Building labor-management partnerships for Total Worker Health® in public sector healthcare facilities

L. Punnett, S. Nobrega, A. Kurowski, M. Cherniack, R. Henning

CPH-NEW Research Team at Univ. of Massachusetts Lowell, Univ. of Conn. Health Center, & Univ. of Connecticut
The healthcare sector: A large workforce….

About 11% of the U.S. labor force exposed to many hazards….

- Physical workload
- Biological agents, needle-stick injuries
- Cleaning and disinfection chemicals
- Shiftwork and extended hours
- Assault, harassment, bullying
- Psychosocial stressors: low decision latitude, high job demands, organizational instability
- Repetitive manual activity: labs, data entry
Healthy Workplace Participatory Program

“Design Team” with Facilitator

- Conduct root cause analysis
- Develop systematic, integrated interventions
- Establish key performance indicators (KPI) for evaluation

Training: Design Team members; Steering Committee (leadership)

www.uml.edu/cphnewtoolkit
[Robertson et al.; Nobrega et al.]
Health and Safety Committees are more effective when they.....

- Have more members
- Have a higher ratio of hourly workers to managers
- Review a larger number of worker complaints & suggestions
- Correct action items more quickly
- Address ergonomics & work organization, as well as traditional safety
- Plan for safety training of the workforce

[Morse et al., 2008, 2013]
Recommended HWPP structure: Roles of Steering Committee (SC) & Design Team (DT)

**Steering Committee**
- Forms DT & provides necessary resources
- Invites DT to develop and propose interventions
- Selects most feasible/desirable interventions
- Develops or extends interventions to middle management & staff (with help from DT)
- Helps promote & evaluate all interventions

**Design Team**
- Identifies & prioritizes employee health issues
- Comes up with ideas for workplace interventions
- Proposes best intervention ideas to SC
- Helps promote & evaluate all interventions
- Helps refine interventions, as needed
The CPH-NEW Intervention, Design, and Analysis Scorecard (IDEAS) Tool, aka, “Healthy Workplace Participatory Program” (HWPP)
IDEAS Design Process

Step 3
The team sets selection criteria

These become Key Performance Indicators

- Step 1: Identify H&S Problem and Contributing Factors
- Step 2: Set Measureable Objectives & Brainstorm Solution Activities
- Step 3: Set Selection Criteria for Evaluating Solution Activities
- Step 4: Apply Selection Criteria & Create 3 Intervention Alternatives
  - Step 5A: Rate Intervention(s)
  - Step 6: Implement Intervention(s)
  - Step 7: Monitor and Evaluate, Modify if Needed

- Step 1: Identify H&S Problem and Contributing Factors
- Step 2: Set Measureable Objectives & Brainstorm Solution Activities
- Step 3: Set Selection Criteria for Evaluating Solution Activities
- Step 4: Apply Selection Criteria & Create 3 Intervention Alternatives
  - Step 5B: Rate Intervention(s), Provide Feedback, & Select
  - Step 6: Implement intervention(s)
  - Step 7: Monitor and Evaluate, Modify if Needed
IDEAS Design Process

DT develops 3 solutions, making them as complete as possible

Step 4
Apply the selection criteria to each solution
Safety and Health through Integrated, Facilitated Teams ("SHIFT")

Co-facilitators

Labor-management health & safety committee ("Design Team")

Role | Examples of job titles
--- | ---
DT co-facilitator | Safety officer; RN union president
DT member | Nursing, housekeeping, rehab, infection control, dietary, admin, maintenance/carpentry, pharmacy, staff development
Champion | Site director
Coach | UML research staff

UML Coach

Director/Champion

CFO

Steering Committee

Dir. of Nursing

Dir. of HR

Dir. of Facilities

Dir. of Opns.
“SHIFT” intervention study

Formal evaluation of participatory intervention (HWPP) to improve **effectiveness** and **scope** of safety committees

- CPH-NEW provides training and program implementation support
- Collect baseline & follow-up data; evaluate process and changes over time in exposures, outcomes

Safety/health outcomes prioritized jointly by site leadership, union leadership, committee members, researchers:

- Job stress
- Assaults
- MSDs / ergonomics (incl. patient handling)
- Other injuries?
- Health promotion goals? (exercise, sleep quality, etc.)
Public sector healthcare facilities

 العسكريين Administration (2 facilities)
   – Excellent safe patient handling program; employee wellness, assault, others

Mass. Soldiers Homes (2); Dept. of Mental Health (2)
   – Mandated joint labor-management HSC’s
   – Safety infrastructure, agency champions
   – Data-driven priorities (problems, solutions)
   – Access to EAP, health promotion services
“Stepped-wedge” study design (hypothetical example)

SHIFT: 2 sites compared within each agency.
1 “immediate intervention;” 1 “lagged intervention”
SHIFT Study Timeline

5-year study duration: ½ coached intervention, ½ ongoing monitoring (for each site)
Program outcomes to be evaluated

- **Committee effectiveness** in primary prevention of health and safety issues (recorded incidents/claims; worker self-rated health, exposures; management support of safety, health climate)

- **Worker involvement** in identifying causes, setting priorities, developing solutions, making **business case to management** for H&S interventions

- Establish a H&S **continuous improvement** process which is **sustainable**

- **Connections** between OHS and other employee health issues

- **Benefits for clients/patients**, tied to improved environment of care/work?
Study Challenges

- Personnel turnover between signed agreement and funding, AND after
- Inconsistent history of union participation in joint HSCs
- Multiple bargaining units per facility
- Agencies’ own policies and procedures:
  - IRBs, patient privacy, IT security, rules on use of personal cell phones at work, etc.
- Possible “contamination” between sites
CPH-NEW Resources publicly available (i.e., accessible to all study sites)

Healthy Worksite Participatory Program
- Online toolkit and training materials

On-line continuing ed. for nurses (CEU’s)
- Job Stress
  (http://www.uml.edu/Research/Centers/CPH-NEW/nurse-education/modules.aspx)
- Other topics in preparation: ergonomics & patient handling, workplace violence, etc.

CPH-NEW e-Newsletter; Speakers Bureau
Activities currently underway

- Meetings with facility leaders, union representatives, design team members
  - Review study goals, design, protocols, logistics
  - Identify appropriate committee
  - Ensure line worker participation
  - Refine/customize data collection instruments

- Institutional Review Board approvals, etc.

- Baseline assessments: organizational readiness for change; S&H needs, priorities

- Randomize sites between A and B
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.
HearWell: A Total Worker Health™ approach to Hearing Conservation among Transportation Workers

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Laura Punnett, PhD, UMass Lowell
Martin Cherniack, MD, MPH, UConn Health
Robert Henning, PhD, UConn

Center for the Promotion of Health in the New England Workplace
Building Partnerships

Connecticut Department of Transportation

UConn Health, Division of Occupational and Environmental Medicine

Connecticut Employees Union Independent
Building Partnerships

UConn Health provides occupational health services to DOT

Connecticut Department of Transportation

UConn Health, Division of Occupational and Environmental Medicine

Connecticut Employees Union Independent
Building Partnerships

UConn Health works with CEUI on implementing green cleaners (NIOSH R21)

Connecticut Department of Transportation

UConn Health, Division of Occupational and Environmental Medicine

Connecticut Employees Union Independent

Go Green!
Move to green cleaners for worker health and a safer environment
Building Partnerships

Collaboration for Hearing Health (NIOSH K01)

Connecticut Department of Transportation

UConn Health, Division of Occupational and Environmental Medicine

Connecticut Employees Union Independent

HearWell
Traditional Hearing Conservation

- Training: Hearing and Noise
- Perform Audiometric Testing
- Control Noise Exposure Levels
- Hearing Protectors
- Monitor Noise Exposure Levels
- Record Keeping
HearWell for Total Hearing Health

- Training: Hearing and Noise
  - Perform Audiometric Testing
  - Control Noise Exposure Levels
  - Hearing Protectors
  - Monitor Noise Exposure Levels
  - Record Keeping

Performed through active participation using CPH-NEW Healthy Workplace Participatory Program (HWPP)
HearWell: Achieve Total Hearing Health using CPH-NEW Healthy Workplace Participatory Program

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Get Ready for Program Start Up</td>
</tr>
<tr>
<td>2.</td>
<td>Form Steering Committee</td>
</tr>
<tr>
<td>3.</td>
<td>Identify and Train Facilitator</td>
</tr>
<tr>
<td>4.</td>
<td>Identify Health and Safety Priorities</td>
</tr>
<tr>
<td>5.</td>
<td>Form Design Team</td>
</tr>
<tr>
<td>6.</td>
<td>Generate Solutions using the IDEAS Tool</td>
</tr>
<tr>
<td>7.</td>
<td>Evaluate Your Program</td>
</tr>
</tbody>
</table>
Transportation Maintenance Workers – Variable Noise Exposures, Rely on HPD

### Noise Levels by Decibels

<table>
<thead>
<tr>
<th>Tool</th>
<th>Decibels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pneumatic Precision Drill</td>
<td>119</td>
</tr>
<tr>
<td>Hammer Drill</td>
<td>114</td>
</tr>
<tr>
<td>Chain Saw</td>
<td>110</td>
</tr>
<tr>
<td>Spray Painter</td>
<td>105</td>
</tr>
<tr>
<td>Hand Drill</td>
<td>98</td>
</tr>
<tr>
<td>NIOSH Recommended Exposure Limit</td>
<td>85</td>
</tr>
<tr>
<td>Normal Conversation</td>
<td>60</td>
</tr>
<tr>
<td>Whisper</td>
<td>30</td>
</tr>
</tbody>
</table>

Source: NIOSH Noise Meter [http://www.cdc.gov/niosh/topics/noisel/enosisenzymeit.html](http://www.cdc.gov/niosh/topics/noisel/enosisenzymeit.html)  
Study Methods

- Survey of maintenance garages (n=24, Spring 2016)
  - Last hearing test
  - Diagnosis of hearing loss
  - Hearing symptoms
  - Frequency of hearing protection device (HPD) use
  - Safety climate (6-items)\(^1\)

\(^1\)Hahn and Murphy 2008
## Study Population

<table>
<thead>
<tr>
<th></th>
<th>n (%) or mean (±SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Male</strong></td>
<td>254 (97)</td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>194 (74)</td>
</tr>
<tr>
<td>Black</td>
<td>34 (13)</td>
</tr>
<tr>
<td>Other and mixed races</td>
<td>34 (13)</td>
</tr>
<tr>
<td><strong>Age (yrs)</strong></td>
<td>44 (±11)</td>
</tr>
<tr>
<td><strong>Job Title</strong></td>
<td></td>
</tr>
<tr>
<td>Maintainer</td>
<td>227 (86)</td>
</tr>
<tr>
<td>Supervisor</td>
<td>36 (14)</td>
</tr>
<tr>
<td><strong>Job Tenure (yrs)</strong></td>
<td>11 (±6)</td>
</tr>
</tbody>
</table>

If you use noisy tools or are in noisy areas, do you use hearing protectors (e.g. earplugs or earmuffs)?
How often do you experience these symptoms after a noisy day at work?

- Tinnitus
- Muffled Hearing

Number of workers

- Never or Almost Never
- Less than Half the Time
- About Half the Time
- More than Half the Time
Individual Safety Climate

Worker involvement
Management commitment
Safety feedback
Coworker behavior norms

Generic safety climate ratings reflect immediate safety risks, not hearing health risks
Moving towards Total Hearing Health

• Hearing Conservation Program has clear areas for improvement
  • Lack of regular hearing tests, inconsistent hearing protection use, and signs of early auditory damage

• Interventions are being crafted using the Intervention, Design, and Analysis Scorecard: a participatory intervention planning method

www.uml.edu/CPH-NEW/toolkit
Continued Partnerships

Addressing extended and irregular work hours

Connecticut Department of Transportation

UConn Health, Division of Occupational and Environmental Medicine

Connecticut Employees Union Independent

HearWell
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- Noah Seixas PhD, U of Washington

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- Lisa Rusch, Doctoral Student Public Health, UConn
- Katrina Burch, Doctoral Student Industrial/Organizational Psychology, UConn
- Jenny Garza ScD, UConn Health

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A Conceptual Model to Guide Total Worker Health® Research and Interventions

Glorian Sorensen, Jack Dennerlein, Deborah McLellan, Erika Sabbath, Eve Nagler, Nicolaas Pronk, Gregory Wagner

Harvard T.H. Chan School of Public Health
Center for Work, Health and Wellbeing
Disclosures

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• Presentation will not include any discussion of the unlabeled use of a product or a product under investigation.

• Funding support from:
  – NIOSH:U19 OH008861
Objectives

• Present a conceptual model for Total Worker Health® to:
  – Guide research on determinants of worker safety and health
  – Inform the design, implementation and evaluation of integrated approaches to protecting and promoting worker safety and health.

• Illustrate the application of the model

• Describe implications for future research priorities
Work matters for health and safety

Physical
– Potential exposures to safety and health hazards

Organization
– Hours worked
– Workload and pace of work
– Benefits (Wages, Leave, Flexibility)
– Access to resources on the job

Psychosocial
– Job stress
– Supervisor support
– Co-worker social norms
– Culture of health and safety at work
Egerter et al., Commissionhealth.org, RWJH, 2008.
Total Worker Health® is defined as policies, programs, and practices that integrate protection from work-related safety and health hazards with promotion of injury and illness prevention efforts to advance worker well-being. (http://www.cdc.gov/niosh/twh/)

- Funds 6 Centers for Excellence, including the Harvard Center
- Dozens of Affiliated Centers
Harvard T.H. Chan School of Public Health
Center for Work, Health and Wellbeing

Glorian Sorensen: Director
Jack Dennerlein: Associate Director

Research: Expand the scientific evidence base for protecting and promoting worker safety, health and well-being through system-level approaches
Practice: Develop and disseminate resources and best practices
Policy: Explore the policy implications
Capacity-building: Workforce development and training
Defining integrated approaches to worker health

“A strategic and operational coordination of policies, programs & practices designed to simultaneously prevent work-related injuries & illnesses & enhance overall workforce health & well-being”

– Coordination and linkage of separate policies, practices & programs
– Continuum of approaches exists

Sorensen et al, JOEM 2013
Center for Work, Health and Well-being Conceptual Model

Enterprise Characteristics

Workplace Policies, Programs, & Practices
- Degree of integration
- Indicators of integration

Conditions of work
- Physical Environment
- Organization of Work
- Psychosocial Factors
- Job Tasks & Demands

Worker Proximal Outcomes
- Health & Safety Behaviors
- Engagement in Programs
- Beliefs
- Knowledge
- Skills

Worker Outcomes
- Injury
- Illness
- Wellbeing

Enterprise Outcomes
- Productivity & Quality
- Turnover & Absence
- Health Care Costs

Sorensen et al Prev Med 91 (2016) 188–196
Indicators of Integration

- Leadership commitment
- Comprehensive strategies that are implemented collaboratively across the organization
- Participatory processes engaging stakeholders across organizational levels
- Adherence to regulations and ethical norms
- Data-driven change

- Policies, programs and practices that create supportive working conditions
  - Physical Environment
  - Psychosocial Factors
  - Job Tasks, Demands, and Resources

TWH Hierarchy of Controls

- **Eliminate**
  - Eliminate working conditions that threaten safety, health, and well-being

- **Substitute**
  - Substitute health-enhancing policies, programs, and practices

- **Redesign**
  - Redesign the work environment for safety, health, and well-being

- **Educate**
  - Educate for safety and health

- **Encourage**
  - Encourage personal change

Source: https://www.cdc.gov/niosh/twh/totalhealth.html
OPERATIONALIZING THE MODEL: SOCIAL EPIDEMIOLOGICAL RESEARCH
Be Well - Work Well Study

• Datasets
  – Surveys of patient care workers at 2 hospitals
    – 2009: N=1572, response rate = 79%
    – 2012: N=1596, Response rate = 75%
    – 2014: N=1418, Response rate = 71%
  – Nurse manager surveys
  – Administrative databases
Integrated research database

- Hospital policies and practices
- Survey of workers
- Workers, clustered in units
- Worker’s comp
- Hospital injury log
- Health care use and spending
- Planned and unplanned absence
- Quality of patient care

Center for Work, Health, & Well-being
Harvard T.H. Chan School of Public Health
Attending to the Conditions of Work: Summary Findings for Healthcare Workers

CONDITIONS OF WORK
Physical Environment
• Job Demands

Organization of Work
• Ergonomic Practices
• Job Flexibility
• Inadequate staffing
• Shift schedule/control

Psychosocial Factors
• Low decision latitude
• Coworker/supervisor support
• Work-family conflict
• Harassment

WORKER PROXIMAL OUTCOMES
• Sleep deficiency
• Fatigue
• Physical Activity
• Psychological distress
• BMI

WORKER OUTCOMES
• Pain
• Work interferences
• Cardiometabolic risk

### Examples of Shared Pathways

<table>
<thead>
<tr>
<th></th>
<th>Supervisor support</th>
<th>Harassment at work</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk of injury</td>
<td>↓</td>
<td>↑</td>
</tr>
<tr>
<td>Physical activity</td>
<td>↑</td>
<td>↓</td>
</tr>
<tr>
<td>Sleep deficiency</td>
<td>↓</td>
<td>↑</td>
</tr>
<tr>
<td>Psychological distress</td>
<td></td>
<td>↑</td>
</tr>
</tbody>
</table>

*Nelson et al 2014; Reme et al 2014; Sabbath et al 2014; Sorensen et al 2011; Tveito et al 2014; Reme et al (in review).*
Aim 1: Develop a worksite-based, multi-component, and integrated musculoskeletal disorders prevention and health promotion intervention for workers in commercial construction

Aim 2: Complete a feasibility study of the developed worksite based intervention on six sites, randomly assigned to either intervention (five sites) or controls (five sites) with 420 workers total (70 per site) measured at baseline and at six-month follow up

Dennerlein et al., Work, Stress, and Health, Minneapolis, MN 2017.
Flow chart demonstrating ARM Intervention → Effects

Commercial Construction

- Workplace Policies, Programs, & Practices
  - Health Week
  - StIpp program

Worker / Work Force
- Construction workers

Conditions of work
- Physical Environment
- Psychosocial Factors

Worker Proximal Outcomes
- Diet
- Physical Activity
- Use of ergonomics solutions

Worker Outcomes
- Injury (Pain)

Enterprise Outcomes

Dennerlein et al., Work, Stress, and Health, Minneapolis, MN 2017.
Table 1: Effects of intervention on changes in working conditions from baseline to follow-up 1

<table>
<thead>
<tr>
<th>Outcome Measure (units)</th>
<th>N</th>
<th>B-Coefficient (95% CI)</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 item ergonomics scale</td>
<td>215</td>
<td>0.09 (-0.05, 0.23)</td>
<td>0.1782</td>
</tr>
<tr>
<td>Physically demanding work</td>
<td>200</td>
<td>0.11 (-0.12, 0.33)</td>
<td>0.3080</td>
</tr>
</tbody>
</table>

Table 2: Effects of intervention on changes in worker health from baseline to follow-up 2

<table>
<thead>
<tr>
<th>Outcome Measure (units)</th>
<th>N</th>
<th>B-Coefficient (95% CI)</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recreational physical activity (minutes/day)</td>
<td>93</td>
<td>39.24 (16.46, 62.02)</td>
<td>0.0036</td>
</tr>
<tr>
<td>Healthy diet</td>
<td>114</td>
<td>0.92 (0.02, 1.80)</td>
<td>0.0459</td>
</tr>
<tr>
<td>Unhealthy diet</td>
<td>113</td>
<td>-0.25 (-0.78, 0.27)</td>
<td>0.3649</td>
</tr>
<tr>
<td>Dietary balance</td>
<td>113</td>
<td>1.20 (0.04, 2.36)</td>
<td>0.0440</td>
</tr>
</tbody>
</table>

Categorical outcome variables

<table>
<thead>
<tr>
<th>Outcome Measure variables</th>
<th>N</th>
<th>OR (95% CI)</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>12-month pain (increase compared to no change)</td>
<td>111</td>
<td>0.33 (0.15, 0.72)</td>
<td>0.0113</td>
</tr>
<tr>
<td>12-month pain (decrease compared to no change)</td>
<td>111</td>
<td>0.78 (0.27, 2.23)</td>
<td>0.6052</td>
</tr>
</tbody>
</table>

Dennerlein et al., Work, Stress, and Health, Minneapolis, MN 2017.
ARM Overall Takeaways

- Intervention was effective at changing health behaviors and reducing pain incidence
  - Increased leisure time physical activity
  - More balanced diet
  - Reduction of “new pain”
- No measured changing the physical working conditions
  - Ergonomic scales and safety managers said little change occurred
  - Did not measure other conditions of work such as psychosocial factors at play including supervisor and co-worker support.

Dennerlein et al., Work, Stress, and Health, Minneapolis, MN 2017.
For Practice: Adapting to the Setting

- Organizational, job and worker characteristics
- Risks related to the job and setting
  - Nature of work/job
  - Work environment/organization
- Existing resources—budget, staff, prior programs, leadership support
- Key priorities as gatekeepers to TWH
  - Examples: Safe patient handling in health care; project planning in construction; continuous improvement processes in manufacturing
Research Gaps

Epidemiology
- Health disparities (worker & workplace)
- Synergies across pathways (Interactions)
- Temporal patterns (development & sustainability)
- Shared pathways on multiple outcomes

Interventions
- Diverse settings and types of workers
- Effective pathways
- Cost and value for the business case
- Strategies for systems level change & sustainability
- Dissemination and knowledge transfer
Conclusions: Contributions of the Conceptual Model

- An organizing framework for research and practice by specifying the causal pathways through which work can influence health outcomes
- A framework for designing and testing interventions to improve worker safety and health that are responsive to conditions of work
- Elaboration of underlying assumptions of integrated interventions
- A tool to guide future research aimed at testing the effectiveness of integrated approaches to worker health protection and health promotion
- A framework for translating research to practice, framing the focus on the conditions of work
Thank you!

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• Funded in part by grant U19OH008861 from the CDC/NIOSH
• http://centerforworkhealth.sph.harvard.edu/
• @HSPHCenterWork