**Supplemental Table SI.** Duration (mean minutes/shift) of cleaning and disinfecting tasks by occupation and unit

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Occupation** | **Unit** | **Equipment Cleaning****(Min-Max)** | **Floor Cleaning****(Min-Max)** | **Instrument Cleaning****(Min-Max)** | **Fixed Surface Cleaning****(Min-Max)** | **Mixing Cleaning Products****(Min-Max)** |
| Housekeepers | CC |  | 113 (95-130) |  | 71 (45-110) | 5 (5-5) |
|  | Dialysis | 5 (5-5) | 55 (35-75) |  | 63 (45-80) | 15 (15-15) |
|  | ER |  | 58 (35-80) |  | 83 (65-110) | 5 (5-5) |
|  | OR GI | 40 (5-75) | 61 (25-205) |  | 117 (15-305) | 8 (5-20) |
|  | Ward | 5 (5-5) | 58 (10-120) |  | 94 (15-265) | 9 (5-20) |
|  |  |  |  |  |  |  |
| Registered Nurses | CC | 5 (5-5) |  |  |  |  |
|  | Dialysis | 18 (15-20) |  |  | 15 (15-15) | 10 (5-15) |
|  | ER | 5 (5-5) |  |  |  |  |
|  | OR GI | 11 (5-20) |  | 25 (25-25) |  |  |
|  | Ward |  |  |  | 8 (5-10) |  |
|  |  |  |  |  |  |  |
| Licensed Practical Nurses | Dialysis | 30 (20-40) |  |  |  | 20 (20-20) |
|  | OR GI | 50 (50-50) |  | 90 (85-95) | 10 (10-10) |  |
|  |  |  |  |  |  |  |
| Respiratory Therapists  | CC | 10 (10-10) |  |  |  |  |
|  | Ward | 10 (5-15) |  |  |  |  |

\*Medical Appliance Technicians were not observed completing cleaning and disinfecting tasks during data collection; Surgical Technologists were observed completing only two cleaning and disinfecting tasks; CC = critical care, ER = emergency room, OR GI = operation room/gastrointestinal endoscopy unit.

**Supplemental Table SII.** Frequency (% of shifts) and duration (mean minutes/shift) of chemicals in products for laboratory and clinical support and cleaning and disinfecting occupations

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Clinical Laboratory Technicians** | **Dental Laboratory Technicians** | **Endoscopy Technicians** | **Floor Strippers /Waxers**  | **Housekeepers** | **Medical Equipment Preparers** |
| **Chemical group** | **% of Shifts** | **Mean Minutes (Min-Max)** | **% of Shifts** | **Mean Minutes (Min-Max)** | **% of Shifts** | **Mean Minutes (Min-Max)** | **% of Shifts** | **Mean Minutes (Min-Max)** | **% of Shifts** | **Mean Minutes (Min-Max)** | **% of Shifts** | **Mean Minutes (Min-Max)** |
| Acid | 8.3 | 5 (5) |  |  | 31.6 | 73 (5-170) | 30.8 | 31 (25-40) | 17.3 | 40 (5-215) | 15.4 | 45 (25-65) |
| Acrylate | 8.3 | 10 (10) | 45.5 | 18 (5-30) |  |  | 30.8 | 18 (15-25) |  |  |  |  |
| Alcohol | 58.3 | 45 (5-130) | 27.3 | 60 (5-155) | 84.2 | 65 (5-305) | 61.5 | 24 (5-45) | 94.2 | 117 (10-325) | 76.9 | 94 (5-165) |
| Aldehyde | 41.7 | 76 (15-125) |  |  | 26.3 | 18 (5-35) |  |  |  |  |  |  |
| Alkane |  |  | 9.1 | 10 (10) | 10.5 | 8 (5-10) | 30.8 | 34 (30-40) | 13.5 | 11 (5-25) | 23.1 | 22 (10-40) |
| Amide |  |  |  |  | 5.3 | 305 (305) |  |  | 21.2 | 59 (5-125) | 23.1 | 35 (20-65) |
| Amine |  |  | 18.2 | 13 (5-20) | 57.9 | 81 (5-305) | 92.3 | 57 (25-105) | 71.2 | 85 (5-325) | 46.2 | 90 (5-260) |
| Ammonia |  |  |  |  |  |  | 30.8 | 36 (20-55) |  |  |  |  |
| Aromatic | 33.3 | 45 (10-80) |  |  |  |  | 53.8 | 39 (25-70) | 1.9 | 25 (25) |  |  |
| Base | 25 | 10 (5-20) | 9.1 | 5 (5) | 36.8 | 34 (5-60) | 38.5 | 55 (45-65) | 51.9 | 104 (5-325) | 23.1 | 65 (5-130) |
| Carboxylic Acid | 16.7 | 23 (15-30) | 9.1 | 10 (10) | 47.4 | 49 (5-130) | 7.7 | 45 (45) | 65.4 | 82 (5-325) | 30.8 | 64 (5-130) |
| Enzyme |  |  |  |  | 36.8 | 67 (10-170) |  |  |  |  | 46.2 | 90 (10-260) |
| Ester | 16.7 | 8 (5-10) | 18.2 | 5 (5) |  |  | 30.8 | 36 (20-55) |  |  | 7.7 | 20 (20) |
| Ether |  |  |  |  | 5.3 | 305 (305) | 69.2 | 38 (915-70) | 61.5 | 108 (5-245) | 7.7 | 5 (5) |
| Fragrance |  |  |  |  |  |  | 15.4 | 58 (55-60) | 48.1 | 43 (5-135) |  |  |
| Glycol Ether |  |  | 9.1 | 5 (5) |  |  | 92.3 | 83 (20-135) | 17.3 | 33 (5-85) |  |  |
| Halogenated Compound |  |  | 9.1 | 25 (25) | 5.3 | 10 (10-10) |  |  |  |  | 7.7 | 20 (20) |
| Oxidizer | 16.7 | 8 (5-10) | 27.3 | 33 (20-55) | 42.1 | 45 (5-130) |  |  | 25 | 42 (5-110) | 7.7 | 60 (60) |
| Phenolic | 16.7 | 13 (5-20) | 27.3 | 8 (5-10) | 21.1 | 39 (5-60) |  |  | 7.7 | 73 (5-215) | 30.8 | 63 (20-100) |
| Quaternary Ammonium Compound |  |  | 9.1 | 5 (5) | 31.6 | 24 (5-45) | 15.4 | 25 (5-45) | 90.4 | 115 (10-325) | 46.2 | 70 (5-130) |
| Salt | 25 | 80 (5-125) | 27.3 | 8 (5-10) | 21.1 | 39 (5-60) | 7.7 | 5 (5) | 55.8 | 122 (10-245) | 30.8 | 84 (60-100) |
| Surfactant |  |  |  |  | 26.3 | 37 (10-75) | 15.4 | 58 (55-60) | 21.2 | 49 (5-120) | 61.5 | 99 (10-260) |
| Terpene |  |  |  |  | 15.8 | 28 (5-45) | 7.7 | 45 (45-45) | 42.3 | 103 (15-325) | 15.4 | 95 (60-130) |

Pharmacy technicians/pharmacists are not included in the table since they were observed using only alcohol (75% frequency with average of 29 minutes)

**Supplemental Table SIII.** Frequency (% of shifts) and duration (mean minutes/shift) of chemicals in product for patient care occupations

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Certified Nursing Assistants** | **Dental Assistants** | **Licensed Practical Nurses** | **Registered Nurses** | **Respiratory Therapists**  |
| **Chemical group** | **% of Shifts** | **Mean Minutes (Min-Max)** | **% of Shifts** | **Mean Minutes (Min-Max)** | **% of Shifts** | **Mean Minutes (Min-Max)** | **% of Shifts** | **Mean Minutes (Min-Max)** | **% of Shifts** | **Mean Minutes (Min-Max)** |
| Acid |  |  |  |  |  |  | 6.8 | 28 (5-75) |  |  |
| Acrylate |  |  | 27.3 | 12 (5-25) |  |  | 6.8 | 118 (5-225) |  |  |
| Alcohol | 75 | 48 (5-120) | 100 | 25 (5-75) | 66.7 | 19 (5-50) | 68.2 | 49 (5-240) | 75 | 32 (5-85) |
| Aldehyde |  |  |  |  | 22.2 | 85 (15-155) | 4.5 | 8 (5-10) |  |  |
| Alkane | 25 | 85 (70-100) | 18.2 | 15 (10-20) | 22.2 | 8 (5-10) | 25 | 22 (5-50) | 50 | 33 (10-85) |
| Amide | 25 | 35 (10-60) |  |  |  |  | 34.1 | 25 (5-100) |  |  |
| Amine | 12.5 | 5 (5) |  |  |  |  | 2.3 | 40 (40-40) |  |  |
| Aromatic |  |  |  |  |  |  | 4.5 | 58 (55-60) |  |  |
| Base |  |  |  |  | 22.2 | 60 (50-70) | 11.4 | 21 (5-75) |  |  |
| Carboxylic Acid | 12.5 | 5 (5) | 18.2 | 15 (5-25) | 44.4 | 99 (50-175) | 15.9 | 26 (5-60) |  |  |
| Enzyme |  |  |  |  | 22.2 | 83 (55-110) | 2.3 | 45 (45-45) |  |  |
| Ester | 25 | 35 (10-60) |  |  |  |  | 15.9 | 36 (5-85) |  |  |
| Ether |  |  |  |  |  |  | 22.7 | 20 (5-100) |  |  |
| Glycol Ether | 25 | 8 (5-10) | 100 | 25 (5-70) |  |  | 9.1 | 40 (5-100) | 16.7 | 30 (5-55) |
| Halogenated Compound | 37.5 | 57 (5-95) |  |  | 22.2 | 8 (5-10) | 22.7 | 2 (5-50) | 75 | 63 (35-125) |
| Oxidizer |  |  | 9.1 | 5 (5) | 44.4 | 71 (50-90) | 15.9 | 14 (5-30) | 8.3 | 15 (15) |
|  |  |  |  |  |  |  |  |  |  |  |
| Quaternary Ammonium Compound | 37.5 | 7 (5-10) | 72.7 | 26 (10-70) | 11.1 | 15 (15-15) | 27.3 | 45 (5-240) | 25 | 7 (5-10) |
| Salt | 12.5 | 5 (5) | 18.2 | 8 (5-10) | 22.2 | 95 (25-165) | 40.9 | 47 (5-225) | 75 | 41 (10-70) |
| Surfactant | 12.5 | 5 (5) |  |  | 22.2 | 83 (55-110) |  |  |  |  |

Ammonia, Fragrance, and Terpene were not present in products we observed being used by these patient care occupations. Surgical Technologists are not included in the table; they were observed using enzyme- and phenolics-containing products for less than 15 minutes on average.