

# Hotel Housekeeper Job

## Musculoskeletal Disorder Risk

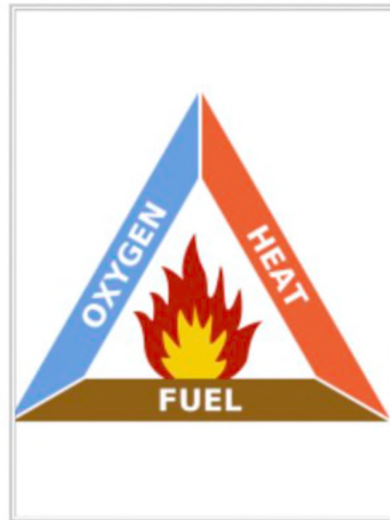
STEVEN F. WIKER, PH.D., CPE

## QUESTIONS

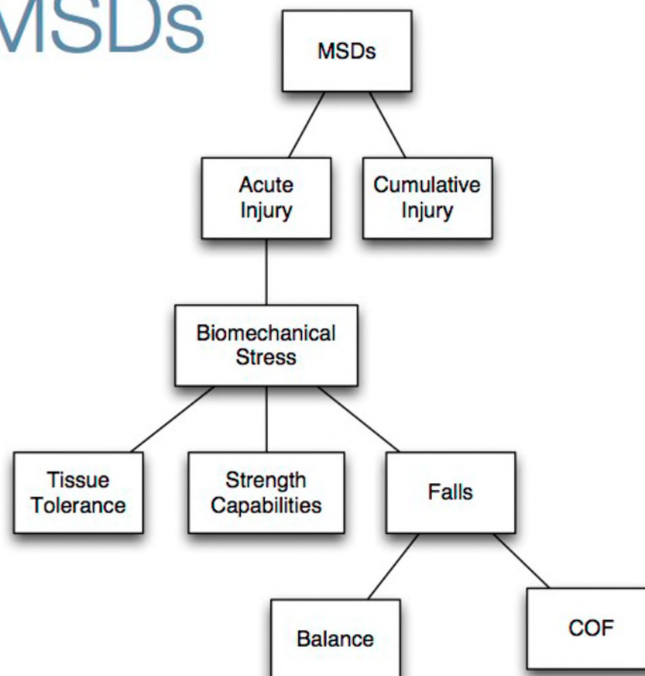
- \* Housekeepers at risk for work-induced MSDs?
- \* If not, why not?
- \* If so, what can we do to eliminate hazards?

# MSD Analog to Fire Risk

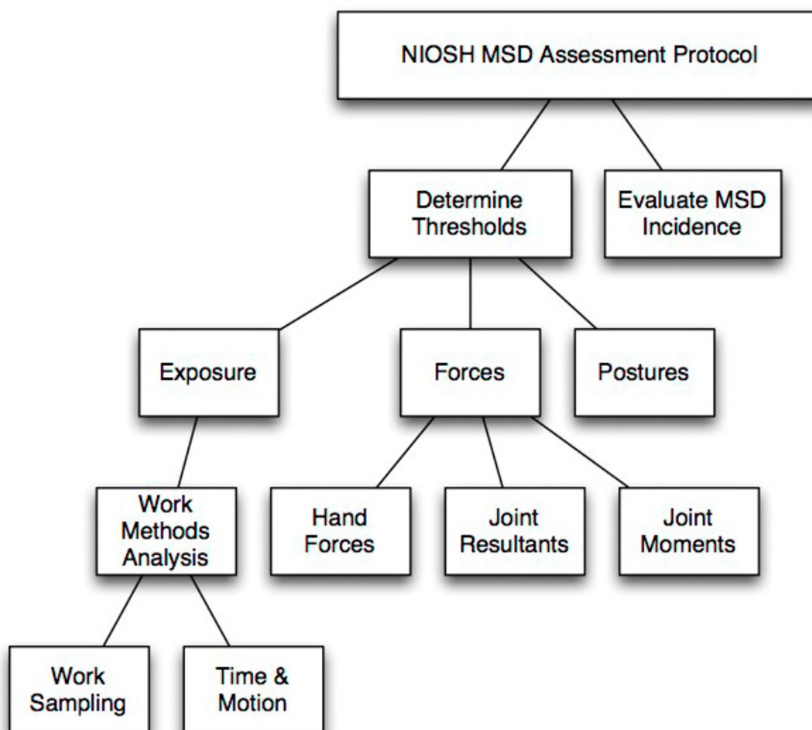
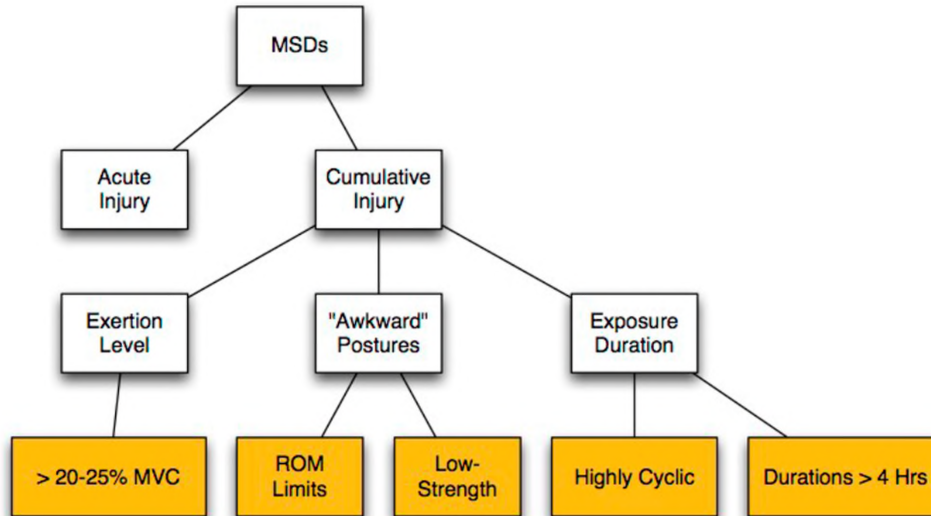
- \* Thresholds
  - \* Forces > 20 % MVC
  - \* Awkward Postures
  - \* Adequate Exposure
    - \* 4 Hrs + Per Shift, or
    - \* Highly Cyclic



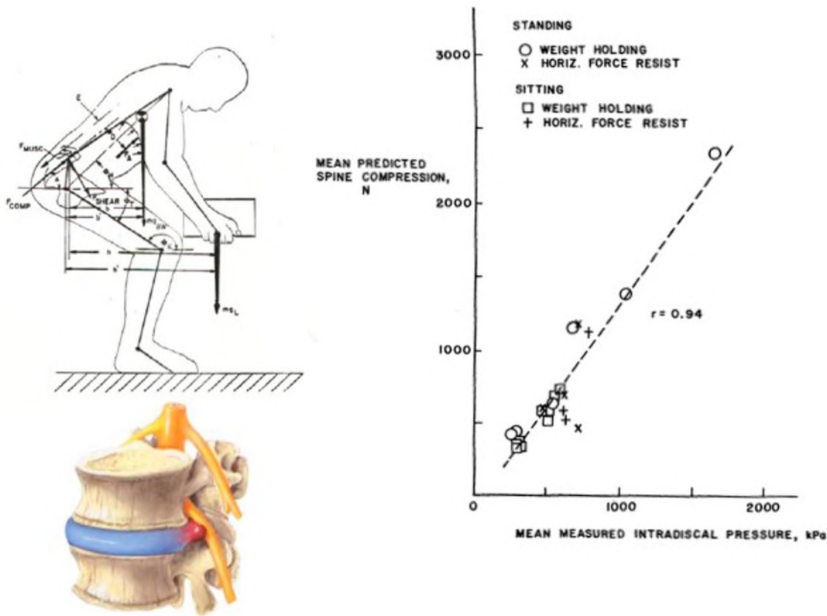
# Acute MSDs



# Cumulative MSDs



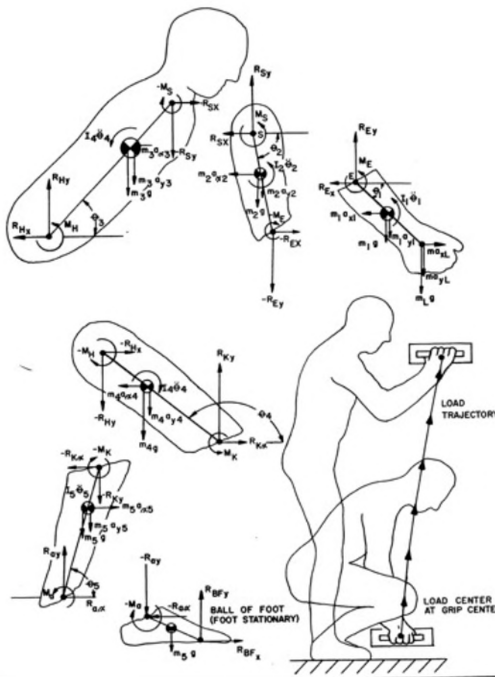
# Biomechanical Model



# Postural Recording

- \* Kinematic Recording System
- \* Continuous HD Video Recordings

## Ground Reaction Forces Measure Hand Forces



## Hand Forces (Static v. Dynamic?)

- \* Dynamic Forces
  - \* 1G (Static) + Exertion Acceleration or Dynamic Component
- \* Spinal Tissue Stress is More Tolerant of Static Stress
  - \* NIOSH AL ~ 7 x Body Weight Above Spinal Segments
  - \* Ejection Seats ~ 18 x Body Weight Above Spinal Segments

# Participants

- \* Trained
- \* Experienced
- \* All Females
- \* No MSD History
- \* Paid Normally

Housekeeper	Age (Yrs)	Stature (cm)	Body Mass (kg)
1	21	152.4	56.8
2	37	147.3	56.8
3	42	147.3	54.5
4	22	147.3	54.5
5	35	162.6	68.2
6	28	161.3	68.2
7	35	152.4	72.7
8	46	149.9	44.5
9	40	147.3	45.0
10	35	160.2	68.0
Min	21	147.3	44.5
Max	46	162.6	72.7
SD	8.2	6.2	10.0
Mean	34.1	152.8	58.9



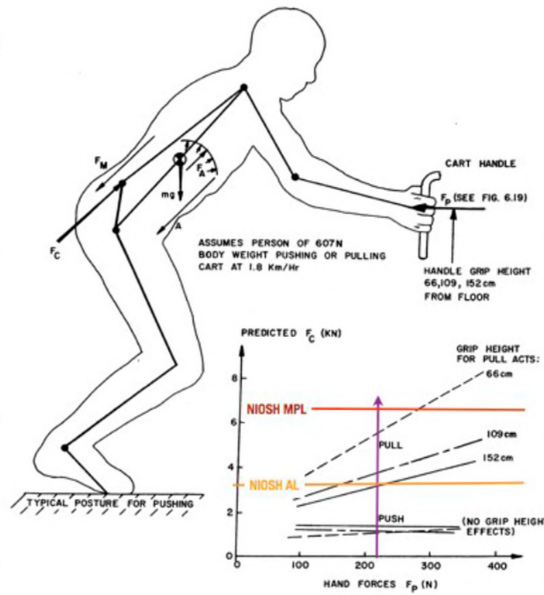
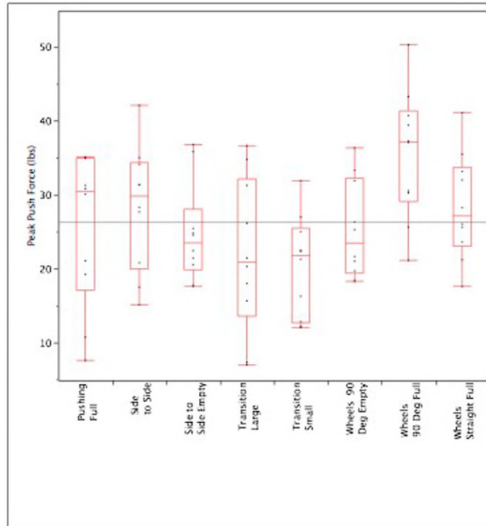
**FORBS HOUSEKEEPER CART**  
LOADED (290 LBS) V. EMPTY (108 LBS)







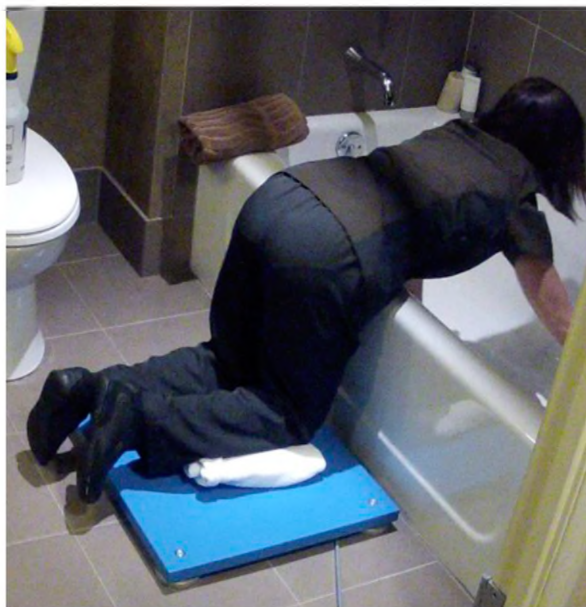




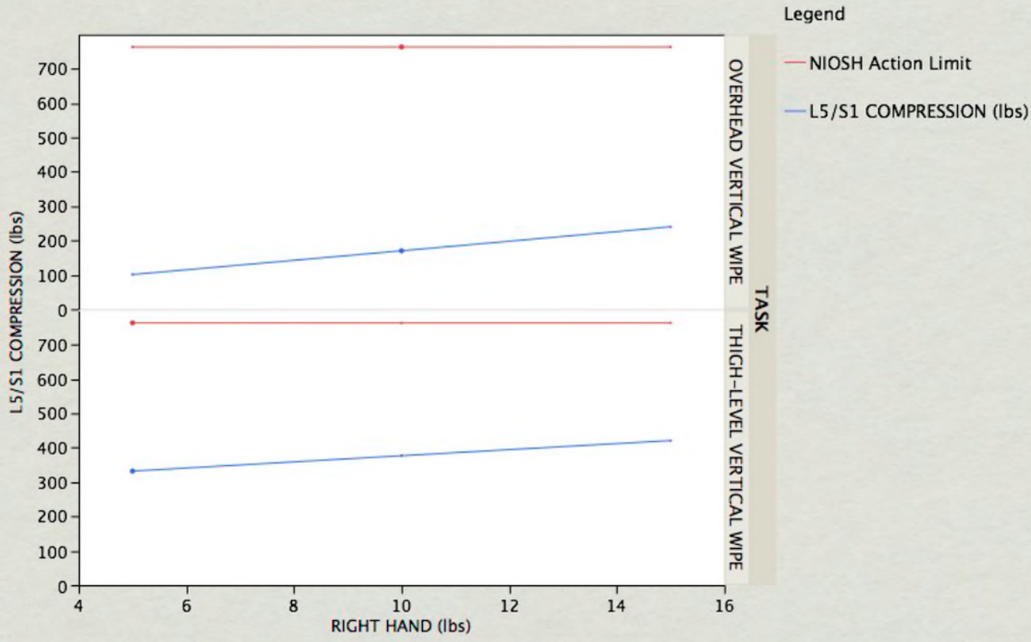
## CART AND CHAIR PUSHING RESULTS

## Bathtub Cleaning

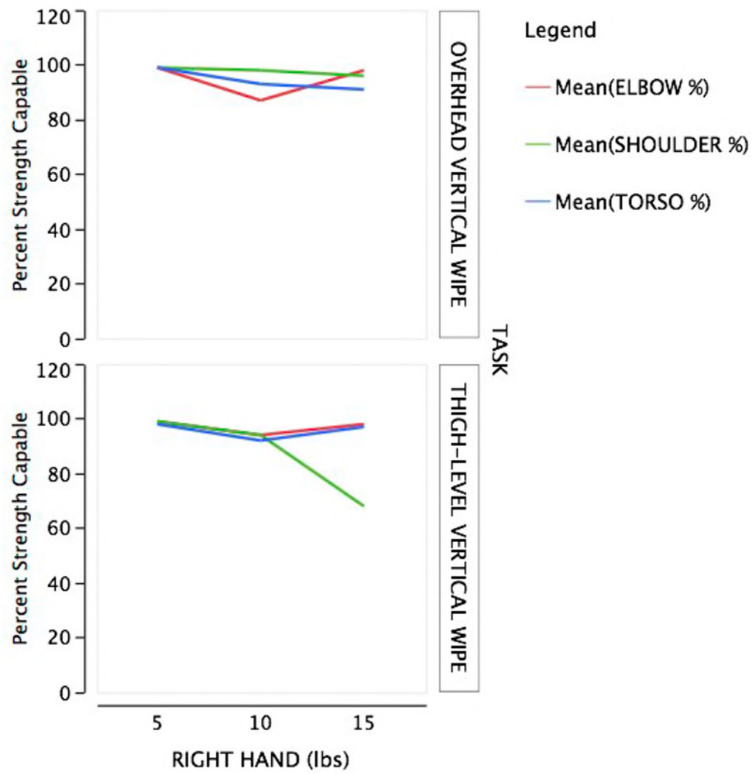
- \* Multiple Body Support
  - \* Bathtub Rail
  - \* Bathtub Standing Surface
- \* Safe Fcomp & Low-Strength Demand



## VERTICAL WIPING



## VERTICAL WIPING STRENGTH DEMANDS







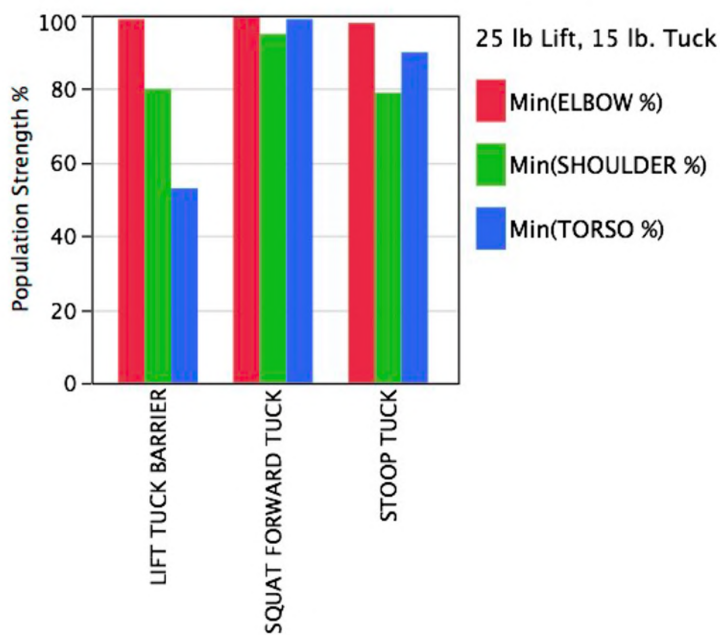
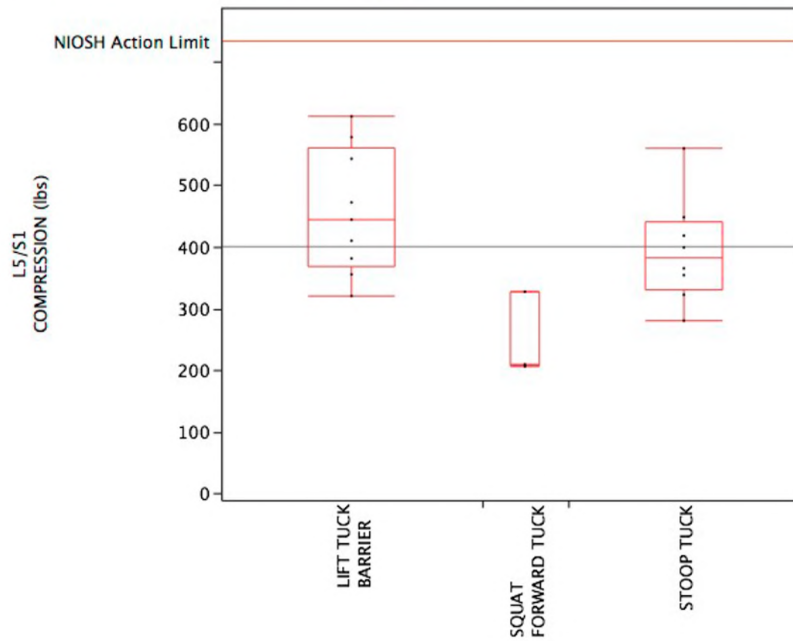








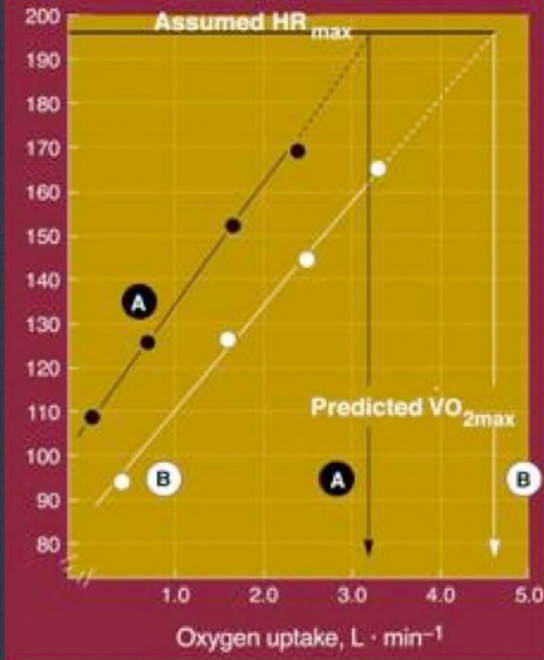
# Bed Making Flat Sheets



## STRENGTH DEMANDS MAKING BEDS

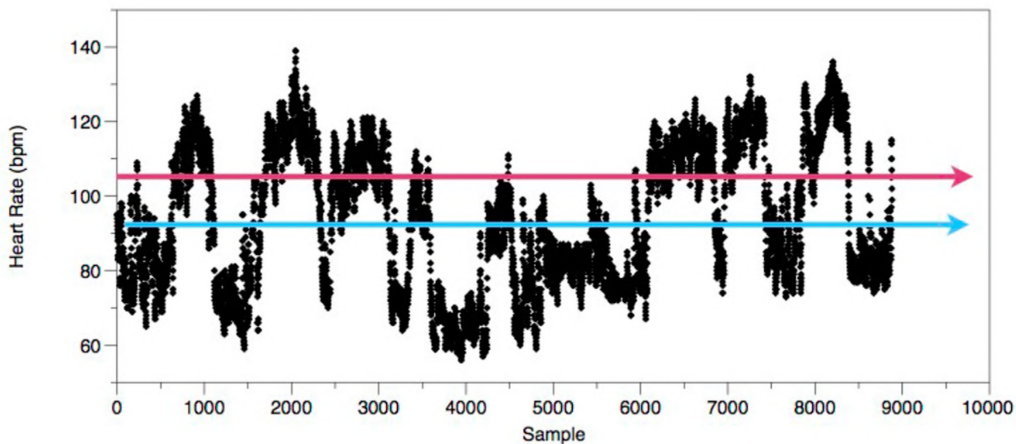


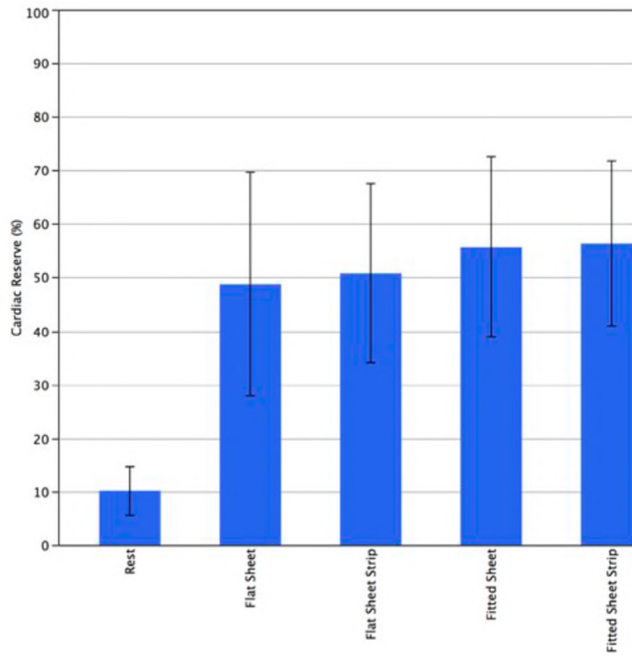




## CARDIAC & ENERGY CONSUMPTION

## Heart Rate During Work Sampling Study





## CARDIAC RESERVE DEMAND

### BED MAKING WITH FLAT AND FITTED SHEETS

# Work Sampling Results

Activity	MSD Risk	Percent (%)	MSD x Percent
Move Desk Chair	0	0.5	0
Sink	0	1	0
Stand	0	1	0
Wiping	0	2	0
Mop	0	2	0
Shower Wall	1	2	2
Toilet	0	2	0
Carry Linen	0	6	0
Missing (Behind Bathroom Door)	0	10	0
Dust	0	11	0
Other (Clipboard, Trash, Arrange)	0	11	0
Walk	0	12	0
Fabreeze	1	1	1
Vertical Wiping	0	1	0
Tub	1	4	4
Vacuum	1	8	8
Make Bed	1	26	26
			Sum = 41 %

