# Consequences of Wearing Face Masks

## Description

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**Background:** As face masks became mandatory in most countries during the COVID-19 pandemic, adverse effects require substantiated investigation.

**Methods:** A systematic review of 2,168 studies on adverse medical mask effects yielded 54 publications for synthesis and 37 studies for meta-analysis (on $n$ = 8,641, $m$ = 2,482, $f$ = 6,159, age = 34.8 ± 12.5). The median trial duration was only 18 min (IQR = 50) for our comprehensive evaluation of mask induced physio-metabolic and clinical outcomes.

**Results:** We found significant effects in both medical surgical and N95 masks, with a greater impact of the second. These effects included decreased SpO2(overall Standard Mean Difference, SMD = ?0.24, 95% CI = ?0.38 to ?0.11, $p$< 0.001) and minute ventilation (SMD = ?0.72, 95% CI = ?0.99 to ?0.46, $p$ < 0.001), simultaneous increased in blood-CO2 (SMD = +0.64, 95% CI = 0.31–0.96, $p$ < 0.001), heart rate (N95: SMD = +0.22, 95% CI = 0.03–0.41, $p$ = 0.02), systolic blood pressure (surgical: SMD = +0.21, 95% CI = 0.03–0.39, $p$= 0.02), skin temperature (overall SMD = +0.80 95% CI = 0.23–1.38, $p$ = 0.006) and humidity (SMD +2.24, 95% CI = 1.32–3.17, $p$ < 0.001). Effects on exertion (overall SMD = +0.9, surgical = +0.63, N95 = +1.19), discomfort (SMD = +1.16), dyspnoea (SMD = +1.46), heat (SMD = +0.70), and humidity (SMD = +0.9) were significant in $n$ = 373 with a robust relationship to mask wearing ($p$ < 0.006 to $p$ < 0.001). Pooled symptom prevalence ($n$ = 8,128) was significant for:headache (62%, $p$ < 0.001), acne (38%, $p$ < 0.001), skin irritation (36%, $p$ < 0.001), dyspnoea (33%, $p$< 0.001), heat (26%, $p$ < 0.001), itching (26%, $p$ < 0.001), voice disorder (23%, $p$ < 0.03), anddizziness (5%, $p$ = 0.01).

**Discussion:** Masks interfered with O2-uptake and CO2-release and compromised respiratory compensation. Though evaluated wearing durations are shorter than daily/prolonged use, outcomes independently validate mask-induced exhaustion-syndrome (MIES) and down-stream physio-metabolic disfunctions. MIES can have long-term clinical consequences, especially for vulnerable groups. So far, several mask related symptoms may have been misinterpreted as long COVID-19 symptoms. In any case, the possible MIES contrasts with the WHO definition of health.

**Conclusion:** Face mask side-effects must be assessed (risk-benefit) against the available evidence of their effectiveness against viral transmissions. In the absence of strong empirical evidence of effectiveness, mask wearing should not be mandated let alone enforced by law.

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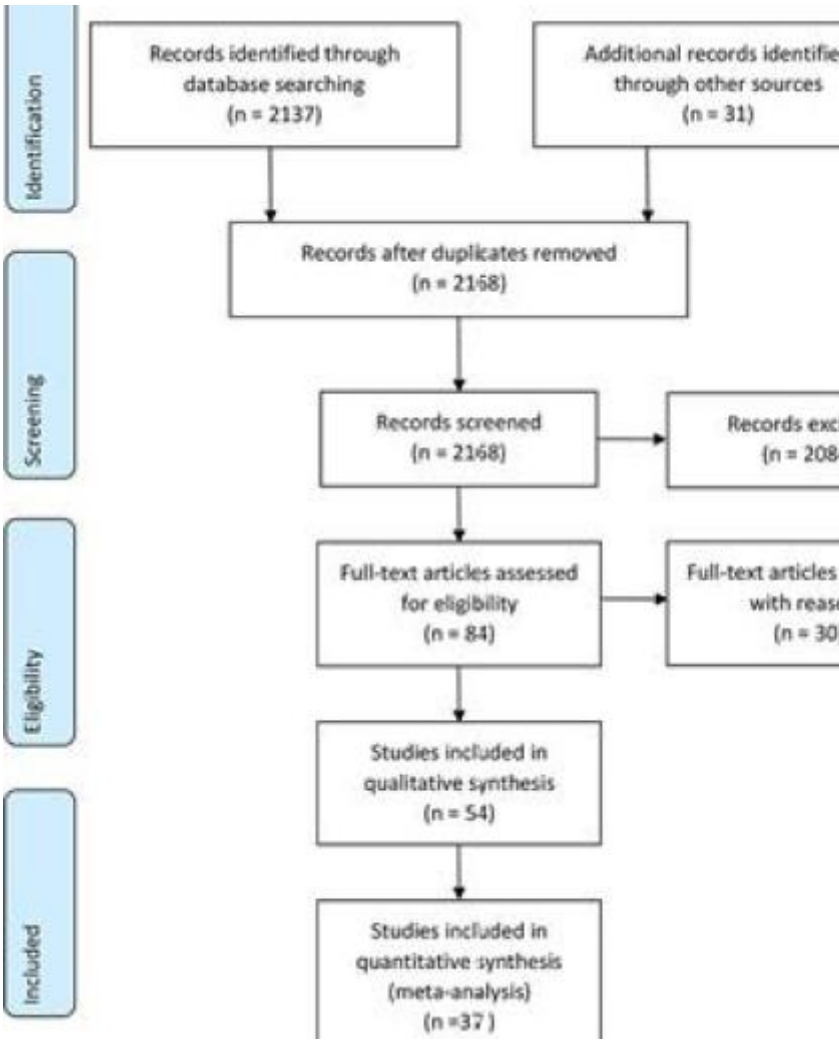


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