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Evaluation of a Safe Resident Handling Program in U.S. Nursing Homes

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“[Heathcare and Social Assistance] is burdened by the historical and entrenched belief that patient care issues supersede the personal safety and health of workers and that it is acceptable for HCSA workers to have less than optimal protections against the risks of hazardous exposures or injuries.”

Identification of Research Opportunities for the Next Decade of NORA: State of the Sector | Healthcare and Social Assistance. NIOSH Publication No. 2009-138.

Background

- Employees in healthcare and social assistance have among the highest rates of workplace injuries among U.S. workers
  - Many back and other MSDs due to heavy lifting of patients/residents.

- The past 30 years of occupational health and safety literature has reported on the hazards of patient handling…

yet the hazards persist!

Safe Resident Handling Program Implemented in 2004-2006

vs.

Photo credits: 1: WA State Dept Labor & Industries; 2,3: http://www.invacare.com

Background

- It's been shown that buying equipment isn't always sufficient
- Why do programs sometimes work, but not always?
  - There is a gap in research-to-practice
  - Some is related to policy issues (e.g. what facilities want to invest in)
  - We were interested to find out if there were scientific reasons too

Project Timeline

Pre-SRHP
(up to 3 years)

Baseline

3 mos.

1 year

2 years

3 years

5+ years

SRHP Intervention

Program Handoff

Evaluation Methods

1) Review of ergonomic exposures from direct observations of nursing aides, pre- and three years post-SRHP
2) Calculation of injury rates and recurrences from workers' compensation claims (WCC) three years pre- and six years post-SRHP
3) Longitudinal analysis of up to six years of low back pain (LBP) reports from surveys of clinical staff
4) Evaluation of return-on-investment up to six years post-SRHP
5) Evaluation of factors associated with equipment use

Evaluation of Ergonomic Exposures following a Safe Resident Handling Program

vs

Baseline — 3 m — 1 yr — 2 yrs — 3 yrs

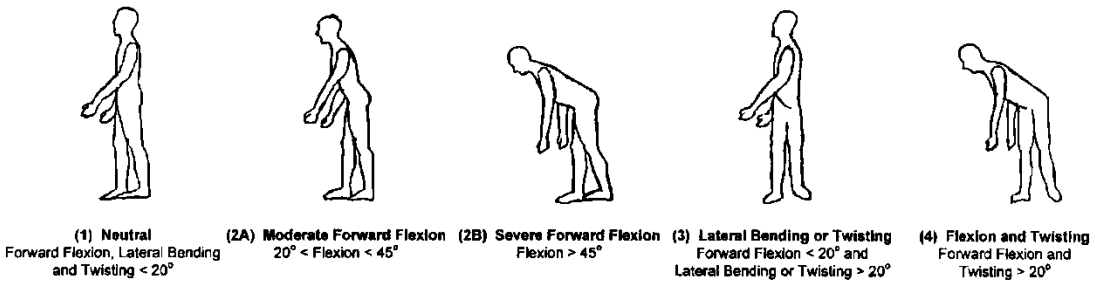
SRHP Intervention

n = 12 nursing homes

Direct Observations of CNA's

Exposure Categories:

- Trunk, arm, and leg postures
- Weight in hands
- Lifting equipment (yes/no)

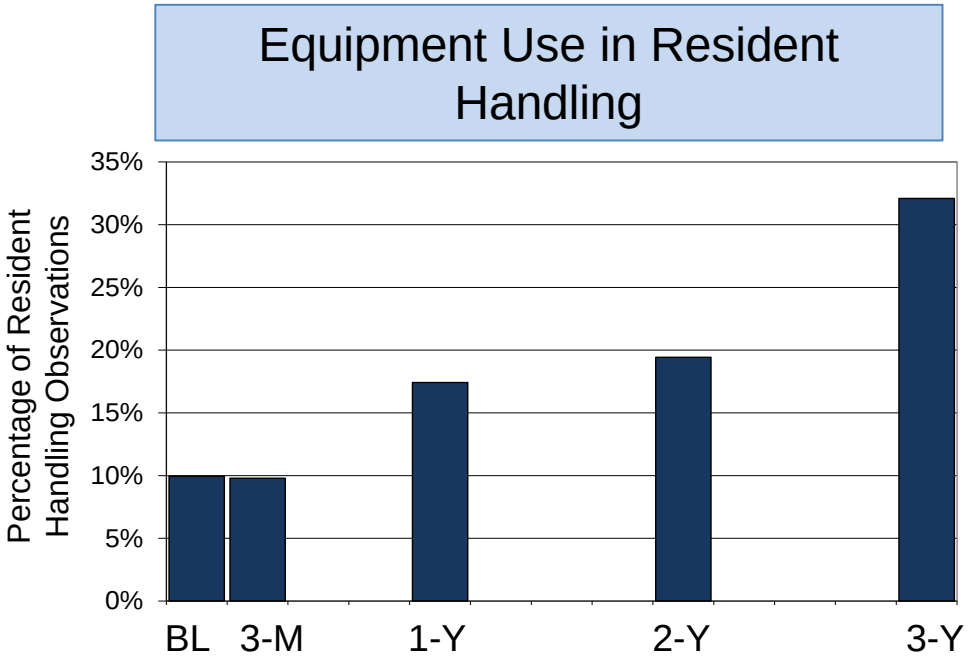


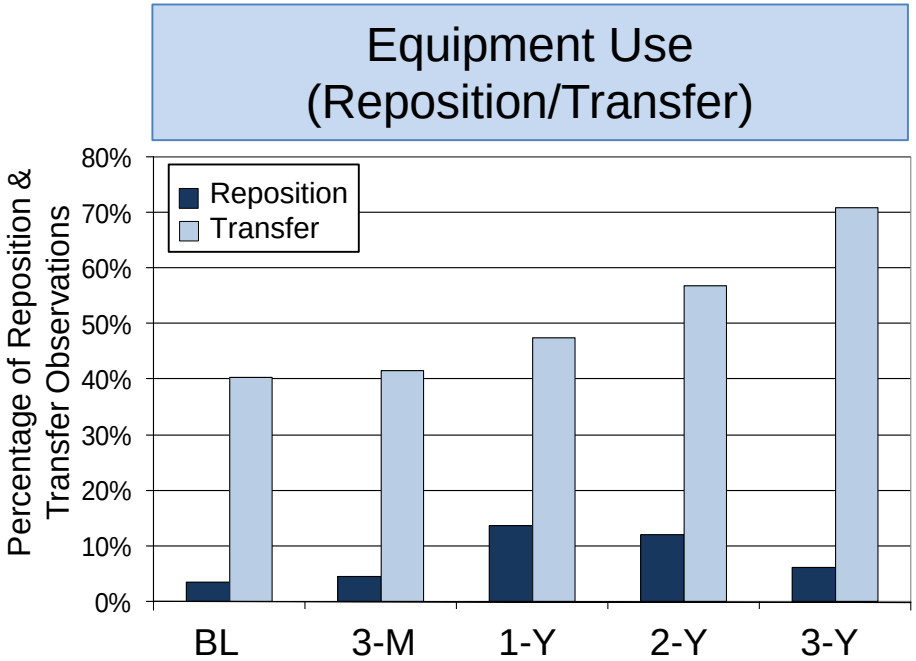
	Baseline (Pre-SRHP)	3 m post-SRHP	1 yr post-SRHP	2 yrs post-SRHP	3 yrs post-SRHP
Total Obs. Periods	60	56	100	88	57
Total Obs. Moments	15,185	16,031	25,472	24,652	17,365

Kurowski et al. 2012

Equipment Use Before/After SRHP

(% of investigator observations)





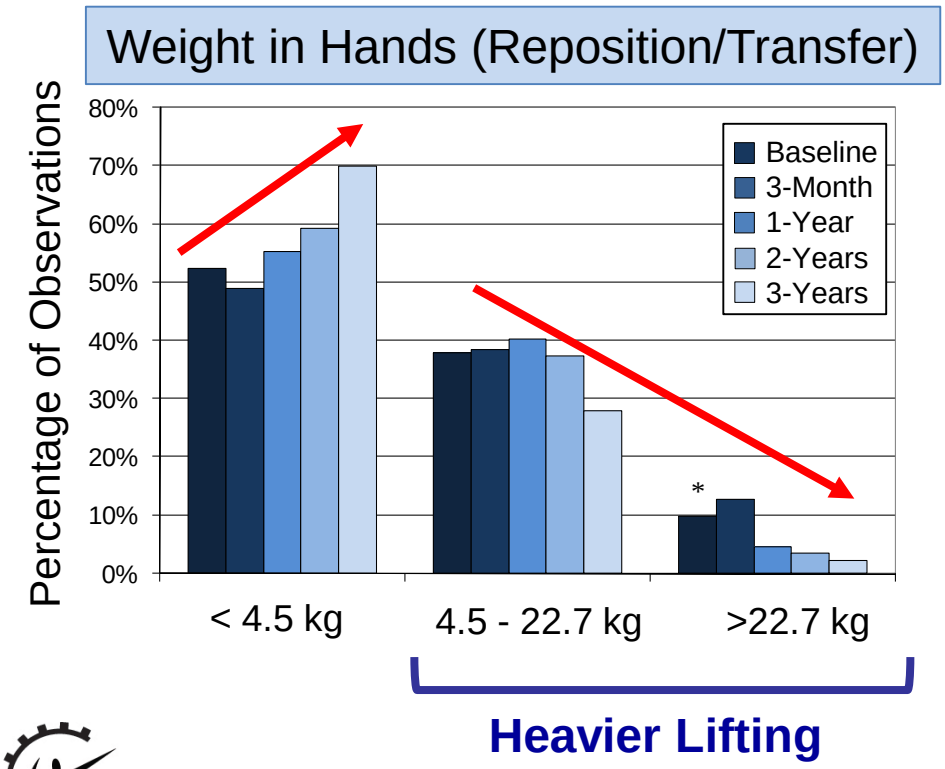
Resident Handling Activities: Ambulation assist, reposition, transfer & transport

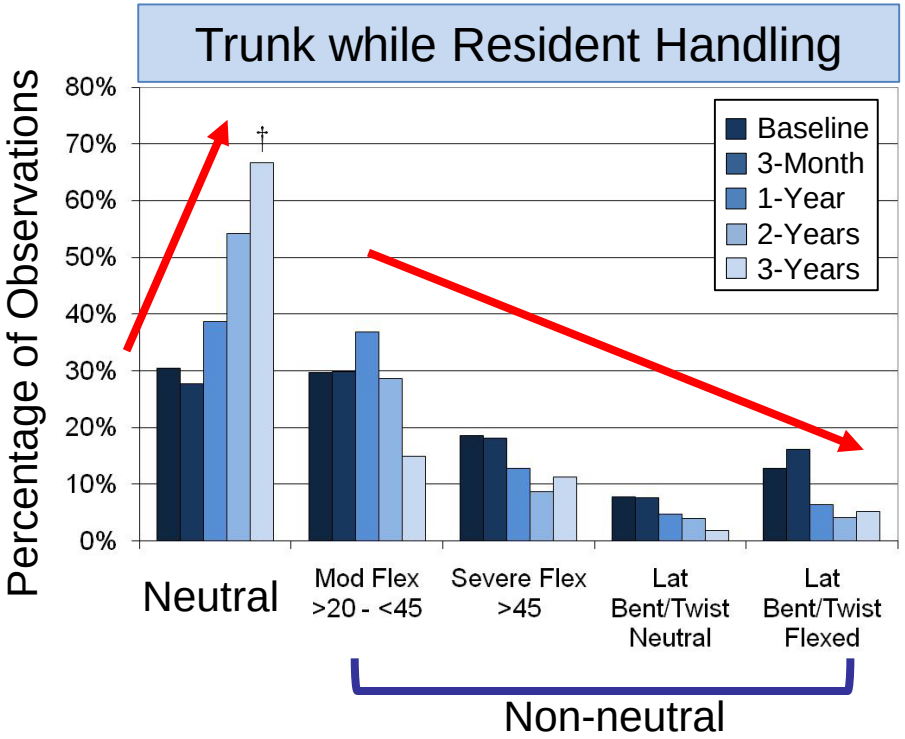
Equipment: Total body lifts, sit-stand lifts, slings, slideboards, slipsheets, gait-belts

Kurowski et al. 2012

Weight Handled & Trunk Posture before/after SRHP

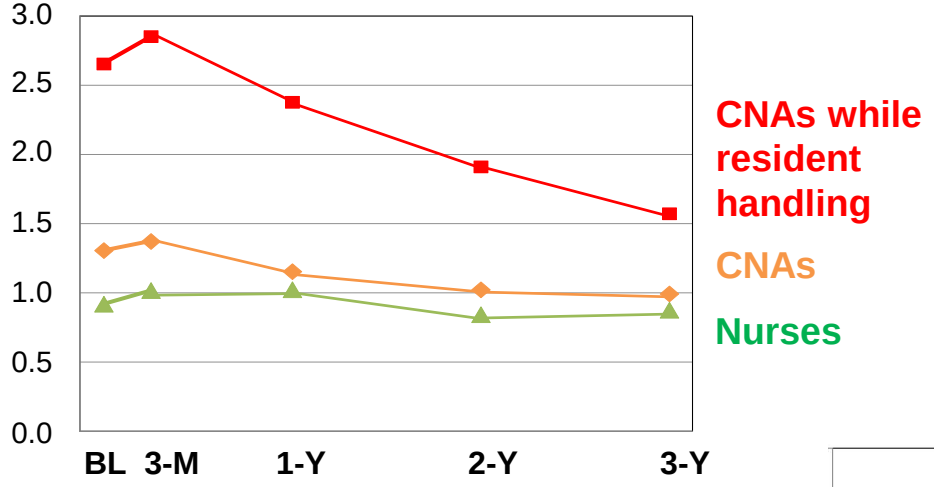
(% of investigator observations)





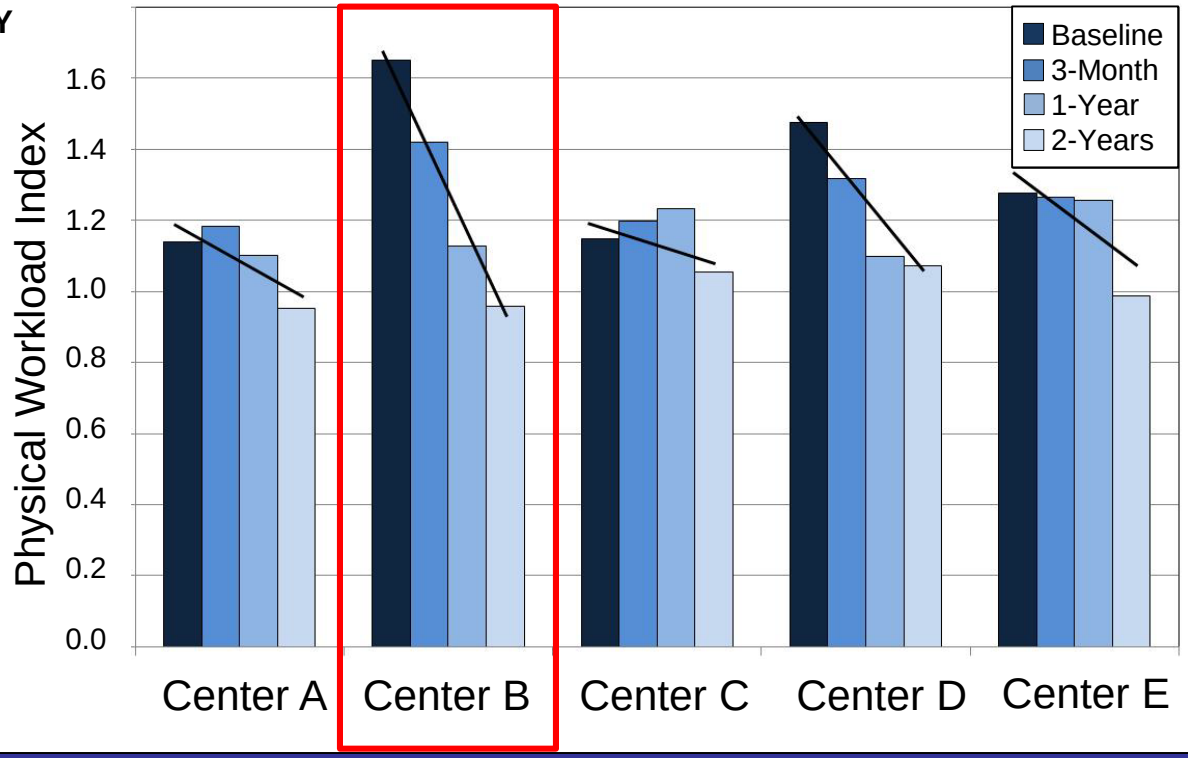
Kurowski et al. 2012

Physical Workload Index



Kurowski et al. 2014

Variability among Centers in Physical Workload Index (Nursing Aides)



Center B (largest decrease in physical workload) had many positive work organizational features:

- less time pressure,
- good communication,
- more access to equipment

Kurowski et al. 2012b

Reductions in Workers' Compensation Claims

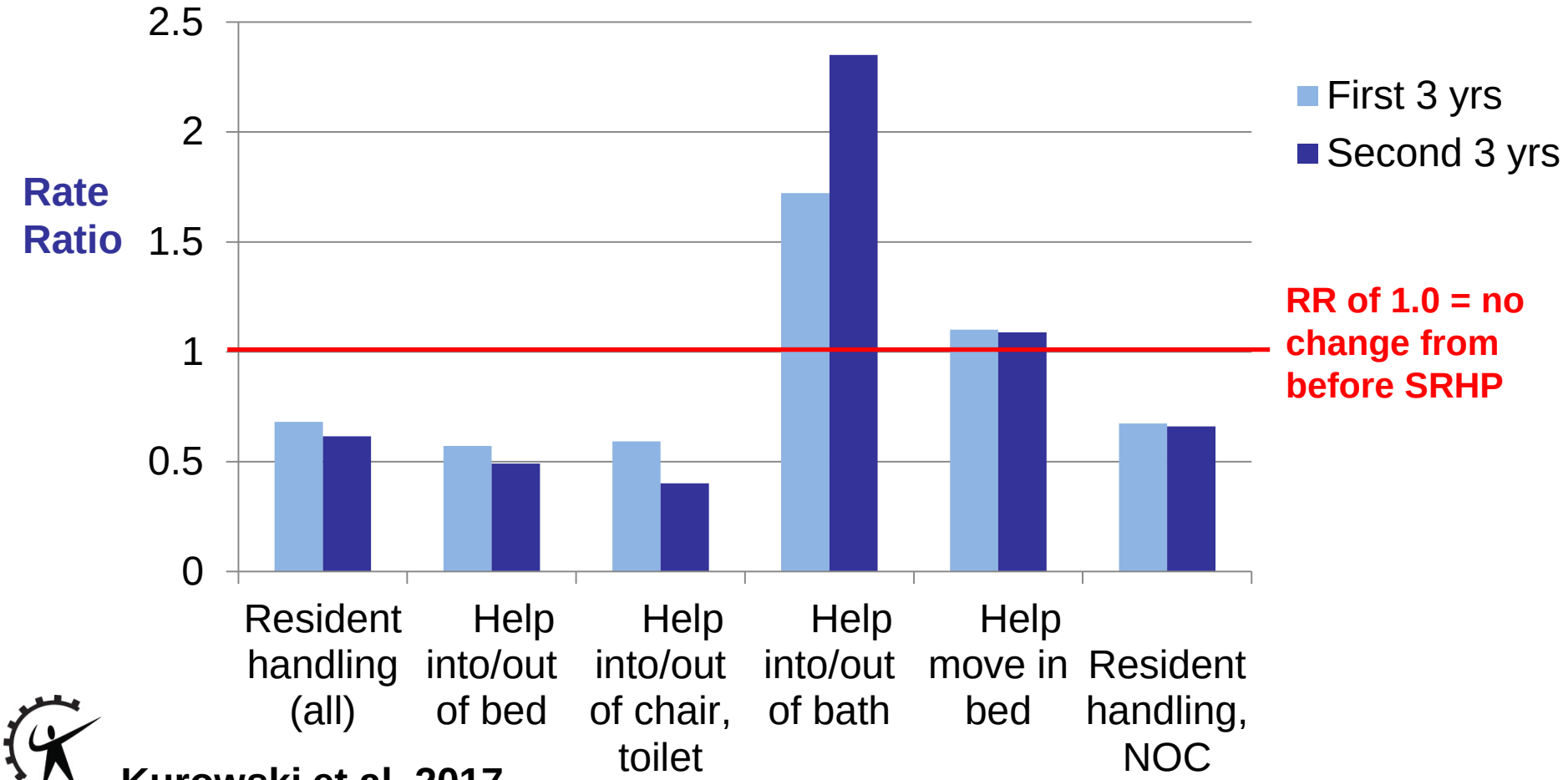
vs

Variable (up to 3 years)	3 years	3 years
PRE	POST 1 Third Party Managed	POST 2 Individual Centers Managed

SRHP Intervention

n = 136 nursing homes

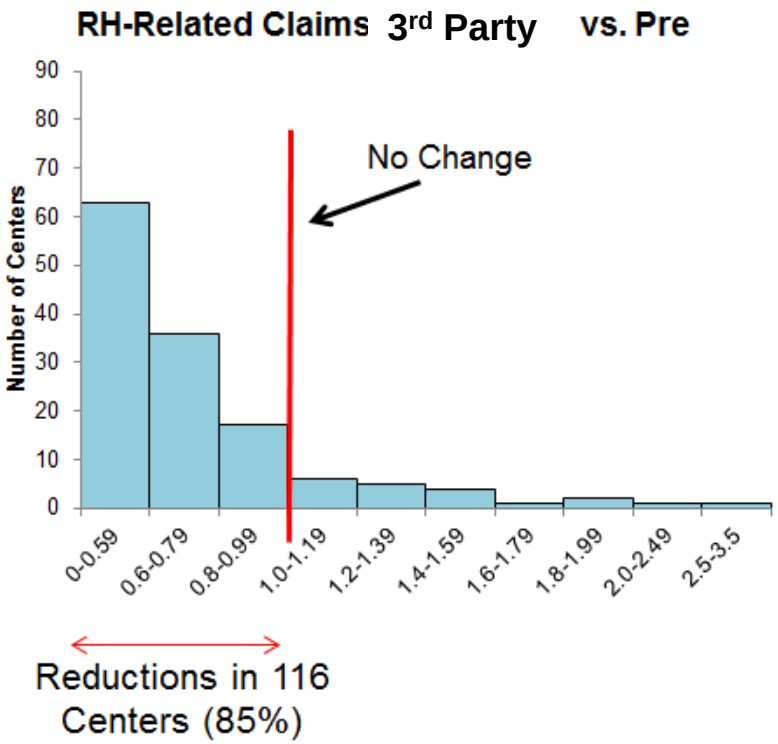
Workers' Compensation Claims for Resident Handling Incidents Before/After SRHP Implementation



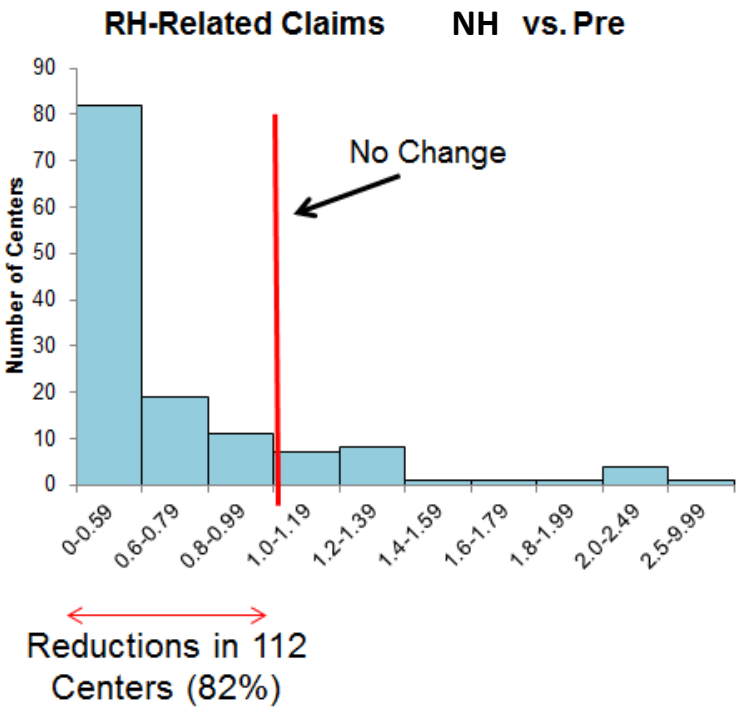
Kurowski et al. 2017

Changes in Resident Handling Claim Rates by Center

POST 1



POST 2



Variation partially explained by: Wellness Program Status, Unionization, LPN turnover (pre-SRHP) **Kurowski et al. 2017**

Return-to-Work Outcomes for Injured Workers

vs

3 years	3 years	3 years
PRE	POST 1 Third Party Managed	POST 2 Individual Centers Managed

SRHP Intervention

n = 136 nursing homes

Length of Disability

All lost time claims (n = 3263)

	Mean Length of First Episode of Disability (with 3 day gaps) for Lost-time claims		
	PRE	POST1	POST2
RH-related lost time claims *	146.2	123.2	85.9
Non-RH-related lost time claims *	134.2	124.8	102.5
RH-related lost time back claims *	138.8	123.7	83.6
Non-RH-related lost time back claims	178.7	149.9	126.8

* Significant decrease

Lost time claims with **6 months or less LOD only** (n = 2811)

	Mean Length of First Episode of Disability (with 3 day gaps) for Lost-time claims		
	PRE	POST1	POST2
RH-related lost time claims	29.2	29.6	32.7
Non-RH-related lost time claims	35.1	32.7	33.9
RH-related lost time back claims	28.6	28.7	30.5
Non-RH-related lost time back claims *	38.3	35.2	25.8

* Significant decrease

Recurrent Injuries

< 6 MONTHS of disability Numbers and % of recurrent claims	Pre-SRHP	First Post Period	Second Post Period
RH-related lost time claims *	157 (33%)	101 (30%)	78 (24%)
Non-RH-related lost time claims	161 (30%)	163 (29%)	164 (28%)
RH-related lost time back claims	69 (28%)	53 (33%)	41 (25%)
Non-RH-related lost time back claims	26 (31%)	38 (38%)	39 (39%)

- Mean paid indemnity and medical costs were about 3 times higher for claimants with recurrence
  - RH claims with recurrence
  - RH Back claims with recurrence

Predictors of Low Back Pain among Clinical Staff

vs

Baseline

1 yr

2 yrs

5+ yrs

SRHP Intervention

n = 8 nursing homes

Prevalent & Incident Low Back Pain

- In the past 3 months, have you had musculoskeletal symptoms in the low back?
  - Any LBP (yes/no)
  - At least mild severity during the previous week

- "Incidence" required no LBP in any prior survey

	Prevalence		Incidence ("New LBP")	
Survey period	Total eligible, n	% (n)	Total eligible, n	% (n)
Baseline	805	42.7 (344)	--	--
1 Year	1407	41.0 (577)	307	23.5 (72)
2 Years	1154	37.4 (431)	348	16.7 (58)
5+ Years	2409	35.9 (865)	228	22.4 (51)

Gold et al. 2016

Poisson Regression Modeling

- **LBP prevalence at 2 years** was associated with:
  - Less frequent use of handling equipment
  - Higher physical exposure score
  - Higher psychological job demands
  - Less social support
  - More physical assault
  - Previous back injury in prior 12 months
  - Less frequent physical exercise
  - Younger age
- **LBP incidence (new LBP) at 5+ years** was associated with:
  - Less frequent prior handling equipment use
  - Lower work-family balance

Gold et al. 2016

Economic Analysis of a Safe Resident Handling Program

vs

Variable (up to 3 years)

Variable (at least 3 years)

PRE

POST

SRHP Intervention

n = 110 nursing homes

Analysis of Annualized Net Costs

• Total Avoided Costs	$4.63 million
– Total Intervention Costs	$2.74 million
= Total Net Savings	$1.89 million

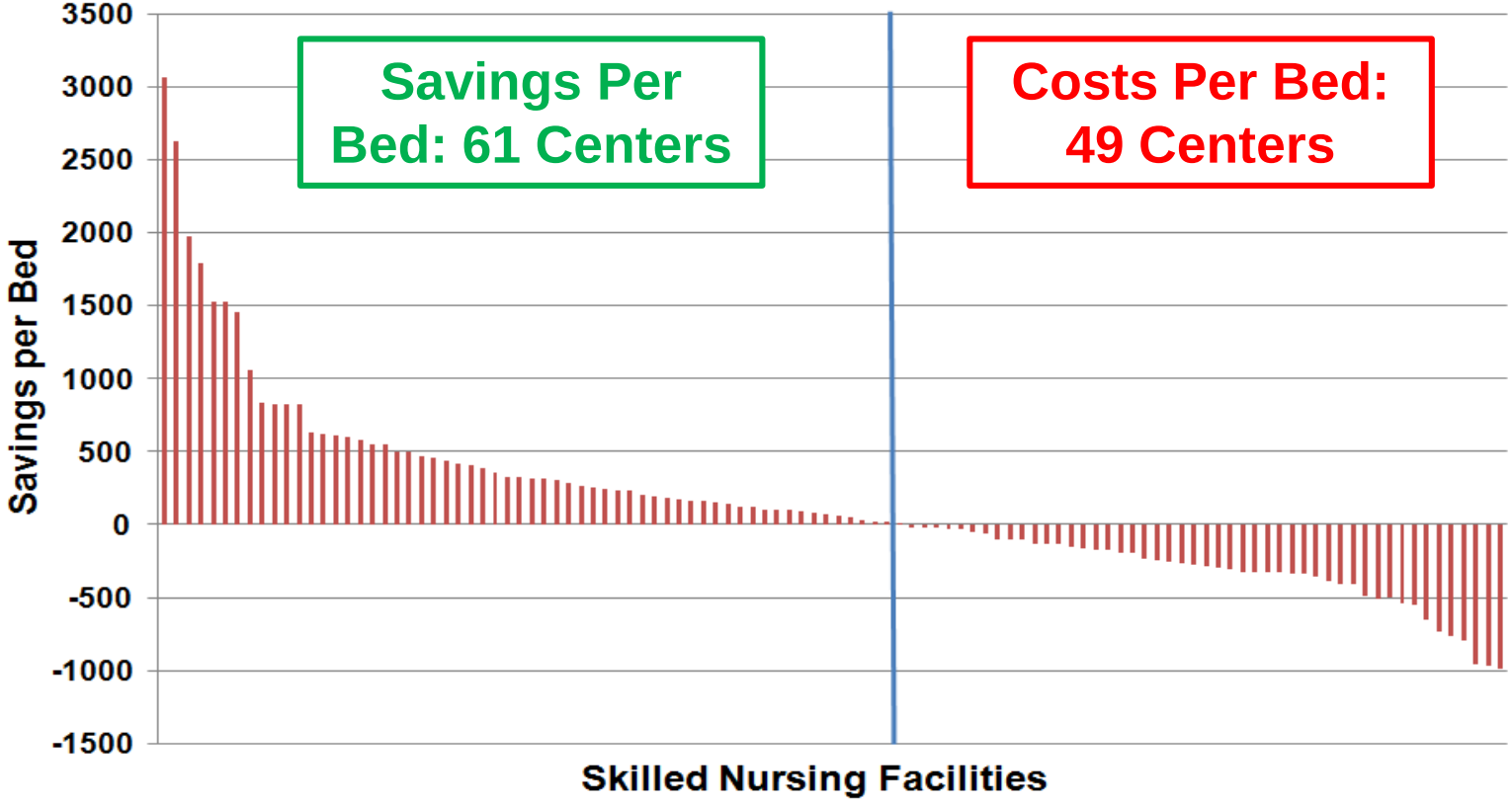
• Average Net Savings Per Facility	$17,182
• Average Net Savings Per Bed	$143

- Benefit to cost ratio = 1.7
  - For every $1 spent, $1.70 is saved

Lahiri et al. 2013

Variation in Savings/Costs by Center

Average net savings = $143 per bed per year



Lahiri et al. 2013

Safe Resident Handling Equipment: Frequency of and Barriers to Consistent Use

vs

Baseline

3 m

1 yr

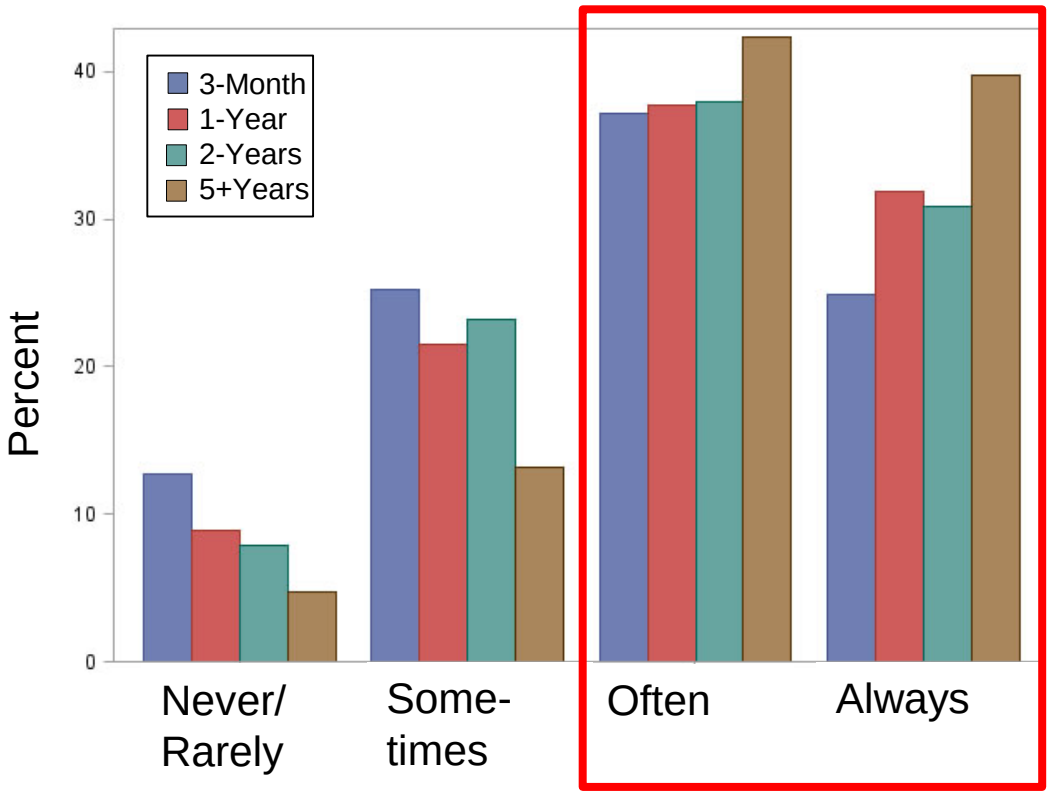
2 yrs

5+ yrs

SRHP Intervention

n = 5 nursing homes

Frequency of Resident Handling Equipment Use Reported by CNAs



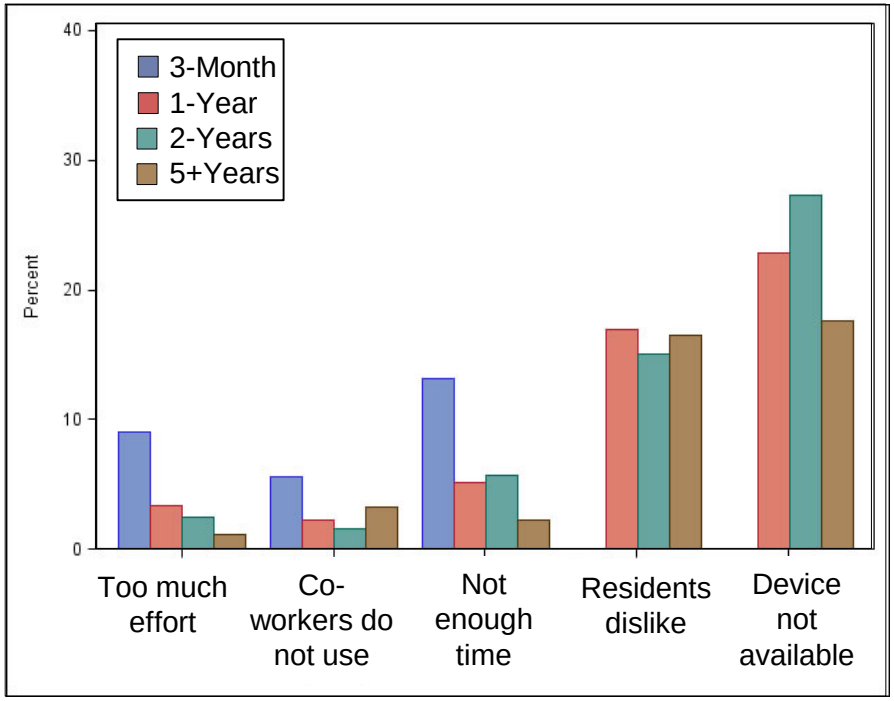
At least 2/3 respondents

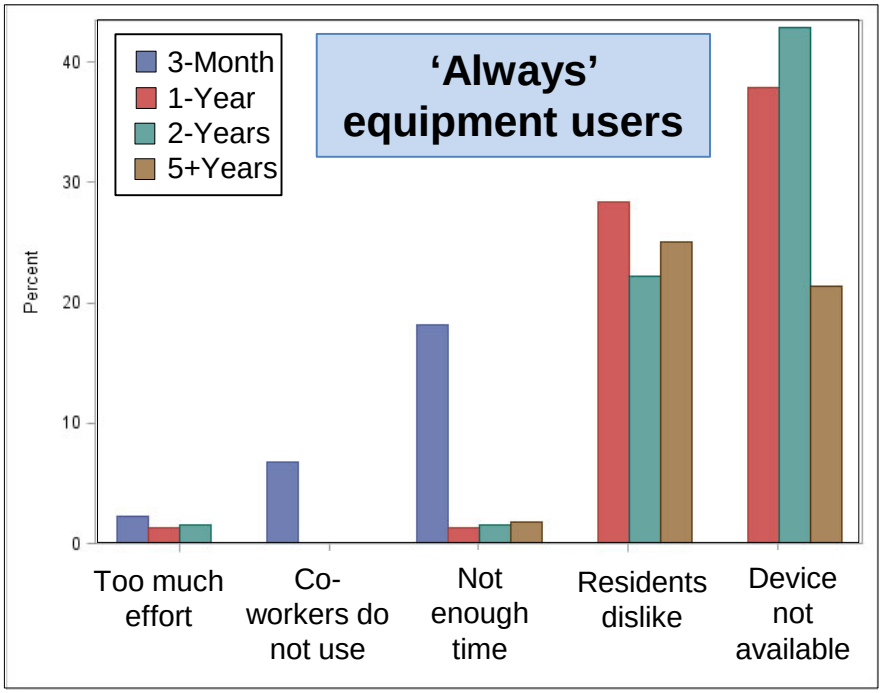
Kurowski et al. 2016

Factors Related to Increased Equipment Use

- Higher SRHP commitment
- Higher SRHP prior expectations
- Lower workplace assault
- Older age
- Higher health self-efficacy
- Lower supervisor support

Reasons for not using Resident Handling Equipment





Barriers to consistent use should be addressed

- Attention to device availability and maintenance
- Education of residents & family members

Kurowski et al. 2016

Some SRHP Expectations Confirmed

- **Ergonomic exposures** were reduced
  - Increases in use of handling equipment, handling lighter loads, and neutral postures
- **Physical workload** for nursing assistants decreased, particularly while handling residents
- **Rates of workers' compensation claims** were reduced (and sustained) following the SRHP
- **Cost savings** was observed following the SRHP

However, we observed wide variation in outcomes in multiple analyses…

Physical Assault

- Employees reporting more frequent physical assault were also less likely to report frequent equipment use (Kurowski, 2016).
- Separate analysis showed associations with single site and multi-site musculoskeletal pain (Miranda, 2011) and low back pain (Gold, 2016)
- If an employee was assaulted by a resident while using equipment, they would be less likely to use equipment with that resident in the future.

Use of Handling Equipment

- Less frequent equipment use results in manual transfers, possibly leading to MSDs, as observed in the study of low back pain (Gold, 2016)
  - Use of lateral transfer devices should be encouraged, since use was infrequent (Kurowski, 2012) and increases in injuries related to moving residents in bed were observed (Kurowski, 2017)
- One of the main reasons CNAs reported not using equipment was due to residents' dislike (Kurowski, 2016)
  - Attention should be paid to resident/family education programs to alleviate residents' dislike of equipment

Adequacy of Equipment

- Employee satisfaction with the adequacy of supplies and equipment was associated with reduced physical workload (Kurowski, 2012b) and also higher cost savings.
- Reduced physical workload due to increased equipment use can be plausibly linked to lower injury rates and turnover, leading to higher cost savings for those centers.

Wellness Program Status

- Centers with more developed wellness programs also generally had higher cost savings following the SRHP (Lahiri, 2013) as well as lower risk of injury rates (Kurowski, 2017)
- It is possible that centers that committed to employee wellness also have other positive organizational features, which led to more effective SRHPs
  - Better social support; lower intention to leave job

Conclusions

- SRHP did not improve use of lateral transfer devices
- Even well-developed SRHP had different outcomes in different centers
  - Related to work environment characteristics
  - Commitment to SRHPs is an important factor in staff's equipment use
- It may take time for a SRHP to show a reduction in low back pain symptoms
  - Back pain is inherently recurrent, and the SRHP may have contributed to reductions in recurrent back claims

Selected Publications

1. Gold J, et al. [2016] Predictors of low back pain in nursing home wokres after implementation of a safe resident handling programme. Occupational and Environmental Medicine Published Online First: 10 November 2016.
2. Kurowski A, et al. [2012] Changes in ergonomic exposures of nursing assistants after the introduction of a no-lift program in nursing homes. International Journal of Industrial Ergonomics 42:525-532.
3. Kurowski A, et al. [2012b] Differences among nursing homes in outcomes of a safe resident handling program. Journal of Healthcare Risk Management 32(1):35-51.
4. Kurowski A, et al. [2014] A physical workload index to evaluate a safe resident handling program for clinical staff in nursing homes. Human Factors 56(4):669-683.
5. Kurowski A, et al. [2016] Use of resident handling equipment by nursing aides in long-term care: associations with work organization and individual level characteristics. American Journal of Safe Patient Handling and Movement 6(1):16-24.
6. Kurowski A, et al. [2017] Injury rates before and after the implementation of a safe resident handling program in the long-term care sector. Safety Science 92:217-224.
7. Lahiri S, et al. [2013] An economic analysis of a safe resident handling program in nursing homes. American Journal of Industrial Medicine 56(4):469–478.
8. Miranda H, et al. [2011] Violence at the workplace increases the risk of musculoskeletal pain among nursing home workers. Occupational and Environmental Medicine 68(1):52-57.

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The Center for the Promotion of Health in the New England Workplace is supported by Grant Number U19-OH008857 from the U.S. National Institute for Occupational Safety and Health. This material is solely the responsibility of the authors and does not necessarily represent the official views of NIOSH.