

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

Supriya Lahiri

Professor, Department of Economics

Laura Punnett

Professor, Department of Work Environment

Saira Latif

Associate Professor

Department of Management

& CPH-NEW Team

University of Massachusetts Lowell, Massachusetts

2012 Total Worker Health Symposium Safe, Healthy and Cost-Effective Solutions, Marriott Hotel in Coralville, Iowa; November 29-30, 2012

Accepted for publication by the American Journal of Industrial Medicine (AJIM)





Contacts and Acknowledgements

University of Massachusetts Lowell

Sandy Sun

Email: Sandy_Sun@uml.edu

Tel: 978-934-3268

CPH-NEW general email:

CPHNEW@UML.EDU

CPH-NEW main website:

www.uml.edu/centers/CPH-NEW

University of Connecticut

Jeff Dussetschleger

Email: jdussetschleger@uchc.edu

Tel: 860-679-1393

University of Connecticut

CPH-NEW website:

<http://www.oehc.uchc.edu/healthywork/index.asp>

The Center for the Promotion of Health in the New England Workplace is supported by Grant Number 1 U19 OH008857 from the National Institute for Occupational Safety and Health. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of NIOSH.



Safe Resident Handling - for Residents and for Workers



Total Body Lift



Sit-Stand Lift



Photo credits: WA State Dept Labor & Industries; <http://www.invacare.com>

Objective

- To estimate the net economic costs of investments in a safe resident handling program (SRHP) intervention to reduce work-related morbidity in a chain of nursing homes
 - **Is there a business case for the SRHP?**

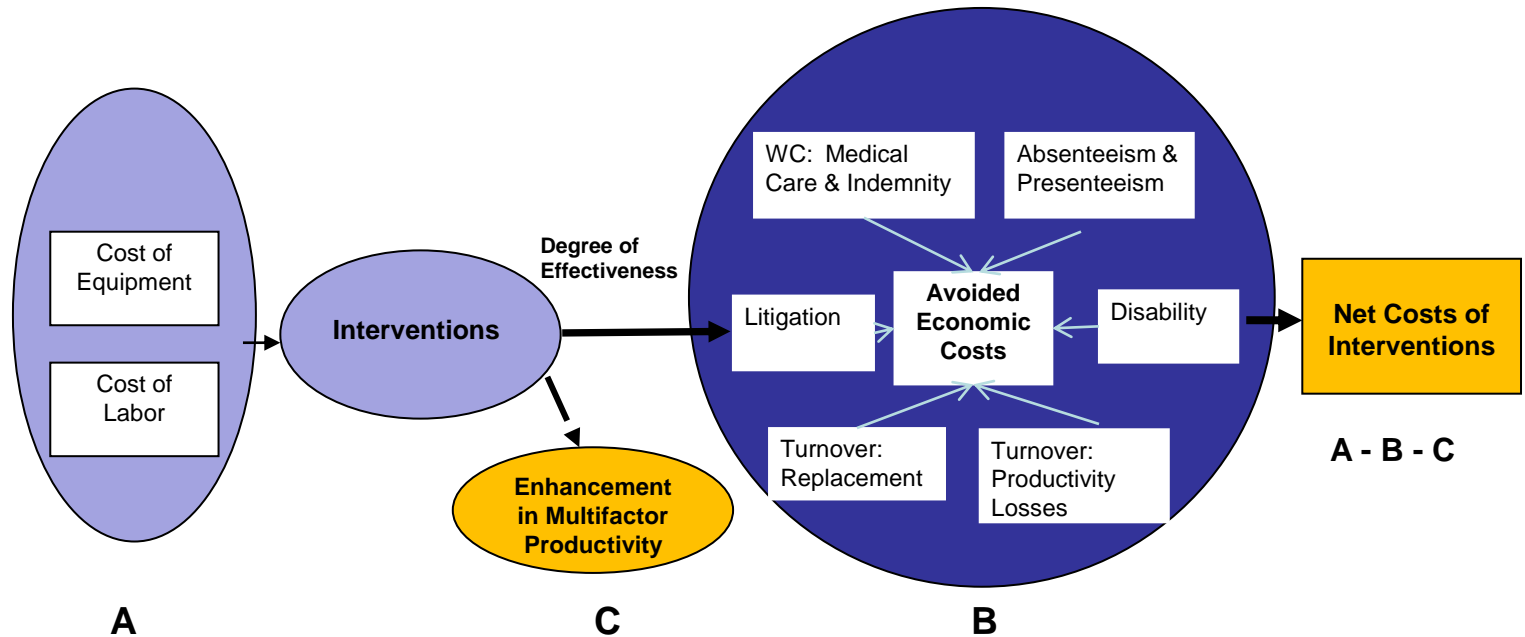


Introduction



- ⚙️ What are the relevant economic outcomes for the employer?
- ⚙️ The choice of the perspective on cost is an important methodological decision:
 - Which costs and effects to count and from whose perspective?
 - How to value them?



Model Framework for the Net-Cost Model



Computation of Net-Costs

-  **We estimate net-costs from the employer's perspective**
-  This is a chain of nursing homes that is **self-insured for workers compensation** insurance, hence, it is in the interest of the company to reduce injury costs



No-Lift Program Costs

Net-Costs of Intervention* =

Total intervention costs

- avoided medical care costs
- avoided productivity losses
- avoided employee turnover costs

* All estimates *annualized*

*Lahiri et al., 2005



Economic Outcome: Change in Workers' Comp. Medical Care Cost*

Avoided Medical Costs =


Pre-intervention WC medical costs

- Post-intervention WC medical costs

* All estimates *annualized*



Economic Outcome: Change in Workers' Indemnity Costs*

 Avoided Indemnity Costs =
Pre-intervention WC indemnity costs
- Post-intervention WC indemnity costs

* Proxies for estimating productivity losses

* All estimates *annualized*



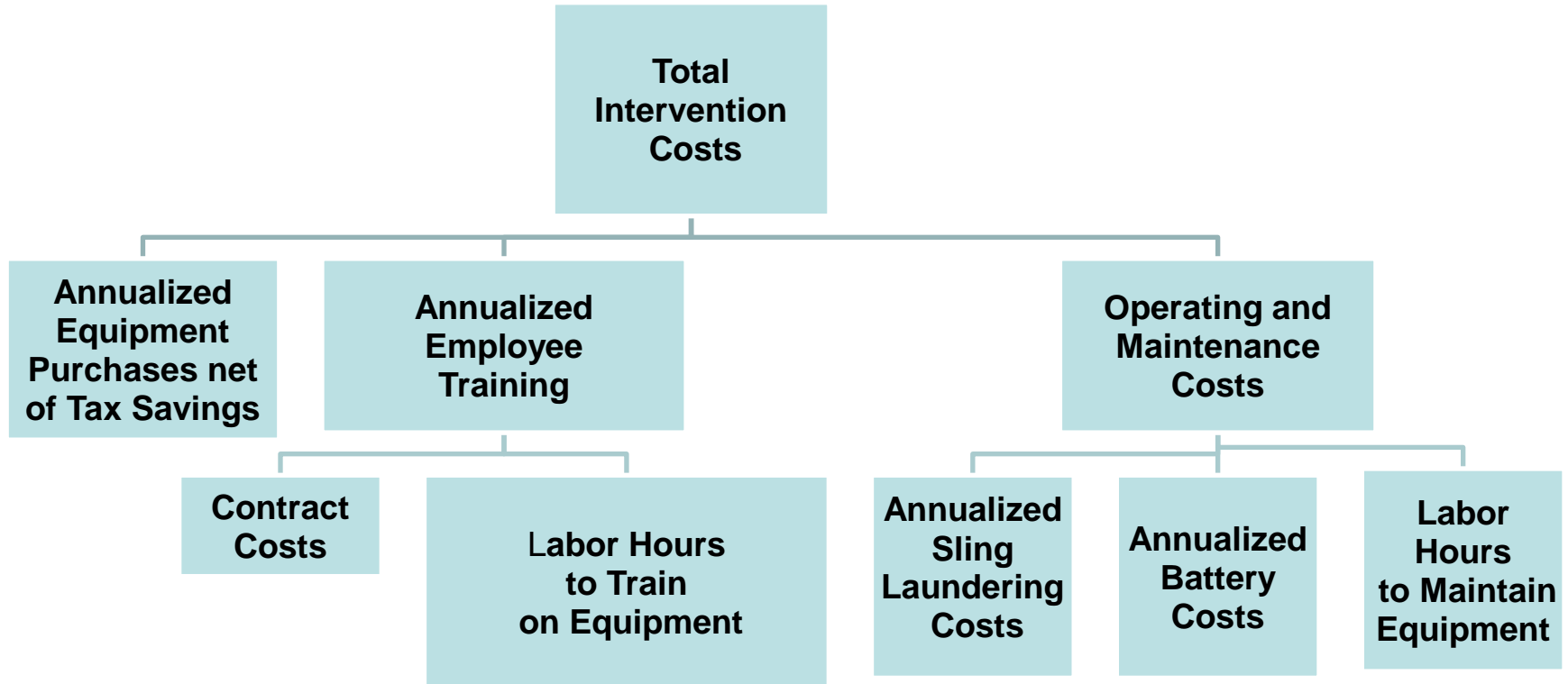
Economic Outcome: Changes in Turnover Costs*

Avoided Turnover Costs =
Pre-intervention turnover costs
- Post-intervention turnover costs

* All estimates *annualized*






Intervention Cost Components



**All Costs Adjusted to 2006 \$*



Data Collection & Management (1)

-  **Intervention implemented: Mar 2004 to Dec 2009, corporate-wide**
-  Data on intervention costs (SRHP) received for 120 centers
-  **Workers' compensation claims (2003-2009) and retention data (2003-2009) were identified by date as Pre- or Post-Intervention for each center**



Data Collection & Management (2)

- ⚙️ **WC data were disaggregated over individual claims (23,811 claims)**
- ⚙️ **110 centers (Business Units) had accrued at least 3 years post-intervention. They were selected for the final analysis**
- ⚙️ **Costs of Turnover for Nurses and Other Direct Care Workers were received from the company**



Economic Outcome: Retention/Turnover

- 🕒 **Did retention of employees improve after the intervention (vs. before)?**
- 🕒 The average annual retention increased across the 110 centers, although the results varied by site:
 - CNAs: +5.17%
 - LPNs: +4.14%
 - RNs: +3.19%
- 🕒 **How do we put a monetary value on improved retention?**



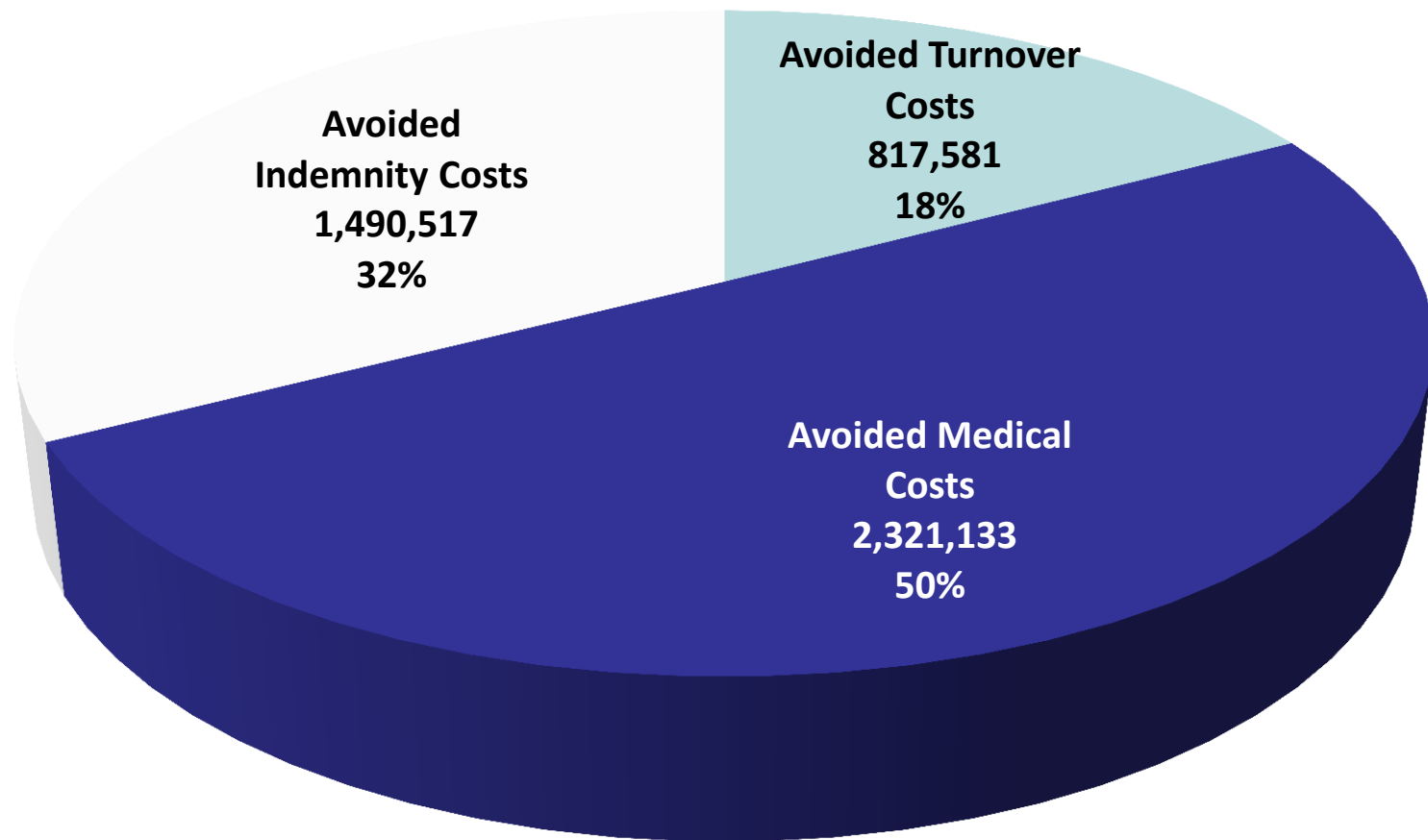
Costs of Turnover for Nurses and Other Direct Care Workers (obtained from the Company)

- ❁ Turnover cost estimates were provided by the Human Resources Office by state and job category
- ❁ In all categories, the company's estimated turnover cost did not exceed 34% of salary for that job category.



Components of Avoided Costs: Turnover, Medical Care, Indemnity

Using Turnover Cost Estimates from Company



Results Using Turnover Costs based on company estimates

- Analysis of net-costs by business unit (n=110):
- Total annualized intervention costs = \$2.740**
Total annualized **net savings = \$1.89 million**
Total annualized avoided costs = \$4.629 million
(Benefits)
- Average annualized **net savings per bed = \$143 (95% C.I. = \$22 – \$264)**
- Average annualized **net savings per full time equivalent (FTE) = \$ 165 (95% C.I. = \$22 –\$308)**
- Benefit to cost ratio =1.689**

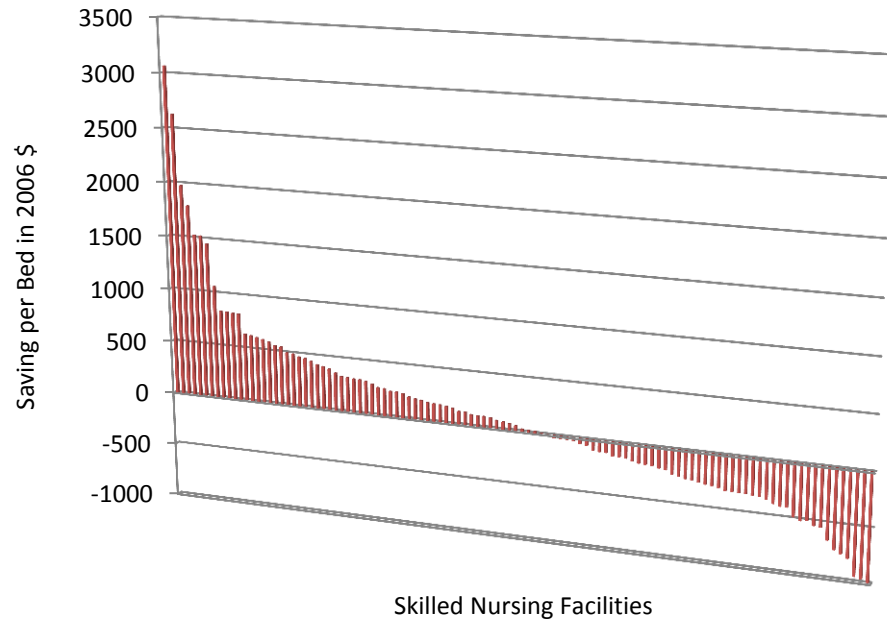


Payback Period

- ⌚ 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.



Annualized Net-Savings per bed over the different facilities



Efficacy of Intervention by Length of Post-intervention Period

Time post-intervention	Average net savings (per bed)	Avoided Workers Comp Cost (per bed)	Avoided Turnover Costs (per bed)
< 5 yrs (n=38)	\$83	\$205	\$67
≥ 5 yrs (n=72)	\$258	\$405	\$37



Economic Costs of Turnover based on Literature Estimates

- ❁ Nurse turnover rates, and the costs of nurse turnover are high for health care organizations (Waldman 2004, Jones 2004 ,Gray et. al 1996, Johnson 1999)
- ❁ Turnover is defined as any departure beyond organizational boundaries (Macy and Mirvis 1976, Cascio 2000)
- ❁ Turnover may be voluntary or involuntary



Costs of Turnover based on Economic Theory of Human Capital

- ⚙️ This method is based upon the economic theory of human capital that recognizes nurses as organizational assets with knowledge, skills and abilities that impact organizational productivity and performance
- ⚙️ Pre-Hire and Post-Hire Costs



Pre-Hire Costs

- Ⓜ **Advertising and Recruiting**
 - Recruitment Expenses (e.g. Ads, Job Fairs, recruitment personnel salaries etc.)
- Ⓜ **Vacancy**
 - ***Overtime***
 - ***Closed Beds***
 - ***Lower Productivity of Substitutes***
 - ***Productivity Losses of Permanent Staff***
 - ***Patient Deferrals***
- Ⓜ **Hiring**
 - **Interviewing personnel time, salaries, and expenses**
 - **Employment processing**
 - **Sign-up Bonuses**
 - **Search-firm costs**
 - **Background checks**



Post-Hire Costs

- 🕒 **Orientation and Training**
- 🕒 **Decreased new RN productivity**
- 🕒 **New RN productivity during learning period**
 - **Supervisor/co-worker productivity**
- 🕒 **Decreased pre-turnover productivity**
 - **Departing worker**
 - **Supervisor/co-worker productivity**
- 🕒 **Termination (exit interview, early retirement etc)**

- 🕒 **Pre-Hire Costs: 80%-86% of total**
- 🕒 **Post-Hire Costs: 14% to 20% of total**
- 🕒 **Vacancy costs were the single largest category of costs (72%-78%)**



Costs of Turnover for Nurses and Other Direct Care Workers (Based on Literature)

Conservative Rule of Thumb:

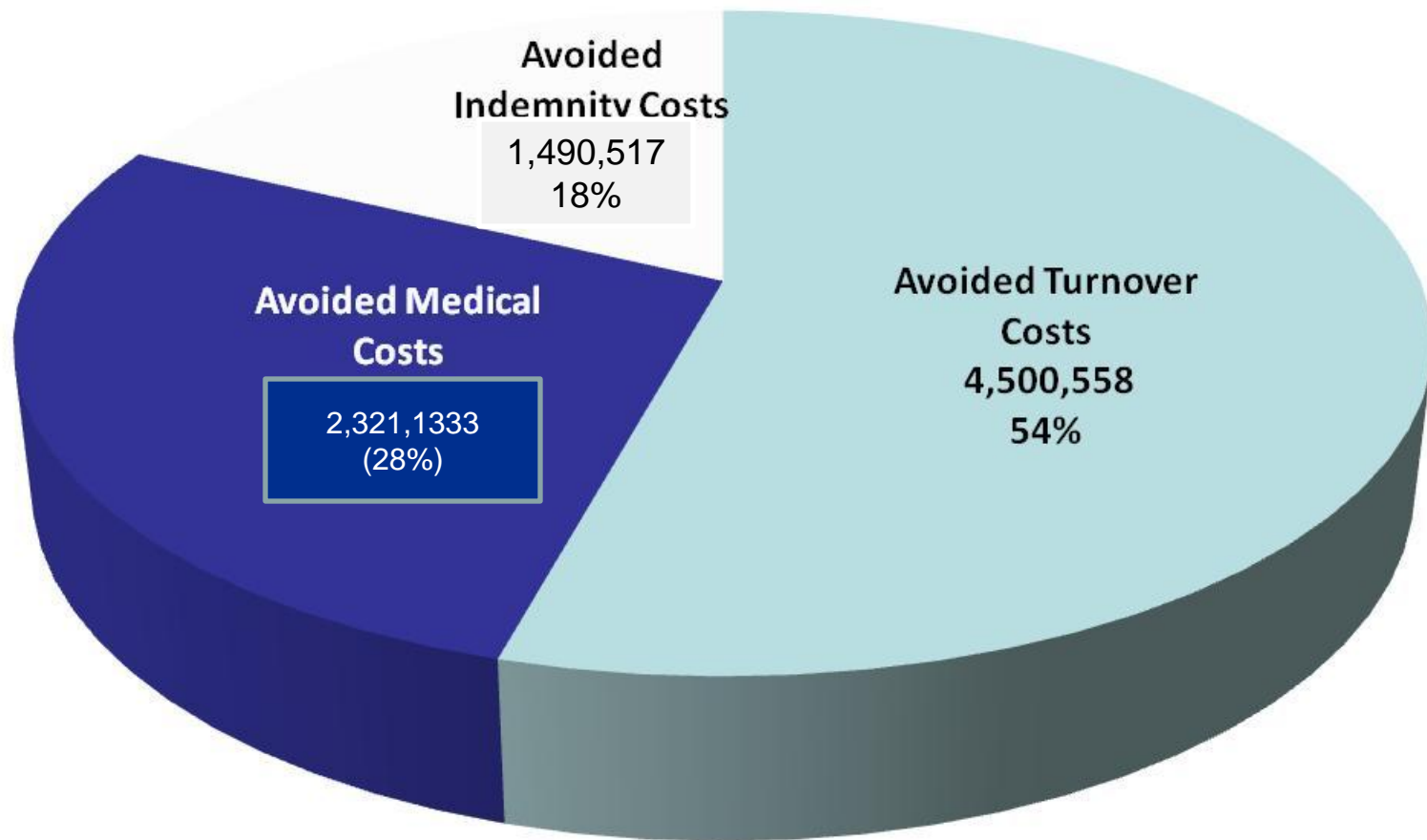
Ratio of turnover costs to annual wages =

- 1.00 for RNs (Jones 2004, VHA 2002)
- 0.25 for other direct care workers (Seavey 2004, Employment Policy Foundation 2002)



Components of Avoided Costs: Turnover, Medical Care, Indemnity

Using Turnover Cost Estimates from Literature



Discussion (1)

- ⚙️ The net-costs were estimated from the employer's perspective, using data at the facility level
- ⚙️ There was substantial variability in net-costs/bed among the facilities
- ⚙️ A longer time post-intervention seems to enhance the effectiveness of the intervention with respect to avoided costs of workers comp and turnover costs
- ⚙️ Workers Comp. costs – both medical and indemnity – are likely underestimates of the true losses





Discussion (2)

- ❁ Turnover cost was an important determinant of the magnitude of net costs of intervention for the employer
- ❁ There is, however, considerable uncertainty around the turnover costs, with a wide range of estimates in the literature
- ❁ Turnover studies across different organizations suggest that lower turnover can be expected to enhance organizational productivity, in line with Human Capital theory



Conclusions

-  **Overall, the ergonomics intervention resulted in net savings through avoided costs of workers compensation and turnover**
-  **OSH interventions could prove to be effective retention strategies that warrant further research**



Future Work Plans

- ⚙️ Modeling of the **inter-facility variability** in net costs
- ⚙️ **Analyze data at the respondent level** (surveys in 18 centers) to explain variability in SRHP effectiveness
- ⚙️ Prospective studies to **estimate turnover costs** of nursing home employees
- ⚙️ **Impact of an integrated health promotion (HP) and SRHP** on efficacy
- ⚙️ Apply the Net-Cost Model from **each stakeholders perspective**



References (1)

- Drummond Michael F., O'Brien B., Gerg L. Stoddart, Torrance George W. Methods for the Economic Evaluation of Health Care Programmes. Second Edition, Oxford University Press, New York 2004.
- Gold Marthe R., Siegal Joanne E., Russell Louise B., Weinstein Milton C. editors: Cost-Effectiveness in Health and Medicine, New York, 1996.
- Cherniack Martin, and Lahiri Supriya, **Barriers to Implementation of Workplace Health Interventions: An Economic Perspective** forthcoming The Journal of Occupational Health and Environmental Medicine, September 2010
- Lahiri Supriya, Cherniack Martin. Cost Utility Models for Supporting Prevention through New Reimbursement Methods: A Framework. Session on Prevention and Health Care Insurance: New Paradigm for Reimbursement. NIOSH WorkLife2007 Conference.
- Lahiri Supriya, Gold Judith, Levenstein Charles. Estimation of net-costs for prevention of occupational low back pain: Three case studies from the US. Am J Ind Med 2005 Nov 18;48 (6):530-541.
- Macy, B. A., Mirvis, P. H. Measuring the quality of worklife and organizational effectiveness in behavioral economic terms. Administrative Science Quarterly 21, 212-226
- Lahiri Supriya, Gold Judith, Levenstein Charles. Net-cost model for workplace interventions. J Safety Res 2005 ;36 (3):241-55.



References (2)

- Cascio Wayne F. Costing Human Resources: The Financial Impact of Behavior in Organizations. Fourth Edition, Southwestern College Publishing, United States 2000
- Waldman J. Dean, Kelly Frank, Arora Sanjeev, Smith Howard. The Shocking Cost of Turnover in Health Care. Health Care Management Review, January-March 2004. pp 1-7
- Jones Cheryl B: The Cost of Nurse Turnover, Part 1: The Economic Perspective. J Nursing Administration 34 (12): 562-570, 2004.
- Jones Cheryl B: The Cost of Nurse Turnover, Part 2: Application of the Nursing Turnover Costs Calculation Methodology. J Nursing Administration 35(1): 41-49, 2005.
- Gray A. M., Phillips V. L., and Normand C. The Costs of Nursing Turnover: Evidence from the British National Health Service. Health Policy 38. 1996. pp 117-28
- Johnson L. Cutting Costs by Managing [Nurse] Turnover. Balance. September/October 1999. pp 21-3



References (3)

- Jones Cheryl B: Staff nurse turnover costs: Part II, Measurements and results. J Nursing Administration. 20(5): 27-32, 1990
- Wise L. C.. Tracking turnover. Nursing Economics. Volume 8, Number 1. pp 45-51.
- Advisory Board Company. A misplaced focus: reexamining the recruiting/retention trade-off. Nursing Watch. Volume 11. pp 1-14
- Seavey Dorie: The cost of Frontline Turnover in Long-Term Care:, Better Jobs Better Care, 2004). pp 1-32
- VHA. The business case for workforce stability. Available at: <https://www.vha.com/research/public/stability.pdf>. 2004
- Employment Policy Foundation. Employee Turnover – A Critical Human Resource Benchmark. hr benchmarks, Washington, DC: Employment Policy Foundation. www.epf.org/research/newsletters/2002/hb20021203.pdf
- Ross Stephen, Westerfield Randolph, Jeffery Jaffe, and Jordan Bradford. Corporate Finance: Core Principles and Applications. McGraw-Hill/Irwin., United States. 2007. pp 29

