Is the COREP-project a potential tool to determine the coronavirus occupational risk exposure profile of workers?

M Müller, Upstream Health Inc.
Correspondence: Dr Martin Müller, Director: Upstream Health Inc., 11 Bergzicht Road, Protea Valley, Cape Town
e-mail: safemedsolutions@gmail.com

During an individual coronavirus disease (COVID-19) risk assessment, an attempt should be made to quantify the novel coronavirus (SARS-CoV-2) 'exposure dose' that a worker will potentially receive, as well as the clinical severity of coronavirus disease that might follow.[1]

Multiple factors have been identified that predict the clinical severity that can be expected once infected by SARS-CoV-2.[2] Quantifying SARS-CoV-2 exposure in the workplace has proven to be more challenging.

The coronavirus occupational risk exposure profile (COREP) tool (Table 1) is being developed with this in view, and is based on the established transmission routes of SARS-CoV-2. The tool provides an approach to grade SARS-CoV-2 droplet creation mechanisms, droplet exposure profiles, surface contact exposure profiles, and personal protective equipment (PPE) provision and compliance. Scores for each of the domains can be determined by the worker self-reporting his or her score or via supervisor observation. Once the scores for all five domains have been determined, they are added together to determine the total exposure risk score and group (Table 2).

For example, using the COREP-tool for a hypothetical petrol pump attendant: for the droplet generation exposure profile domain, the pump attendant will receive a score of 1 (he reports normal exhalation in a well-ventilated work area). For the close contact duration domain, he will receive a score of 3 (he reports spending > 15 minutes during a shift within 1 m of customers). For the contact duration domain, he will receive a score of 1 (he reports stepping back well beyond 2 m from the customer after handing over the card machine). For the surface contact exposure profile domain, he will receive a score of 3 (he attends to multiple pumps at the station during a shift and each pump is considered a separate work area). For the PPE compliance and exposure profile domain, the worker receives a score of 1.

His employer determined that he must wear a face shield when servicing clients. He confirms receiving it and reports wearing it correctly 100% of the time. The supervisor decides to verify the score and observes him working, without his knowledge. It becomes evident that he uses the face shield incorrectly for more than 50% of the shift, resulting in his risk score being adjusted to 3. Thus, his total risk score is 11, which falls in the very high exposure risk group.

The COREP-tool employs a semi-quantitative methodology based on the following assumptions:

1. Any contact within a 2 m radius of a fellow worker, regardless of COVID-19 status, carries an exposure risk.[3-5] This is based on evidence that suggests that a significant number of COVID-19 cases are asymptomatic carriers.[6-8] There is a high likelihood that these cases will never be tested and confirmed but can contribute

Table 1. The COREP-tool

Risk score	Domain				
	Droplet generation exposure profile	Close contact (< 1 m) duration (min.)	Contact (1–2 m) duration (min.)	Surface contact exposure profile	PPE compliance and exposure profile
1	Work tasks with normal exhalation in well-ventilated work areas	0–5	0–10	Contact with one work surface in one work area	Wearing PPE when indicated > 95% of the time
2	Work tasks which increase the force of exhalation in well-ventilated areas OR Work tasks with normal exhalation in poorly ventilated areas	6–15	11–30	Contact with multiple work surfaces in one work area	Wearing PPE when indicated for ≥ 50%, but not 100% of the time
3	Work tasks which increase the force of exhalation in poorly ventilated areas OR Any work in confined spaces OR Workers performing aerolisation procedures on humans	> 15	> 30	Contact with work surfaces in more than one work area	Wearing PPE when indicated for < 50% of the time

to the spread of the virus. When a worker moves within a 2 m range of a fellow worker, he starts to receive a droplet 'dose' which increases as he moves deeper into the breathing zone of his colleague.[3-5] The longer the time spent in this droplet zone, the bigger the received virus dose.

2. Each worker has a unique workplace 'fingerprint' determined by interaction with work surfaces in his work areas, the assumption being that bigger 'fingerprints' translate into a higher exposure risk of SARS CoV-2.
3. Consideration is given to grading the provision and compliant use of PPE in reducing SARS-CoV-2 exposure. The tool does not consider cloth masks as PPE as they do not offer protection against SARS-CoV-2 exposure. The author's opinion is that the wearing of cloth masks should be viewed as an engineering control measure to limit the amount of environmental contamination with SARS-CoV-2. Employers should evaluate the need for PPE based on the workers' interaction with potential sources of SARS-CoV-2 in the workplace. The risk-grading for PPE compliance is based on the values used in the World Health Organization's risk assessment tool for healthcare workers.[9]

There are limitations for each of the domains of the COREP-tool. Further research is required to determine what constitutes normal and forced exhalation. At this stage, coughing, sneezing and shouting are considered as examples of forced exhalation. The maximum grading of more than 15 minutes for close contact (< 1 m) duration is based on the National Institute for Communicable Disease's criteria for high risk exposure.[10] The chosen time durations for the other two risk categories in the close contact (< 1 m) domain need further research. Additional research is required to determine time durations that will lead to equivalent SARS-CoV-2 doses in the 1–2 m contact zone compared to the < 1 metre zone. Finally, the tool does not consider the effect of cloth mask usage on environmental contamination and how this relates to exposure risk.

Table 2. Exposure risk classification

Exposure risk score	Exposure risk group
5	Low
6–7	Medium
8–10	High
11–15	Very high

The COREP-tool is an attempt to provide employers with an approach to determine the coronavirus occupational risk exposure of workers. The tool is based on numerous assumptions, has many limitations, and needs further development and testing. However, in the context of a fast-moving, lethal pandemic, where exposure risk management is vital, it is hoped that the COREP-tool might be of some value.

DECLARATION

The author declares that this is his own work; all the sources used in this paper have been duly acknowledged and there are no conflicts of interest.

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