

THE BUSINESS CASE FOR TCAB: A COST-BENEFIT ANALYSIS

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Transforming Care at the Bedside Business Case

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EXECUTIVE SUMMARY

Front-line nurses, CNOs, and others believe that TCAB has improved nursing care and nurses' satisfaction by increasing the amount of time RNs spend in direct patient care, improving patient safety, and engaging nurses in making these improvements, among other positive changes. Yet the TCAB interventions are not without costs. TCAB expenditures are best justified not only by improvements in quality and staff satisfaction, but also by a positive financial return. Are there financial benefits to TCAB that offset the costs of implementation?

This study uses cost-benefit techniques to estimate the net benefits of implementing TCAB, using data from the original 10 TCAB hospitals and 13 units. Outcomes in three areas—RN turnover, patient falls with harm, and RN overtime--were assessed to see if these costly events were reduced on TCAB units, or if the rates of these events on TCAB units were lower than those on an average medical-surgical unit. If either reductions or lower rates were the case, the monetary value of these positive outcomes could be estimated as the "cost savings" of TCAB. The costs of implementing and maintaining TCAB were subtracted from the cost savings to produce the net benefit of TCAB.

The analysis indicates that of the three outcomes, only falls with harm showed a consistent reduction in TCAB units from 2005 through 2007. However, rates of all three outcomes were lower than those on an average medical surgical unit. Based on this difference, the lower RN turnover found on TCAB units saved each TCAB unit \$288,200 from 2004 to 2007 compared to an average medical-surgical unit. Having lower numbers of falls with harm saved each TCAB unit approximately \$50,400 from 2005 through 2007. Less RN overtime hours was the biggest savings, at \$509,261 per TCAB unit from 2005 - 2007. Added together, the total estimated cost savings per unit was \$847,861.

Costs of implementing and maintaining TCAB on each unit were estimated based on a report from one TCAB unit. The amount came to \$222,258 from 2004 through 2007. The net benefit per unit, therefore, was $\$847,861 - \$222,258 = \$625,603$. The total net benefit for all 13 TCAB units was \$5 million.

The estimates of this study must be used with extreme caution. The estimates merely compare outcomes on TCAB units to those reported in the literature. Results do not imply that TCAB "caused" the better-than-average outcomes because the study did not use a matched comparison group. It is highly possible that outcomes in non-TCAB units in the hospitals could have been as good. Nor were the rates or costs of outcomes used for the "average" comparison group (which were obtained from the literature) necessarily completely accurate estimates of the true average.

Another issue is that the cost savings for patient falls with harm was overestimated due to the fact that hospitals do not keep all of the cost savings from reductions in these events. Due to charge-based reimbursements, hospitals may only capture 60-80% of the savings. This balances out with the fact that the cost savings overall were underestimated because only three outcomes were included; there are many other patient adverse events and labor costs that could have contributed to cost savings.

BACKGROUND

Transforming Care at the Bedside (TCAB) began in the fall of 2003 as a project of Robert Wood Johnson Foundation (RWJF) in partnership with the Institute for Healthcare Improvement (IHI). Eventually 10 hospitals (13 units) across the U.S. participated in innovative transforms of their medical-surgical units and in evaluations of the changes and outcomes. Although the initial “TCAB 10” project came to a close in May 2008, a new TCAB phase was launched in July 2007 under the leadership of the American Organization of Nurse Executives (AONE). AONE is partnering with RWJF to bring 68 new hospitals into TCAB.

TCAB is a program that improves processes and outcomes in hospital medical-surgical (med-surg) units by changing hospital and unit culture, empowering bedside nurses, strengthening nursing leadership, and engaging nurses in innovative change. Front-line nurses are encouraged to think of better ways to go about their work, and to test and implement those changes. Through these process changes, TCAB aims to produce measurable improvement in work unit vitality, patient safety and reliability of care, efficiency in the delivery of care, and the patient centeredness of the care. TCAB innovations are not a required set of initiatives, but rather come from the individual unit decision-making and testing. Some TCAB innovations, however, are “spread” to other units and hospitals by virtue of their reputation of having a positive impact on staff and patient care, and therefore they become part of a common set of innovations. White boards in patients’ rooms and rapid response teams are two examples of TCAB innovations that have spread within and outside the TCAB community.

Front-line nurses on TCAB units, their CNOs, and other executives, believe that TCAB has improved nursing care and nurses’ satisfaction. In some units, the amount of time RNs spend in direct, hands-on patient care has increased, while time spent charting and searching for equipment, and other indirect care has decreased. Patient safety has improved, as can be seen by the fact that the number of patient falls with harm has decreased.

Yet as beneficial as these results are, the TCAB interventions are not without costs. Reorganization of staff, redesign of units, staff education, and time off to participate in meetings, are part of the costs of TCAB. In this era of cost containment, expenditures must be justified not just by improvements in quality and staff satisfaction, but also by a positive financial return. Are there financial benefits to TCAB that offset the costs of implementation? This question has been front and center as hospital CNOs state that their executive suite wants to be shown that TCAB can help their bottom line before they commit to initiating or sustaining the investment.

In general, to produce a financial benefit in hospitals, an investment must decrease the cost of caring for patients and/or increase the number of patients that can be cared for. TCAB has the potential to do this through its positive impacts on nurses, thus potentially reducing nursing turnover, overtime, absenteeism, and use of agency nurses, and therefore lowering labor costs. It can also lower costs of patient care if there are fewer patient complications, and therefore shorter lengths of stay, or fewer readmissions. Finally, if patient satisfaction, quality, and safety are improved, the hospital may see financial benefits through an increase in the number of patients.

The goal of this study is to assess the “business case” (the net benefit) of TCAB in the original “TCAB 10.” It is based on self-evaluations of various outcomes on the 13 units in the 10 hospitals that undertook TCAB transformations between 2004 and May 2008. The outcomes used to establish the business case are: RN turnover, RN overtime, and patient falls with harm. If these events decreased over time in TCAB units, and/or if their rates were lower than national average rates, then these units with TCAB had cost savings. If the cost savings were greater than the costs of implementing and maintaining TCAB, then there were net benefits on units with TCAB.

METHODS

The business case, or net benefit, of TCAB was calculated by subtracting the costs of TCAB from the benefits (Net benefit = benefits – costs)¹. The costs of TCAB are expenses that are over and above those normally incurred for that unit. They are both start-up costs and costs of maintaining the program. Some of these are: travel costs for TCAB meetings, costs of relief staff for TCAB meetings, overtime for TCAB work, funds for TCAB project needs. The benefits of TCAB are measured in terms of outcomes that lead to lower labor costs and fewer patient adverse events (e.g., lower RN turnover and overtime, fewer patient falls with harm). These outcomes result in lower costs of care per patient, and are termed collectively the “cost savings” of TCAB.

The costs of TCAB could be assigned without too much controversy. However, the benefits of TCAB could be difficult to ascertain due to other factors that could have affected the outcomes. How would we know that it was TCAB making the difference versus other things going on? The best way to calculate the benefits of TCAB would be to assess certain outcomes on TCAB units both before the initiation of TCAB (or at the beginning of TCAB) and again after the unit has had TCAB for a period of time. The change in outcomes, if any, would be compared to outcomes on a control (or comparison) unit which was similar to the TCAB. In this type of “pre-post matched comparison group” design, if there were improvements on the TCAB unit that did not occur in the comparison unit it could be reasonably concluded that TCAB played a role in the improvements.

Due to the fact that this business case evaluation of TCAB took place retrospectively, and that the ongoing evaluation of TCAB was not conducted with a comparison group, the methodology for this financial evaluation did not include a matched comparison group. Instead, there were two possible approaches to calculating the benefits (cost savings) on TCAB units that could give us some idea of whether TCAB had a financial benefit: 1) internal tracking of outcomes in the TCAB units over time, assessing whether there were cost savings over time; and 2) comparison of TCAB outcomes with national and state averages, assessing whether there was a cost savings compared to the national average. We tried both approaches in the analyses, keeping in mind that neither was “proof” that TCAB was what was making the difference.

The TCAB outcomes used to calculate benefits (cost savings) were RN turnover, RN overtime, and patient falls with harm. RN turnover and patient falls with harm were tracked by TCAB leaders as part of the evaluation of TCAB. RN overtime data had to be extracted from scheduling systems at each hospital.

¹ Note that this study *does not* use present value calculations to estimate the net benefit.

RN turnover was considered to be a good outcome for calculating cost savings since it is known to be an expensive and common problem in hospitals. Therefore, reductions in this outcome would clearly be a cost savings. Patient falls with harm was chosen because it would produce a cost savings based on estimates of the costs of treating falls with harm in hospitals. The cost savings from this outcome was adjusted based on the proportion of payment that was per diem. RN overtime was included in the cost savings calculations since reductions in it would result in reductions in labor costs equivalent to the fewer overtime hours multiplied 1.5 times the average RN wage. Once the savings from these outcomes was estimated in terms of inflation-adjusted dollars, all amounts were summed to produce a total cost savings.

To perform the analyses above, the following steps were taken:

1. Data were obtained from TCAB units regarding their rates and incidences of voluntary nurse turnover, patient falls with harm, and RN overtime. An attempt was also made to collect data regarding the proportion of per diem payments in each hospital and the costs of implementing and maintaining TCAB.
2. A systematic review of the literature was conducted, and information from other sources was collected, to determine average rates and costs of turnover, falls with harm, and overtime.
3. Financial metrics were developed that determine cost savings based on the changes in outcomes on TCAB units (Approach 1), and on the difference between TCAB outcomes and average outcomes (Approach 2).
4. Cost savings Approach 1: cost savings were calculated from:
 - reductions in voluntary nurse turnover in TCAB units
 - reduced falls with harm in TCAB units
 - reduced RN overtime in TCAB units
5. Cost savings Approach 2: cost savings were calculated from comparing rates of outcomes in TCAB units to national or other averages:
 - less voluntary nurse turnover in TCAB units compared to average RN turnover
 - fewer patient falls with harm in TCAB units compared to averages
 - less RN overtime in TCAB units compared to averages
6. All cost savings were summed up in each approach
7. Approach 2 had more consistent results, so it was the only approach used for the remainder of the study
8. The costs of TCAB were calculated
9. The net benefit of TCAB was calculated by subtracting TCAB costs from cost savings.

Data collection

Data collection occurred throughout 2007 and 2008 within the 13 units that comprised the original TCAB project. RN turnover and patient falls with harm were collected by all TCAB units and submitted to the TCAB evaluation team. This data was complete for all units from 2003 up through the end of 2007 by March 2008. RN overtime, however, needed to be pulled from the staffing systems at each hospital. A survey was sent to all TCAB key contacts on April 1 and July 23 2008, requesting RN hours of overtime and total RN hours. Requests for this data were also made several times by the evaluation team. Data on overtime hours was returned for six units, but only three units also submitted total hours (needed to determine rates of overtime). Two other requests were

made in July and August focusing on three TCAB hospitals thought to be most likely to accommodate requests. One hospital responded (Cedar Sinai Hospital), but it was found that their data could not be used for the overtime calculations since their definition of overtime was anything over eight hours a day, which grossly inflated overtime numbers based on anything over 40 hours per week. By December 2008, RN overtime data remained incomplete, with only 6 units returning usable overtime hours and only 3 submitting total hours.

The surveys referred to above, that were sent in April, July, and August, also included a request for data on the proportion of per diem payments and the costs of TCAB at their facility. Only one hospital returned these data elements.

Systematic Review of the Literature

Between January and April 2008, we conducted reviews of the literature to determine average rates and costs of RN turnover, RN overtime, and patient falls, especially falls with harm. We looked for national and state-level rates of RN turnover and estimated costs. Search words included: RN turnover, nurse turnover, RN turnover rates, nurse turnover rates, RN turnover costs, nurse turnover costs. We searched for national, state, and facility-level rates of RN overtime and estimated costs, with search terms of: RN overtime, nurse overtime, rates of RN overtime, rates of nurse overtime, RN overtime costs, nurse overtime costs. Finally, we searched for facility or multi-facility rates of patient falls and falls with harm, and estimates of costs. Search words were: patient falls, falls in hospitals, falls with harm, costs of patient falls, and inpatient hospital falls and cost.

The searches were conducted using web search engines such as Google and Google Scholar, and the following academic article databases: Academic Search Premier, CINAHL, EconLit, Medline/Pubmed and Healthstar.

Financial Metrics and Cost Saving Calculations: Approach 1

The first approach for calculating cost savings was to compare the amount of RN turnover, RN overtime, or patient falls in a baseline year to the amount of these outcomes several years after implementation of TCAB. The amount of fewer turnovers, overtime, or patient falls after implementation of TCAB was used to calculate cost savings.

- The Approach 1 metric for cost savings from RN turnover was: $\sum (\# \text{ TCAB RN turnovers in Year}_{t+1} - \# \text{ TCAB RN turnovers in Year}_t) \times \text{average cost of 1 RN turnover}$. Since our calculations showed that there was not a reduction in RN turnover on TCAB units on the average (see Table A1), we were unable to calculate cost savings from RN turnover using Approach 1.
- The Approach 1 metric for cost savings from patient falls with harm was: $\sum (\# \text{ TCAB patient falls with harm in Year}_{t+1} - \# \text{ of TCAB patient falls with harm in Year}_t) \times \text{average cost of a patient fall}$. The baseline year for patient falls with harm was 2005 because that was the first year of data for this outcome. The average cost of patient falls with harm was taken from the literature which estimated a patient fall to cost approximately \$7,000 (Bates, et al, 1995; see also Table A5 in appendix).

- The Approach 1 metric for cost savings from RN overtime was: $\sum (\# \text{ TCAB RN overtime hours in Year}_{t+1} - \# \text{ TCAB RN overtime hours in Year}_t) \times \text{hourly overtime amounts}$. The baseline year for RN overtime was 2005 because that was the first year of data for this outcome. Since our calculations showed that there was not a reduction in RN overtime on the TCAB units that turned in data, we were unable to calculate cost savings from RN overtime using Approach 1.

Financial Metrics and Cost Saving Calculations: Approach 2

The alternative method was to compare RN turnover, patient falls, and RN overtime in TCAB units to their averages nationally, and then calculate the cost savings from having lower than average rates of these events.

- The Approach 2 metric for cost savings from RN turnover was to find the difference in rates of RN turnover between TCAB and a national or state average, then to translate the difference in rates into a difference in numbers of turnovers. Finally, the difference in numbers was multiplied times estimated costs per RN turnover found in the literature. This was then applied to each year in the study (2004-2007). The year 2003 was not used because it was a baseline year, prior to the initiation of TCAB
 - The difference in rates was calculated as: TCAB rate of RN turnover minus an average rate of RN turnover obtained from the literature. The average rate of RN turnover from the literature is presented in Table A11 in the appendix. Based on one national study that reported RN turnover rate at 8.4% in 2007 (the study did not distinguish between voluntary and involuntary) and two state studies that reported voluntary turnover rates of 8.85 and 8.5 %, we chose a conservative rate of 8% for the average.
 - The translation of the difference in rates to a difference in numbers was accomplished by applying the ratio of TCAB turnover number/rate to the national average rate: $(\text{TCAB \# RN turnovers} / \text{TCAB rate of RN turnovers}) \times \text{average rate of RN turnover}$. This produced an average number of RN turnovers, which was subtracted from the number of TCAB turnovers.
 - The difference in numbers of RN turnover was multiplied times the best estimate of the cost per turnover. We chose the estimates by Jones (2005, 2008) of cost per RN turnover, which were \$62,100 in 2002 and \$82,000 in 2007 (see table A4 in the appendix). We applied \$62,100 to the years 2004, and 2005 and \$82,000 to the years 2006 and 2007.
 - The yearly costs savings was summed for a 4 year total.
- The Approach 2 metric for cost savings from patient falls with harm was to find the difference in rates of patient falls with harm between TCAB and a national or state average, then to translate the difference in rates into a difference in numbers of falls. Finally, the difference in numbers was multiplied times estimated costs per patient fall found in the literature. This was then applied to each year in the study (2005 – 2007).
 - The difference in rates was calculated as: TCAB rate of patient falls with harm minus an average rate of patient falls with harm obtained from the literature. The average rate of falls with harm from the literature is presented in Table A12 in the appendix. We took the average of the following rates of falls with harm found in the literature: 0.99, 1.42, 1.22, 1.11, 0.84, and 0.39 (all per 1,000 patient days). This came to 1 fall/1,000 patient days.
 - The translation of the difference in rates to a difference in numbers was accomplished by applying the TCAB falls number/rate ratio to the national average rate: $(\text{TCAB \# patient falls with harm} / \text{TCAB rate of falls with harm}) \times$

- average rate of falls with harm. This produced an average number of falls with harm, which was subtracted from the number of TCAB falls with harm.
 - The difference in numbers of falls was multiplied times the best estimate of the cost per falls. From the literature, we found only one U.S. article providing an estimate of the cost of falls. Bates, et al., 1998 calculates costs at around \$7,000 per incident (see Table A5 in the appendix).
 - This amount was multiplied times the average number of falls and the resulting amount was applied to all years: 2005, 2006, and 2007.
 - The amount of yearly costs savings was summed for a 3 year total.
- The Approach 2 metric for cost savings from RN overtime was to find the difference in rates of RN overtime hours between TCAB and a national or state average, then to translate the difference in rates into a difference in numbers of overtime hours. Finally, the difference in numbers was multiplied times estimated hourly overtime costs. This was then applied to each year in the study (2005 – 2007).
 - The difference in rates was calculated as: TCAB rate of RN overtime hours minus an average rate of overtime hours obtained from the literature. Rates of overtime found in the literature are in Table A13 in the appendix. We averaged the rate of voluntary overtime from three studies with the following values: 15.8%, 4.5%, and 5.1%. This resulted in average RN hours of overtime of 8.5%.
 - The translation of the difference in rates to a difference in numbers was accomplished by applying the TCAB number of overtime hours/ overtime rate ratio to the national average rate: (TCAB # RN overtime hours/ TCAB rate of RN overtime hours) X average rate of overtime hours. This produced an average number of RN overtime hours, which was subtracted from the number of TCAB RN overtime hours.
 - The difference in numbers of overtime hours was multiplied times the average hourly overtime cost. Hourly overtime amounts were estimated by taking the average RN wage X 1.5. Average RN wages for this time period were: \$27.80 in 2005, \$29.31 in 2006, and \$30.69 in 2007 (see Bureau and Labor Statistics, and Table A6 in the appendix). The hourly overtime amounts (1.5 X hourly wages) were respectively: \$41.70, \$43.96 and \$46.03.
 - The amount of RN overtime hours saved in 2005, 2006 and 2007 in the three units was summed for a 3 year total.

Summation of Cost Savings from Approach 2

Since Approach 2 had more consistent results, it was the only approach used for the remainder of the study. The cost savings from lower RN turnover, fewer patient falls with harm, and less RN overtime on TCAB units than on the average were summed.

Calculating the Costs of TCAB

We only obtained data on the costs of TCAB from one TCAB unit. Those costs were used to estimate TCAB costs on the other units.

Calculating the net benefit of TCAB

The net benefit of TCAB was calculated by subtracting TCAB costs from cost savings on a per unit basis and for all TCAB units combined.

RESULTS

Approach 1 (Internal Changes on TCAB Units)

We found that RN turnover fell in most TCAB units from 2003 to 2006, producing a slight average drop in turnover by 2006 (see Table A1 in appendix). However, in 2007, turnovers increased dramatically in several TCAB units. Even when weighted for changes in the number of RN's per unit, the average rate of turnover in 2007 was higher than that in 2003 or 2004 (see Table A8 in the appendix). As a result, between 2003 and 2007 there was on the average 1 additional RN turnover per TCAB unit, or 14 additional turnovers in total across all TCAB units. Due to this result, there were no cost savings related to internal reductions in RN turnover except on some individual units.

In contrast, between 2005 -2007 there was an average reduction in the number of patient falls with harm on each TCAB unit of 2.66 (see Table A2 in appendix). When multiplied times \$7,000 per incident, this was a cost savings of \$18,620 per unit, or \$243,000 for all TCAB units combined.

Of the 6 TCAB units that provided data on RN overtime hours, RN overtime did not improve on any unit between 2005 and 2007. Therefore, a case could not be made for costs savings due to internal decreases in RN overtime on TCAB units.

Since a summation of the cost savings from internal changes in RN turnover, patient falls with harm, and RN overtime was reduced to just the cost savings from the reduction in patient falls with harm, approach 1 was not pursued further.

Approach 2 (Comparison of TCAB Units to National Data)

Cost Savings from Lower RN Turnover Compared to National Average

In TCAB units RN turnover averaged 5.15%/year/unit, or 1.7 RNs/year/unit, *compared to a national average* of around 8% per year (see tables A8 and A11 in the appendix). Table 1 shows that this translates to 1 fewer RN turnovers per TCAB unit per year than the national average.

Table 1: TCAB RN Turnover Compared to National and State Averages

TCAB RN Turnover Rate (Average)	National Average RN Turnover Rate	Difference in Rates of RN Turnover	TCAB Number of RN Turnovers (Average)	National Average Number of RN Turnovers*	Fewer RN Turnovers/ Unit/Year than the Average
5.15%	8%	-2.9%	1.7	2.7*	-1

*This number is based on applying TCAB turnover number/rate ratio to the national average rate: Average number of RN turnovers = $(1.7/5.15\%) 8\% = 2.7$

Table 2 presents the cost savings that accrue when the cost of RN turnover is multiplied times the one less RN turnover /year/unit. Year 2003 was not included in the cost savings because it was a baseline year, prior to the initiation of TCAB. In 2004 and 2005 the cost savings were

\$62,100 per unit per year. This increased to \$82,000 per unit per year in 2006 and 2007. Total cost savings per unit for 2004 – 2007 were \$288,200. For all TCAB units combined the cost savings for the four years were \$3,746,600.

Table 2: Cost Savings Due to Lower Voluntary RN Turnover in TCAB Units Compared to National and State Averages

Year	Average No. of Fewer TCAB RN Turnovers/ Unit	Average Costs per RN Turnover	Average Cost Savings/ Unit	TCAB Cost Savings All 13 Units
2004	1	\$62,100	\$62,100	\$807,300
2005	1	\$62,100	\$62,100	\$807,300
2006	1	\$82,000	\$82,000	\$1,066,000
2007	1	\$82,000	\$82,000	\$1,066,000
2004 - 2007			\$288,200	\$3,746,600

Cost Savings from Lower Number of Falls Compared to Average

In TCAB units patient falls from harm averaged 0.78 falls/1,000 patient days per year per unit, or 8.5 falls/year/unit, *compared to an average from the literature* of 1 fall/1,000 patient days (see Tables A9 and A12 in the appendix). This translates to 2.4 fewer patient falls per TCAB unit per year compared to the average. Table 3 shows that this translates to 2.4 fewer patient falls with harm per TCAB unit per year than the average.

Table 3: TCAB Falls with Harm Compared to National and State Averages

TCAB Falls with Harm Rate (Average)	National Average Falls with Harm Rate	Difference in Rates of Falls with Harm	TCAB Number of Falls with Harm/Unit/ Year	Average Number of Falls with Harm/ Year*	Fewer Falls with Harm/ Unit/Year than the Average
0.78/1,000 patient days	1/1,000 patient days	-0.22/ 1,000 patient days	8.5 falls/ year/ unit	10.9 falls/year/ unit	-2.4

*This number is based on applying TCAB falls with harm number/rate ratio to the national average rate: Average number of falls with harm = $(8.5/0.78) \cdot 1 = 10.9$

Table 4 presents the cost savings that accrue when the cost of falls with harm is multiplied times the 2.4 fewer falls with harm/year/unit. Average per unit yearly costs savings were \$16,800. The total cost savings per unit for 2005 through 2007 were \$50,400. The cost savings for all units combined were \$655,200.

Table 4: Cost Savings from Falls with Harm on TCAB Units Compared to Averages in the Literature

Year	Average Number of Fewer Falls/ Unit	Average Costs/Fall with Harm	Average TCAB Cost Savings/ Unit	TCAB Cost Savings All units
2005	2.4	\$7,000	\$16,800	\$218,400
2006	2.4	\$7,000	\$16,800	\$218,400
2007	2.4	\$7,000	\$16,800	\$218,400
2005-2007	7.2	\$7,000	\$50,400	\$655,200

Cost Savings from Lower RN Overtime Compared to National

The needed data to derive rates of overtime in TCAB units was complete for only three TCAB units. The average rate of overtime for those units was 2.65% of total hours (see Table A10 in the appendix) compared to 8.5% in the literature (as an average of three studies--See Table A13 in the appendix). As shown in Table 5, this translates to 3,868 fewer OT hours per unit per year than on the average.

Table 5: TCAB RN Overtime Compared to National and State Averages (Percent of Total Hours)

TCAB RN Overtime Rate (Average)	Average RN Overtime Rate	Difference in Rates of RN Overtime	TCAB Number of RN Overtime Hours/Year/ Unit	Average Number of RN Overtime Hours/Year*	Fewer RN Overtime Hours/ Unit/ Year than the Average
2.65	8.5	5.85	1,752	5,620	3,868

*This number is based on applying TCAB RN overtime number/rate ratio to the national average rate: Average number of RN overtime hours = $(1,752/2.65) 8.5 = 3,868$ hours.

Table 6 presents the cost savings that accrue when the cost of RN overtime is multiplied times the 3,868 fewer hours of overtime per unit per year than the average. Since the average hourly wage of RNs increased each year, the amount of cost savings also increased each year, going from \$161,296 per unit in 2005 to \$177,928 in 2007. The total amount per unit for 2005-2007 was \$509,261. The total cost savings for all units for the three years was \$6,620, 393.

Table 6. Cost Savings from RN Overtime in TCAB Units Compared to National and State Averages

Year	Average Number of Fewer OT hours/ Unit	Average Cost/OT hour	Average TCAB Cost Savings/ Unit	TCAB Cost Savings All units
2005	3,868	\$41.70	\$161,296	\$2,096,848
2006	3,868	\$43.96	\$170,037	\$2,210,481
2007	3,868	\$46.03	\$177,928	\$2,313,064
2005-2007			\$509,261	\$6,620,393

Total Estimated Cost Savings on TCAB Units

Table 7 presents the summed cost savings on TCAB Units. These summed cost savings capture some of the difference between TCAB units and average medical-surgical hospital units in the U.S. From 2004 through 2007, each TCAB unit may, on the average, have saved \$847,861 compared to an average medical-surgical unit in the U.S. The 13 units may have saved close to eight million dollars in total in this time period.

Table 7. Total Estimated Cost Savings on TCAB Units

	Cost Savings from Lower than Ave. RN Turnover	Cost Savings from Lower than Ave. Falls with Harm	Cost Savings from Lower than Ave. RN Overtime	Total Cost Savings per TCAB Unit	Total Cost Savings All TCAB Units
2004	\$62,100	--	--	\$62,100	\$807,300
2005	\$62,100	\$16,800	\$161,296	\$240,196	\$2,159,313
2006	\$82,000	\$16,800	\$170,037	\$268,837	\$2,482,480
2007	\$82,000	\$16,800	\$177,928	\$276,728	\$2,516,891
2003-2007	\$288,200	\$50,400	\$509,261	\$847,861	\$7,965,984

Costs of Implementing and Maintaining TCAB

Costs of implementing and maintaining TCAB must be subtracted from these cost savings to arrive at the net benefits of TCAB. Table 8 presents an estimate of the costs of TCAB that was received from one TCAB unit. We used this report as a template for the costs in each unit. The tables shows that TCAB costs included travel to TCAB meetings, membership fees, overtime labor costs, and costs to implement TCAB projects. Costs tended to increase over time as the units developed more TCAB projects. The total cost from 2004 through 2007 was \$222, 258 in this TCAB unit. We used this to estimate the costs in all TCAB units.

Table 8. Estimate of the Costs of TCAB in One TCAB Unit

	2004	2005	2006	2007	2004-7
Travel to TCAB Meetings	\$6,000	\$12,000	\$20,000	\$42,858	\$80,858
Overtime to work on TCAB	--	--	\$3,000	\$ 16,500	\$19,500
Implementation of TCAB Projects	--	--	\$18,400	\$19,500	\$37,900
Join IHI / IMPACT	\$13,500	\$13,500	\$13,500	\$13,500	\$54,000
Other*	\$5,000	\$5,000	\$10,000	\$10,000	\$30,000
Total costs:	\$24,500	\$30,500	\$64,900	\$102,358	\$222,258

*e.g., Liberalized diet, Condition Help, Palm Pilots, Upgrade Palm Pilots, TCAB cabinet, PDA's, Med Card, Flyers, Med Magnets, Pens.

Estimated Net Benefit of TCAB

The average net benefits of TCAB per unit are estimated by subtracting the total costs of TCAB per unit from the total cost savings per unit. Cost savings, costs, and net benefits per TCAB unit are listed in columns two -four in Table 9. From 2004 to 2007, the net benefits averaged \$625,603 for each TCAB unit. Over the 13 units, the net benefits came to \$5 million.

Table 9. Net Benefits of TCAB

	Total Cost Savings per TCAB Unit	Total Costs of TCAB per Unit	Net Benefit/ TCAB Unit	Total Cost Savings All TCAB Units	Total Costs of TCAB All Units	Net Benefit All TCAB Units
2004	\$62,100	\$24,500	+\$37,600	\$807,300	\$318,500	+\$488,800
2005	\$240,196	\$30,500	+\$209,696	\$2,159,313	\$396,500	+\$1,762,813
2006	\$268,837	\$64,900	+\$203,937	\$2,482,480	\$843,700	+\$1,638,780
2007	\$276,728	\$102,358	+\$174,370	\$2,516,891	\$1,330,654	+\$1,186,237
2004-2007	\$847,861	\$222,258	+\$625,603	\$7,965,984	\$2,889,354	+\$5,076,630

CONCLUSIONS

This project demonstrates that from 2004 through 2007 TCAB units had lower RN turnover, fewer patient falls with harm, and less RN overtime than average medical-surgical units in the U.S. The lower rates of these outcomes translate into lower costs, which can be considered a cost savings (or a benefit). The cost savings were considerably more than the estimated costs of TCAB. Therefore, these units experienced a financial net benefit compared to the average medical-surgical unit. Although we cannot say for certain (because the study methodology does not allow for a causal statement), it appears that TCAB had a positive financial impact.

STUDY LIMITATIONS

The best evaluation strategy would have been a quasi-experimental pre-post matched control group design. This had to be altered in the planning stages because the evaluation began late in the TCAB project and there were not assigned control groups. It

was decided to take the approach of internally tracking outcomes in the TCAB units over time, assessing whether there were cost savings over time, while comparing TCAB outcomes with national and state averages, assessing whether there was a cost savings compared to the national average.

The evaluation design had to be further altered after the evaluation began because two of the key indicators (RN turnover and RN overtime) did not move in the expected direction. Instead, these events increased from 2004 through 2007. This could have occurred for several reasons. The first possibility is that the units were already on the frontier of low RN turnover and overtime, in which further improvements would be difficult, if not impossible. That this was a likely scenario is borne out by the fact that RN turnover and overtime rates were significantly lower than those found in the literature. Another possibility is that other processes were occurring on the TCAB units that contributed to the increases in RN turnover and overtime. It is even possible that TCAB contributed to the higher RN turnover and overtime. Instead of using changes in outcomes on TCAB units over time compared to a matched comparison group to make the “business case,” we used the difference in outcomes between TCAB units and average medical-surgical units.

This evaluation did not take into consideration a complicating factor in the estimation of cost savings: not all of the savings from reductions in patient adverse events accrue to the individual hospital. A proportion of the savings due to adverse events reduction occurs because of the lower length of stay. In cases where the payment is per-diem, the hospital will merely be paid less for lower lengths of stay, and the insurance company will capture the savings due to the lower lengths of stay. Therefore, the cost savings from adverse events reductions must be adjusted downward by the proportion of per diem payment hospitals receive.

On the other hand, cost savings in this analysis were underestimated because we did not include several other patient adverse events outcomes that could lead to lower costs. Other than patient falls with harm, adverse events such as pressure ulcers, pneumonia, and urinary tract infections, could lead to cost savings if their rates were lowered or were lower than those on comparison units. We also did not include lower use of agency nurses, fewer nurse injuries, and other labor cost reductions. Adding all of these into the cost savings side of the equation would have resulted in greater cost savings.

Another limitation of the evaluation was that data was not turned in by all units, so missing values were estimated based on existing data from other units. RN overtime and TCAB costs were two elements of the evaluation that were missing a significant amount of data. This led to having to estimate the RN overtime for all 13 TCAB units based on that of 3 units. Likewise, the costs of TCAB for all units were estimated based on those of one unit. This made the numbers and calculations in the financial metrics less reliable than if all units had returned data.

Given all this, the results are not as strong as they would have been if a rigorous quasi-experimental research design had been used with complete data. We recommend that future financial evaluation of projects of this type require that the participants collect and turn in all data necessary to complete the evaluation, that the projects include the most rigorous evaluation design possible for that project, and that as many cost savings outcomes as possible be used in the analysis.

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APPENDIX

Table A1. TCAB Change in RN Turnover, 2003- 2007

	Change in the Number of RN Turnovers				
Unit	2003 -2004	2004 -2005	2005 -2006	2006 -2007	2003 -2007
Cedars 8S	0	-1	0	0	-1
Children's 6W*	0	+2	0	-5	-3
Haley VA	-3	0	+1	+1	-1
KP 2S	+1	0	-1	0	0
LIJ 5S	0	-1	0	0	-1
MDA P5	+1	-2	+2	-1	0
MDA 10E	+1	0	-2	+3	+2
N.Shore 3C	+2	+4	-6	+2	+2
Prairie Lakes	0	-1	+1	+5	+5
Seton	-2	+2	-1	+8	+7
ThedaC 4thF	-3	0	+1	0	-2
ThedaC 5thF	-1	-1	+1	+8	+7
UPMC 4E	-2	0	0	+1	-1
Net Δ All Units	-6	+2	-4	+22	+14
Average Δ in Turnover	-6/13 = -.46	+2/13 = +0.15	-4/13 = -0.30	+22/13 = +1.69	+14/13 = +1.07

Table A2: TCAB Change in the Number of Patient Falls with Harm, 2005- 2007

	2005 -2006	2006 -2007	Total change 2005- 2007
Cedars 8S	-4	0	-4
Children's 6W	-3.4	-1	-4.4
Haley VA	-5	+7.5	+2.5
KP 2S	NA	-1	-1
LIJ 5S	-1	+13	+12
MDA P5	+1	-1.67	+0.67
MDA 10E	-3	+4	+1
N.Shore 3C	-2	-2	-4
P. Lakes	NA	+3	+3
Seton	-6	+3	-3
ThedaC 4thF	-10	+4	-6
ThedaC 5thF	-20	-5	-25
UPMC 4E	-1	-4	-5
Net Δ All Units	-54.4	+19.83	*-34.57
Average Δ	-4.18	1.52	-2.66

*Column total gives -33.23

Table A3: TCAB Change in RN Overtime Hours,
2005 – 2007

Unit	2005 -2006	2006 -2007	2005 -2007
Cedars 8S*	NA	NA	NA
Children's 6W	+822	-535	+286
Haley VA	NA	NA	NA
KP 2S	NA	NA	NA
LIJ 5S	NA	NA	NA
MDA P5	-399	+3070	+2,671
MDA 10E	-203	+821	+618
N.Shore 3C	NA	NA	NA
Prairie Lakes	-703	+933	+230
Seton	NA	NA	NA
Theda Care, 4 th F	NA	NA	NA
Theda Care, 5 th F	+512	+766	+1,277
UPMC 4E	+950	+205	+1,155
Net Δ OT, All Units	+979	+5,260	+6,237
Average Change in Overtime	+163	+877	+1,040

NA = not available or not usable. Data for Cedar's could not be used due to a different definition of OT hours. Theda 4th F and Seton data were available only for 2007. Others did not submit data.

Table A4: Estimated RN Turnover Costs

Citation (Author, date)	Study Methodology	Cost Estimate of RN Turnover, Unadjusted	Year of Cost Esti- mate	Cost Estimate, Inflation Adjusted to 2005*	Costs as a % of Ave. RN Annual Salary in 2005**	Cost Categories Included in Estimate
Colosi, 2002	Not an original study. Cost estimates are taken from the Saratoga Institute, Human Resources Financial Reports, Santa Clara, CA, 2001.	\$93,664- \$145,000	2001	\$104,089 - \$161,139	190.39- 294.75%	Advertising Hiring Union reqs Travel Terminal Pay Lost revenues Lost product. Bed closures Training Overtime Incentives Increased Hours

Contino, 2002	Costs for replacing a nurse with a new graduate at a small community hospital in southern CA.	\$33,841	2002	\$37,607	68.79%	Preceptor time Termination Vacancy Hiring Training
Jones, 2004	Service-level data collected from clinical nurse directors and hospital-level data collected from associate chief nurse at a 600 bed acute-care hospital.	\$62,100 for med-surg nurse; \$67,100 for specialty nurses	2002	\$69,012-\$74,682	126.23-136.60%	Advertising/recruiting Vacancy hiring Orientation/training Productivity (before and after) Termination
Jones, 2008	Inflation adjustment of baseline RN turnover cost using CPI, Hospital Services Index, & the Professional Services Index	\$82,000 - \$88,000	2007	NA		Advertising/r ecruiting Vacancy Hiring Orientation/tr aining Productivity (before and after) Termination
O'Brien-Pallas, et al, 2006	An international study. Costs reported here are the average of 4 units in U.S. hospitals.	\$33,062	2001	\$37,111	67.88%	Advertising/ recruiting Temporary replacement Orientation/ training Termination/ separation
Strachota et al, 2003	Not an original study. Data are from the Advisory Board Company (see References)	\$42,000 for a med-surg nurse; \$64,000 for a specialty nurse	2000	\$48,258-\$73,538	88.27-134.51%	Recruitment Orientation Precepting Productivity
Waldman et al, 2004	Used multiple databases at an academic medical center in the Southwest.	\$15,825	2001	\$17,763	32.49%	Termination Hiring Training

* Since wages are a large component of these costs, the costs are adjusted by using the National Average Wage Index. See <http://www.ssa.gov/OACT/COLA/AWI.html>.

**Based on the Bureau of Labor Statistics Current Population Survey report of average annual RN salary for 2005 of \$54, 670. See <http://www.bls.gov/bls/blswage.htm>.

Table A5: Estimated Cost of Patient Falls in Institutions:

Author	Study Methodology	Detailed Costs by Category	Average Costs per incident	Adjusted Average Costs per incident in 2006 \$ ^{±¥}
Bates, et al., 1995	Retrospective case-control in U.S. hospital	None reported. Additional costs are due to longer LOS (12 days on average) and higher total charges	\$4,233 (in 1987-1991 \$)	\$4,233 X 1.64 = \$6,942 [CPI conversion factor = 1.64]
Nadkarni, et al., 2005	Retrospective case study (no controls) in U.K. hospital	--Average costs for surgery (hip operation, or fixation of long-bone fracture, or other) and casting material = £4,582. --Average costs for additional LOS = £1,050/week, £150/day --Average increase in LOS = 4 weeks --At 4 weeks additional LOS per incident, the cost for additional days = £1,050 X 4 = £4,200 --At 12 days additional LOS per incident (see Bates above), the cost for additional LOS = \$1,800 --Average cost per incident = £4,582 + £4,200 = £8,782 OR £4,582 + £1,800 = £6,382	At 12 days additional days of care (see Bates above) = £6,382 (in 2000-2002 £)	\$6,382 X \$1.42 X 1.13 = \$10,241 [1£ = \$1.42 in 2001; CPI conversion factor = 1.13]
Nurmi, et al., 2002	Prospective case study (no controls) in 2 hospitals and 2 nursing homes in Finland	ER, outpatient, x-ray, hip surgery, bed-days, transportation costs (ambulance). 70% of costs were due to treatment of hip fractures.	Average cost per fall was €944 (in 1999 €)	\$944 X \$0.9 X 1.2 = \$1,019 (€1 = \$0.9 in 1999; CPI conversion factor = 1.2)

[±]\$ are converted to 2006 \$ using the CPI inflation index at <http://www.westegg.com/inflation/>

[¥]Foreign currencies (£, €) are converted to \$ using an on-line currency converter at <http://www.oanda.com/convert/classic>, then are converted to current \$ using the CPI inflation index. Note that foreign average costs will differ greatly from the U.S. For example, lengths of stay in GB are much longer than in the U.S. Also, it is unknown how materials, personnel, and other costs compare to the U.S. Further estimations should be conducted to relate foreign costs to U.S. costs. For example, one could further adjust the Nadkarni estimate by using the ratio of average UK costs to US costs.

Summary notes: major cost categories for falls are: surgery, supplies, additional days of care. The Bates study provides the most reliable estimate of average costs due to its use of study controls and U.S. costs, but it does not break down costs per category.

Table A6: Estimated Overtime Costs,
2003 – 2007

Year	National Mean Hourly Hospital Wage	Overtime = 1.5 X Hourly Wage
2003	\$25.05	\$37.57
2004	\$26.54	\$39.81
2005	\$27.80	\$41.70
2006	\$29.31	\$43.96
2007	\$30.69	\$46.03

Source: Bureau of Labor Statistics,
Occupational Employment Statistics

Table A7: Mean National
RN Salary, 2003- 2007

Year	Mean Annual Hospital Salary
2003	\$52,050
2004	\$55,200
2005	\$57,820
2006	\$60,970
2007	\$63,820

Source: Bureau of Labor Statistics,
Occupational Employment Statistics

Table A8: Yearly Rate of TCAB Turnover:

Unit	2003	2004	2005	2006	2007	Sum 2003 -2007	Average 2003 -2007
Cedars 8S	2.44	2.33	0.00	0.00	0.00	4.77	0.95
Children's 6W*	7.50	6.25	11.63	10.42	0.00	35.80	7.16
Haley VA	19.05	4.52	4.07	9.01	13.20	49.85	9.97
KP 2S	0.00	2.78	2.56	0.00	0.00	5.34	1.07
LIJ 5S	3.67	3.61	0.00	0.00	0.00	7.28	1.45
MDA P5	3.44	5.64	0.00	4.72	2.32	16.10	3.22
MDA 10E	1.81	7.02	7.23	0.00	9.10	25.00	5.00
N.Shore 3C	4.22	11.63	28.23	3.50	10.50	58.08	11.62
Prairie Lakes	3.23	3.13	0.00	2.78	12.8	21.90	4.39
Seton	6.00	1.92	5.45	3.51	18.30	35.20	7.04
ThedaC 4thF	11.76	3.23	5.26	9.09	6.39	35.73	7.15
ThedaC 5thF	4.76	2.22	0.00	2.33	11.20	20.51	4.10
UPMC	14.81	0.00	0.00	0.00	4.17	18.98	3.79
Average	6.36	4.17	4.96	3.49	6.77	25.75	5.15

Table A9: TCAB Yearly Rate of Patient Falls with Harm/ 1,000 Patient Days 2005 – 2007

	2005	2006	2007	Average Rate 2005 - 2007
Cedars 8S	*0.19	0	0	0.06
Children's 6W	*1.13	0.14	0	0.42
Haley VA	1.79	1.50	*1.23	1.58
KP 2S	NA	*0.25	0.28	0.26
LIJ 5S	0.68	0.64	*0.93	0.75
MDA P5	0.27	0.35	*0.10	0.24
MDA 10E	0.64	0.28	*0.53	0.48
N.Shore 3C	1.20	1.06	0.91	1.05
Prairie Lakes	NA	0.49	0.61	0.55
Seton	0.81	0.38	0.49	0.56
ThedaC 4thF	2.14	0.48	2.26	1.62
ThedaC 5thF	3.53	1.30	0.77	1.86
UPMC 4E	*0.70	1.01	*0.52	0.74
	1.00	0.59	0.43	0.77

*incomplete data –values extrapolated

Table A10: TCAB Yearly Overtime Rates 2005 – 2007[±]

	2005	2006	2007	Average Rate 2005 -2007
Cedars 8S	NA	NA	NA	NA
Children's 6W	0.67	1.84	1.08	1.20
Haley VA	NA	NA	NA	NA
KP 2S	NA	NA	NA	NA
LIJ 5S	NA	NA	NA	NA
MDA P5	NA	NA	NA	NA
MDA 10E	NA	NA	NA	NA
N.Shore 3C	NA	NA	NA	NA
Prairie Lakes	NA	NA	NA	NA
Seton	NA	NA	NA	NA
ThedaC 4thF	NA	NA	2.76	2.76
ThedaC 5thF	2.77	3.13	3.65	3.18
UPMC 4E	1.97	3.99	4.47	3.48
Average	1.80	2.99	2.99	2.65

[±]Overtime as a percentage of total hours

Table 11: State and National RN Turnover Rates in Hospitals (% of Filled Positions)

Source	Year of Data Collection	Sample	Rates	Link
American Association of Colleges of Nursing: Pricewaterhouse-Coopers' Health Research Institute Report	2007 (publication date)	National	8.4%	http://www.aacn.nche.edu/Media/pdf/NrsgShortageOct07.pdf http://wiche.edu/agenda/book/Nov_07/presentations/carparelli.pdf
Florida: Florida Center for Nursing: 2007 Nurse Employer Survey: Methods and Statewide Results	2007	Florida State	Hospitals, direct care: 22.8% Hospitals, indirect Care: 13.6%	http://www.flcenterfornursing.org/files/2007_Employer_Survey_Report.pdf
Michigan Center for Nursing	2007	Michigan State	17.7% voluntarily left hospital nursing position in last 2 years (8.85% / yr?)	http://www.michigancenterfornursing.org/mimages/nursesurvey07.pdf
Center for New Mexico Nursing Excellence	2007	New Mexico State	23.2%	http://www.nmnursingexcellence.org/associations/6561/files/Nursing%20Vacancy%20Turnover%20Survey%20Report%20Jun%2007.pdf
Healthcare Association of New York State	2006	New York State	13.18%	http://www.hanys.org/upload/workforce_advocacy_results_2007.pdf
Greater New York Hospital Association	2005	New York State	9.1% 8% voluntary , 1.1% involuntary	www.gnyha.org/pubinfo/2005_Nurse_Staffing_Survey.pdf
Ohio Hospital Association	2006	Ohio State	13.5%	http://www.ohanet.org/workforce/FAQ.asp
Vermont Health Workforce Assessment Survey 2007	2007	Vermont State	10%	http://www.choosenursingvermont.org/reports/PDFs/hospital07.pdf

Table A12: Rates of Patient Falls and Falls with Harm in Hospitals

Source	Year of Data Collection	Sample	Rates	Link
Bates et al.(2003)	2003	Studies that reported using information technology to detect adverse events by searching 1966–2001 MEDLINE records	2.6/ 1,000 admissions. [Since average LOS in short stay hospitals in 2004 = 4.8 days, this = 0.54/ 1,000 patient days]	http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=150365
Berry et al.(2004)	2004	300 bed hospital in Indianapolis	3.5/ 1,000 patient days	http://www.cdc.gov/nchs/data/series/sr_13/sr13_162.pdf#table13 http://findarticles.com/p/articles/mi_m3257/is_11_58/ai_n6362155/pg_7
Dunton, et al. (2004)	Oct-Dec 2002	NDNQI data set for fourth quarter 2002, 282 facilities in 45 states, 1,836 units: 25% critical care, 17% step-down, 19% medical, 14% surgical and 26% combined medical-surgical.	3.73/ 1,000 patient days Mean number of injurious falls was 0.99/1,000 patient days	
Hitcho, et al. (2004)	Nov 2002-Jan 2003	A 1,300-bed urban academic hospital over 13 weeks in St. Louis, MO	3.38/ 1000 patient days Falls with harm: 1.42/ 1,000 patient days	
Hook & Winchel, (2006)	2004	Data from Dunton, et al. (2004)	3.73/ 1,000 patient days	
Krauss, et al. (2005)		Barnes Jewish Hospital, St. Louis, MO	3.29/1000 inpatient days Falls with harm: 1.22/ 1,000 patient days	
Potter, et al. (2003)	Feb 2000 – Jan 2001	Single Hospital, Barnes Jewish Hospital, St. Louis, MO	2.78/ 1,000 patient days	

Sherrod & Good, (2006)	May 2004-May 2005	Medical-Surgical unit of large urban hospital (TX)	5.75/ 1,000 patient days	
Shorr et al. (2008)	2007	Sixteen adult nursing units (349 beds) in an urban, academic community hospital in Florida	From hospital's incident reporting system: 3.73/1,000 pd. From Evaluation Service: 4.45/1,000 pd Averaging both data sources: 5.20/1,000 pd Fall with harm: 1.11 /1,000 patient days	http://findarticles.com/p/articles/mi_m3257/is_11_58/ai_n6362155/pg_7
Smith (2008)	March-May 2006	Massachusetts hospitals: 65 acute care hospitals, and 10 specialty hospitals	Medical units: 4.40/1,000 pd. Med-Surg: 3.48/ 1,000 pd. Step-down: 2.72 / 1,000 pd Surgical: 2.68/ 1,000 pd Critical care: 1.16/1,000 pd Falls with Injury: Critical Care: 0.23 patient days Stepdown: 0.64 patient days Medical: 0.84/1,000 patient days Surgical: 0.39/ 1,000 patient days	
Sovie & Jawad, (2001)	FY 1997 & 1998	29 university teaching hospitals that had more than 300 acute operating beds; the hospitals represented eight of the nine U.S. census regions.	2.88-2.95 patient days	

* Frequency of reported events

Table 13: Rates of RN Overtime

Source	Date of data collection	Sample	Rates	Link
National Sample Survey of RNs (2007) 15.8%	2004	Sample of RNs from 50 states and DC: 54,000 RNs	7.5 hours/week (= 15.8%*)	http://bhpr.hrsa.gov/healthworkforce/rnsurvey04/appendixa.htm#20
Berney et al. (2005) 4.5%	1995 - 2000	193 acute general hospitals in New York State	The average weekly overtime RNs worked was 4.5% of total hours, varying from almost none to 16.6%.	http://www.blackwell-synergy.com/doi/abs/10.1111/j.1547-5069.2005.00032.x
Blegen et al. (2008) 5.14%	2000	47 hospitals in 11 geographic areas across the U.S.	Proportion of RN overtime in Medical/Surgical units: 0.051 (5.1%)	

* rate = # OT hours/(40 hours + # of OT hours)

Average rate of OT hours from 3 studies = 15.8+4.5+5.1= 8.48 = 8.5%