



Who is Really Getting Injured and How ?

Clues from scientific research and
healthcare workers' voices



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Who am I and Why am I here?

- Personal Labor History
 - Construction, MA State Healthcare, Transportation, Manufacturing
- Occupational Health Training
 - Clinical Allied Health, Ergonomics, Industrial Hygiene, and Occupational Epidemiology
- Professional Goal
 - Combine scientific research with worker participation and ergonomic best practices to reduce work-related health problems in healthcare populations

Presentation Outline

Part I

- Who
- What

Part II

- How

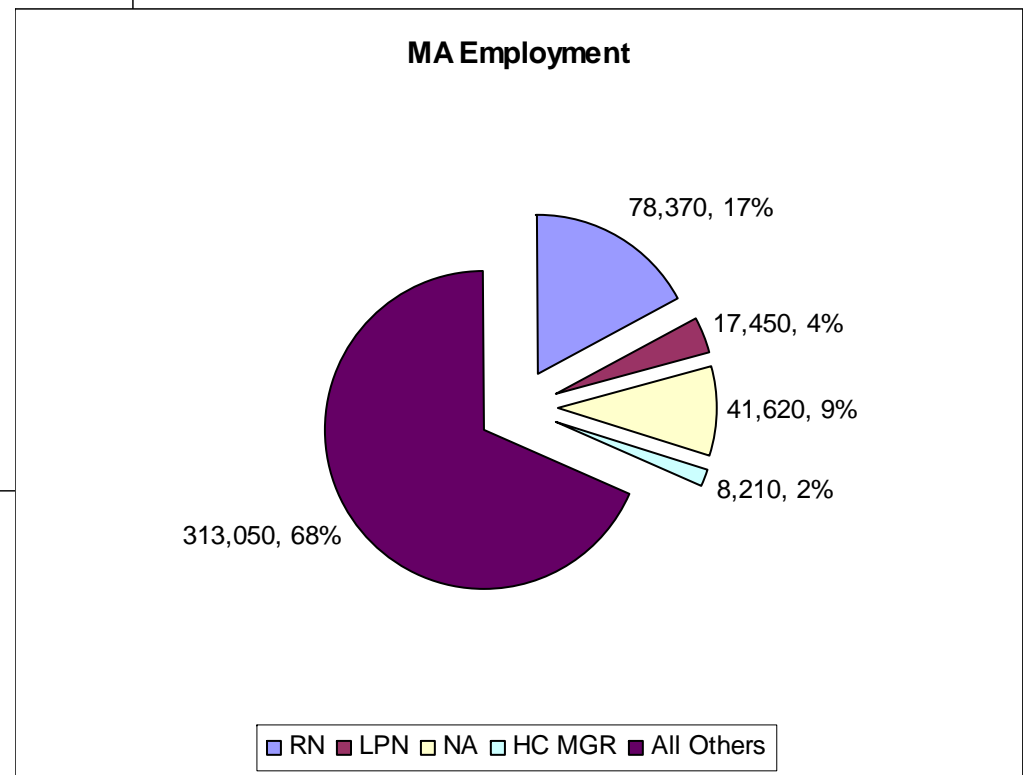
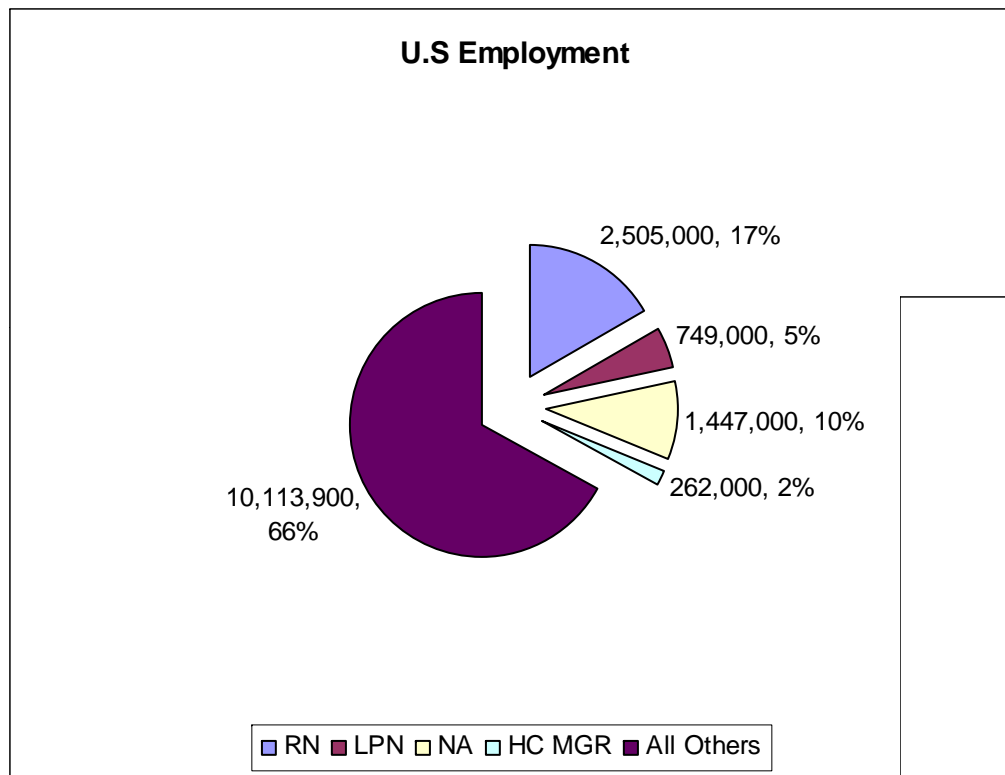
- Seems very straightforward, right?

Part I:

Who works in healthcare and who is getting injured?

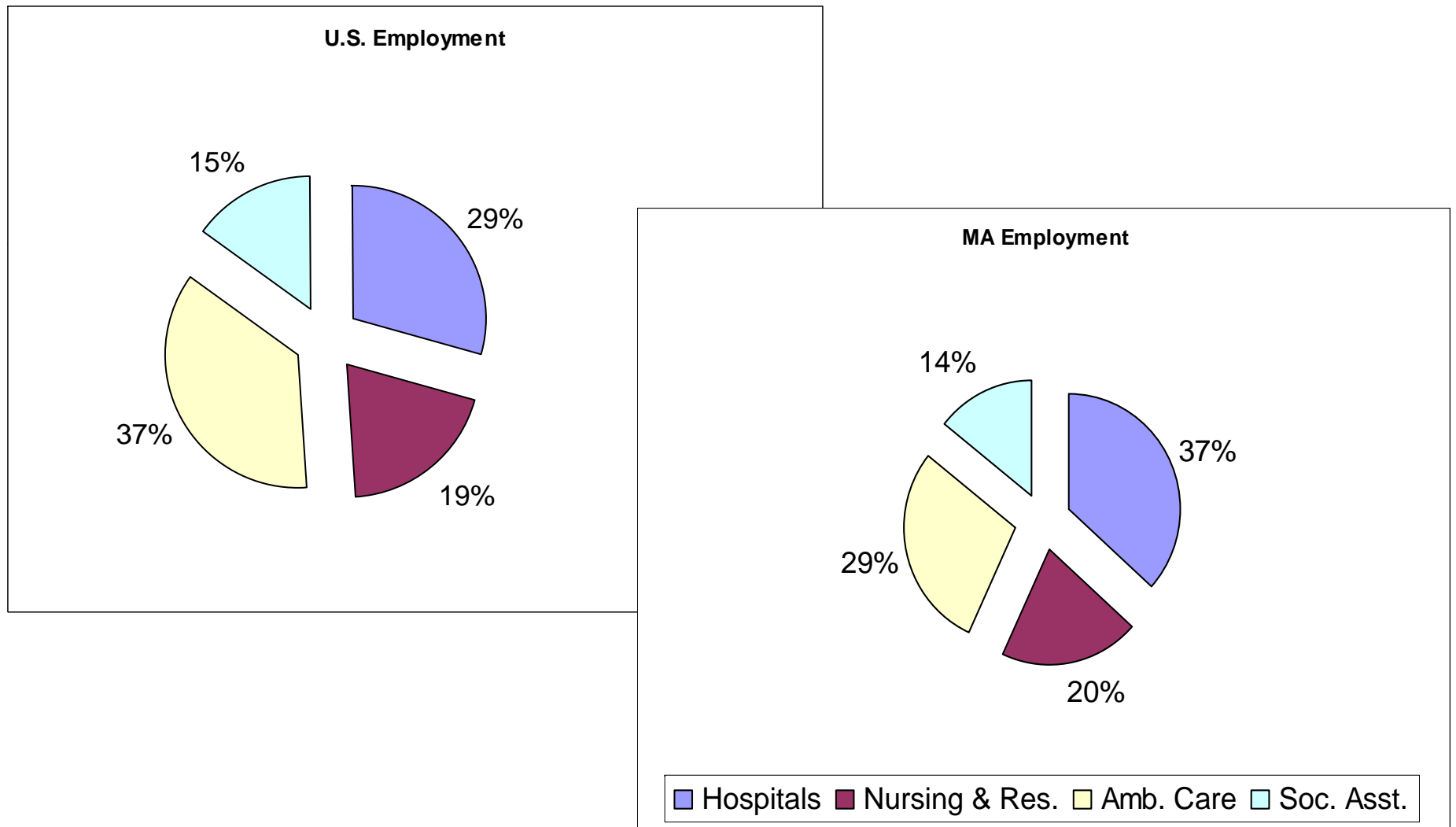
- Individuals
 - Diverse social, ethnic and racial backgrounds
 - Women are majority
- Job title categories
 - Direct Patient Care, Other Clinical Functions, Non-clinical support, Management and Administration
- Industry Sub-sectors
 - Hospitals, Ambulatory Clinics, Nursing and Residential Care, Home Healthcare, Govt. & Ed.

Health care and Social Assistance Sector Employment: Selected Jobs in 2007



Sources: <http://www.bls.gov/data/>; <http://online.onetcenter.org/>

Health care and Social Assistance Employment Percentages: By Sub-Sectors in 2007



Sources: <http://www.bls.gov/data/>; <http://online.onetcenter.org/>

What is an injury?

- Multiple Definition Types
 - Clinical
 - Administrative
 - Worker description
- Sensitivity vs. Specificity
- Time Course
 - Acute vs. Chronic
- Surveillance Method
 - Active
 - Passive
- Above determine who gets counted and who doesn't

Injury Occurrence vs. Reporting

- Reporting Filters
 - Administrative Barriers
 - Medical Diagnoses
 - Management Disincentives
 - Financial Disincentives
 - Lack of Training

Voices from Massachusetts Hospital Employees

- *““In reality a lot of people don’t report a lot of things”
(Hospital employee)*
- *“...you fill out a form. You go to the emergency room. You wait for three hours. [Laughter] [...] Nobody taking over for you while you’re going through the formal process. Man, because it’s an onerous process.”
(MNA Hospital Nurse).*
- *“[...] you’re just too exhausted [...]. It’s just one more thing [...] more paper work. They’re (the incident reports) designed, I think, to (keep you from filling them out) they’re complicated.”
(Nurse)*

UML PHASE Project

- Massachusetts hospital and nursing home workers (n = 480) were asked in 2003-2005:
 1. “whether or not, in the past 12 months, you have had any serious injury to any part of your body...”
 2. “..whether or not it happened at work”
- 12.3 % had a serious injury but only 49.2 % reported it.

The Iceberg of unreported occupational injuries



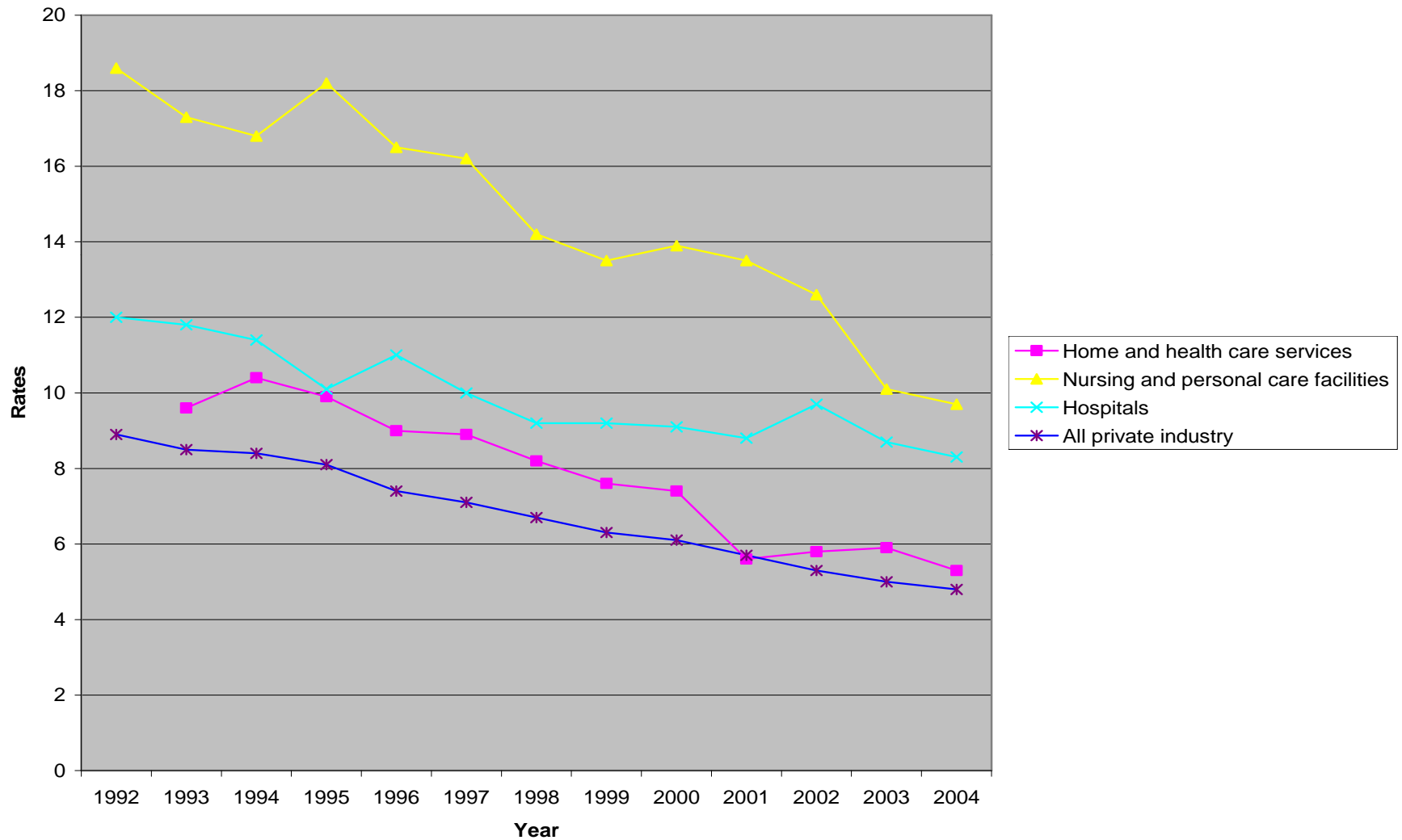
Injury Rates and Occupational Health Priorities

- Part of the population / whole pop. in over a specific period of time
- Tracked along with injury severity to determine:
 - intervention priorities
 - union bargaining strategies
 - research priorities
 - OSH policies
 - Corporate Budgets

Rates of injury & illness per 100 full-time U.S. workers in selected healthcare sub-sectors compared to all private industry



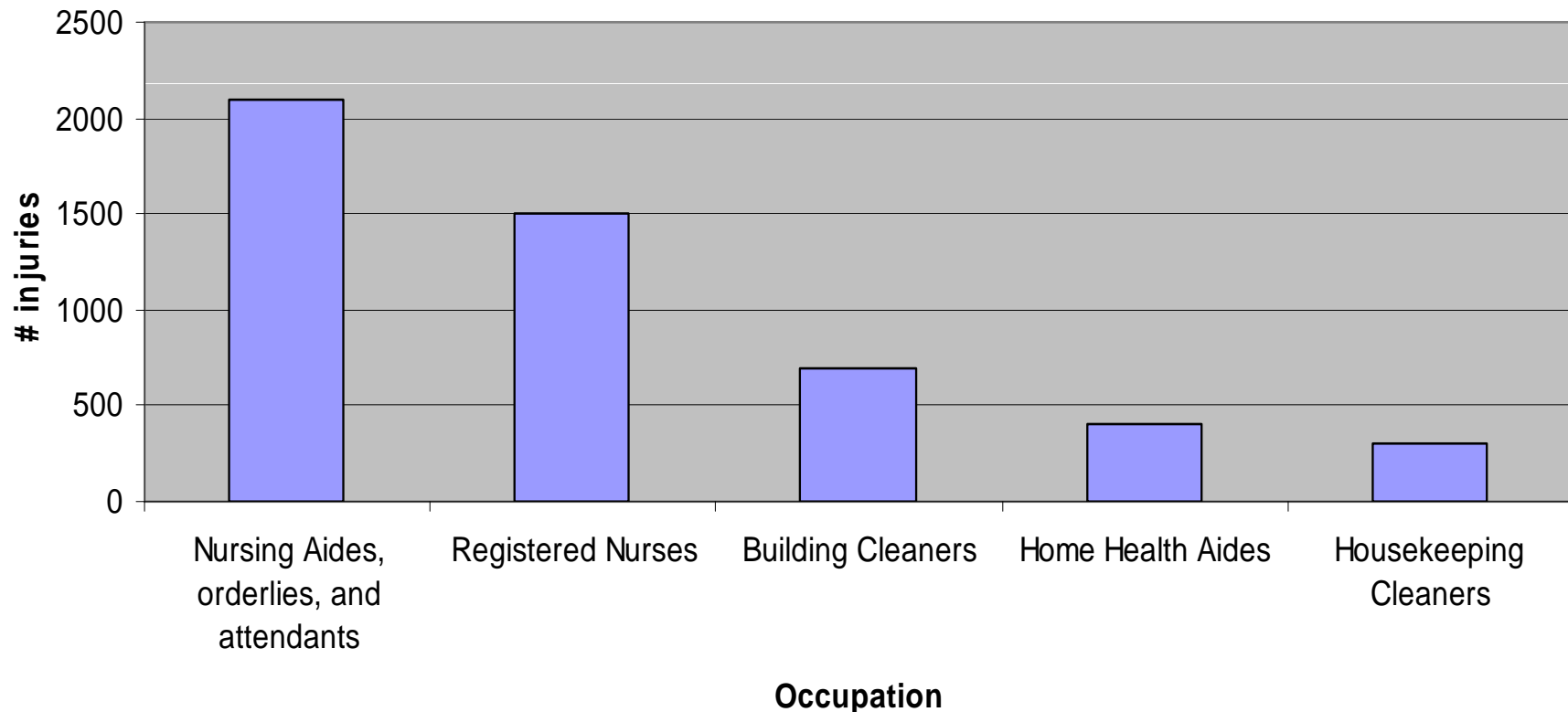
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Source: <http://www.bls.gov/data/>

Massachusetts

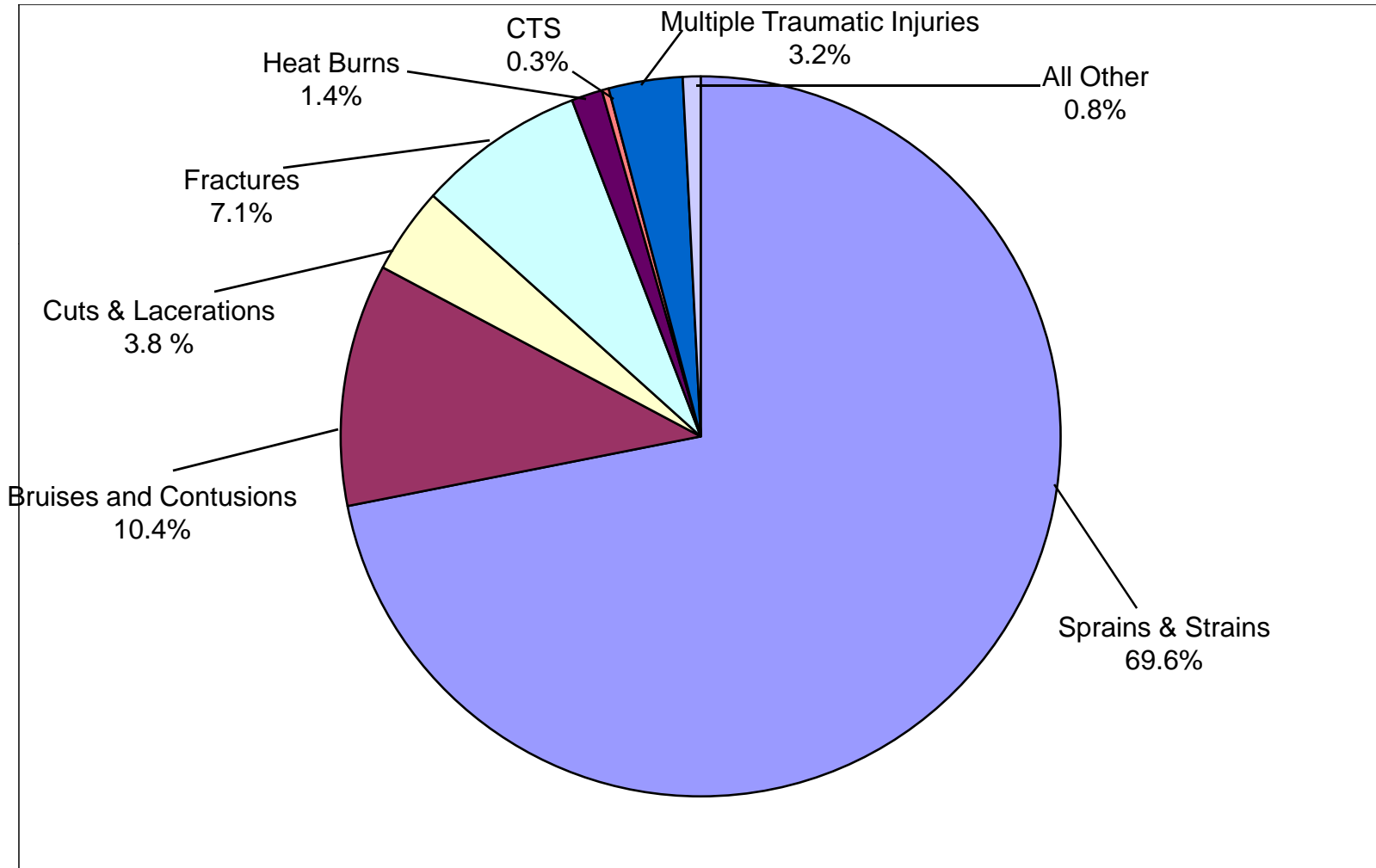
Selected occupations with the highest number of nonfatal occupational injuries and illnesses with days away from work, education and health services, 2007



Source: Reproduced from the Massachusetts Occupational Injuries and Illnesses Report, 2007; <http://www.mass.gov/>

Massachusetts

Percent of nonfatal injuries and illnesses involving days away from work by nature of injury or illness, education and health services, 2007



Source: Reproduced from the Massachusetts Occupational Injuries and Illnesses Report, 2007; <http://www.mass.gov/>

Massachusetts

Percent of nonfatal injuries and illnesses involving days away from work by body part affected, education and health services, 2007

1. Back (32.6%)
2. Lower Extremities (20.8%)
3. Upper Extremities (14.9%)
4. Multiple Body Parts (11.1%)
5. Shoulder (8.7%)
6. Head (6.9%)
7. Neck (3.3%)
8. All Other (1.6%)

Injury Severity: Which case is the worst?

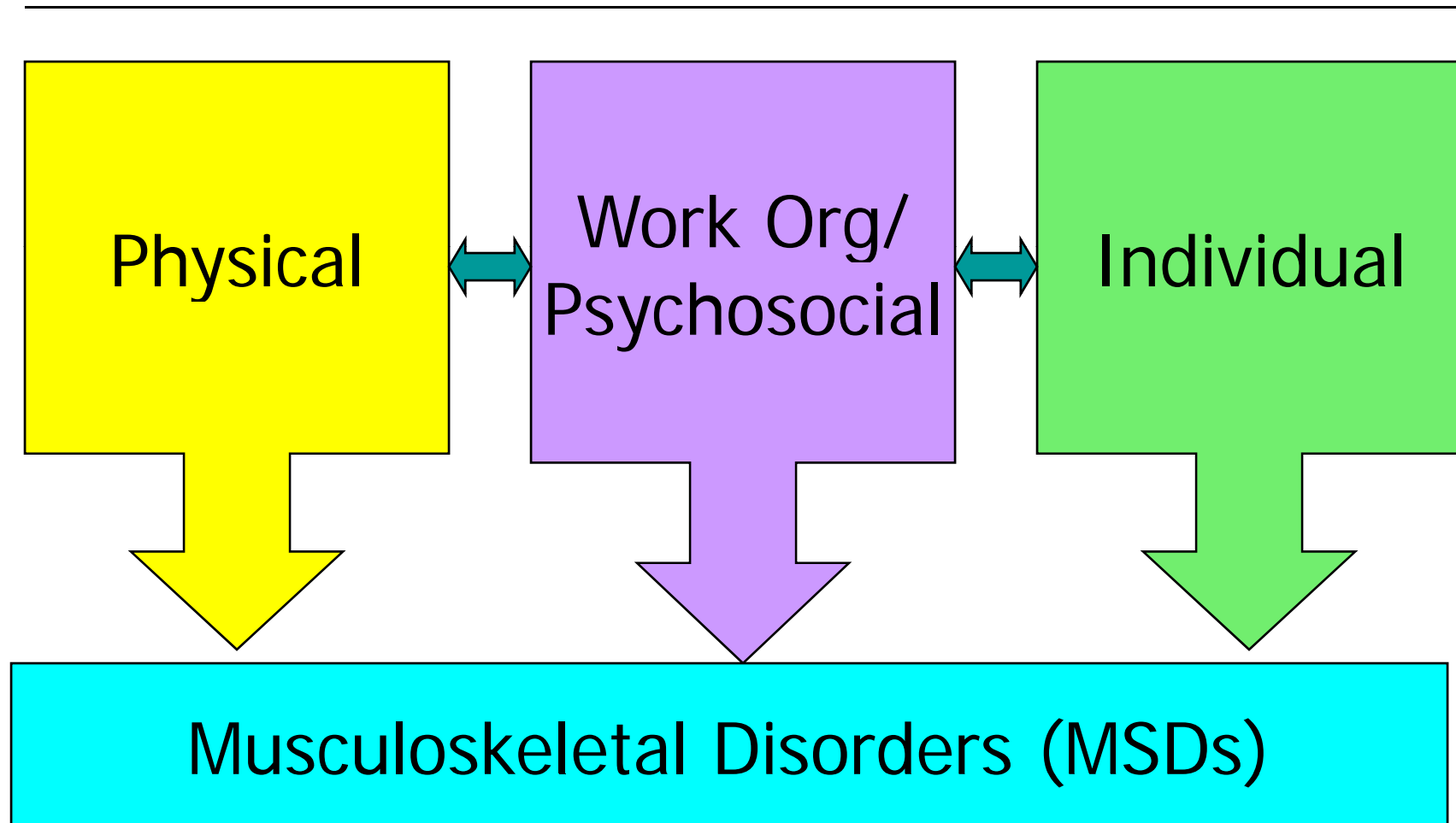
- Working with pain and weakness but no official work restrictions
- 3 days of lost work time with severe pain
- 6 days of lost work time with moderate pain
- Working with restricted duties for 3 months
- 1 year of lost work time with wages & medical benefits
- 6 months of lost work time without wages or medical benefits

Part II:

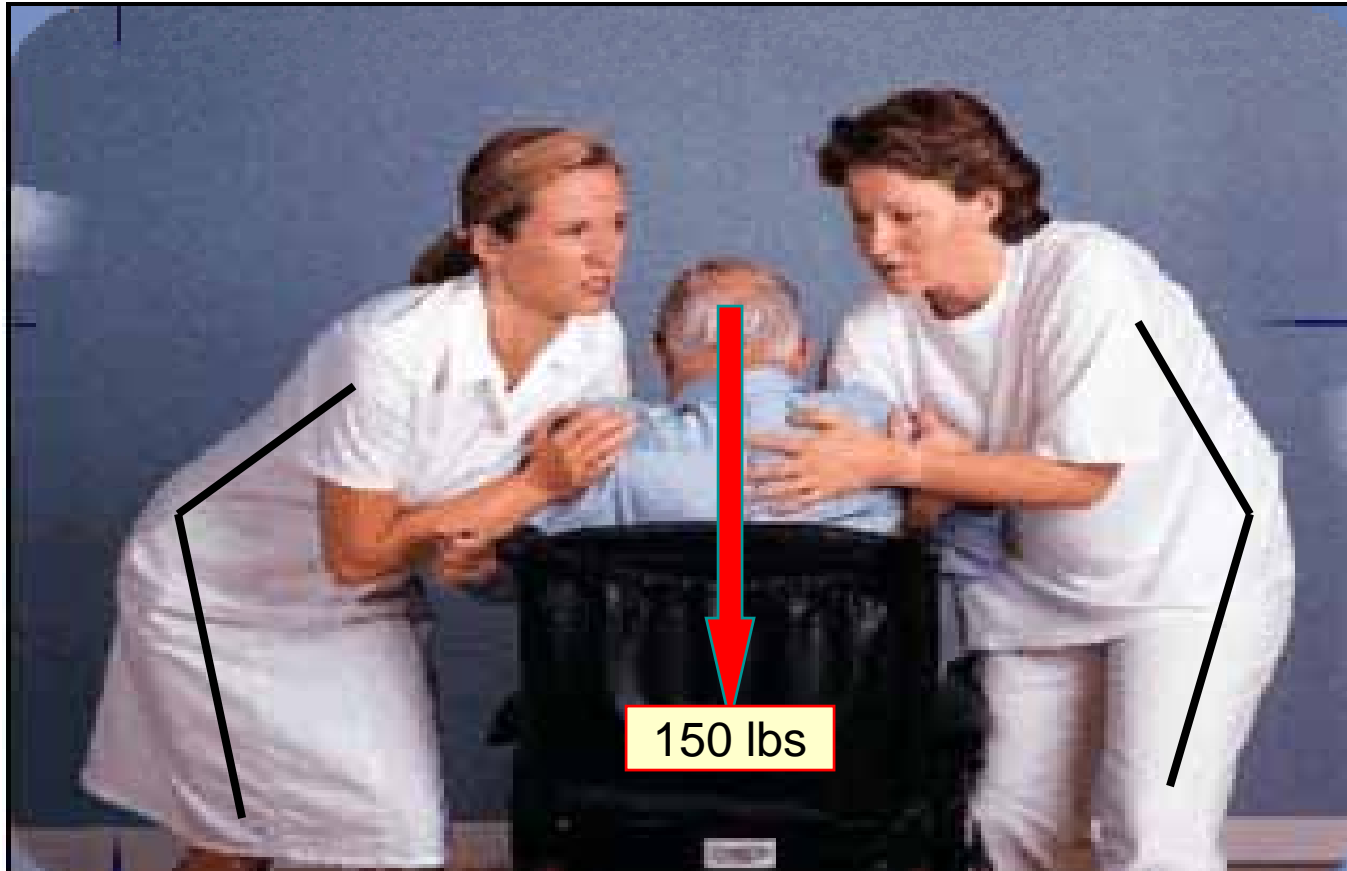
How do occupational injuries happen?

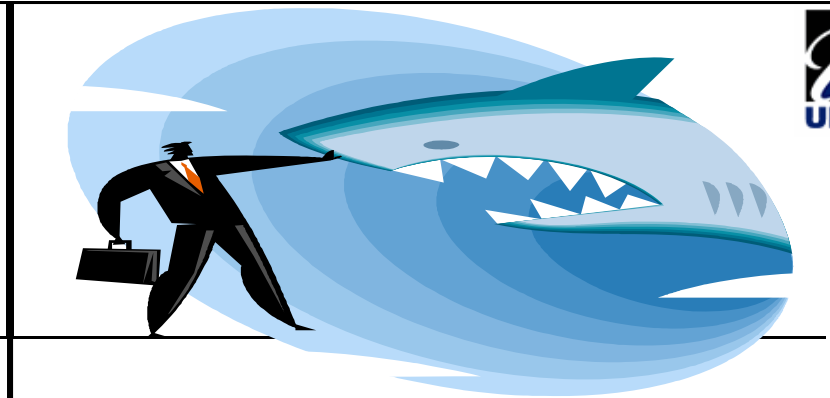
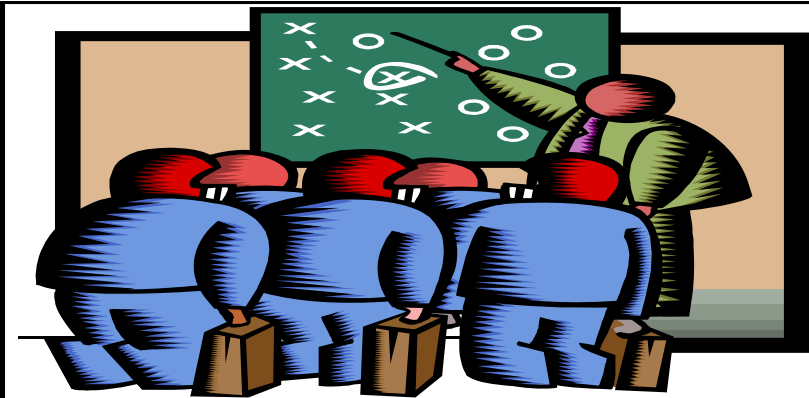
- Through complex interactions between people performing work tasks with tools, equipment, and other people.
- Frequency, intensity, and duration of exposure to risk factors among susceptible populations
- Risk factor profiles in healthcare vary
 - job titles, departments, sub-sectors, and patients

Recognized Ergonomic Risk Factors



Physical Work Risk Factors





- Work Organization

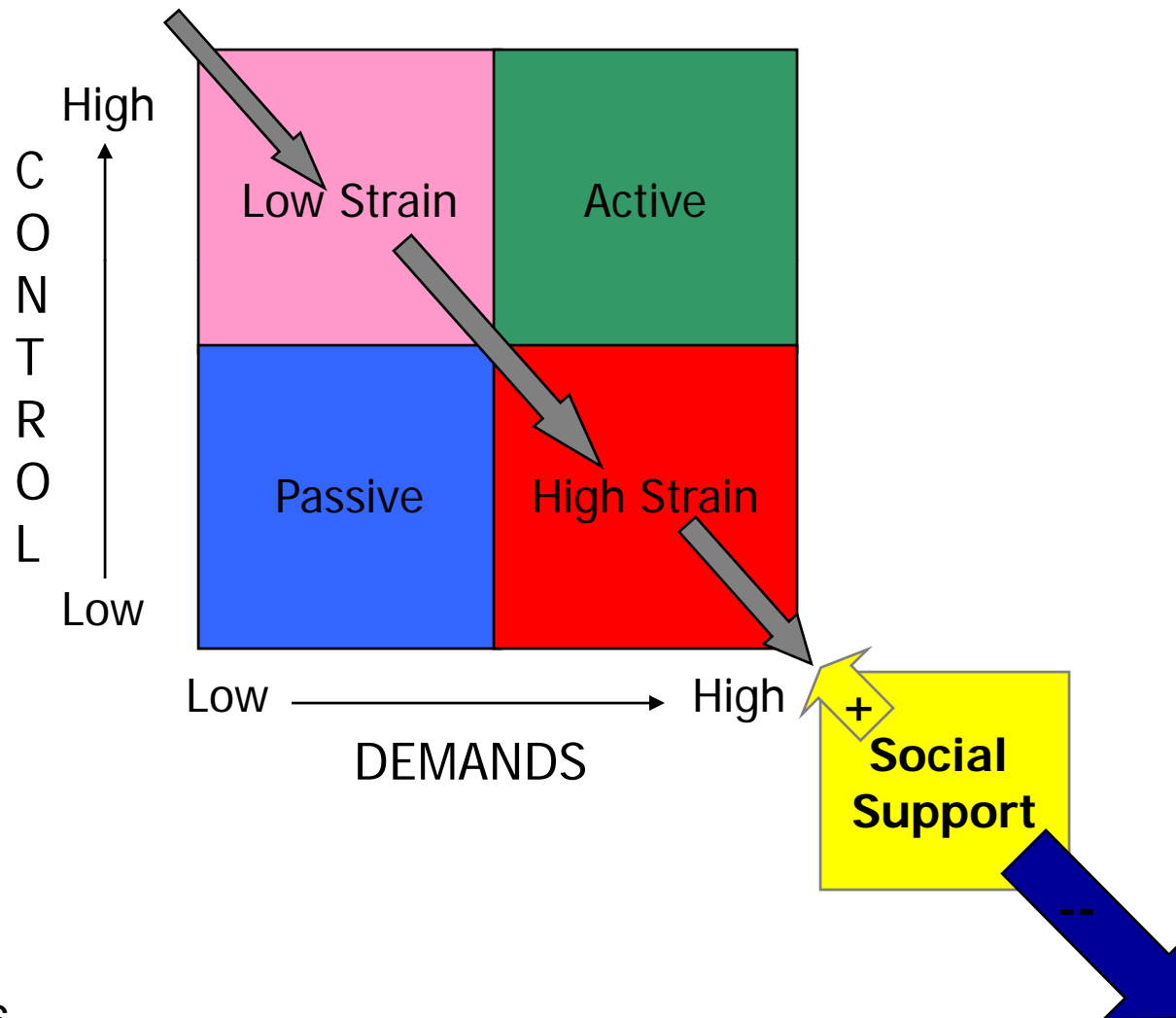
- Structure
- Payment scheme
- Shift-work
- Break schedules
- Staffing Levels
- Labor Contract
- Safety Climate
- Work Pace
- Time pressure

- Psychosocial

- Psychological Demands
- Job Control
- Social Support
- Efforts and Rewards
- Work and Family Imbalance
- Emotional Labor

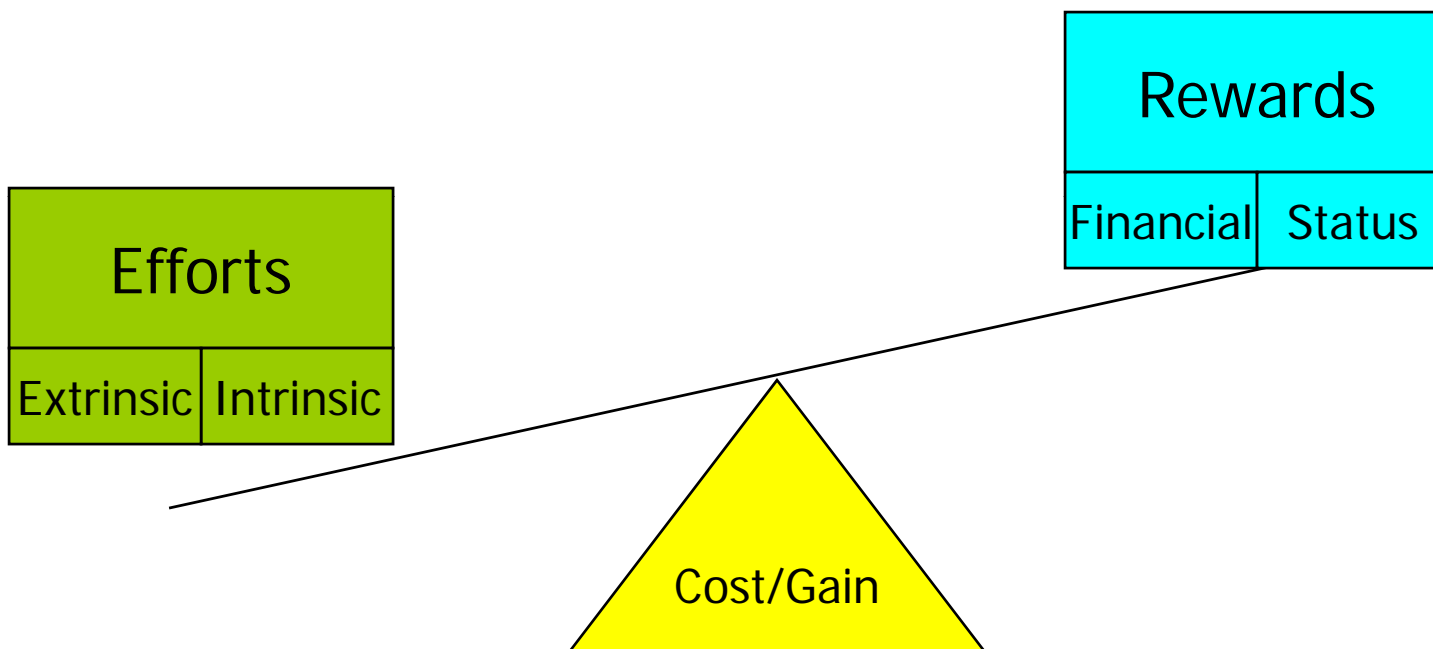
Demand Control Support Model

(Environmental Focus)

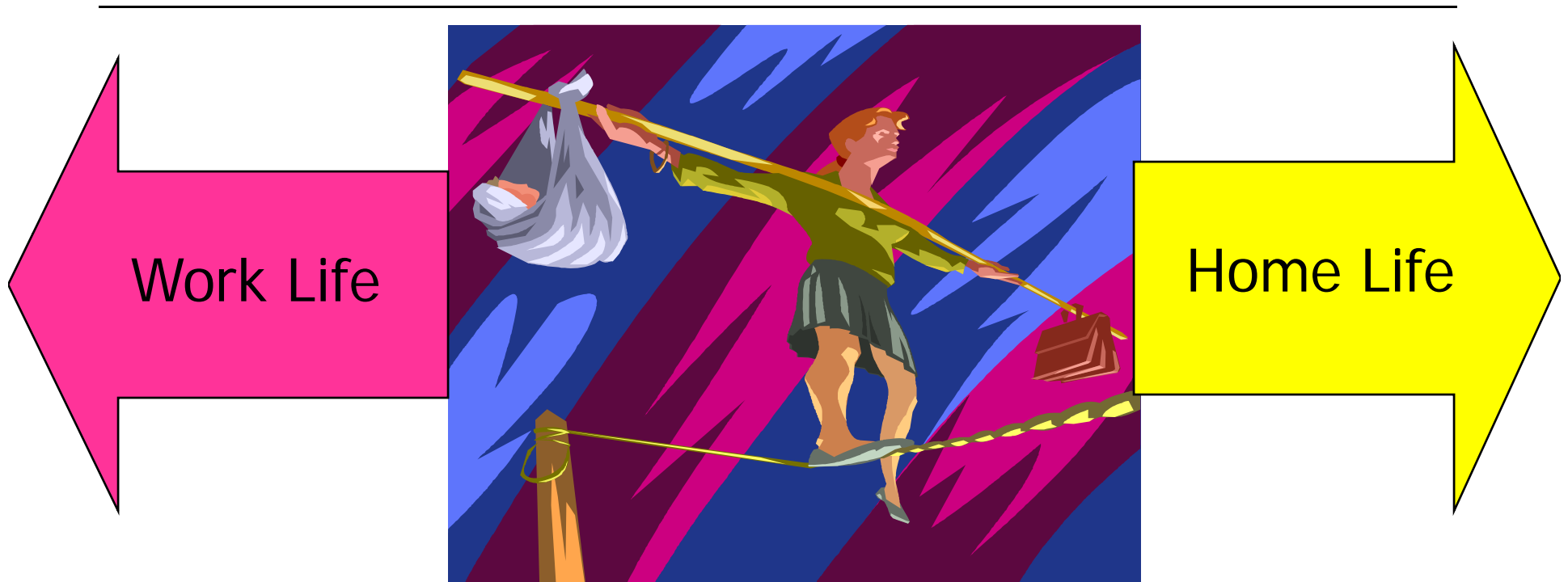


Effort Reward Imbalance Model

(Individual Focus)



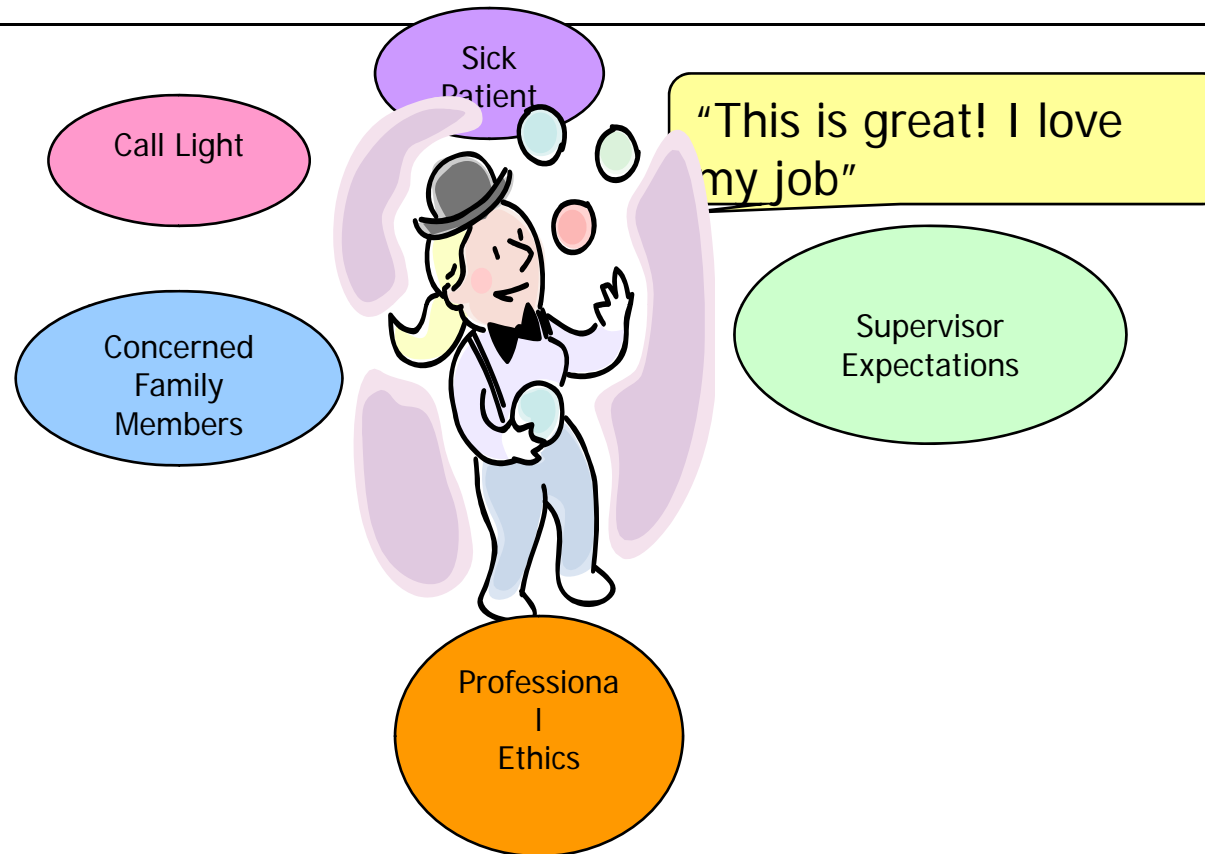
Work and Family Imbalance



- Scarcity Hypothesis
- Expansion Hypothesis
- Women

- Role Conflict
 - Time Based
 - Strain Based

Emotional Labor

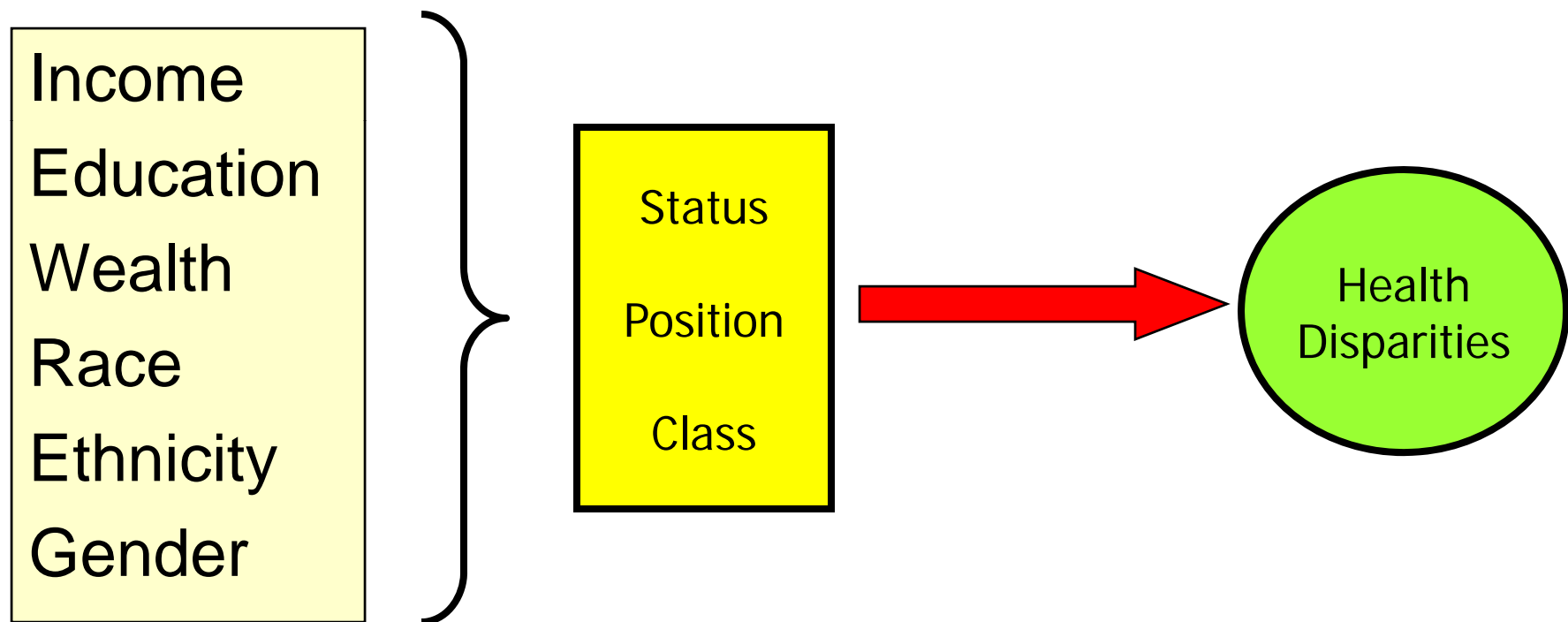


- Energy scarcity hypothesis imbalance generated through emotional expression and suppression

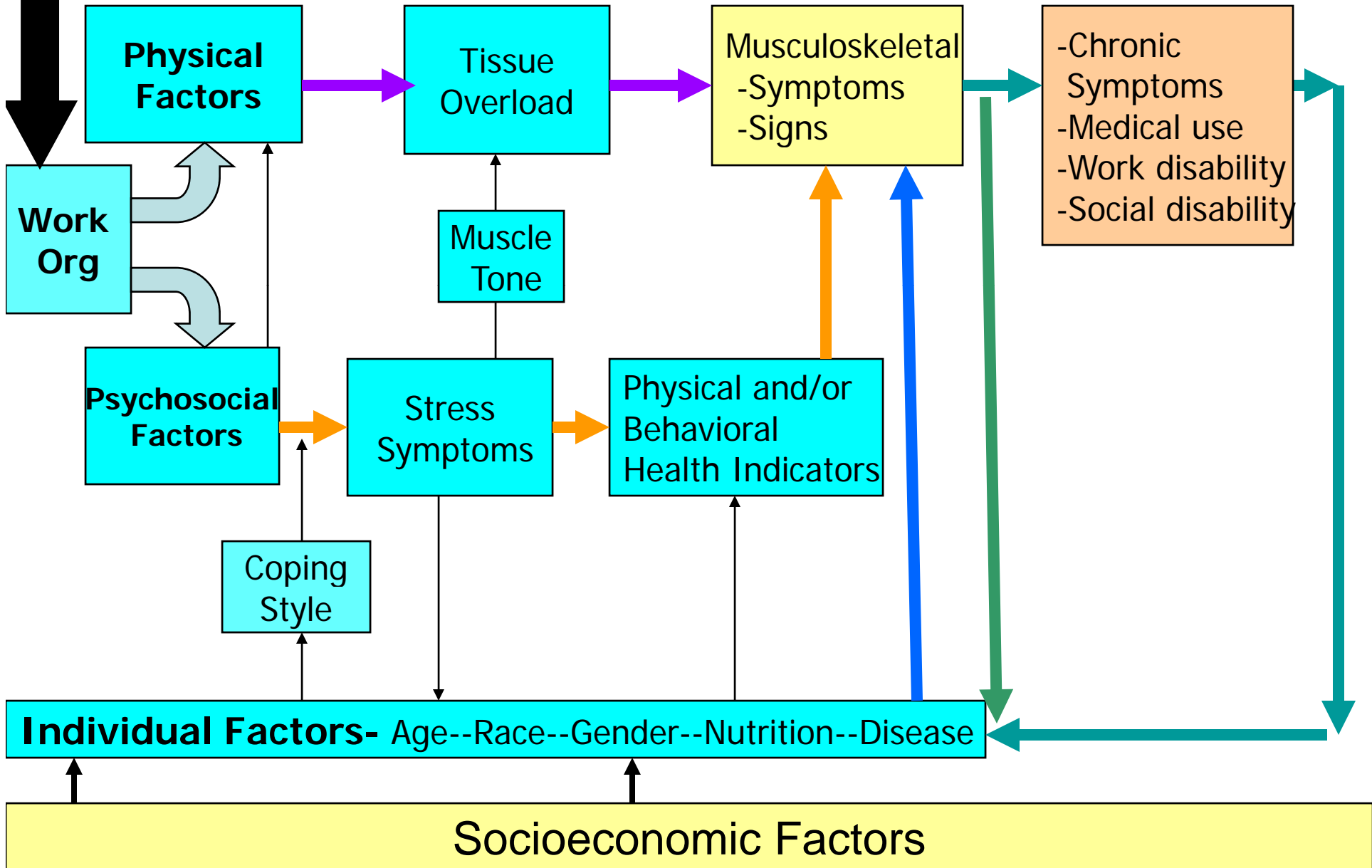
Individual/Demographic Risk Factors

- Age
- Genetics
- Health Status
- Lifestyle/Behaviors
 - Smoking
 - Exercise
 - Leisure Activities/hobbies
 - Body Mass Index (BMI)
- Previous back injury/illness
- Gender

Socioeconomic Status Constructs



Socioeconomic Factors



Studying work as a determinate of health disparities

- U.S. NIOSH Call for Proposals (2000)
 - Health Disparities among Healthcare Workers
 - “How much of the variation in health outcomes can be explained by SES and working conditions?”
 - The Promoting Healthy and Safe Employment (PHASE) in healthcare study (UML, 2001-2006)
 - Slatin et al. 2004; d’Errico et al. 2007; Cifuentes et al, 2007; Boyer et al. 2009 in press.

The Hospital Research Setting

- Hospitals are known to employ a diverse worker demographic from a spectrum of socioeconomic positions in jobs exposed to a range of ergonomic risk factors
- Musculoskeletal injuries are known to represent a large proportion of the work-related injuries reported among hospital workers
- Risk for hospital worker injury reporting related to combinations of ergonomic exposures, individual factors, and socioeconomic status are poorly described in the literature

Study I Aims:

- Observe exposures to manual handling, trunk posture, leg activities, and work organization risk factors
- Compare exposure to specified risk factors across clinical and non-clinical jobs in hospitals and nursing homes

Study I Methods

- Study Design, Setting, and Population
 - Exposure assessment of a sub-sample of adult workers in jobs from 2 hospitals and 2 nursing homes in Massachusetts
- Data Collection
 - Facility walk-throughs, workforce rosters, job descriptions
 - Direct observations of jobs level Postures, Activities, Tools, and Handling activities
 - Work organization checklists
- Statistical Exposure comparisons
 - between-job groups and between-facility types

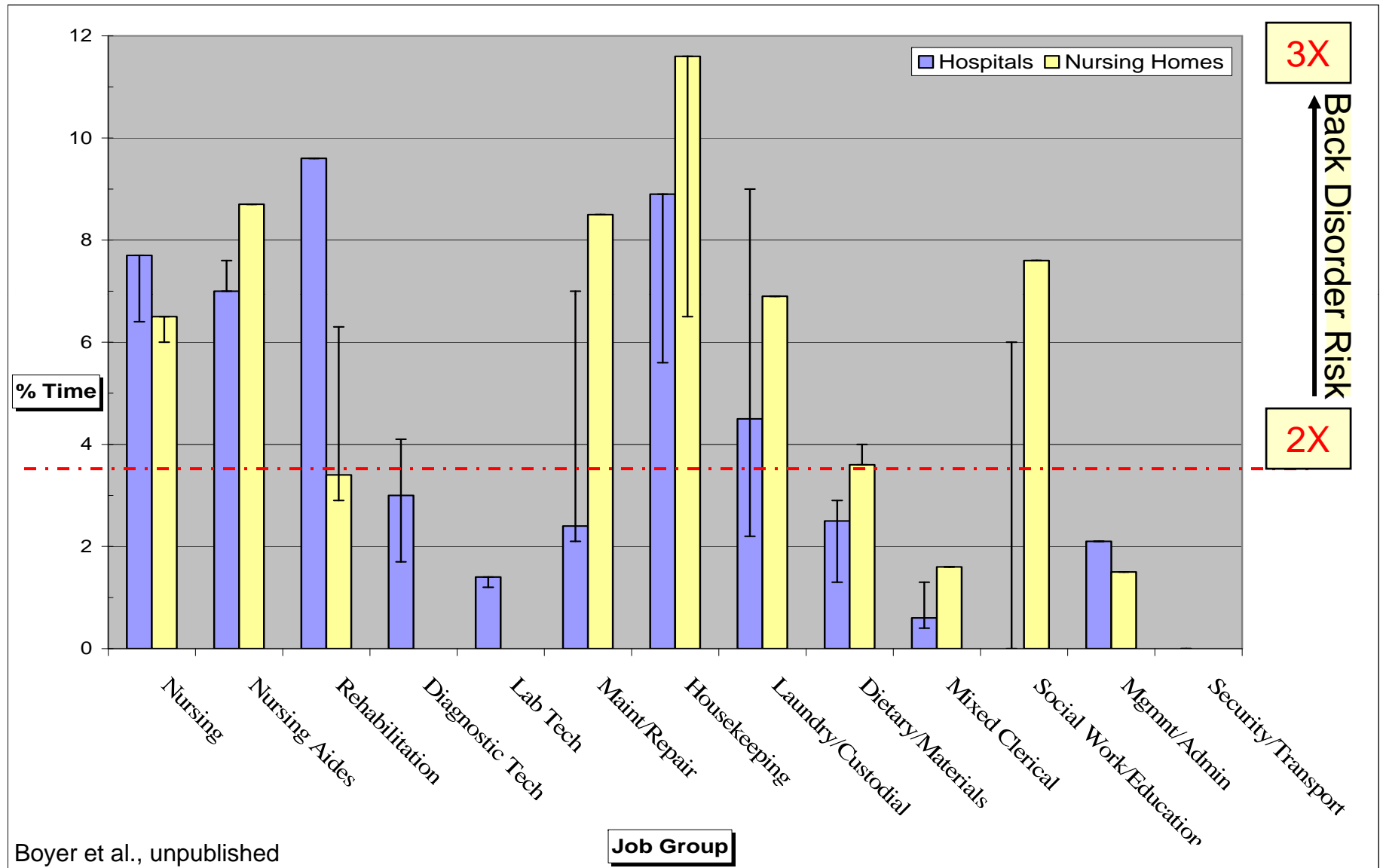
Observation Results by Ergonomic Job Group



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GROUP #	Ergonomic Job Group	Employed #	Job Titles Total	Job Titles # Observed	PATH Obs. #
1	Nurse	963	31	4	4,058
2	Nurse Aides	471	26	6	3,885
3	Rehabilitation	108	21	6	1,304
4	Diagnostic Tech	196	29	11	1,464
5	Lab Tech	203	25	10	1,946
6	Maint/Repair	57	18	7	801
7	Housekeeping	79	8	4	1,003
8	Laundry/Custodial	51	9	7	1,638
9	Dietary/Materials	159	42	14	3,172
10	Mixed Clerical	636	90	18	2,543
11	Social Work/Education	97	33	3	224
12	Mgmnt/Admin	368	129	8	679
13	Security/Transport	58	7	2	286
14	Paramedics	29	2	0	0
	Totals	3444	468	100	23,003

Median (Q1-Q3) percent work time observed in trunk flexion > 45 degrees by job group in hospitals and nursing homes

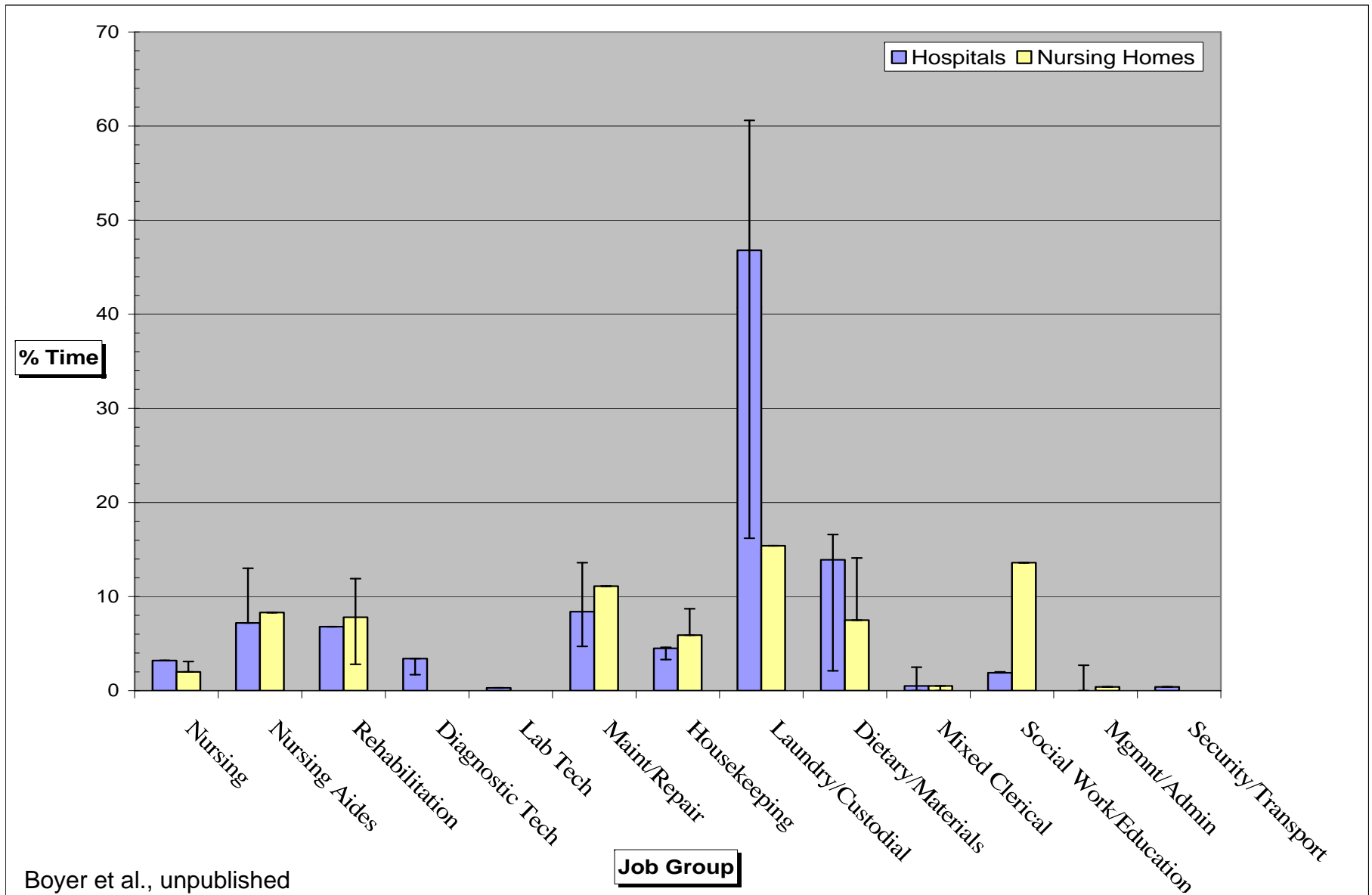


Boyer et al., unpublished

Median (Q1-Q3) percent work time observed handling loads > 10 pounds by job group in hospitals and nursing homes



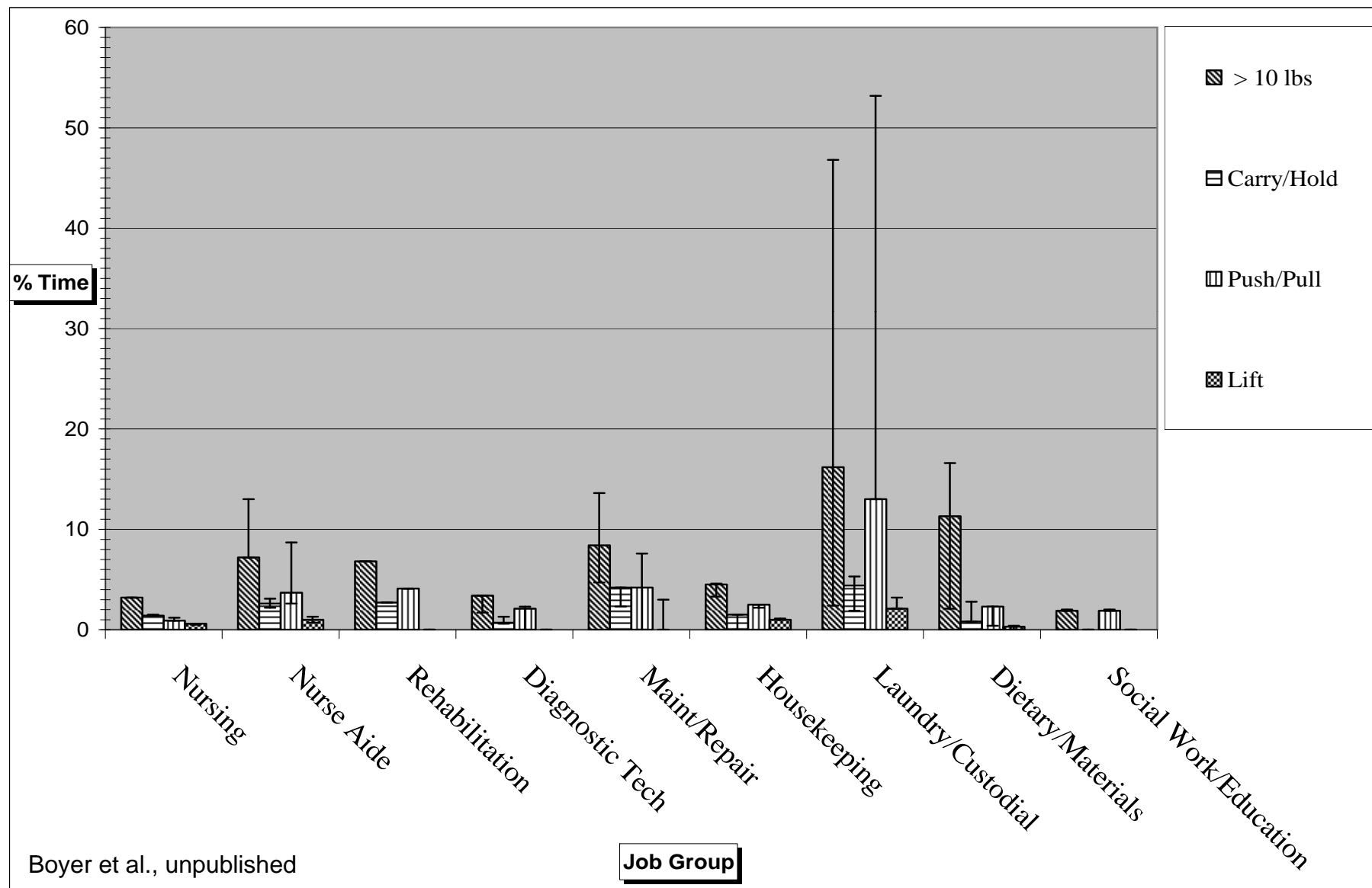
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Median (Q1-Q3) % work time observed in manual handling actions > 10 pounds by job group in hospitals



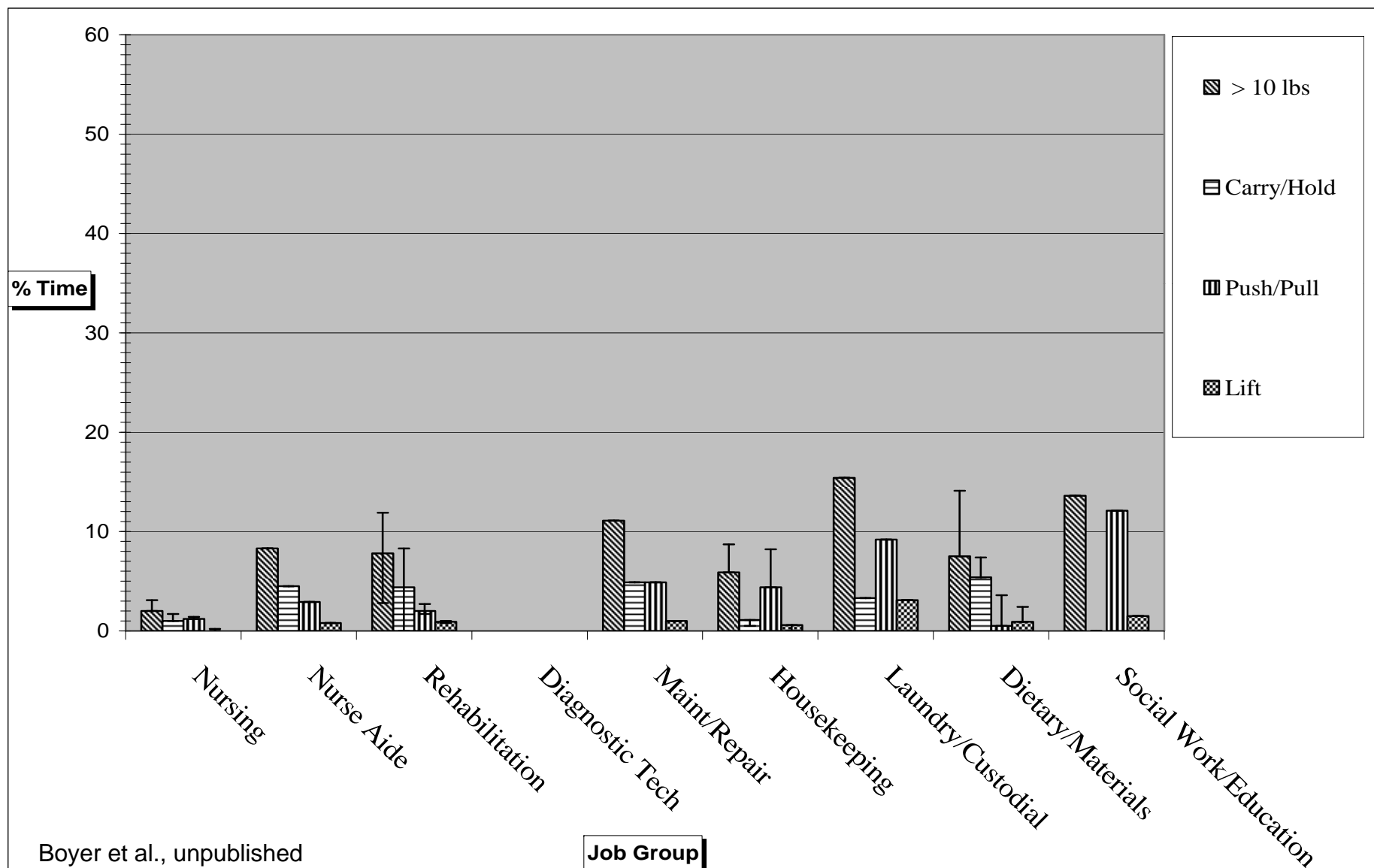
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Median (Q1-Q3) % work time observed in manual handling actions > 10 pounds by job group in nursing homes



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Study I Conclusions

- Exposures to manual handling, trunk posture loads, and stressful work organization factors were widespread
- Some jobs like housekeepers, custodians, and nurse's aides had the high exposures to multiple physical factors and the lowest opportunity for seated recovery
- Low between job group variability but some low and high groups were identified for each exposure tested
- Differences between hospitals and nursing homes were found only for time handling of the heaviest loads and sitting

Study II Aim

Estimate risk of workers' compensation (WC) claims for strain & sprain, back, and all injuries related to socioeconomic status, ergonomic working conditions, and individual worker factors

Boyer, J; Galizzi, M; Cifuentes, M; d'Errico, A; Gore, R; Punnett, L; Slatin, C; and the PHASE in Healthcare Team. 2009. Ergonomic and Socioeconomic Risk Factors for Hospital Workers' Compensation Injury Claims. AJIM in press.

Study II Methods

- Study Design, Setting, and Population
 - Prospective study among all adult employees in 1 Massachusetts hospital WC reporting yrs 2003-2005
- Information Sources
 - Workforce Rosters
 - Workers' Compensation reports
 - Ergonomic JEM database
 - From MA Hosp. observations & national data

Hospital Population Characteristics

Workers	All Workers	Injured
	n (%)	
Workers	1468 (100)	288 (19.6)
Female gender	1180 (80.4)	230 (79.9)
Non-white race	132 (8.9)	23 (7.9)
Per diem workers	354 (24.1)	33 (11.4)
	Mean (std)	
Age in years	42.8 (12.9)	42.3 (11.7)
Tenure in years	11.0 (10.1)	9.2 (9.7)
Hours scheduled per week	29.0 (10.8)	33.7 (10.8)
Hourly wage in dollars	21.4 (12.7)	21.4 (8.3)

Injury rates and percents for selected body part case groups

Injury case groups	Injuries per 100 FTEs (95% CI)	Percent of all cases*
All Back	1.4	11.5
Shoulder	0.5	3.7
Elbow, Wrist, Hand	3.5	29.3
Knee, Ankle, Foot	1.4	11.2
All injuries	11.9	100

* Does not sum to 100 % due to group overlap and groups not shown

Ranked injury incidence rates for selected job titles with at least 5 WC reports

JEM Job Title	All injuries per 100 FTEs (rank)	Sprain & Strain injuries per 100 FTEs (rank)	Back Injuries per 100 FTEs (rank)
Electrical repair & maintenance	67.6* (1)	1.9 (4)	13.4 (1)
Security Guards	29.2 (2)	-	-
Radiologic Technologists & Technicians	26.5 (3)	4.5 (1)	2.5 (5)
Maids and Housekeeping Cleaners	25.4 (4)	3.5 (3)	4.6 (2)
Registered Nurses	18.9 (5)	3.6 (2)	2.4 (6)
Food Preparation Workers	18.2 (6)	-	-
Surgical Technologists	16.6 (7)	0.47	3.3 (3)
Licensed Practical and Vocational Nurses	15.6 (8)	0.15	-
Janitors and Cleaners, Except Maids and Housekeeping	14.0 (9)	0.22	3.1 (4)
Laboratory Technologists and Technicians	13.8 (10)	0.32	0.46
Nursing Aides, Orderlies, and Attendants	13.0 (11)	1.3 (5)	2.5 (5)
Emergency Medical Technicians and Paramedics	11.1 (12)	0.22	1.6 (7)
Medical and Health Services Managers	7.4 (13)	0.48	-
Office Clerks, General	4.9 (14)	0.41	-

* All rate estimates significant $p < 0.05$ except rate for all injuries to electrical repair workers

Injury incidence rates per 100 FTEs for all injuries, strains & sprains, and back claims by SES category

PHASE SES	PHASE SES Label (n)	n workers	All Injuries rate per 100 FTEs (95% CI)	Strain & Sprain Injuries rate per 100 FTEs (95% CI)	Back Injuries rate per 100 FTEs (95% CI)
6	Administrators	55	2.6 (.97 to 6.9)	0.0 (no cases)	0.0 (no cases)
5	Professionals	227	8.8 (6.6 to 11.7)	2.7 (1.6 to 4.5)	1.3 (.64 to 2.8)
4	Nurses	358	18.5 (15.7 to 21.8)	4.6 (3.4 to 6.4)	2.1 (1.3 to 3.4)
3	Semi-Professionals	276	12.7 (10.1 to 15.8)	4.1 (2.8 to 6.1)	1.9 (1.1 to 3.3)
2	Skilled	445	8.1 (6.4 to 10.2)	1.4 (.77 to 2.4)	.45 (.17 to 1.2)
1	Semi-Skilled	107	16.6 (12.1 to 22.8)	3.5 (1.7 to 7.0)	2.2 (.91 to 5.2)
totals	All SES Categories	1468	11.9 (10.8 to 13.2)	3.0 (2.4 to 3.6)	1.4 (1.0 to 1.9)

Multivariate relative risk results for all injury types

Exposure or Risk Factor	Adjusted Relative Risk	Adjusted 95 % CI	Adjusted p-value
Non-white Race	0.57	0.38 to 0.87	.0201
Female Gender	0.84	0.63 to 1.1	.1648
Age in years	1.1	1.1 to 1.2	.0351
Tenure (< 2 years)	4.6	3.7 to 5.9	<.0001
Physical Work Scale	1.3	1.1 to 1.5	.0004
Psychological Demands	1.2	1.1 to 1.4	.0212
Psychosocial Rewards	0.68	0.52 to 0.89	.0465
Supervisor Support	0.78	0.58 to 0.97	.0489
PHASE SES Job Groups			
Administrators (reference)	-	-	-
Professionals	2.2	0.79 to 6.3	.1988
Nurses	2.8	0.99 to 8.0	.2098
<i>Semi-Professionals</i>	3.2	<i>1.1 to 9.0</i>	<i>.0498</i>
Skilled	2.1	0.72 to 6.2	.2655
Semi-Skilled	2.6	0.80 to 8.3	.2037

Multivariate relative risks for strains & sprains

Exposure or Risk Factor	Adjusted Relative Risk*	Adjusted 95 % CI	Adjusted p-value
Non-white Race	0.41	0.15 to 1.1	.1009
Female Gender	0.46	0.24 to 0.88	.0196
Age in years	1.1	1.0 to 1.3	.0492
Tenure (< 2 years)	3.9	2.4 to 6.4	<.0001
Time in Manual Handling Activities	1.4	1.1 to 1.7	.0314

Multivariate risk results for back segment injuries

Exposure or Risk Factor	Adjusted Relative Risk*	Adjusted 95 % CI	Adjusted p-value
Non-white Race	0.67	0.20 to 2.2	.5575
Female Gender	0.56	0.25 to 1.3	.1140
Age in years	1.2	0.98 to 1.4	.1762
Tenure (< 2 years)	4.9	2.5 to 9.9	<.0001
Time Bending and Twisting the Trunk	2.3	1.5 to 3.4	.0031

Results Summary & Conclusions

- Physical workload exposures and psychological demands were related to a 20 to 210 percent increase in claims risk
- Increased psychosocial rewards and supervisor support decreased claim risk for all injuries by 20-30 percent
- Low job tenure increased risk of reporting by 3 to 5 times
- Physical, psychosocial, and individual factors all weakened the relationship between SES and risk of filing a claim for any WC injury

Voices from the Field: Hospitals

- White female staff nurse:

“ We run around crazy for the entire shift and all the paperwork builds up. At the end, we spend hours trying to get our notes and stuff done. Then, we get asked to do a double shift to cover for someone who is out sick. You can understand why we get burned out and some patients think we don't care. ”
- White female dialysis technician:

“ The patients just keep coming in the door. We have no time to check them in and no place to put them because the machines are all taken. So we get them weighed-in and try to keep them comfortable but it takes a toll on them and us. ”

Voices from the Field: Nursing homes

- Haitian male laundry worker:

“ I don’t care how much I have to lift or how much shit I have to clean, I just want to be able to pay my bills ! Yes, my back hurts but what am I supposed to do ? ”

- Dominican female housekeeper:

“ My hourly rate hasn’t changed since I was hired 10 years ago but now they expect me to do more work for the same money. Patient rooms and common areas are now my responsibility. If I finish my work then I have to go fold in the laundry. My body hurts every day. ”

Interpretation of workers' voices and epidemiologic analyses:

- Dedicated workforce under stress from:
 - excessive physical and mental workloads,
 - lack of control over demands,
 - perceived mismatch between services rendered and rewards received
- Lack of satisfaction with rewards strongest in low status employees
- Healthcare workers are aware that their working conditions are affecting their health and the quality of patient care

Implications for Intervention

- Interventions designed to reduce disparities in WC reporting risk among hospital workers should focus on:
 - Reduction of known physical workload factors
 - Increased hazard awareness and safe work method training, gradual workload increases, and screening processes for new employees
 - Increasing employee sense of satisfaction with financial, professional, and personal rewards from work
 - Develop policies and practices for social and financial support of injured workers who report work-related injuries

Hospital Study Limitations

- No strain/sprain or back injury reports among occupations in highest SES categories
- Risk related to previous injuries not examined
- Potential underreporting of WC data injuries
- Single facility study limits evaluation of variation across hospitals

Hospital Study Strengths

- Uses innovated exposure assessment methods to estimate risks for workers compensation case reporting
- Uses multiple exposure measures from different source types that were obtained independent of case status
- Exposures & outcomes collected with different methods
- Uses a prospective design with exposures and outcomes collected from the same population of workers during the same time period

The Big Question: Why do occupational injuries continue to happen?

To Be Continued.....



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Thanks!

