, it is not likely unless some of the barriers can be mitigated.

Kaplan (2003) adds one further dimension in discussing the “gift of failure”. He finds that repetitive tasks become habitual and are ultimately performed with “little attention to the components of the routine” (p.30). It is our contention that the routine completion of staffing and census forms (daily or weekly tallies) are the kind of repetitive tasks that nurses and other LTC staff will complete with ‘little attention’. When such records are not reconciled with payroll data, latent errors due to lack of attention, fatigue and other factors will introduce errors. These errors can not be minimized or eliminated unless the data is reconciled to objective sources or unless the staffing ratios are audited.

Kaplan (2003) distinguishes between active and latent errors. Active errors are skill, rule or knowledge based human errors that are closely linked in time with the action. Latent errors are disconnected from the decision that led to their occurrence. They are technical or organizational failures that “have their antecedents in managerial decisions or actions” (p.33).

Active and latent errors could both be attributable to repetition and “over learned unmindful task performance” (p. 33) if they occur in association with routine tasks. Nursing staff may not realize the rationale behind administrative processes and may disregard important control steps that impact both staffing and census accuracy. Latent errors can lead to mistakes in census counts and to errors in completing time cards or other payroll records. Possible latent errors motivate our
audit design and must be considered by managers, auditors, and regulators when using census and nursing hours PPD data.

Our audit is mindful of the fact that available data documenting staffing and census figures in nursing homes is limited because LTC facilities are prone to reporting errors. As Bostick, et al. (2006) pointed out, the OSCAR database is inherently flawed because it relies on self-reporting and is not audited (p. 373). It is our contention that the absence of electronic records and a reliance on manual recording taxes an already overworked staff and results in an increase in reporting errors. This potential for latent errors suggests the need for better recording systems and for recognition of the need to include corrections as they are identified. By recognizing these limitations, along with audited and corrected nurse staffing and census data, more reliable data will be available for managers, regulators, and litigators. Similarly, more reliable data will provide better evidence for managers or regulators to use in decisions that can have a positive impact on patient care.

The Centers for Medicare and Medicaid Services (CMS) are concerned about data reliability issues in LTC facilities and suggested: “we have serious reservations about the reliability of staffing data at the nursing home level” (http://www.hhs.gov/, 2004, p.1). LTC facilities are required to post licensed and non-licensed nursing hours on-site on a daily basis and identify time devoted to direct patient care. Daily nursing hours must be posted in a visible, easily accessible place and must be documented in a clear and legible manner. Rather than specify a data reporting format, CMS allows latitude in choosing a format that best reflects staffing and requires only that the format is “clear and readable” (Federal Register, Volume
70, 2005, p. 62073). While these new disclosures improve transparency, they do not address the data accuracy issues raised herein. The required daily data displays are still self-reported and not subject to any audit requirements.

Our audit accomplishes one of Bostick’s clarion calls for an implementation study showing how payroll data can help increase the accuracy and usefulness of nursing hours PPD for both management and public policy discourse. Bostick suggested: “payroll data are a promising source for this information; however, this method has not had sufficient reliability and validity testing. A large-scale study using payroll data…would be a valuable addition to the literature (p. 375).” Our audit is an extensive longitudinal payroll and census audit over four years. It is unique in its extensive access to internal, sensitive and previously unavailable daily data on such a large scale. It is also unique in relying on corrected and audited staffing and census data—which is often not available until many months after the normal reporting cycles are completed. It is especially unique in addressing the ‘denominator effect’ of census and how over-reporting of census data might bias (downwards) reported staffing ratios.

Audit Objectives

Our first objective was to determine whether the reported nursing hours could be validated and matched to paid nursing hours. If not, paid hours would be used as a more accurate staffing record. We expected that reporting errors could have been due to fatigue (especially during ‘double-shifts’ or ‘split shifts’), prioritizing patient care needs versus record-keeping, and faulty recall when completing the daily or
weekly MSR tallies. We further expected that corrected staffing data, based on payroll data, would require positive (increased) corrections to the daily (MSR) reports.

The second audit objective was to determine whether the reported daily patient census was accurate and whether some of the same errors affecting reported nursing hours could also have caused census reporting errors. Such errors might be due mostly to the clinical prioritization of patient care needs versus record-keeping when census levels are high and/or when patients are in crisis. We expected relatively minor census errors because a LTC facility’s census is highly scrutinized and closely tied to Medicaid payment rates.

Another focus was on the feasibility of using payroll records as source data for this type of forensic audit. We used a variety of extant records to rebuild the staffing records to compute hours worked daily over a four-year time period. We conducted a retrospective audit using payroll and census records to check the accuracy of contemporaneous source documents, namely the MSR used at BLTC.

**Methodology**

Staffing data in a typical LTC facility could be obtained from several records; for example sign-in sheets, staffing schedules, nursing departmental reports, or payroll records. Payroll records were the most reliable data set available; even though they were in “hard copy” format since the original electronic records had been purged (or lost). For most health care providers, payroll records will be the most objective, the most audited, the most likely to be computer-based, and the most accurate source data on hours worked. For BLTC, the payroll function had
been outsourced to ADP, an external company unrelated to BLTC. Consequently, the scope was based on ADP payroll reports along with corrected time sheets and staffing schedules from each bi-weekly period. These corrections were indicated by approval notations from the affected employees and their departmental supervisor. Additional data sets included original time sheets and payroll notes accumulated as back-up documentation for payroll corrections. We used multiple data sources to minimize inherent risk by requiring corroborating evidence for any audit adjustments.

Only data for “regular” hours worked or “overtime” hours were accumulated. No holiday bonus pay was included, nor was sick or vacation time, or any other time (e.g. jury time, bonus hours, etc.) where the staff person was not on-site.

Individual hours worked were combined into a ‘grand-total’ for all direct nursing staff. Many nurses worked in several departments each pay period, while all their hours were recorded in a ‘home’ department. Therefore, reconciliations could only be conducted on a combined basis for all direct nursing. Nursing hours worked were then reconciled to the biweekly ADP payroll reports. The audit protocols associated with staffing data are shown in Exhibit 1.

These reconciliations demonstrated excellent correspondence between paid and worked nursing hours such that total payroll hours reconciled perfectly to timesheet hours in 20 payroll periods. In 63 payroll periods, the discrepancy between the hours worked and paid was less than 100 hours. In 13 payroll periods, the discrepancies were greater than 100 hours. In summary, these discrepancies represent a low materiality threshold of less than 0.8% of the total hours paid at
BLTC over three years (1997, 1998, and 2000). Another view of these nursing hour reporting errors is shown in Figure 1:

![Figure 1. Summary of Nursing Hours Reporting Errors](image)

The Summary of Nursing Hours Reporting Errors (Figure 1) illustrates the distribution of audit adjustments relative to nursing hours on the MSR. This distribution is skewed towards positive adjustments with a few very large percentage increases (20%-30%, 40%-50%, and 60%-70%). Note that the scale on this chart is not uniform as it begins with single percentage point ranges and then switches to ten-percentage point ranges (above 10%). We expected to find a more symmetric distribution of adjustments and did not expect to find the many large percentage adjustments identified in this chart.

Even though the reporting errors were relatively small for three years, the paid hours in 1999 could not be fully reconciled to nursing hours worked. In early to mid-1999, substantial gaps were identified in the available payroll data that may
have been due to software defects or payroll coding errors. Data from mid-February to the end of June 1999 were subsequently deemed unusable because all the hours worked could not be located or verified. In these cases, the amounts paid to BLTC nursing staff (hourly employees) were often inaccurate and overstated.

Similar results occurred in the final months of 2000, but the potential reasons could not be identified. Consequently, five payroll periods in 1999 and five additional periods at the end of 2000 were omitted from further analysis. Based on the remaining 86 bi-weekly payroll periods, we used BLTC’s paid nursing hours to confirm and correct hours worked. All of the large audit adjustments (above 9%) occurred in the remaining pay periods in 1999 that were deemed useable.

For pool staff, invoices from their companies were accumulated and logged into an EXCEL worksheet showing employee, vendor, staff classification, invoice number, service dates and hours worked. Pool hours were added to nurse staffing hours to create daily hours worked.

In terms of deriving a more accurate count of resident days, census logs were examined to identify patients absent from the facility while they were hospitalized, or on family leave, or offsite. Patient charts, hospital admission/discharge dates, discharge records, food intake forms, medication forms, leave of absence forms, and other patient records were used to identify patient absences. Census adjustments were made on 465 days over the four-year period (none on 673 days). No census data was available for 215 days, a much higher incidence of missing data than anticipated. The skewed distribution of census corrections, with 185 negative adjustments of more than one patient, is shown in Figure 2:
It is impossible to show the detailed reconciliations of each census correction as it would require showing 1138 rows from our spreadsheets. We counted each type of reporting error across the four years as shown below:

<table>
<thead>
<tr>
<th>Reporting Errors</th>
<th>1997</th>
<th>1998</th>
<th>1999</th>
<th>2000</th>
<th>Total</th>
<th>% of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospitalization</td>
<td>450</td>
<td>463</td>
<td>309</td>
<td>438</td>
<td>1660</td>
<td>60.4%</td>
</tr>
<tr>
<td>Family Leave</td>
<td>427</td>
<td>129</td>
<td>46</td>
<td>76</td>
<td>678</td>
<td>24.7%</td>
</tr>
<tr>
<td>Discharge</td>
<td>129</td>
<td>81</td>
<td>79</td>
<td>79</td>
<td>368</td>
<td>13.4%</td>
</tr>
<tr>
<td>Other</td>
<td>18</td>
<td>4</td>
<td>11</td>
<td>8</td>
<td>41</td>
<td>1.5%</td>
</tr>
</tbody>
</table>

This data illustrates that the error rate in recording census data is about 15% on the basis of discharge recording errors and “other” recording errors. For example, failing to properly record discharges (including deaths) resulted in 13% of all identified census adjustments. “Other” errors such as arithmetical or tallying errors were less than 2% of the total. Hospitalizations and family leave accounted for the majority of census discrepancies. As noted above, it is in BLTC’s best interests...
(financially) to include patients who are on leave or in the hospital in their census calculations. Indeed, they are permitted to do so by Medicare and Medicaid. However, for the purpose of calculating nursing hours PPD, this anomaly must be recognized when PPD ratios are used for regulatory or enforcement actions.

These census adjustments and the resulting corrected census data were incorporated into the revised nursing hours PPD ratios. The audit protocols for census data are provided in Exhibit 2. On many days, the census figures were unchanged. However, in 394 cases, the corrected census figures were below the original census data. In 71 cases, the corrected census figures were above the original census data. These corrected census figures were used to calculate the corrected hours PPD ratios. Note that an overstated census would have led to higher Medicaid payments, even though the effect would have been to depress MSR reported nursing hours PPD. To the best of our knowledge, our findings are the first reported instance of this issue.

In terms of the overall effect of these corrections to both census and hours worked, there were only 18 days where the MSR direct nursing hours PPD data matched the corrected nursing hours PPD worked at BLTC. For 167 days, the corrected hours PPD were less than the MSR nursing hours PPD. In most cases, 953 days, the corrected nursing hours PPD were higher than the MSR hours PPD. Note that two kinds of errors (incorrect census days and incorrect nursing hours worked) were identified.

Conducting this forensic audit required over 1500 hours by five assistants over four months. Four of these assistants had baccalaureate business degrees;
one had a graduate accounting degree, one was a graduate accounting student and one was in medical school. The direct audit costs were approximately $100,000.

One team exclusively conducted the staffing audit; they were not aware of the staffing ratio calculation. Another team conducted the census audit and had no contact with staffing data. The senior author designed the audit protocols for both teams (Exhibits 1 & 2), but did not conduct any audits. One author conducted staffing audits for 1997 and quality control checks on the remaining years. One author only managed the data, merging files, conducting final quality control checks, and data analysis. This separation of duties maintained independence at each stage.

A three-step quality assurance process was implemented to verify these results and minimize control and detection risks. By using strict quality assurance techniques, including the reconciling of hours worked to paid hours, a very high level of accuracy was attained. The process we followed as described above should result in more accurate daily staffing hours and patient census than in BLTC’s original records.

Results

The annual average corrected direct nursing hours PPD at BLTC during the four-year period (1997-2000) were 4.3%-21.2% higher than the direct nursing hours PPD reported on the Master Staffing Report. In other words, the MSR consistently under-reported nursing hours PPD; errors in collecting and reporting staffing and census data resulted in many understatements (953) and fewer overstatements (167) on the MSR.
Annual average nursing hours PPD are shown below. This summary compares corrected direct nursing hours PPD worked at BLTC vs. those reported on the MSR.

### Average Direct Nursing Hours PPD

<table>
<thead>
<tr>
<th>Year</th>
<th>Corrected Direct Nursing Hours PPD</th>
<th>Original (MSR) Direct Nursing Hours PPD</th>
<th>%Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td>5.44</td>
<td>4.98</td>
<td>9.2%</td>
</tr>
<tr>
<td>1998</td>
<td>4.78</td>
<td>4.45</td>
<td>7.4%</td>
</tr>
<tr>
<td>1999</td>
<td>5.59</td>
<td>5.36</td>
<td>4.3%</td>
</tr>
<tr>
<td>2000</td>
<td>6.00</td>
<td>4.95</td>
<td>21.2%</td>
</tr>
<tr>
<td>1997-2000</td>
<td>5.35</td>
<td>4.91</td>
<td>9.0%</td>
</tr>
</tbody>
</table>

These data show that the gap between MSR reported hours PPD and corrected direct nursing hours PPD varied widely each year. The lowest gap in 1999 is likely due to elimination of five outlier periods. On the other hand, the largest gaps in 2000 were perhaps due to staff turnover or other unique and anomalous events in 2000. These summary data clearly show that the MSR under-reported the BLTC’s PPD ratios. On an overall basis, at least 9% more direct nurse staffing hours PPD were provided by BLTC than shown on the MSR. While each year shows different results, it is clear that individual daily data from the MSR did not accurately reflect BLTC’s staffing levels. This finding is most significant to managers and regulators who often place catastrophic emphasis and penalties on those days with low staffing ratios. Our results suggest that auditors must be cautious in accessing and using contemporaneous staffing and census records in LTC facilities.

We calculated a new variable “error” as the difference between the MSR nursing hours PPD and the corrected nursing hours PPD. A positive error term
indicates that the corrected data exceeded the original MSR data. A negative error term indicates that the corrected data was less than the MSR data.

We split the data into two partitions based on median staffing ratios. A t-test of mean differences was highly significant at p<.0000. Note that average errors are positive and that the average errors are higher when staffing ratios are higher.

<table>
<thead>
<tr>
<th>PPD Average Ratio and related statistics</th>
<th>High 50%</th>
<th>Low 50%</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average of Corrected Direct Nursing (hours ppd)</td>
<td>5.97</td>
<td>4.73</td>
<td>5.35</td>
</tr>
<tr>
<td>Min of Corrected Direct Nursing (hours ppd)</td>
<td>5.37</td>
<td>2.81</td>
<td>2.81</td>
</tr>
<tr>
<td>Max of Corrected Direct Nursing (hours ppd)</td>
<td>7.88</td>
<td>5.37</td>
<td>7.88</td>
</tr>
<tr>
<td>StdDevp of Corrected Direct Nursing (hours ppd)</td>
<td>0.46</td>
<td>0.49</td>
<td>0.78</td>
</tr>
<tr>
<td>Count</td>
<td>569</td>
<td>569</td>
<td>1138</td>
</tr>
<tr>
<td>Average Error</td>
<td>0.62</td>
<td>0.25</td>
<td>0.44</td>
</tr>
<tr>
<td>Min of Error</td>
<td>-1.83</td>
<td>-1.94</td>
<td>-1.94</td>
</tr>
<tr>
<td>Max of Error</td>
<td>3.40</td>
<td>2.24</td>
<td>3.40</td>
</tr>
<tr>
<td>StdDevp of Error</td>
<td>0.56</td>
<td>0.49</td>
<td>0.56</td>
</tr>
</tbody>
</table>

We conducted another test by splitting the data into two unequal partitions based on the government’s assertions that minimum staffing levels should be greater than 5.0 nursing hours PPD. We used the 5.0 hours PPD criterion only as an indicator of ‘lower staffing levels’ so they could be graphically displayed on a single page (more data points would be too dense).

<table>
<thead>
<tr>
<th>PPD Average Ratio and related statistics</th>
<th>&lt; 5</th>
<th>&gt;= 5</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average of Corrected Direct Nursing (hours ppd)</td>
<td>4.47</td>
<td>5.76</td>
<td>5.35</td>
</tr>
<tr>
<td>Min of Corrected Direct Nursing (hours ppd)</td>
<td>2.81</td>
<td>5.00</td>
<td>2.81</td>
</tr>
<tr>
<td>Max of Corrected Direct Nursing (hours ppd)</td>
<td>4.99</td>
<td>7.88</td>
<td>7.88</td>
</tr>
<tr>
<td>StdDevp of Corrected Direct Nursing (hours ppd)</td>
<td>0.43</td>
<td>0.53</td>
<td>0.78</td>
</tr>
<tr>
<td>Count</td>
<td>362</td>
<td>776</td>
<td>1138</td>
</tr>
<tr>
<td>Average Error</td>
<td>0.19</td>
<td>0.55</td>
<td>0.44</td>
</tr>
<tr>
<td>Min of Error</td>
<td>-1.45</td>
<td>-1.94</td>
<td>-1.94</td>
</tr>
<tr>
<td>Max of Error</td>
<td>2.24</td>
<td>3.40</td>
<td>3.40</td>
</tr>
<tr>
<td>StdDevp of Error</td>
<td>0.48</td>
<td>0.55</td>
<td>0.56</td>
</tr>
</tbody>
</table>
Only 362 days were below this arbitrary threshold. Again, the t-test of mean differences was highly significant at p<.0000 confirming the above results that reporting errors were higher when staffing levels were higher.

To illustrate these results, and the underlying staffing data at the lower levels (below 5.0 hours PPD), we include the following graphical results: Figure 3 shows that the error rates are distributed fairly evenly. In addition, we also illustrate the mean (.55) of the larger staffing level's error terms (>= 5) to show the contrast with the 362 lower level's errors. Figure 3 also shows the distribution of the 362 PPD corrected values below 5.0, compared to the mean (5.76) of the remaining values above 5.0 hours PPD. There are no obvious patterns or trends in these error terms.

![Figure 3. Direct Nursing Hours PPD above and below 5 hours ppd threshold](image)

**Conclusions**

The authors conducted a forensic audit using staffing and census data often unavailable to academics, especially daily data (1138 days). We found that neither
BLTC managers, nor regulators and litigators who filed the false claims fraud case had reliable, audited data for analyzing and evaluating BLTC’s staffing ratios. We also note that the cost of conducting this detailed staffing audit was quite high. The BLTC staffing, census and hours PPD data had been self-reported, and had not been maintained or corrected on an ongoing basis. We were able to evaluate the accuracy (or inaccuracy) of the MSR staffing ratios by using original source records in our forensic audit to cross-validate and correct the nursing hours and census data.

We found a 9% average staffing understatement which was not surprising given Kapp’s observation that “Various characteristics of the nursing home industry, its operation, and the population it serves make errors likely to happen” (Kapp, 2003, p.52). We found that staffing reporting errors were significant and skewed. We found, for the first time, an unexpected overstatement of originally reported census data.

While the case was settled for less than two million dollars, an amount approximately equal to the government’s costs in the case, it is difficult to ascertain the effect of our audit findings on the settlement. We observed that this case was not likely to be settled until our findings were reported. The government’s initial lawsuit sought recovery of more than $20m. Compared to at least $4m in legal costs for plaintiffs and defendants, we believe that our audit was an incredibly cost-effective investment. Of course, if our audit findings had been unfavorable, then the outcome may have been different.

Our results suggest that staffing ratios for LTC facilities should not be based on manual data collection systems that are unaudited or unverified, particularly
where staffing ratios are used as performance metrics and where they are used as quality of care proxy indicators. Data on hours worked and patient census, particularly at the floor or unit level, are fraught with potential and actual errors. Payroll records did not confirm the staffing data originally reported in the MSR, mostly because BLTC failed to use its payroll records to reconcile staffing ratios. We demonstrated that such errors resulted in a 4.3-21.2% understatement in nursing hours PPD reported as compared to the manually-maintained MSR over the four-year period.

One alternative to the manually-based forensic audit, though untested, is to extract (or confirm) hours worked from a computerized audited payroll system and to only extract census data from an electronic medical record (EMR) with precise rules governing patient holidays, hospital stays, and other absences. Failure to implement such audit protocols calls into question the use of such self-reported data (e.g, MSR data) extracted from manually-maintained staffing and census records and undermines the accuracy of any resulting statistical analyses or policy decisions.

We find that staffing analyses must consider the potential impact of related census effects. Staffing cannot be considered in isolation from the underlying patient census data. Due to inherent measurement errors, nursing hours PPD as a single variable is not very meaningful for managerial analysis, public policy deliberations, or regulatory control. In this vein, our results are consistent with Kash (2007) who call “for a more accurate reporting system” (p. 480). In contrast, we found effects on nursing hours PPD that were also due to over-reporting the LTC facility’s census data. This effect has been previously un-documented.
This article provides important evidence for fraud auditors who encounter similar staffing ratios in health care cases. We suggest that significant testing and validation of available data must occur prior to relying on staffing ratios. The organizational constraints often encountered in LTC, including nursing staff with varied training and backgrounds, chronically-ill patients, a variety of manually-based administrative processes, and the challenges of dealing with Medicaid and other quality surveyors, must be considered in planning and conducting an audit. Conventional expectations are insufficient in this rarified environment and the data underlying staffing ratios must be tested before an opinion or expert report can be issued.

Concern for reporting errors associated with manual census and staffing data pales in comparison to concerns for the health and well-being of a hard working, over taxed work force and their critically ill patients. We submit, however, that data accuracy, reporting quality, and patient health and well-being are positively correlated. Improving the accuracy of data on staffing hours and census will indicate how higher quality care can be efficiently provided and will undoubtedly result in improved conditions for LTC staff and patients.
References


Kash, Bita A., Hawes, Catherine, and Phillips, Charles D., “Comparing Staffing Levels in the Online Survey Certification and Reporting (OSCAR) System


Scott, Linda D. Hwang, Wei-Ting, and Rogers, Ann E., The Impact of Multiple Care Giving Roles on Fatigue, Stress and Work Performance Among Hospital Staff Nurses, Journal of Nursing Administration, Volume 36, Number 2, pp. 86-95, 2006(a).

Scott, Linda D., Rogers, Ann E., Hwang, Wei-Ting, and Zhang, Yawei, Effects of Critical Care Nurses' Work Hours on Vigilance and Patients' Safety, American Journal of Critical Care, 15.1, January 2006(b), pp. 30-37.
EXHIBIT 1: Audit Protocols for Extracting Hours Worked from Bi-monthly Payroll Data (BLTC)

For each bimonthly period, for the departments of interest at BLTC, conduct the following auditing procedures:

1. Use the ADP Payroll Summary, for each bimonthly period, to identify and highlight any adjustments, hand-drawn checks, and other unusual items.
2. For the remaining payroll entries for hours worked, enter them in the spreadsheets, one for direct nursing for each employee each day and the other for all other departments (of interest).
3. For direct nursing, use the “Second” Time Report to enter the hours worked plus overtime hours by person by day.
4. Identify control totals on the ADP Payroll Summary for direct nursing for each nursing staff person for each bimonthly period.
5. Reconcile as many as possible bimonthly totals of hours worked to control totals, noting discrepancies on the spreadsheets.
6. Use the following documents to resolve discrepancies: Daily Payroll Timesheet Correction Checklist and Time Card Report with Errors, the “First” Time Card Report, and other documents as available.
7. Trace as many highlighted adjustments, hand-drawn checks and other unusual items as possible to the correct day of service. Include these items in the control totals and the appropriate daily totals.
8. Keep a separate spreadsheet page (log) of all such items included in hours worked, shown as “Items Reconciled and Included”. Include nursing staff identifiers or department codes and dates and amount of hours.
9. Keep a separate spreadsheet page (log) of all such items NOT included in hours worked, shown as “Items NOT reconciled and NOT included”. Include nursing staff identifiers or department codes and dates and amount of hours.
10. Keep a separate spreadsheet page (log) of salaried personnel by personal ID# and by department (of interest). Include any attributed hours worked.
11. Keep back-up copies of all spreadsheets on flash drives.
EXHIBIT 2: Audit Protocols for Adjusting BLTC's Daily Census to Reflect Corrections based on Hospital, Family & Other Absences

1. Review Medical Records Census charts and identify all instances where codes indicate a patient may have been in the hospital, on family leave, or otherwise absent from the facility.
2. Cross reference each individual incident against the Daily Census Reports for the day the patient is shown as out of the facility.
3. Where both the Medical Record Census and the Daily Census Report reflect the same findings, adjust the census accordingly.
4. When the Medical Record Census and the Daily Census Report are in disagreement for any day, mark that patient and day for the following verification process.
5. Verification Process:
   a. Review patients’ medical records file for the Release of Responsibility for Leave of Absence form, the Nurses’ Notes, and the Food Intake Form for the dates in question. The standard to determine if a patient is deemed absent from the facility is as follows for each form of verification document:
      1. Release of Responsibility form: Identify date of departure and return (NA for hospitalizations).
      2. Nurses’ Notes: Identify dates of departure and return. Treat instances where no notes are shown for dates in question as a patient absence.
      3. Food Intake Form: Identify meals not served and not refused for dates in question.
   b. If any two of these forms indicate that the patient was out of the facility, note these dates as absences.
   c. If only two forms are available and if both forms indicate the patient was absent, than note such dates as absences.
   d. If the two forms do not agree, note the disagreement and final determinations will be made later.
   e. Use the “midnight rule” for these census corrections. If the patient is identified as being absent at midnight, then consider that patient absent for the preceding day; e.g. if a patient is not in the facility at midnight between April 1 and April 2, then show the patient as being absent on April 1.
6. In the few cases where only one of the above noted forms is available, then refer to other documents such as restorative care reports, therapy reports, hospital summary records, and other departmental reports. If another document agrees with the available form (above) regarding the patient’s absence, note such absences.
7. If there is no confirmation on the available form (above), note the disagreement.
8. Prepare a summary report noting the original census reported on the Master Staffing Report, all adjustments pertaining to the above corrections, and the
corrected census for those days when patients were included in the Daily Census and when, in fact, they were absent from the facility.

9. Prepare a final table showing the corrected census after any disagreements in #5d and #7 have been examined and resolved.