HHS Public Access
Author manuscript
Am J Ind Med. Author manuscript; available in PMC 2018 April 04.

Published in final edited form as:
Am J Ind Med. 2013 April ; 56(4): 469–478. doi:10.1002/ajim.22139.

An Economic Analysis of a Safe Resident Handling Program in Nursing Homes

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Abstract

Background—Occupational injuries, especially back problems related to resident handling, are common in nursing home employees and their prevention may require substantial up-front investment. This study evaluated the economics of a safe resident handling program (SRHP), in a large chain of skilled nursing facilities, from the corporation's perspective.

Methods—The company provided data on program costs, compensation claims, and turnover rates (2003-2009). Workers' compensation and turnover costs before and after the intervention were compared against investment costs using the “net-cost model”.

Results—Among 110 centers, the overall benefit-to-cost ratio was 1.7–3.09 and the payback period was 1.98–1.06 year (using alternative turnover cost estimates). The average annualized net savings per bed for the 110 centers (using company based turnover cost estimates) was $143, with a 95% confidence interval of $22–$264. This was very similar to the average annualized net savings per full time equivalent (FTE) staff member, which was $165 (95% confidence interval $22–$308). However, at 49 centers costs exceeded benefits.

Conclusions—Decreased costs of worker injury compensation claims and turnover appear at least partially attributable to the SRHP. Future research should examine center-specific factors that enhance program success, and improve measures of turnover costs and healthcare productivity.

Keywords

cost-benefit analysis; safe resident handling; nursing homes; net-cost model; return on investment; workplace interventions

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Introduction

Nursing aides rank third among U.S. occupations with number of injuries and illnesses that require days away from work [Bureau of Labor Statistics, 2009]. In 2008, the incidence rate of non-fatal occupational injuries and illnesses for nursing and residential care facilities was 8.4/100 for total recordable cases, which was close to twice that of the rate in the construction sector. In particular, overexertion accounted for 48% of the injuries and illnesses among nursing aides, orderlies and attendants, compared to 19% among construction workers [Bureau of Labor Statistics, 2009].

Among health care workers, lifting and moving of patients or residents is one of the primary risk factors for these injuries [Marras et al., 1999; Miller et al., 2006; Tullar et al., 2010]. Patient handling devices have been shown to be efficacious in reducing biomechanical loading on the healthcare worker's back [Zhuang et al., 1999]. Many, but not all, workplace studies of effectiveness have shown corresponding health benefits [Brophy et al., 2001; Ronald et al., 2002; Smedley et al., 2003; Collins et al., 2004; Engst et al., 2005; Fujishiro et al., 2005; Badii et al., 2006; Miller et al., 2006; Alamgir et al., 2008; Martimo et al., 2008; Park et al., 2009; Tullar et al., 2010; Lipscomb et al., 2012; Schoenfisch et al., 2012].

A comprehensive safe patient/resident handling program often requires substantial investment on the part of the employer. It is often argued that a well-designed economic analysis that provides a rationale for investment would induce the employer to control risks at the workplace through relevant interventions [Verbeek et al., 2009]. The documentation of such an economic analysis procedure may lead to a “win–win” solution for injury prevention; in the healthcare sector it could also help in driving down health care costs if further successful in reducing compensation claims and secondary consequences of injury such as light-duty placements or employee turnover.

The objective of this study was to determine whether the monetary benefits of a safe resident handling program (SRHP) in a large chain of nursing homes outweighed the investment costs from the employer's perspective. The program has already been shown to lead to reductions in ergonomic exposures for nursing aides, who perform the majority of resident handling in these facilities [Kurowski, 2011; Kurowski et al., 2012b]. This study's hypothesis was that the program would also reduce the costs to the corporation of workers compensation claims as well as other indirect injury costs.

The “net-cost model” [Lahiri et al., 2005a,b], an economic tool for evaluating occupational health and safety interventions, was used to estimate the net cost of the SRHP. It has been utilized to evaluate ergonomic interventions in three different companies in the US manufacturing sector [Lahiri et al., 2005a,b] and to evaluate engineering noise control interventions for noise-induced hearing loss [Lahiri et al., 2011]. It has been adapted and translated into a web-based calculator for the U.S. construction sector [Lahiri and Welch, 2010]. It has also been assessed very favorably in two independent systematic reviews of OHS interventions with economic evaluations [Verbeek et al., 2009; Tompa et al., 2010].

Methods

The company is a privately held, self-insured corporation that owns or jointly manages a chain of skilled nursing facilities in the eastern United States. The SRHP [Kurowski et al., 2012b] included protocols for assessing each resident's need for assistance; purchase of enough portable whole-body and sit-to-stand lift devices as well as friction-reducing slide boards for all of those residents; training employees in equipment use and requiring their competency as a condition of employment; and implementation of maintenance and use protocols (including sling laundering and battery re-charging). A third-party company designed and implemented the program, that is, determined how many of each device type to purchase for each center, trained and evaluated employees, and communicated the maintenance and cleaning/laundering protocols to all department heads.

The net-cost model has three essential components from the company's perspective: (1) the cost of equipment and labor to implement the program; (2) the financial benefits attributable to the effectiveness of the interventions; and (3) any increase in productivity that might result. This is essentially an accounting framework where net cost is equal to investment on intervention equipment plus labor costs involved in implementing the intervention, minus the avoidable costs of illness, injury and productivity losses. The full set of relevant costs, from the corporation's perspective, include: workers compensation claims (medical care and indemnity); productivity losses from (uncompensated) absenteeism and presenteeism; group health and disability insurance premiums; malpractice litigation losses; employee turnover; poor labor relations; other costs related to tarnished image or goodwill; etc. Obviously some of these are difficult to quantify yet no less important.

The net cost of the SRHP was estimated from the company's perspective using avoided costs from workers' compensation (WC) claims (2003–2009) and clinical employee turnover data (2003–2009). Data on other possible costs of worker injury to the corporation were not available. The model generated annualized net savings when the annualized net costs were negative (i.e., the sum of the annualized avoided costs exceeded the annualized intervention costs in SRHP).

The accounting framework of the net-cost model was used for computation of the benefit-to-cost ratio (BCR) and the payback period. The BCR was computed by dividing the annualized value of avoided costs by the total annualized investment costs, and the payback period is the inverse of the rate of return on investment.

Annualized net cost was estimated for each facility according to the equations below, with all cost components annualized:

- Net-costs = Total intervention costs – (Avoided medical care costs – Avoided productivity losses – Avoided employee turnover costs).
- Avoided medical costs = (pre-intervention WC medical costs – post-intervention WC medical costs).
- Avoided indemnity costs = (pre-intervention WC indemnity costs – post-intervention WC indemnity costs).

- Avoided turnover costs = (pre-intervention turnover costs – post-intervention turnover costs).

Analyses were conducted with Excel and SAS software.

Intervention Costs

Intervention cost (metrics) included equipment purchases (net of tax savings); in-house labor to be trained, install equipment, and administer the program (3.5 hr for each clinical staff member); operating and maintenance costs; and the third-party contract (device selection, employee training, evaluation, etc.) which was paid over 3 years. Data on invoices of the equipment including lifts, slings, padded assist belts, tubes, and scales that had been purchased by the corporation were collected. Invoices had records of the unit price, quantity purchased, and total cost. There were different types of lifts available for purchase, ranging in cost per lift from $1338.00 for to $3497.00. The average purchase price of a lift was $1803.00 with a standard deviation of $285.00. The average number of lifts purchased per facility was around six lifts with a standard deviation of 2.5. The average cost of all equipment purchased related to the lift intervention was $19,836.00 with a standard deviation of $6788.00.

All costs were discounted and calculated separately for each facility. To adjust for inflationary changes, all costs were converted to the base year dollar values of 2006.

All direct costs of investment (capital equipment and labor) were defined as the direct additional cost that was incurred due to the implementation of the intervention (“marginal cost”). The lump-sum investment costs on the over-head lifts were annualized by determining the capital recovery factor for the relevant equipment. The capital recovery factor is the sum of the depreciation rate and the opportunity cost of capital (a uniform rate of 7% was assumed to be the average long run rate of return on private capital). The depreciation rate was determined by taking into account the service life, salvage value, and market rate of interest rate. Depreciation was calculated with the following formula:

$$K = \sum d(1 + i)^{a - t} + \phi$$

where K, total investment; d, depreciation; i, interest rate; a, service life of the equipment in years; t, running time variable; and ϕ, salvage value of the equipment.

The US tax system allows for a deduction for the cost of an asset spread over a period of time based on the economic life of the equipment (depreciation allowance) in determining the total amount of taxes that the company pays to the government. These depreciation allowances are considered as tax incentives to invest in long-term business assets. Hence, the direct annualized investment costs of the overhead lift equipment were adjusted accordingly by calculating the net after-tax annualized direct investment cost of equipment. This analysis used a conservative 35% as the marginal corporate tax rate, consistent with that used in standard finance textbooks [Ross et al., 2008].

Avoided Cost Components

The effectiveness metrics were the avoided costs of workers' compensation for medical care and indemnity (i.e., proxy for productivity losses) and of employee turnover (i.e., costs related to human capital). Again these were computed at the level of the individual facility, discounted, and annualized for the reference year 2006. Avoided costs were computed by comparing costs in each category before versus after the intervention in each center.

Each WC claims record included facility identifier, accident date, medical and indemnity costs. The injury date for each claim was compared to the implementation date for that facility. If the accident date occurred before the implementation date it was classified as pre-intervention and if afterward then it was classified as post-intervention. All WC expenditures were adjusted to represent the 2006 price by using the CPI index [Federal Reserve Bank of Minneapolis, 2010]. The sum of the adjusted medical care/indemnity costs paid for the different claims were added for each business unit for the pre- and post-period with Excel Pivot tables.

The costs of medical care and indemnity payments were annualized over the length of the pre- and post-intervention periods for each business unit as follows:

$$\text{Pre}-\text{intervention(years)} = \text{Number of days from January1, 2003, to intervention date}/365\,.$$

$$\text{Post}-\text{intervention(years)} = \text{Number of days from intervention date to December31, 2009}/365\,.$$

$$\text{Annualized average WC costs(per business unit)} = \text{WC cost}/\text{years of follow} - \text{up}\,.$$

Annual retention data were available for 2003–2009 for three categories: CNA, LPN, and RN at the business unit level. All the years prior to the intervention year were categorized as pre and all the years in the post-intervention period were classified as post. For each business unit, annual average turnover (headcount) was computed separately for each job category, and avoided turnover was the difference between the totals for all “pre” years and all “post” years.

The costs of turnover were computed by using two alternative cost factors (expressed as ratios of the annual salary per job category). The first set of estimates was provided by the company's Human Resources office, averaged over the period 2003–2009 by state and job category (nurse and nursing aide). In all categories, the company's estimated turnover cost did not exceed 34% of salary for that job category (detailed breakdown of these costs is available from the authors on request). In the economics literature, the nursing turnover cost calculation methodology is based upon the theory of human capital that recognizes nurses as organizational assets with knowledge, skills, and abilities that impact organizational productivity and performance. Most quantitative estimates of nurse turnover cost in the healthcare economics literature have been derived from hospital data and varied substantially, ranging from 0.31 to 1.60 as a ratio to annual salary. A smaller number of detailed studies are available for turnover costs of frontline workers in long-term care nursing homes [Seavey, 2004]. In Seavey's article, an expanded accounting model with direct and indirect costs was used to estimate the turnover costs of direct care workers. These conservative rules of thumb cited in the literature were used to obtain an alternative set of estimates: for registered nurses (RNs) it was 1.00 times annual salary [Jones, 2004; Buchan, 2010]; and for direct care workers 0.25 of annual salary [Employment Policy F, 2002; Seavey, 2004]. These figures were used to obtain a second set of estimated turnover costs.

Since the overall net savings depend upon variances in the model parameters, the 95% confidence interval for the net savings per bed was computed, using the standard error of the sampling distribution of the sample mean and the relevant z or t coefficient corresponding to the appropriate confidence level.

Results

Complete administrative data were obtained for 120 of the company's skilled nursing facilities (corporate business units). Those centers (n = 110) for which 3 years of pre-SRHP data were available and which had accrued at least 3 years of data post-intervention as of December 31, 2009, were included for analysis.

A total of 110 nursing homes met the inclusion criteria. They were located in 10 states in the northeastern region of the United States. Combined, these nursing homes employed an annual average of 11,779 employees, who filed a total of 16,683 claims during the study period (2003–2009; Table I). Prior to the SRHP, the average number and cost of workers' compensation claims were high for these facilities, with a large inherent variability, as revealed by the standard deviations.

The total annualized investment costs for the SRHP over all 110 business units were $2.740 million. Total annualized avoided costs of compensation for medical care and indemnity and employee turnover (company cost estimates) were estimated at $4.629 million (Table II). Thus, in the 3 years following SRHP implementation, the company realized a total net savings of at least $1.89 million, for a BCR of 1.689.

The total investment cost of the SRHP intervention ($8.78 million) divided by the annualized avoided costs ($4.629 million) minus the total operating costs ($0.2 million) results in a payback period of 1.98 years. Since the rate of return on investment (ROI), is simply the inverse of the payback period, this would imply a 50.5% annual rate of return on total investment in SRHP.

The average annualized net savings per bed for the 110 centers was $143, with a 95% confidence interval of $22–$264. This was very similar to the average annualized net savings per full time equivalent (FTE) staff member, which was $165 (95% confidence interval $22–$308).

The company's own figures for turnover cost were considerably lower than those in the available literature, so the net savings based on their data were also considerably lower

($1.89 million) than the literature-based turnover cost estimate ($5.73 million). The latter value gave an average annualized net savings per bed of $417 (95% confidence interval $100–$735), a benefit to cost ratio of 3.09, and a payback period of 1.06 years.

On the whole, the magnitude of net savings outweighed the net costs. However, there was substantial variability in net costs per bed among the 110 facilities (Fig. 1). Sixty-one centers had annualized cost savings and 49 had positive net costs. The range was very large, from positive net savings of approximately $3,064 per bed to a negative savings (i.e., net cost) of over $992 per bed (using the company's turnover cost estimates). On average, centers with longer observation time post-intervention had higher total avoided costs of workers compensation claims (Table III). No similar pattern was evident for turnover costs.

Additionally, sensitivity analyses were performed to determine the impact of important parameter assumptions with respect to the working life of the lift equipment and the interest rate (private opportunity cost of capital) on the results. First the working life of the equipment was varied from 7 years (base case assumption) to 12 years. As the working life of the equipment becomes larger, the annualized cost of investment becomes lower, and this allows net savings to increase, all other factors remaining constant (Fig. 2).

As the interest rate falls from 7% to 2%, the net savings decline, although remaining positive. This occurs due to the fact that there are two opposing forces in the model. The third party contract costs were fixed in amount but spread over time, hence the discounted present value at the base reference year 2006 becomes larger when the interest rate falls. On the other hand, with a lower interest rate, the capital recovery factor becomes more favorable due to the fall in the opportunity cost of private capital. This exerts a favorable impact on net savings. The negative effect of the present value on contract costs outweighs the positive impact on the annualized investment cost of equipment. Hence the net-savings fall (Fig. 3), although to a marginal extent.

We also plotted workers' compensation costs (i.e., the annual sum of medical + indemnity dollars paid by each center) over time. In Figure 4, the dots aligned in each vertical bar might represent different calendar years for the different centers but each bar represents the same timing relative to the intervention (year −3, −2, −1, 0, 1, etc.). There was no perceptible trend in WC costs before the intervention but there was a clear inflection point in the year of program implementation and a downward trend after that.

Discussion

This study of a SRHP in a large chain of nursing homes makes a favorable economic case for the corporation as a whole, with a benefit-to-cost ratio in the range from 1.7 to 3.09. Since this particular corporation is self-insured for workers compensation insurance, the reduction in injury costs directly benefits the corporation. The sensitivity analysis results show that net savings were robust with regard to assumptions about working life of the lift devices as well as interest rates. Figure 4 also assists with the interpretation of the study findings by showing that there was NOT a previous downward trend, prior to program implementation.

However, there was considerable inter-facility variability in net costs. For a fairly large number of facilities, the costs of investment outweighed the benefits. The benefits increased with length of observation time after the program began, suggesting either institutional learning or a lag in reduction of injury occurrence and severity, or both. These results suggest a need for further investigation of facility-level characteristics, or other factors, that might encourage or hinder the successes of such a program.

Turnover accounted for a large proportion of net costs (and savings) for the employer, even when using the lower estimate of cost provided by the company. Nurse turnover rates are high [Gray et al., 1996; Jones, 2004; Waldman et al., 2004] and the cost for health care organizations has been described as “shocking” [Waldman et al., 2004]. Yet turnover-related productivity losses are often neglected because they are difficult to measure. In fact, there is considerable uncertainty in the literature around the estimates of the ratio of turnover cost to salary in health care settings. Nonetheless, turnover studies across different economic sectors and organizations show that a decrease in turnover rate can be expected to enhance organizational productivity, in line with human capital theory [Cascio, 1999]. This warrants future studies to estimate empirically the turnover costs of nursing home employees with greater precision.

This study has both strengths and weaknesses. The sample presented here (11,315 staff members in 110 nursing homes) is larger than almost all other published work to date. Other major strengths include the length of follow-up (6 years per center), as well as the availability of data in a standardized format on a corporate basis for a large number of facilities, permitting examination of variability among centers.

The major limitation is that data were available only for workers compensation and turnover costs. WC costs—both medical and indemnity—are likely underestimates of the true complete losses for employers, as enumerated by ourselves and others [Oxenburgh et al., 2004; Lahiri et al., 2005b]. Therefore, it is important to keep in mind that these results might underestimate the benefits of the program. For example, workplace injury under-reporting, which is notorious in general in the U.S. [Azaroff et al., 2002] and even more so in the healthcare sector [Galizzi et al., 2010], would lead to further underestimation of true injury costs.

In addition, uncompensated costs of absenteeism were not available. Productivity in the service sector is difficult to measure but might be affected by injuries or diseases that impair full functioning, even when employees are still present on the job. An important element of engineering control interventions could be the impact on multifactor productivity, due to advanced technological features of the new equipment which has been ignored in this study. Further, malpractice litigation losses by nursing homes are substantial on a national scale [Zhao et al., 2011], but such data were not available for this study.

The second and third components of the net-cost model are the elements that reduce the real cost of the intervention. Obviously, intervention effectiveness is key. Higher effectiveness means more avoidance of injuries, illnesses, and other productivity losses, and therefore, lower net costs of the intervention. The ability to attribute changes in those components to the intervention itself is critical to correct interpretation of study findings. In this instance, it is plausible to attribute at least a proportion of the reduced injury occurrence and cost to the SRHP. In support of this argument, another study component involving direct observation of clinical jobs in these workplaces showed increases in lift device use over time and reductions in ergonomic exposures, especially for nursing assistants [Kurowski, 2011; Kurowski et al., 2012b]. Less self-evident is whether all of the reduced turnover can be attributed similarly. It is possible that other center characteristics or activities within the company, concurrent with the SRHP, might be more directly responsible [Lipscomb et al., 2012]; this question will be examined in future analyses.

Economic evaluation of work and safety interventions is a neglected area of research in occupational health and safety, even though the burden of avoidable work-related injuries is very large. Only some of the above-cited studies have examined the cost-effectiveness of safe patient handling programs for healthcare workers [Brophy et al., 2001; Spiegel et al., 2002; Collins et al., 2004; Engst et al., 2005; Badii et al., 2006; Miller et al., 2006; Alamgir et al., 2008; Park et al., 2009; Lipscomb et al., 2012]. Most, but not all, of these studies found at least modest economic benefits to the employer that were deemed attributable to reduced physical workload and consequent MSDs. Except for the studies by Engst and Smedley, all were based on before/after comparisons without a control group (similar to our study design).

In all of these studies, intervention costs included costs of equipment, with or without labor costs, but benefits were relatively narrowly defined in terms of reduction in absenteeism and/or compensation. As pointed out in the review by Verbeek et al. [2009], none of these studies considered compensated medical care, change in turnover, or other types of costs. The more comprehensive cost–benefit evaluation reported here include workers compensation costs for medical care and indemnity as well as turnover costs.

On the whole, our results show a favorable economic outcome with respect to avoided costs of workers compensation and turnover and provide an economic rationale for the corporation's investment in the SRHP. The payback period reported here (1.98–1.06 years) falls within the range of other economic analyses of lift programs, that is, 0.83–4 years [Spiegel et al., 2002; Chhokar et al., 2005; Engst et al., 2005; Nelson et al., 2006; Alamgir et al., 2008; Verbeek et al., 2009].

However, at a disaggregated level, although in the majority of facilities included here the result of the intervention was economically sound, there were others where the costs were higher than the benefits. This may simply reflect sampling error, as some centers were relatively small, or it may reflect true differences in program effectiveness. To date, little effort has been made to identify and measure the impact of the different organizational and/or worker characteristics that might contribute to the success or failure of workplace interventions [Schoenfisch et al., 2011; Kurowski et al., 2012a]. The variables that help enhance the effectiveness of the implementation of a given intervention should be identified so that they can be addressed first, in a “pre-intervention” phase, to increase organizational readiness for change, or so that interventions can be tailored to the specific characteristics of the settings. Knowledge of the relevant organizational and employee determinants will also help to determine the role of confounding variables that might have contaminated the results of intervention studies, both this one and others. In the light of a surge of interest in the "business case model" for occupational safety and health interventions, the ability to incorporate organizational predictors of success or failure into intervention studies would greatly enhance the practical value of that research.

Given the large up-front investments that are required, the actual adoption of these interventions by many employers may be limited. As a result, society may not realize the extent of health outcome benefits that could be realized with broader implementation of workforce interventions. While economic returns would seem to be an obvious motivator for employer adoption of occupational safety and health interventions, it is not clear what influence this actually holds relative to other factors [Frick, 1997]. Nevertheless, it has obvious implications at the "micro" level for employer decisions and at the "macro" level for driving down health care costs and improving the overall quality of preventive care. In this regard, our study provides a straightforward and convenient tool for the employer to determine the costs and benefits of alternative interventions.

This analysis did not attempt to perform a cost effectiveness analysis at the societal level. For example, costs to employees, ranging from out-of-pocket medical expenses to social and familial consequences [Morse et al., 1998], have not been counted here at all. In order to facilitate the decision-making process in occupational health and safety, it would be useful in future studies to estimate the net cost of intervention from other stakeholders' perspectives: employee; insurer; government; and society as a whole. Economic valuation models from the perspective of the different stakeholders can help to align the incentives, provide guidance for policy formulation and reduce the barriers to successful workplace interventions [Cherniack and Lahiri, 2010; Cherniack et al., 2011].

Acknowledgments

We thank Suzanne Nobrega and Susan Yuhas for liaising with the company, Donna LaBombard for assistance in obtaining the many data files, and Heather (Zajac) Ozhogin, Kendra (Richardson) Kincaid, Bora PlakuAlakbarova, and Rebecca Gore for assistance with file management and computations. This manuscript is solely the responsibility of the authors and does not necessarily represent the official views of NIOSH. This study was supported by Grant Number U19-OH008857 from the U.S. National Institute of Occupational Safety and Health (NIOSH).

Contract grant sponsor: National Institute of Occupational Safety and Health (NIOSH); Contract grant number: U19-OH008857.

I, Supriya Lahiri, worked on this project as Co- Investigator (supported by the U19-OH008857/NIOSH Grant) with Laura Punnett, Principal Investigator. I am a full professor with tenure at the University of Massachusetts Lowell, and have no financial or commercial interests including consultation, investments, stock equity, ownership, stock options, patent licensing arrangement, or payment for conducting or publicizing the study. I was responsible for the economic analysis of the Safe Resident Handling Program in Nursing Homes.

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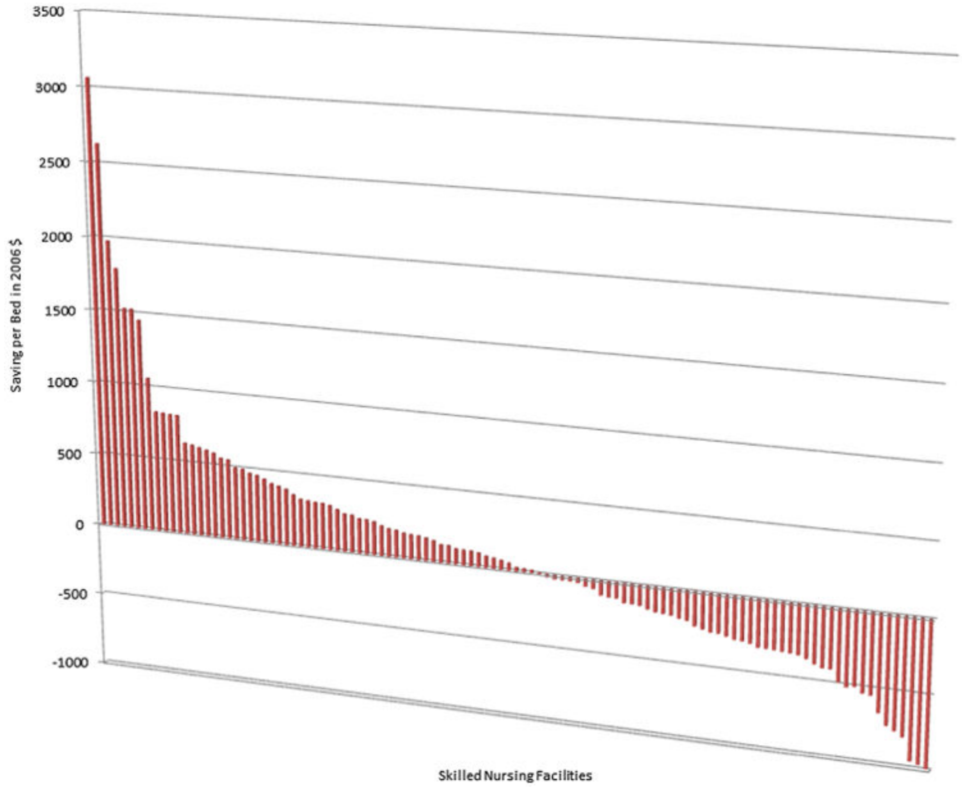

Figure 1.

Annualized net savings per bed following implementation of a Safe Resident Handling Program in a chain of skilled nursing facilities in the eastern United States.

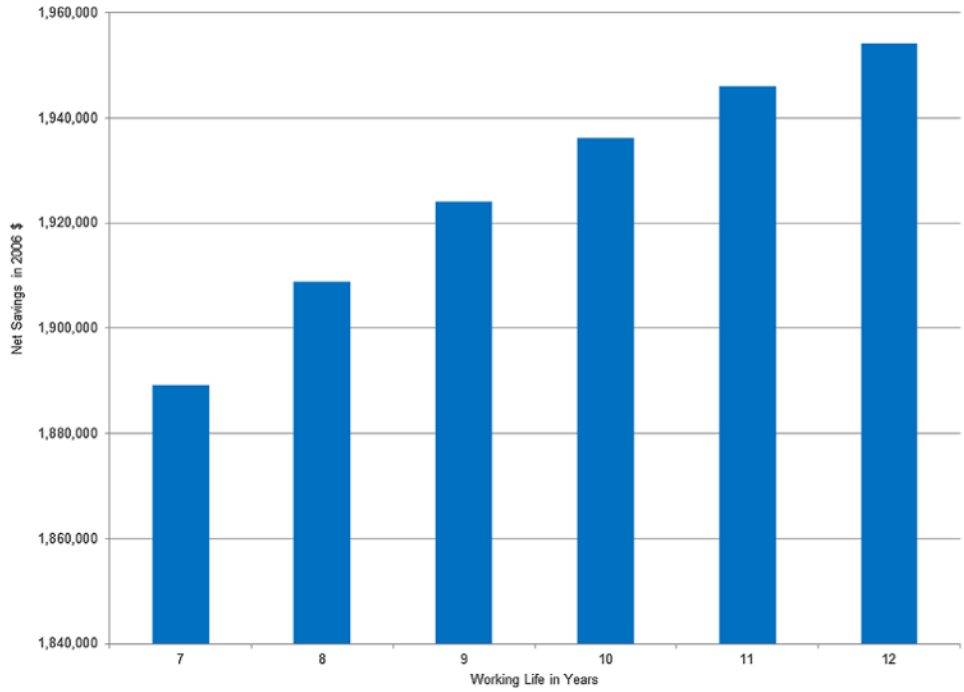

Figure 2.
Aggregate net savings at alternative working life of equipment.

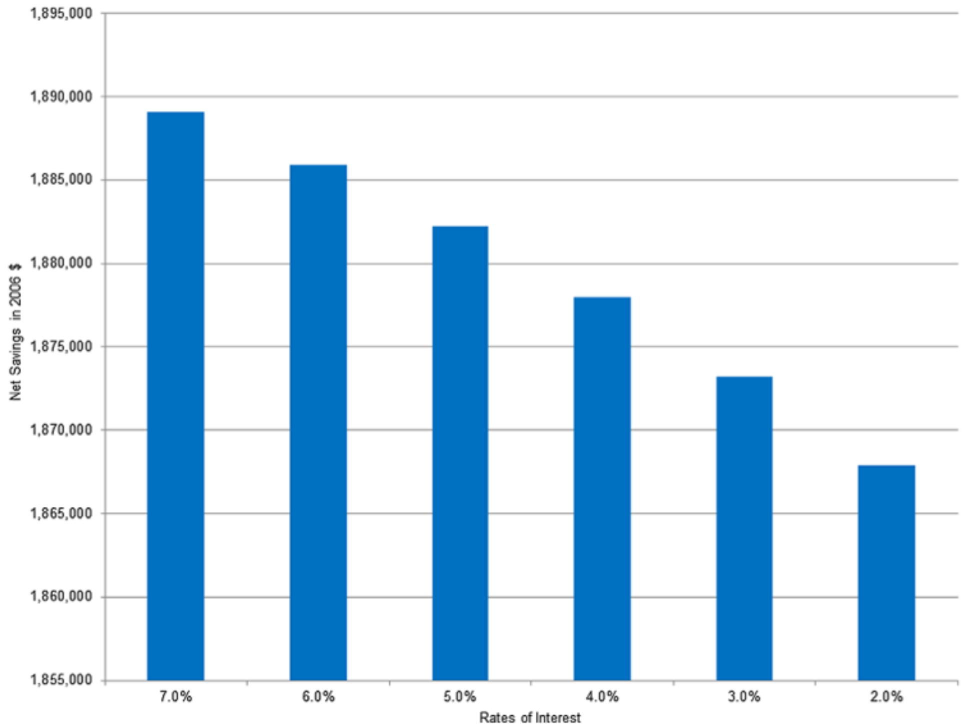

Figure 3.
Aggregate net savings at alternative rates of interest.

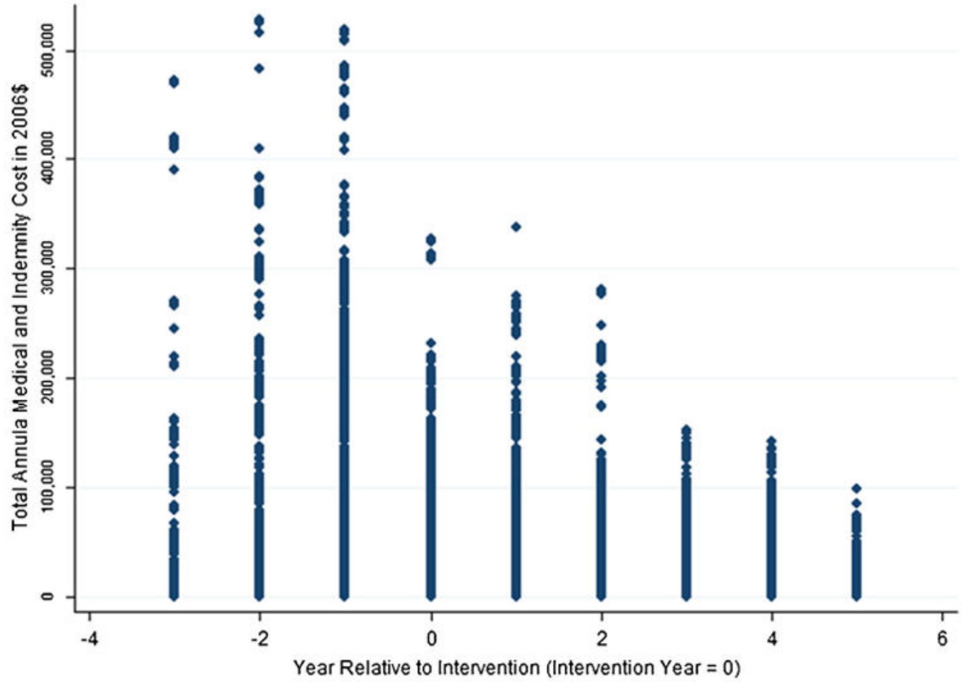

Figure 4.
Time trend in cost of workers' compensation claims.

Table I

Employee and Resident Characteristics of 110 Skilled Nursing Facilities (SNFs) Implementing a Corporate-Wide Safe Resident Handling Program: Centers With at Least 3Years of Follow-Up Post-Intervention

Center characteristic	Pre-intervention mean (SD)[a]	Post-intervention mean (SD)[a]
Center employees[b]		
Number of clinical employees	108.6(34.3)	106.2(34.7)
Employee age (average)	40.9 (2.2)	41.4 (2.5)
Employee sex: female (%)	92.7 (4.5)	91.9 (4.7)
Occupational distribution of clinical employees (%)		
Nursing aides (NAs)	61.4 (4.7)	60.5 (5.4)
Licensed practical nurses (LPNs)	20.5 (4.6)	22.1 (5.0)
Registered nurses (RNs)	18.1 (5.1)	17.5 (5.3)
Employee turnover (%)		
Nursing aides (NAs)	28.2 (9.6)	25.7 (9.4)
Licensed practical nurses (LPNs)	24.0 (11.6)	20.9 (9.7)
Registered nurses (RNs)	28.1 (14.6)	28.1 (13.5)
Center residents[c]		
Number of skilled beds	139.9 (47.3)	139.7(46.5)
Bed occupancy rate (%)	92.7 (6.1)	92.2 (3.7)
Percentage of resident days paid by medicaid	67.4 (11.5)	64.0(11.3)
Percentage of resident days paid by medicare	16.5 (5.6)	17.4 (6.1)
Workers' compensation claims[d]		
Annual number of claims	25(14)	20(10)
Annualized value of claims—medical care	49,449(44,824)	28,248(17,427)
Annualized value of claims—indemnity	34,123(43,943)	20,573 (17,455)

[a]Mean and standard deviation of center statistics, weighted by clinical employee headcount per center.

[b]Data for 2005 (pre) and 2008 (post).

[c]Data for 2003-2006 (pre) and 2007-2009 (post).

[d]In 2006 dollars. Averaged over January 1, 2003 until the intervention date (pre), and at least 3 years or more from the intervention date through December 31, 2009 (post).

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Table II

Total Annualized Avoided Workers' Compensation and Turnover Costs (Company Data) Following Implementation of the Safe Resident Handling Program in 110 Skilled Nursing Facilities, Eastern United States

Avoided turnover costs	$817,581 (18%)
Avoided medical costs	$2,321,133(50%)
Avoided indemnity costs	$1,490,517 (32%)
Total avoided costs	$4,629,232 (100%)

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TABLE III

Annualized Net Savings Following Implementation of the Safe Resident Handling Program in 110 Skilled Nursing Facilities, Eastern United States, by Length of Post-Intervention Period

	Annualized net savings per facility perbed	
Time post-intervention	**<5years (n = 38)**	**≥ 5years (n = 72)**
Average net savings	$83	$258
Avoided workers' compensation (medical)	$124	$257
Avoided workers' compensation (indemnity)	$81	$148
Avoided turnover costs (company cost-factor)	$67	$37