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# Within-wearer variation in fit of FFP3 filtering respirators

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## Abstract

The purpose of respiratory protective equipment (RPE) fit testing is to ensure that the mask being used is capable of fitting the person wearing it. Numerous factors are known to affect the result of a quantitative fit test, including wearer generated particles, and the positioning of the sample probe inside the mask. As well as these factors, the fit itself varies from one fitting to the next, even for the same wearer using the same mask. Given this within-wearer variability of fit, how confident are we that fit testing is a good predictor of adequate fit on subsequent fittings?

The purpose of this study was to measure the within-wearer variability of fit for four models of FFP3 filtering facepiece respirators. Twenty-five volunteers completed three fit tests with each of four models of mask. From the results of the fit tests, the within-wearer variability in fit was determined.

Different models of mask had significant differences in how well they fitted the volunteers, with percentage pass rates for the fit tests varying from 6% for the worst performer to 84% for the best performer. This variation did not appear to depend on specific design features.

The within-wearer geometric standard deviation, which is a measure of the overall variability in the fit for one person repeatedly fitting the same model of mask, was relatively high. Values ranged from 1.51 for the least variable model of mask to 2.19 for the most variable model.

Despite the high within-wearer variability, people who passed a fit test with a model of mask obtained a better fit from it on subsequent fittings than those who did not pass the fit test.


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