



COEH CENTER FOR OCCUPATIONAL
& ENVIRONMENTAL HEALTH

The California Janitor Workload Study

Updates to the California Commission on
Health and Safety and Workers'
Compensation
December 8, 2023



Survey

- COVID-19 impact
- Assess Exposures
- Mental/Physical Health

Focus Groups

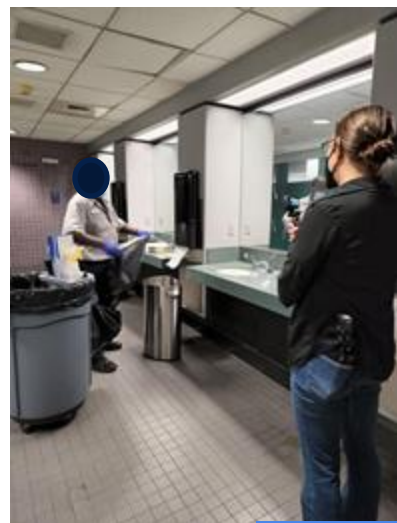
(Labor Occupational Health Program - LOHP)

- Work changes
- Productivity Requirements
- Management challenges

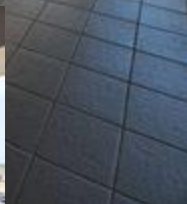
Time Motion Study

- Biomechanical exposures/risk
 - 4 venues: office, mall, event space, airport
- Compare actual to ISSA production rates

On-site Data Collection



Handheld
Camera



Wearable
Sensors



Direct Measurements

On-site Data Collection

Venue 1
Mall (N=16)

Data Collection in
progress (N=9)

Venue 2
Airport (N=16)

Data Collection in
progress (N=4)

Venue 3
Event/Convention
(N=16)

Data Collection in
progress (N=16) *Completed

Venue 4
Office Buildings
(N=16)

Data Collection in
Progress (N=1) + Explore Access

30 of 64
(47%)

Detailed Video Analysis

- Multi-Video Task Analysis (MVTA)
- Cumulative Time on Task by Space

The screenshot displays a video analysis software interface. At the top, there is a multi-colored timeline bar representing task events. Below this is a video feed of a person in an orange shirt cleaning a desk in an office. A yellow circle highlights the person's head. To the left of the video is a 'Records' panel with a 'Frame#:' input field and a list of task categories: 1: Task, 2: Space, 3: Right Hand Tool, and 4: Left Hand Tool. To the right is an 'Events' list with various task names and corresponding colored icons, including Dry Mopping, Dusting, Disinfecting, Wet Mopping, Sweeping, Litter Pick Up, Trashing, Resupply, Walking, Transport, Standing, Furniture Moving, PPE, Wiping, Washing windows, Washing mirrors, Vacuum cleaning, Dish washing, Cleaning Sink, Cleaning Toilet, Repair, Break, and Null. The video feed shows a timestamp of 07:32;22;34 and a frame rate of 30 frames per second. The text 'Detailed Video Analysis' and '30 frames per second' is overlaid at the bottom of the interface.

Detailed Video Analysis

- Venue-Specific Vocabulary List

Space

Bathroom General, Hallway/Walkway, Common Space, Outdoor, Cafeteria/Lounge/Kitchen, Office/Cubicle, Supply Closet, Janitorial Storage, Trash area/Recycling area, Meeting Room, Elevator, Escalator, Breaktime

Task

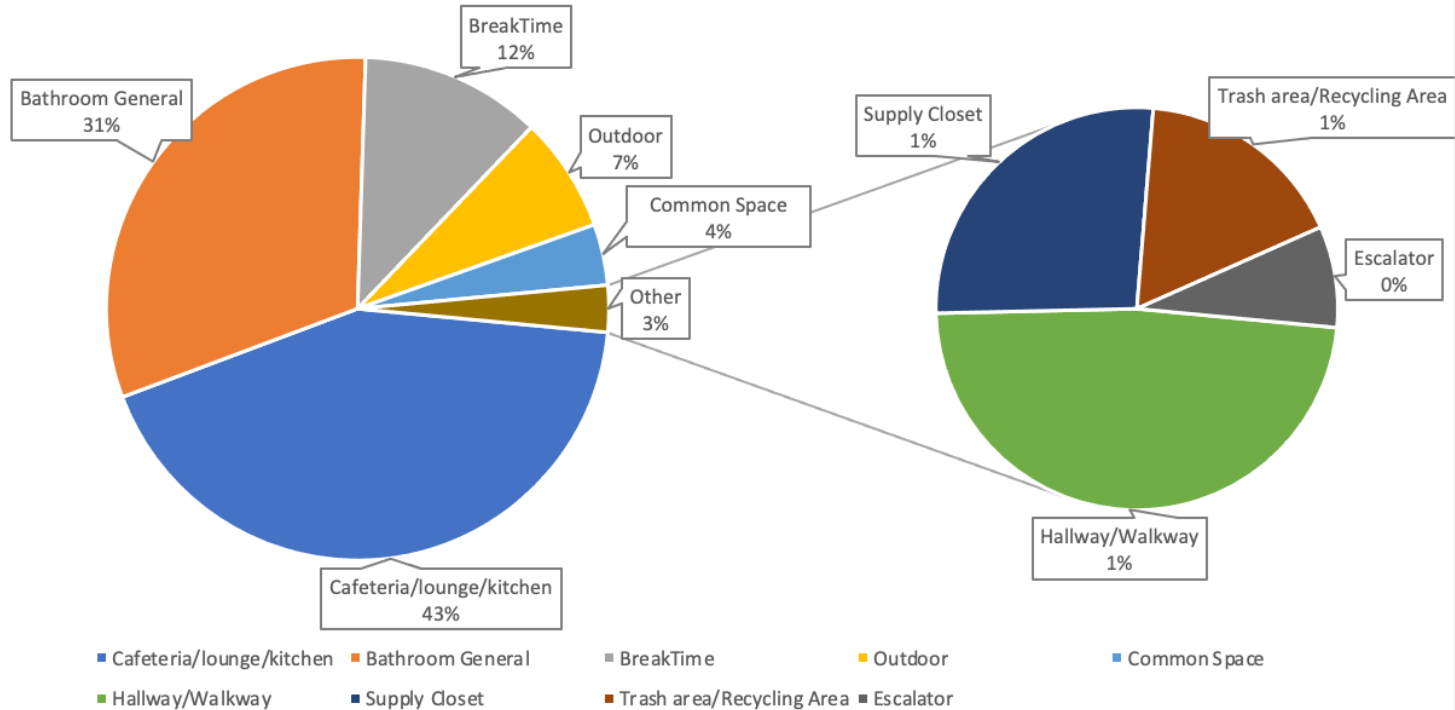
Washing Windows, Washing/Cleaning Mirrors, Wet Mopping, Dry Mopping, Sweeping, Litter Pick Up, Disinfecting/Scrubbing, Dusting, Wiping, Trashing, Resupply, Transport, Walking, Standing, Furniture Moving, PPE, Vacuum Cleaning, Cleaning toilet, Cleaning sink, Breaktime

Tool

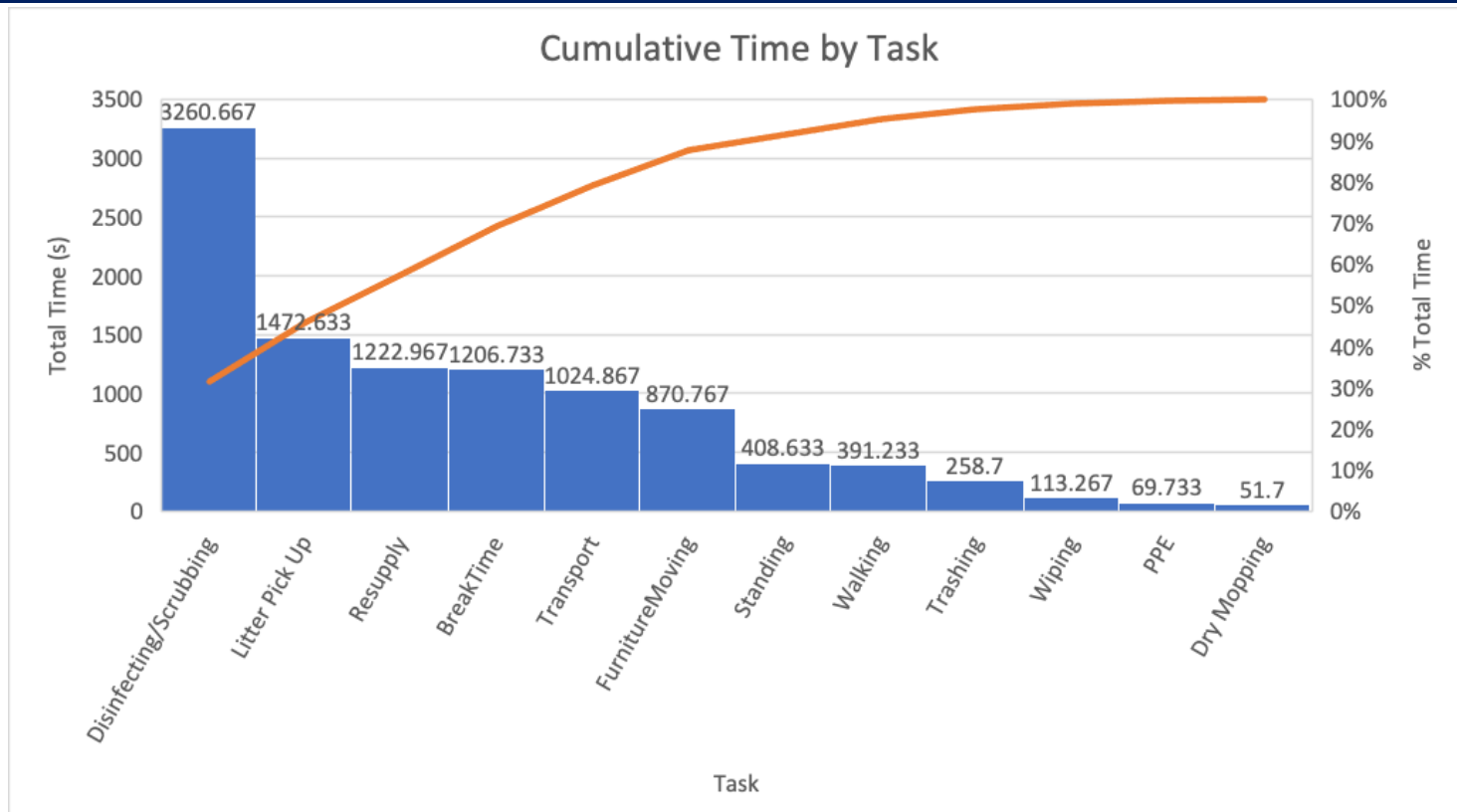
Brooms/Dust Pan, Rag/Paper Towel/Sponge, Trash Barrels, Trash, Picker Upper/Tongs, Duster, Duster Mop, Spray Bottle, Spray bottle trigger, Wet Mop + Mop Bucket, Supplies, Toilet brush, Bucket, Vacuum Cleaner, Cart, Vacuum + Cart, **Walkie Talkie, Hands, No exertion, Breaktime

Results

Time Allocation by Location



Results



ISSA Production Rate

- To calculate cleaning times
- Estimates workloads based on cleaning tasks and the time it takes to complete them.

UNIQUE ID	TASK	TOOL	TIME		
			unit	minutes	seconds
RPO-1	Disinfect toilet	Toilet brush, spray bottle, disinfectant, and cloth	Toilet	0.25	15
RPO-2	Disinfect toilet	Ergonomic-handle toilet brush, spray bottle, disinfectant, and cloth	Toilet	0.22	13
RPO-3	Empty trash, replace supplies, and spot clean surfaces—heavy use	Trash liners, consumable supplies, chemical, cleaning cloths, and mop and bucket on cart or barrel	Per fixture	0.67	40

Risk Assessment

Task	Primary Risk	Risk Assessment Tool
Trashing, Wiping, Disinfecting/Wiping, Mopping, Vacuum	Hand exertion	ACGIHTLV for Hand Activity Level (HAL)
Transport	Push & Pull	Ohio Bureau Worker's Comp (OBWC)
Moving furniture	Lifting	Revised NIOSH Lifting Equation (RNLE)

Workload Calculator (Bao et al, 2023)

Janitors Workload Calculator

SHARP Program
Department of Labor and Industries, Olympia, WA

This calculator is intended to address workload concerns among

This calculator can be used by:

1. Managers/supervisors who want to design janitorial jobs (i.e. assign janitors with various tasks) in order to complete a janitorial contract.
2. Managers/supervisors who want to evaluate workloads for their janitors at a given contract site.
3. EHS practitioners who want to conduct job evaluations for a specific janitorial worker.

Disclaimer: This calculator is based on field data collected among a number of work in several commercial office buildings in Washington State contracted by a participating janitorial firm. The available job tasks may be limited but can be expanded in the future whenever available.

I am a manager/supervisor and want to design a new janitorial job.

I am a manager/supervisor and want to evaluate the workload of

I am an EHS practitioner and want to conduct a job risk evaluation

Task, Location and Tool

Task	Location	Tool	Variation	Hours	Quantity
Damp Mopping	Hard Flooring (damp mop)	Flat Mop (hard floor)	Use bucket, area with obstacles	2	12000 *
Trashing	Offices/Cubicles	Small trash bin w/ liner (o	Stands to empty bins	2	50 *
Vacuuuming	Office/cubicle (vacuuming)	Backpack vacuum (office/i	None	2	12000 *
Restroom/Locker Roo	Restroom (cleaning)	Tools for cleaning surfaces	Straight-handled toilet brush, stri	2	50 *

All fields need to be filled.

Generate Report Start Over

Today's Updates

Assess the associations between:

Physical Workload and adverse mental and physical health outcomes between union and non-union workers.

Physical Workload

Data Collection

- Cross-sectional survey sent to 40,000 CA janitors in a union (SEIU) and non-union organization (MCTF)
- Spanish & English
- email/text interview

Exposures

- 16 common tasks (vacuuming, dusting, mopping, etc.)
- Workload index: arbitrary unit
 - - intensity x frequency x duration
- Typical intensity: intensity of task done for most time
- Peak intensity: maximum intensity of all tasks

Exposures

Task	Intensity	Frequency	Duration	Workload Index**
Dusting	6	5	3	90
Mopping	5	3	2	30
Vacuum	8	2	2	32
Trash	4	5	4	80
				232

** Workload Index = Intensity * Frequency * duration

Job Strain

Modified Job Content Questionnaire (JCQ) survey (Karasek, 1998)

4-point scale - strongly disagree to strongly agree

Decision Latitude (job control)

1. On my job, I have very little freedom to decide how I do my work
2. I have a lot of say about what happens on my job
3. My job allows me to make a lot of decisions on my own

Psychological Demands (job demand)

1. I do not have enough time to get my job done
2. My job requires very fast work
3. My job requires very hard work
4. My job requires excessive work
5. My job involves conflicting demands

Adverse Health Outcomes

Adverse Physical Health Outcomes

- Severe Pain: measured using 10-point numeric pain scale
 - 4 body regions: Neck/shoulder, elbow/hand/wrist, back, hip/knee/ankle
 - Average score ≥ 5 considered severe
- Medication Use: regularly take pain meds at least 1 week per month
- Missed work due to pain: ≥ 1 day every other month or more
- Work-related injury: ≥ 1 in last year

Adverse Mental Health Outcomes

- Anxiety: ≥ 10 using Generalized Anxiety Depression Scale (GAD-7)
- Depression: ≥ 10 using PHQ-9

Statistical Analysis

- To evaluate the associations, odds ratios and 95% confidence intervals calculated using logistic regressions
 - Physical Workload and adverse health outcomes
- All models were adjusted for sex and age
 - Education, comorbidities, and smoking were determined to not be confounders

Table 1: Distribution of Selected Characteristics Overall and Stratified by Union Membership Among Janitors in California in 2022.

	Union (N=257)	Non-union (N=146)	Overall (N=403)
Sex			
Male	64 (24.9%)	29 (19.9%)	93 (23.1%)
Female	190 (73.9%)	106 (72.6%)	296 (73.4%)
Prefer Not to Answer	3 (1.2%)	11 (7.5%)	14 (3.5%)
Age Category			
14-29	4 (1.6%)	6 (4.1%)	10 (2.5%)
30-49	106 (41.2%)	67 (45.9%)	173 (42.9%)
50-65	129 (50.2%)	62 (42.5%)	191 (47.4%)
> 65	18 (7.0%)	11 (7.5%)	29 (7.2%)
Ethnicity			
Asian	2 (0.8%)	0 (0%)	2 (0.5%)
Black	4 (1.6%)	0 (0%)	4 (1.0%)
Hispanic	244 (94.9%)	146 (100%)	390 (96.8%)
White	5 (1.9%)	0 (0%)	5 (1.2%)
Other	2 (0.8%)	0 (0%)	2 (0.5%)
Total Years as a Janitor			
Mean (SD)	13.3 (9.33)	11.2 (7.62)	12.5 (8.80)
Median [Min, Max]	11.0 [0, 40.0]	10.0 [0, 40.0]	10.0 [0, 40.0]

Results

Distribution of Union vs Non-Union Workers

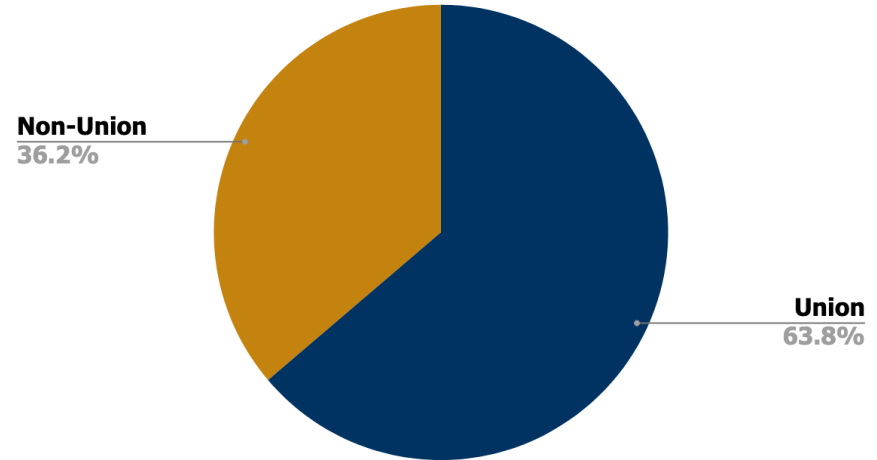


Table 2. Association of Physical Workload with Odds of Severe Pain Prevalence Among Janitors in CA in 2022 (N= 360)

	Odds Ratio (95% CI) ⁱ		
	Crude	Union	Non-Union
Peak Intensity	1.68 (1.44 - 1.95)	1.63 (1.36 - 1.95)	1.90 (1.39-2.60)
Low ⁱⁱ	1.00	1.00	1.00
High	4.44 (2.75 - 7.61)	5.24 (2.83 - 9.71)	3.57 (1.61 - 7.91)
Typical Intensity	1.50 (1.34 - 1.68)	1.44 (1.26 - 1.64)	1.68 (1.33 - 2.12)
Low ⁱⁱ	1.00	1.00	1.00
Medium	3.82 (2.23 - 6.56)	3.10 (1.63 - 5.91)	5.85 (2.04 - 16.81)
High	11.14 (5.77 - 21.52)	11.52 (5.02 - 26.44)	12.13 (3.77 - 39.01)
Workload Index			
Low ⁱⁱ	1.00	1.00	1.00
Medium	2.22 (1.29 - 3.81)	1.67 (0.87 - 3.21)	8.71 (4.04 - 18.79)
High	9.50 (5.12 - 17.64)	4.19 (1.51-11.64)	13.35 (4.37 - 40.77)

ⁱ Estimated in logistic regression model, adjusting for categorical age and sex.

ⁱⁱ Reference Category.

Table 2.1 Association of Physical Workload with Odds of Anxiety/Depression Prevalence Among Janitors in CA in 2022 (N= 344)

	Crude	Odds Ratio (95% CI) ⁱ	
		Union	Non-Union
Peak Intensity	1.28 (1.05 - 1.57)	1.41 (1.07-1.84)	1.15 (0.84 - 1.57)
Low ⁱⁱ	1.00	1.00	1.00
High	1.88 (1.05 - 3.33)	2.82 (1.35 - 5.89)	0.98 (0.36 - 2.66)
Typical Intensity	1.18 (1.02 - 1.36)	1.26 (1.05 - 1.52)	1.09 (0.86 - 1.38)
Low ⁱⁱ	1.00	1.00	1.00
Medium	1.04 (0.49 - 2.19)	1.00 (0.37 - 2.69)	1.36 (0.40 - 4.59)
High	2.18 (1.05 - 4.53)	3.39 (1.36 - 8.46)	1.03 (0.26 - 4.04)
Workload Index			
Low ⁱⁱ	1.00	1.00	1.00
Medium	1.67 (0.78 - 3.62)	1.61 (0.61 - 4.22)	1.98 (0.53 - 7.46)
High	2.14 (1.01 - 4.50)	2.25 (0.90 - 5.62)	2.23 (0.59 - 8.45)

ⁱ Estimated in logistic regression model, adjusting for categorical age and sex.

ⁱⁱ Reference Category.

Conclusion

We found a **high burden** of workload and negative health outcomes in CA janitors in 2022.

- **For severe pain prevalence:** Non-union janitors were found to have increased odds compared to Union janitors.
- **For depression and anxiety:** High prevalence of adverse mental health outcomes were found across all janitors with Union janitors associated with marginally increased odds.

Conclusion

- Union status has shown to result in differences in health outcomes across different occupations and labor industries though limited studies have been conducted on associations among Janitors.
- This study has shown that these associations are worth further exploration and understanding in addressing and reducing occupational health disparities among Janitors in California.

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