



## *Safe Patient Handling in New York State: An Estimate of the Costs and Benefits of Statewide Implementation*

June 13, 2013

### **Executive Summary**

Nurses and other direct patient-care workers in hospitals and nursing homes save lives, and are key to making stays in these institutions healthier, safer and more tolerable. Yet because they repeatedly need to use their bodies in often-awkward ways to move and lift patients, nurses and other health care workers have among the highest rates of on-the-job injuries in New York, including career-limiting and career-ending ones. And these methods of moving patients are risky and demeaning to patients as well.

The costs of medical treatment, workers' compensation and lost workdays related to back injuries in healthcare in New York are an estimated \$1.3 billion annually. The high occupational injury rate among nurses leads a significant number to leave the profession, exacerbating a critical nursing shortage.

Safe Patient Handling practices substitute mechanical lifting devices for nurses' and orderlies' arms and backs. Numerous demonstration projects of these practices in New York and around the nation, and full conversions of institutions to these practices, have shown immense improvements in staff safety, retention, and job satisfaction.

But what about cost? In every study of institutions that have switched to safe patient lifting, institutions' savings in personnel costs—replacing workers who lose work days, workers' compensation costs, staff turnover—have allowed them to recover their initial investments in a matter of a few years.

Drawing on the most recent implementations of safe patient lifting practices for which we have adequate data, we estimate the average cost of implementation (equipment purchase and staff training) at \$1,275 per bed. Reduced worker injury and turnover costs average about \$1,060 per bed per year in the first few years, meaning that institutions recover their initial gross outlays, on average, in less than fifteen months.

Given that there are about 173,000 hospital and nursing home beds in New York State (not counting those already converted to safe patient lifting), statewide implementation of such practices would cost institutions about \$220 million. On average, institutions statewide would be expected to save about \$183 million per year in the first few years, recovering their gross investments in fewer than fifteen months.

The news on monetary costs and benefits is extremely encouraging. But, in addition, there are immeasurable improvements in staff welfare and job satisfaction, and in patient safety and satisfaction, when nursing staff do not have to grapple with already-uncomfortable patients to move and lift them. Nursing retention is also an important ancillary benefit.

## **Introduction**

Health care is a huge part of our lives and is in the news in a multitude of ways every day. Yet, one of the aspects of health care that rarely gets the attention it deserves is what health care represents as a workplace. Our tendency is to think of hospitals as places where the sick and injured get better, and of nursing homes as places where older people are taken care. Yet, hospitals and nursing homes are also workplaces, and in these workplaces, health care workers sometimes get injured. In fact, nurses and other patient care personnel have among the highest rate of on-the-job injuries, and the costs of those injuries have grown and become a significant problem in New York and around the country.

Many nurses and nurse assistants experience back injuries and other musculoskeletal disorders (MSDs) as a result of moving and turning hospital patients and nursing home residents. There were over 37,000 cases of MSDs among nurses and nursing assistants nationwide in 2011, an incidence rate more than three times the average for all industries, and nearly as high as that for laborers and material movers.<sup>1</sup> The American Nurses Association reports that more than half of all nurses suffer from chronic back pain.<sup>2</sup> Since chronic back pain results from cumulative physical strain over time, occupational injury reported data may not be capturing the full extent of work-related injuries.

Disabling back injuries are a key factor in nurses leaving the profession—an estimated 12 to 18 percent of nurses leave the profession annually due to chronic back pain, and another 12 percent consider a job transfer to reduce their risk of back injury.<sup>3</sup> The National Institute of Occupational Safety and Health (NIOSH) notes that the high occupational injury rate among nurses is exacerbating a critical nursing shortage.<sup>4</sup>

The Occupational Health and Safety Administration (OSHA) reports: “Along with higher employer costs due to medical expenses, disability compensation, and litigation, nurse injuries also are costly in terms of chronic pain and functional disability, absenteeism, and turnover.... Direct and indirect costs associated with only back injuries in the healthcare industry are estimated to be \$20 billion annually.”<sup>5</sup>

Healthcare is one of the most hazardous industries in New York, as well as nationally. In 2011 (the latest available data), the occupational illness and injury rate among all private industries in the state was 2.7 per 100 full-time employees. Among hospitals, however, the rate was 5.4 per hundred—double the all-industry rate—and 6.6 per hundred (one in 15 workers) among nursing

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<sup>1</sup> Bureau of Labor Statistics News Release, Nov. 8, 2012, at <http://www.bls.gov/news.release/pdf/osh2.pdf>, Table A and Table 18. There were 120.3 MSD injuries per 10,000 full-time-equivalent nurses and nursing assistants, orderlies, and attendants. The all-industry average was 38.5, and the rate for laborers and freight-stock-and material movers was 140.0.

<sup>2</sup> Testimony submitted by the American Nurses Association to the Subcommittee on Employment and Workplace Safety of the Committee on Health, Education, Labor, and Pensions, Hearing on “Safe Patient Handling and Lifting Standards for a Safer American Workforce,” United States Senate, May 11, 2010.

<sup>3</sup> Hal Wardell, “Reduction of Injuries Associated with Patient Handling,” *AAOHN Journal*, October 2007, pp. 407-12.

<sup>4</sup> National Academies NIOSH Program Review, *Traumatic Injury Research and Prevention*, Sub-goal 5.1: Reduce Acute Injuries Caused by Patient Handling, March 2007, p. 114.

<sup>5</sup> OSHA, “Safe Patient Handling,” accessed on OSHA website, 6/7/2013: <http://www.osha.gov/SLTC/healthcare/facilities/safepatienthandling.html>.

homes.<sup>6</sup> Based on the state's share of nurses and nursing assistants nationally, direct and indirect costs associated with back injuries in healthcare in New York are an estimated \$1.334 billion annually.<sup>7</sup>

With the aging of baby boomers, the share of the population needing hospitalization or nursing home care will rise. The potential for nursing injuries also has been rising because of dramatic increases in adult obesity and extreme obesity ("bariatric" obesity refers to those over 300 pounds). The prevalence of obesity has dramatically increased over the last 20 years. "Over a third of adults are overweight and there is a significant increase in obesity as we age."<sup>8</sup> "Compared to the non-obese population, obese individuals require more frequent and extensive healthcare due to obesity-related health problems, and healthcare personnel are encountering hospitalized and critical-care bariatric patients on an increasingly frequent basis."<sup>9</sup>

This report considers what can be done to reduce patient handling injuries in New York. A number of hospital and nursing home facilities around the country have invested in patient handling equipment that significantly reduces the physical strain on health care practitioners. This equipment results in considerable cost savings in reduced lost work time, reduced turnover and lower workers compensation costs, and means that the equipment costs can be recouped fairly quickly. This report reviews several studies that have evaluated pilot projects where safe patient handling equipment has been put in place, and estimates the costs, benefits and payback period for statewide implementation in New York State of such equipment.

### **Dangers and costs of "traditional" patient handling**

Patients who need to be moved in hospitals and nursing homes have traditionally been lifted by either a "hook and toss" method, in which the caregiver hooks his or her arms under the patient's armpits and lifts; or by the "pivot transfer," which requires that the patient be able to stand and take a step. Both are risky maneuvers, and may put severe strains on the caregiver (leading to muscle or joint injury) or incur drops or falls that can severely damage the patient.<sup>10</sup> While the National Institute for Occupational Safety and Health recommends that no caregiver lift more than 35 pounds of a person's body weight vertically, these methods can lead to a much higher burden. "More than one-third of back injuries among nurses have been associated with the handling of patients and the frequency with which nurses are required to manually move patients."<sup>11</sup>

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<sup>6</sup> New York Department of Labor, at <http://www.labor.ny.gov/stats/osh/pdfs/2011-table10.pdf>

<sup>7</sup> Estimate by Fiscal Policy Institute using OSHA's \$20 billion national cost estimate and New York's 6.67 percent share of registered nurses, licensed practical nurses, and nursing assistants.

<sup>8</sup> Back Injuries in Nursing, University of Minnesota blog at <http://blog.lib.umn.edu/huew0001/backinjuriesinnursing/>, citing Department of Health & Human Services 2012, "Prevalence of obesity in the US 2009"

<sup>9</sup> Centers for Disease Control, 2008, *Preventing Back Injuries in Health Care Settings*, at <http://blogs.cdc.gov/niosh-science-blog/2008/09/lifting/>

<sup>10</sup> "Safe Lifting and Moving in Healthcare," New Yorkers for Patient and Family Empowerment, at <http://patientandfamily.org/files/2012/08/SPH-FAQS.pdf>

<sup>11</sup> Kris Siddharthan, *et al.*, "Cost Effectiveness of a Multifaceted Program for Safe Patient Handling," *Advances in Patient Safety* 3:347-58 (2005), at [www.ahrq.gov/downloads/pub/advances/vol3/Siddharthan.pdf](http://www.ahrq.gov/downloads/pub/advances/vol3/Siddharthan.pdf)

## **What is safe lifting?**

Safe lifting—sometimes including a practice called “zero lift”—uses modern mechanical lifts and repositioning devices to transfer and reposition patients. The machinery, rather than the caregiver, bears the patient’s weight. Potential harm to workers and patients is greatly reduced, and patient mobilization and activity is enhanced by workers’ ability to move patients more frequently.



## **Experience with Safe Patient Handling**

During the 1990s, the National Institute for Occupational Safety and Health looked at the experiences of seven nursing homes and one hospital that had implemented “zero lift” programs over several years.<sup>12</sup> These programs replaced “manual lifting and transferring of patients with modern, battery operated, portable hoists and other patient transfer assistive devices.”

In all eight facilities, injuries from patient transfers were greatly reduced (by 62 percent), as were lost workdays (by 86 percent) and workers’ compensation costs (by 84 percent); the higher reduction in these costs than in injury counts suggests that those injuries that still occurred were less severe. None of the facilities hired any additional personnel, nor did the “zero lift” program affect employee turnover. Comparing the nursing homes’ average workers’ compensation savings to their equipment purchase costs, average payback period was 15 months; the hospital’s savings in patient transfer-related injury costs paid for its investment in 9 months. Nursing personnel reported less exhaustion and back soreness, and older and pregnant nursing workers were able to work longer. Nursing personnel who were on restricted lifting because of herniated discs were able to perform their full work responsibilities. Injuries to patients from lifting and transferring were nearly eliminated, and patients were able to use the toilet more often than before, as well as feeling more comfortable and secure during transfers.

Another study from that era (1995-2000), covering six nursing homes (part of one hospital corporation) over three years before and three years after implementation of “zero lift” practices, also found significant reductions in resident-handling injury reports (61 percent fewer workers’ compensation claims), workers’ compensation costs (reduced by 37 percent), and lost-workday injuries.<sup>13</sup> The hospital corporation’s initial investment for equipment and training (\$158,556) was recouped in less than three years of workers’ compensation savings (\$55,000 average per year).

“The Veterans Health Administration spends \$22 million a year on caregiver injuries associated with patient handling and movement.”<sup>14</sup> In 2001, the Veterans Integrated Service Network

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<sup>12</sup> Arun Garg, “Long-term Effectiveness of ‘Zero-Lift Program’ in Seven Nursing Homes and One Hospital,” prepared for NIOSH, Contract 460/CCU512089-2 (Aug. 16, 1999), at [www.aft.org/pdfs/healthcare/zerolift0899.pdf](http://www.aft.org/pdfs/healthcare/zerolift0899.pdf)

<sup>13</sup> J. Collins, *et al.*, “An Evaluation of a ‘Best Practices’ Musculoskeletal Injury Prevention Program in Nursing Homes,” *Injury Prev*10:206-211(2004), at [www.cdc.gov/niosh/awards/hamilton/pdfs/Collins-practices.pdf](http://www.cdc.gov/niosh/awards/hamilton/pdfs/Collins-practices.pdf). The hospital corporation was self-insured for workers’ compensation, so savings were direct rather than in reduced insurance costs.

<sup>14</sup> Siddharthan *et al*, *op cit*.

covering Florida and Puerto Rico (VISN 8) provided funding for a multifaceted patient care ergonomics program, including the installation of manual and mechanical patient-moving machinery. Unlike the two studies above, this was not “zero lift,” but a program to evaluate specific types of patient moves and determine the least risky practices, limiting manual lifting to appropriate and necessary situations.<sup>15</sup> Injury rates in the involved nursing homes were significantly reduced after the program was in effect, as were costs of medical care billed to workers’ compensation. Not counting indirect benefits from reduced injuries, the initial investment in equipment and training was recovered in 4.3 years. The report points out that savings in costs “related to recruitment and retention of nurses can be substantial,” so that the social value of the intervention is much greater than the direct costs (and thus the implied recovery period for investment shorter). Surveys of nursing personnel indicated significant increases in job satisfaction related to professional status and task requirements.<sup>16</sup>

In 2006, Washington State enacted legislation requiring all hospitals to implement safe patient handling programs. Swedish Medical Center, the largest non-profit provider in the Greater Seattle area, implemented “Safe Moves” in 2008. Their initial gross investment, including training, was \$1.5 million. Based on a conservative estimate of over \$2 million in savings in lost work days due to nursing injuries in 2009, there is little question that “the return on investment is undeniable and dramatic when a safe patient handling policy is implemented successfully.”<sup>17</sup>

### **Successful implementation in New York<sup>18</sup>**

“Overexertion is the leading cause of injury and claims for workers’ compensation” in the healthcare and social assistance sector. These injuries can have severe implications for workplaces; in 2009, in nursing and residential care, one non-fatal injury in 6 led to a loss of 31 or more days of work, and this figure was 31 percent (nearly one in three) in city- and county-run nursing homes. There are clearly significant direct costs to the industry from manual patient lifting, and probably much higher costs in employee morale, turnover, and early retirements. Some observers have argued that without implementation of Safe Patient Handling, the anticipated shortage of nursing professionals would severely endanger patients. In addition, as noted in the literature, patients and nursing-home residents subject to manual lifting are subject to injury, discomfort, and reduced opportunity to move around.

In addition to the experiments reported on above, there have been several programs in New York that have proven the effectiveness—and the cost-effectiveness—of “zero lift” policies.

In 2005, the state Veterans Home at Batavia, in cooperation with the Civil Service Employee Association (CSEA), received a grant toward implementing an effective Zero Manual Lift/Safe Resident Handling Program. After three years, the facility had 93 percent fewer lost workdays

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<sup>15</sup> “Lifting teams [as opposed to individual lifters or mechanical systems] are necessary when certain factors, such as the medical condition of the patient, prohibit lifting by mechanical means.”

<sup>16</sup> A. Nelson, *et al.*, “Development and evaluation of a multifaceted ergonomics program to prevent injuries associated with patient handling tasks,” *International Journal of Nursing Studies* 2006, v.43, pp. 717-733.

<sup>17</sup> June Altaras, RN, in testimony before the Senate Committee on Health, Education, Labor, and Pensions, May 11, 2010, pp. 35-37.

<sup>18</sup> Most of this section extracted from “Safe Patient Handling in New York: Short term costs yield long term results,” submitted to the Assembly by Members Rory Lancman, Keith L.T. Wright, and Richard N. Gottfried, and Allison Weingarten, Legislative Director, Subcommittee on Workplace Safety, May, 2011.

due to resident handling injuries, and employee turnover decreased from 17 percent to 3 percent. While the facility cannot report workers' compensation savings, costs directly related to staff turnover decreased by 63.7 percent over these years.

Kaleida Health Network, based in Buffalo, is the largest healthcare provider in Western New York, with ten-thousand employees and one million patients per year. In October, 2004, the network began implementing a safe patient handling program, investing two million dollars. Among other equipment, Kaleida purchased "Sit/Stand Lifts and full mechanical floor lifts to ambulate patients up to 800 pounds," and "friction reducing devices, air mats and ceiling lifts for a comprehensive approach to moving a diverse group of patients." Kaleida saved enough in reduced patient-handling injury costs by 2007 to recoup this entire investment, and by 2011 the total savings amounted to \$6 million. Among nursing-home staff, there was a 62 percent reduction in patient-handling injuries from 2006 to 2007, and a 69 percent reduction in lost work days,<sup>19</sup> with a 77 percent reduction in lost work days over all of Kaleida's facilities.<sup>20</sup>

The Service Employees International Union Local 1199 started two pilot safe patient handling and moving programs in 2009, at Riverhead Care Center in Riverhead and at Saint James Healthcare Center in Saint James (more facilities were added in 2010). Joint labor-management committees implemented the programs, which involved purchasing the mechanical lifts. While the report cited here was too early to quantify results, "program participants, including labor, management and patients report that the SPHM has positively affected resident/patient care."

### **Estimating costs and benefits for statewide implementation of Safe Patient Handling**

To estimate the costs and benefits of statewide implementation, we used the results of several studies analyzing the various pilot projects implementing safe patient handling equipment.

There are about 57,000 hospital beds in New York State and 118,000 nursing home beds.<sup>21</sup>

Each of the programs cited in the literature summary in the earlier section reported explicitly on its costs and savings, with some differences in the amount of detail. Costs were sometimes expressed just as a total, without breaking out capital costs from training and other transition costs. Benefits, which could include savings in workers' compensation payments (or estimated reductions in future premiums), payments for injury-related lost work days, and reductions in turnover costs, were also sometimes reported only as totals. We used these data to estimate a range of credible costs and benefits, per hospital bed and per nursing home bed, for implementation of "zero lift."<sup>22</sup> Using estimated costs at implementation and (net) benefits per year afterward, we estimate an average length of time for institutions to recoup their initial investments.

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<sup>19</sup> W.F. Wieczorek, *et al.*, "New York State Safe Patient Handling Demonstration Project: Initial Results and Issues for Acute Care," Center for Health and Social Research, State University of New York at Buffalo

<sup>20</sup> New York State Zero Lift Task Force, at <http://www.csealocal1000.org/images/womachka/FACTSHEET4.pdf>

<sup>21</sup> The hospital bed estimate is based on news reports regarding the implementation of recommendations by the Commission on Health Care Facilities in the 21<sup>st</sup> Century and the fact that hospital employment has not changed materially since 2010. The nursing home bed figure is from the Centers for Disease Control and Prevention's 2012 *Health, United States* data book, Table 109.

<sup>22</sup> See the Appendix for technical details

While the data is very limited, and includes no estimates of indirect benefits,<sup>23</sup> we estimate the **cost of implementing Safe Patient Handling at \$1,275 per bed, and a savings of \$1,060 per bed per year in reduced worker injury and turnover costs, for a recovery period of only fifteen months. Savings would continue after the investment is paid for.**

After adjusting the number of hospital and nursing-home beds statewide for those that we know have already been converted to Safe Patient Handling, implementation would affect about 173,000 beds. Using the estimates from existing projects, then, statewide conversion would cost institutions about \$220 million. Institutions statewide could expect to save, in their first few years, an average of \$183 million per year, and, on average, to recover their gross investments in only fifteen months. Savings in reduced lost work time, workers' compensation, and turnover would occur beyond the payback period. In addition, immeasurable improvements in staff welfare and job satisfaction, and in patient safety and satisfaction are likely results. The retention of nurses will also benefit.

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<sup>23</sup> "indirect costs [reduced under SPH] have been estimated as high as five times the direct costs, though an estimate of twice the direct costs is an accepted measure" (Siddharthan et al, *op cit.*, p. 355)



## **Appendix: Technical details**

Since the cost assessments we reviewed for the programs implementing Safe Patient Handling were several years ago, we needed to adjust costs and benefits to current dollars in order to make them comparable.

Capital costs: No producer price index (which applies to institutional costs for capital equipment) for this type of equipment seemed to be available. Assuming that consumers' costs for durable medical equipment and institutions' costs would rise roughly in parallel, we used the Consumer Price Index for Medical Care Commodities<sup>24</sup> to adjust equipment purchase costs to 2012 dollars. Two of the experiments reported only total implementation costs, and these were adjusted with this index as well, on the assumption that capital equipment costs were the bulk of the total.

Some costs, especially those itemized as training, reflect employment costs, while all the available benefit (savings) data are essentially savings in employment costs (reduced workers' compensation payments, savings in lost work days, reduced turnover). To convert these dollar amounts to 2012 dollars required adjusting them according to an employer cost index. The closest data source we could find was the Total Compensation Index for Education and Health Services, starting in 2001.<sup>25</sup> For the projects initiated in 1996 and 1998, we adjusted to 2012 dollars using the 2001 index value,<sup>26</sup> while the other projects' benefits (and training costs) were inflated according to the year of implementation.<sup>27,28</sup>

Four of the experimental projects for which we have data took place in nursing homes and in spinal-cord-injury units in VA hospitals, which we treated as nursing homes (on the assumption that patient-handling needs would be similar to those in long-term care units). Since the costs and benefits in the fifth project were not reported separately for hospital and nursing home units, we kept this project (project "A") separate for this estimation step. The average implementation cost per bed for this group was \$703 (all dollars here are 2012 dollars), and the average benefit per year per bed after implementation was \$393. However, there was a noticeable increase in per-bed costs for the two projects implemented more recently (even accounting for the inflation adjustment); those two averaged \$929 per bed, with a moderately lower average benefit per year per bed of \$374.

The Centers for Disease Control, in its 2006 working paper on SPH<sup>29</sup>, said that, for conversion to mechanical lifts, "an effective combination of both floor and ceiling lifts is generally accomplished with a \$50,000 to \$60,000 investment per 100 bed facility." Using the intermediate \$550 per bed, and adjusting to 2012 dollars, gives us \$642 per bed for capital costs. Given that this does not include training and other conversion costs, and that we are attempting to estimate on the conservative side, we stay with the higher cost and lower benefit measures for nursing homes (rounded) of \$930 per bed cost and \$370 per year per bed benefit.

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<sup>24</sup> U.S. Bureau of Labor Statistics, Series CUSR0000SAM1

<sup>25</sup> U.S. Bureau of Labor Statistics, Series CIU10160000000001

<sup>26</sup> This will understate real benefits, and thus provide a conservative benefit/cost ratio.

<sup>27</sup> For project "A", in which benefits were averaged over 6 years, we used the average index for those years

<sup>28</sup> The index used for capital costs shows a 35% increase since 2001, while the employer cost index rose 38%.

<sup>29</sup> Centers for Disease Control and Prevention, *Safe Lifting and Movement of Nursing Home Residents*, February, 2006, at <http://www.cdc.gov/niosh/docs/2006-117/pdfs/2006-117.pdf>



Applying these estimates to the nursing homes in project “A,” we can estimate the costs and benefits for the hospital beds in that experiment (note that this experiment, by far the largest, may have had unusually high bulk-purchase discounts which we cannot adjust for). These calculations yield costs of \$1,690 per bed and benefits of \$1,960 per year per bed, for a very low investment recovery period of under a year.

For this reason, given the data limitations, we recalculate the costs and benefits by assuming that they are the same (per bed) for hospitals and nursing homes, now just using the four most recent projects for which we have per-bed data (2004-2008 implementations). This leads to an implementation cost estimate of \$1,275 per bed, and a benefit estimate of \$1,060 per year per bed, for a recovery period of 1.20 years (14.4 months), well within the range of recovery periods reported in these experiments.

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