Post-COVID-19 Workspace Design

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Abstract

The Coronavirus Disease 2019 (COVID-19) pandemic has shown the world that current workplace design standards are highly conducive to spreading dangerous respiratory diseases. As such, protective measures are needed to protect personnel while still providing productive and efficient work environments. Mitigations outlined in this research include air purifying systems, custom designed office layouts, and one time use materials for commonly used equipment.

Introduction

Problem Statement: Continuing to operate a physical workspace in a post-COVID-19 environment poses a significant risk to workforce personnel. On the other hand, permanently closing physical workspaces would lower productivity levels to unacceptable levels across multiple industries.

When the COVID-19 pandemic initially struck the world, a large portion of employees around the globe were sequestered in their homes for extended periods of time, in some cases almost a full year. The global workforce couldn't immediately be fully transitioned to a teleworking mode and many industries couldn't transition at all. Thus, if situations like COVID-19 are to be avoided in the future workplace mitigations need to be analyzed and put in place to protect employees while still offering efficient and productive work environments. The purpose of this study is to optimize workspace designs & policies to mitigate the risk of COVID-19 transmission amongst the workforce.

Research Question: How to maintain physical workspace productivity levels while minimizing risk to personnel without significantly increasing operational costs?

Hypothesis

- Given an appropriately designed physical workspace & set of policies any size workforce can continue to operate at pre-COVID-19 productivity levels without a significant increase to operational costs.

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Methods

- Virus Transmission Simulation
- Workspace Transitional Analysis

VIRUS TRANSMISSION SIMULATION

WORKSPACE TRANSITIONAL ANALYSIS

Results

- Virus Transmission Simulation
  - Following the United States (US) Centers for Disease Control and Prevention (CDC) Guidelines for areas listed below will drastically reduce the transmission as well as the severity of the infected individual:
    - Masks
    - Quarantine
    - Borders
- Workspace Transitional Analysis
  - Applying the CDC Guidelines for social distancing, regular cleaning, etc. to understand the cost and schedule of these adjustments

(Honein, 2020)

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Discussion

Air transmission consensus is that it takes about 1,000 particles of COVID-19 or similar virus to get infected. Just breathing can produce 20 small particles per minute (ppm), speaking up to 200 small ppm, & a cough or sneeze up to 200 million particles contained within larger droplets. Thus, a mask policy is the first step to mitigate the number of particles making it into the air. Second, physical space & barriers between workers should be sufficient to give the airflow system time to dissipate the virus particle density or the airflow system itself may need to be revamped to achieve this end to include a purification system. Surface transmission can be mitigated with regular cleaning of restrooms, floors, & cell phones which account for nearly 80% of the high-risk means of surface transmission.
Finally, a quarantining policy should be implemented for those exposed or tested positive to a virus.

Conclusions

- Mask, physical separation, & airflow are key to mitigating air transmission.
- Regular cleaning of high-risk surface areas are key.
- Clear quarantining policy is required

References

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