Supplemental Information.

Laboratory study of physical barrier efficiency for worker protection against SARS-CoV-2 while standing or sitting. Jacob Bartels, Cheryl Fairfield Estill, I-Chen Chen, and Dylan Neu

**Table S1.** Collection efficiency for large sized particles (3.5µm – 6.25µm) in standing and sitting scenarios.

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | **Large Sized Particles (3.5µm – 6.25µm)** |  |
|  | **Number of Experiments** | **Median Efficiency (Range)** | **P-value** |
| **Barrier in Standing Scenario** |  |
| No Barrier | 6 | Reference |  |
| Height (H) from Cough |  |  |  |
|  -16.5 cm H | 18 | -29 (-17730 – 76) | 0.091 |
|  +14 cm H | 18 | 67 (-84 – 91) | <.001 |
|  +44.5 cm H | 18 | 70 (-238 – 99) | <.001 |
| Width (W) Excluding -16.5 cm H |  |  |  |
|  61 cm W | 12 | 58 (-130 – 90) | <.001 |
|  91 cm W | 12 | 77 (-84 – 99) | <.001 |
|  122 cm W | 12 | 66 (-238 – 93) | <.001 |
| Height (H) \* Width (W) |  |  |  |
|  -16.5 cm H \* 61 cm W | 6 | -23 (-140 – 76) | 0.382 |
|  -16.5 cm H \* 91 cm W | 6 | -30 (-1603 – 46) | 0.288 |
|  -16.5 cm H \* 122 cm W | 6 | -70 (-17730 – 13) | 0.186 |
|  +14 cm H \* 61 cm W | 6 | 62 (36 – 85) | <.001 |
|  +14 cm H \* 91 cm W | 6 | 81 (-84 – 91) | <.001 |
|  +14 cm H \* 122 cm W | 6 | 61 (-25 – 78) | <.001 |
| +44.5 cm H \* 61 cm W | 6 | 37 (-130 – 90) | 0.366 |
| +44.5 cm H \* 91 cm W | 6 | 76 (8 – 99) | <.001 |
| +44.5 cm H \* 122 cm W | 6 | 71 (-238 – 93) | <.006 |
|  |  |  |  |
| **Barrier in Sitting Scenario** |  |
| No Barrier | 6 | Reference |  |
| Height (H) from Cough |  |  |  |
|  +9 cm H | 18 | 79 (-137 – 97) | <.001 |
|  +39 cm H | 18 | 81 (8 – 99) | <.001 |
|  +70 cm H | 18 | 71 (-18 – 95) | <.001 |
| Width (W) |  |  |  |
|  61 cm W | 18 | 64 (-117 – 95) | <.001 |
|  91 cm W | 18 | 80 (21 – 99) | <.001 |
|  122 cm W | 18 | 80 (-137 – 97) | <.001 |
| Height (H) \* Width (W) |  |  |  |
|  +9 cm H \* 61 cm W | 6 | 55 (-117 – 85) | <.009 |
|  +9 cm H \* 91 cm W | 6 | 90 (60 – 97) | <.001 |
|  +9 cm H \* 122 cm W | 6 | 81 (-137 – 96) | <.001 |
|  +39 cm H \* 61 cm W | 6 | 83 (8 – 95) | <.001 |
|  +39 cm H \* 91 cm W | 6 | 81 (52 – 99) | <.001 |
|  +39 cm H \* 122 cm W | 6 | 78 (20 – 97) | <.001 |
|  +70 cm H \* 61 cm W | 6 | 56 (-18 – 86) | 0.001 |
|  +70 cm H \* 91 cm W | 6 | 69 (21 – 95) | <.001 |
|  +70 cm H \* 122 cm W | 6 | 85 (2 – 95) | <.001 |

**Table S2**. Comparison of barrier settings’ efficiencies for small sized particles (0.35µm – 0.725µm) in standing and sitting scenarios.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Median Difference of Efficiencies (%)** | **95% Confidence Limits (%)** | **P-Value** |
| **Lower Limit** | **Upper Limit** |  |
| **Barrier in Standing Scenario** |  |  |  |  |
| No Barrier | Reference |  |  |  |
| Height -16.5 cm | -6 | -48 | 36 | 0.787 |
| Height +14 cm | 76 | 47 | 105 | <.001 |
| Height +44.5 cm | 78 | 50 | 107 | <.001 |
|  Height -16.5 cm | Reference |  |  |  |
|  Height +14 cm | 82 | 68 | 96 | <.001 |
|  Height +44.5 cm | 84 | 70 | 98 | <.001 |
|  Height +14 cm | Reference |  |  |  |
|  Height +44.5 cm | 2 | -4 | 9 | 0.462 |
|  |  |  |  |  |
| No Barrier | Reference |  |  |  |
| Width 61 cm exc. -16.5 cm H | 70 | 46 | 93 | <.001 |
| Width 91 cm exc. -16.5 cm H | 80 | 60 | 100 | <.001 |
| Width 122 cm exc. -16.5 cm H | 74 | 53 | 96 | <.001 |
|  Width 61 cm exc. -16.5 cm H | Reference |  |  |  |
|  Width 91 cm exc. -16.5 cm H | 10 | 0 | 20 | 0.058 |
|  Width 122 cm exc. -16.5 cm H | 5 | -6 | 15 | 0.379 |
|  Width 91 cm exc. -16.5 cm H | Reference |  |  |  |
|  Width 122 cm exc. -16.5 cm H | -4 | -9 | 2 | 0.172 |
|  |  |  |  |  |
| **Barrier in Sitting Scenario** |  |  |  |  |
| No Barrier | Reference |  |  |  |
| Height +9 cm (3.5”) | 86 | 79 | 93 | <.001 |
| Height +39 cm (15.5“) | 90 | 83 | 96 | <.001 |
| Height +70 cm (27.5”) | 88 | 81 | 95 | <.001 |
|  Height +9 cm (3.5”) | Reference |  |  |  |
|  Height +39 cm (15.5“) | 4 | 1 | 6 | 0.011 |
|  Height +70 cm (27.5”) | 2 | -1 | 5 | 0.185 |
|  Height +39 cm (15.5“) | Reference |  |  |  |
|  Height +70 cm (27.5”) | -2 | -4 | 1 | 0.168 |
|  |  |  |  |  |
| No Barrier | Reference |  |  |  |
| Width 61 cm | 87 | 79 | 94 | <.001 |
| Width 91 cm | 90 | 83 | 97 | <.001 |
| Width 122 cm | 87 | 80 | 95 | <.001 |
|  Width 61 cm | Reference |  |  |  |
|  Width 91 cm | 4 | 1 | 6 | 0.008 |
|  Width 122 cm | 1 | -3 | 4 | 0.658 |
|  Width 91 cm | Reference |  |  |  |
|  Width 122 cm | -3 | -6 | 0 | 0.063 |

**Table S3**. Comparison of barrier settings’ efficiencies for moderate sized particles (0.9µm – 2.5µm) in standing and sitting scenarios.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Median Difference of Efficiencies (%)** | **95% Confidence Limits (%)** | **P-Value** |
| **Lower Limit** | **Upper Limit** |  |
| **Barrier in Standing Scenario** |  |  |  |  |
| No Barrier | Reference |  |  |  |
| Height -16.5 cm | -36 | -100 | 27 | 0.261 |
| Height +14 cm | 66 | 28 | 104 | <.007 |
| Height +44.5 cm | 67 | 28 | 105 | <.008 |
|  Height -16.5 cm | Reference |  |  |  |
|  Height +14 cm | 102 | 80 | 124 | <.001 |
|  Height +44.5 cm | 103 | 81 | 125 | <.001 |
|  Height +14 cm | Reference |  |  |  |
|  Height +44.5 cm | 1 | -9 | 11 | 0.844 |
|  |  |  |  |  |
| No Barrier | Reference |  |  |  |
| Width 61 cm exc. -16.5 cm H | 64 | 38 | 91 | <.001 |
| Width 91 cm exc. -16.5 cm H | 74 | 48 | 100 | <.001 |
| Width 122 cm exc. -16.5 cm H | 60 | 30 | 91 | <.001 |
|  Width 61 cm exc. -16.5 cm H | Reference |  |  |  |
|  Width 91 cm exc. -16.5 cm H | 10 | 1 | 18 | 0.022 |
|  Width 122 cm exc. -16.5 cm H | -3 | -16 | 10 | 0.658 |
|  Width 91 cm exc. -16.5 cm H | Reference |  |  |  |
|  Width 122 cm exc. -16.5 cm H | -13 | -25 | 0 | 0.048 |
|  |  |  |  |  |
| **Barrier in Sitting Scenario** |  |  |  |  |
| No Barrier | Reference |  |  |  |
| Height +9 cm | 87 | 73 | 102 | <.001 |
| Height +39 cm | 93 | 81 | 106 | <.001 |
| Height +70 cm | 87 | 72 | 101 | <.001 |
|  Height +9 cm | Reference |  |  |  |
|  Height +39 cm | 6 | 0 | 11 | 0.042 |
|  Height +70 cm | 0 | -8 | 7 | 0.982 |
|  Height +39 cm | Reference |  |  |  |
|  Height +70 cm | -6 | -11 | 0 | 0.041 |
|  |  |  |  |  |
| No Barrier | Reference |  |  |  |
| Width 61 cm | 85 | 72 | 97 | <.001 |
| Width 91 cm | 93 | 82 | 104 | <.001 |
| Width 122 cm | 87 | 73 | 100 | <.001 |
|  Width 61 cm | Reference |  |  |  |
|  Width 91 cm | 8 | 3 | 13 | 0.001 |
|  Width 122 cm | 2 | -7 | 11 | 0.618 |
|  Width 91 cm | Reference |  |  |  |
|  Width 122 cm | -6 | -12 | 0 | 0.044 |