Long Mask: A new meta-analysis quantifies mask harms

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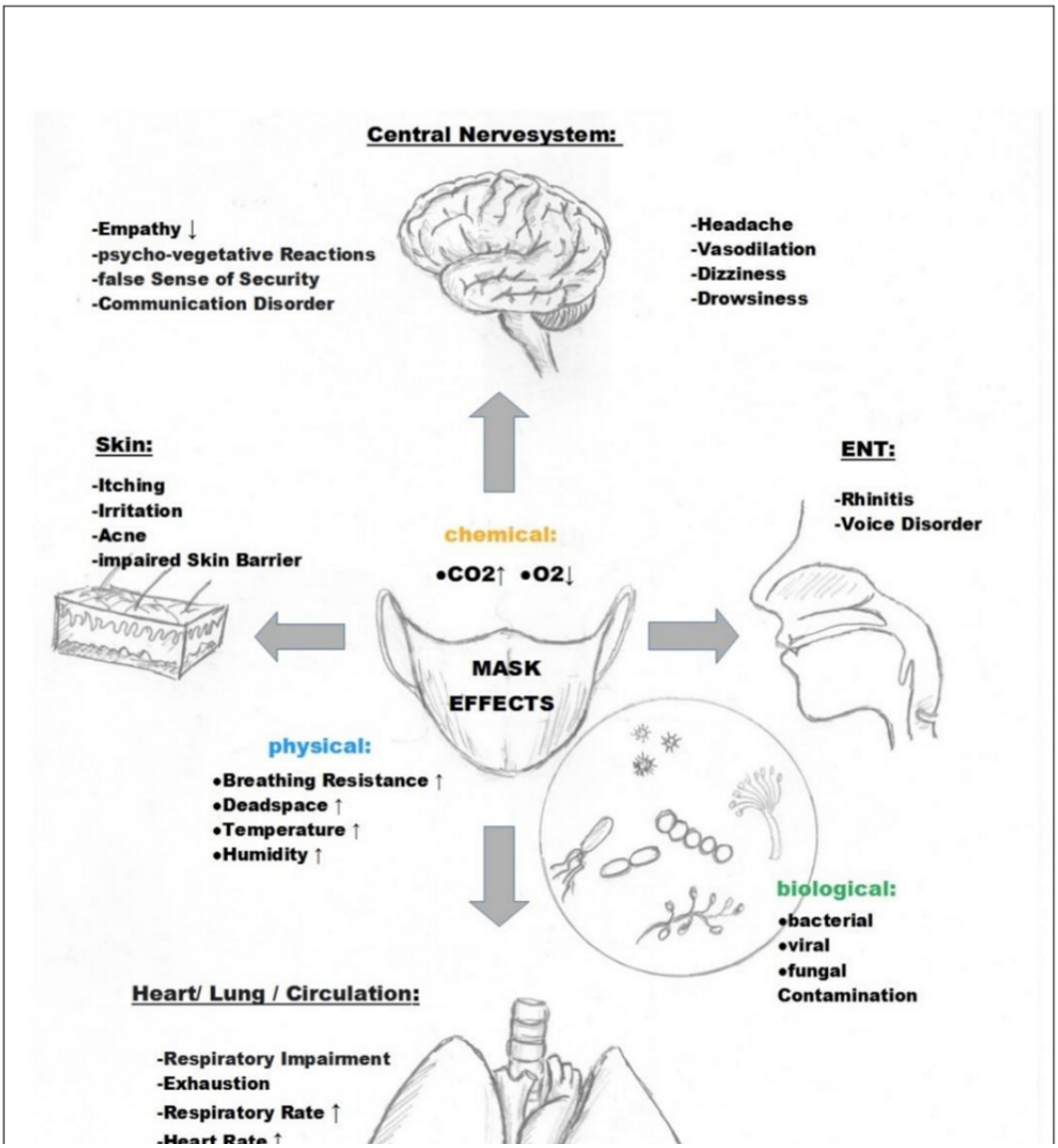
In 2021, Kisielinski et al. published a long scoping review called "*Is a Mask That Covers the Mouth and Nose Free from Undesirable Side Effects in Everyday Use and Free of Potential Hazards?*" [TL:DR Hell no!] In it, they coined the term Mask-Induced Exhaustion Syndrome (MIES) to collectively describe the numerous and varied adverse effects of masks found in the scientific literature up to that point.



Unfavorable mask effects as components of Mask-Induced Exhaustion Syndrome (MIES). The chemical, physical and biological effects, as well as the organ system consequences mentioned, are all documented with statistically significant results in the scientific literature found. The term drowsiness is used here to summarize any qualitative neurological deficits described in the examined scientific literature.

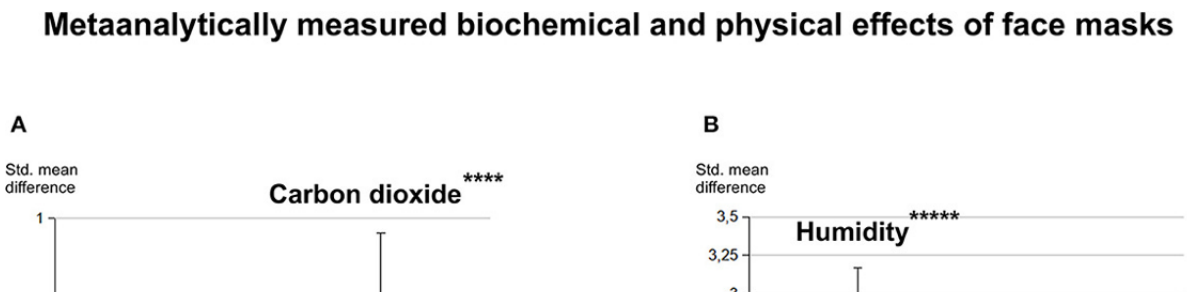
Last week, Kisielinski et al. validated their concept of MIES in a new paper in Frontiers in Public Health titled "*Physio-metabolic and clinical consequences of wearing face masks—Systematic review with meta-analysis and comprehensive evaluation.*"

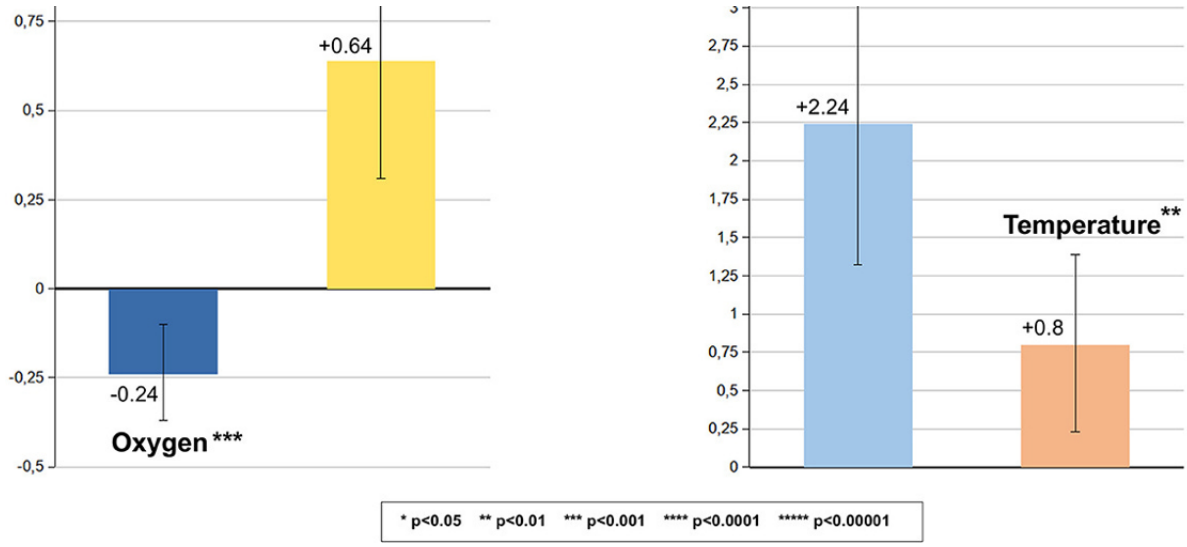
> A systematic review of 2,168 studies on adverse medical mask effects yielded 54 publications for synthesis and 37 studies for meta-analysis (on n = 8,641, m = 2,482, f = 6,159, age = 34.8 ± 12.5).

The 54-study qualitative analysis confirmed the MIES symptoms shown in the figure above and also some new ones. But the main value of the new paper is the 37-study meta-analysis, which quantified the physio-metabolic burden of mask-wearing.

Meta-analysis results: Take a deep breath.

The results showed that masks (particularly N95 masks) significantly restricted oxygen (O_2) uptake, hindered carbon dioxide (CO_2) release, and led to increased humidity and temperature under the mask.





Summary of pooled meta-analytic evaluation of biochemical (A) and physical effects (B) during face mask use. The height of the bars reflects the SMD (standard mean difference), their error bars correspond to the confidence intervals. (A) For carbon dioxide rise in the blood there is a medium effect size of >0.5 and for oxygen drop a small effect size of >0.2 regarding the standard mean difference values thresholds according to Cohen (102). (B) For elevated Humidity and Temperature rise under the face mask there is a strong effect size of ≥0.8.

One potential consequence of reduced O_2 uptake is transient hypoxemia (lower than normal oxygen levels in blood), which ironically could lead to worse infection outcomes.

> Studies have shown that oxidative stress (under hypoxic conditions) can **inhibit cell-mediated immune response** (e.g., T-lymphocytes, TCR CD4 complex, etc.) **to fight viral infections, which may gradually lead to immune suppression** (106, 107). Arterial hypoxemia increases the level of the hypoxia inducible factor-1α (HIF-1α), which further inhibits T-cells and stimulates regulatory T-cells (107). **This may set the stage for contracting any infection, including SARS-CoV-2 and making the consequences of that infection much more severe.**

So is there any evidence to back up this hypothesis? Yep.

> The findings of Spira (16) from European data show that **mask use correlates with increased morbidity and mortality**, which could be due to the above-discussed possible processes.

Next, Kisielinski et al. discuss how hindered CO_2 release may lead to transient hypercarbia

(increase in carbon dioxide in the bloodstream). Again, there's not much positive to report here.

> **kidney and organ calcification** were frequently seen in animal studies on low-level CO_2 exposure(122, 123)... Even slightly elevated CO_2 induces higher levels of pro-inflammatory Interleukin-1β, a protein involved in regulating immune responses, which causes **inflammation, vasoconstriction and vascular damage** (128).

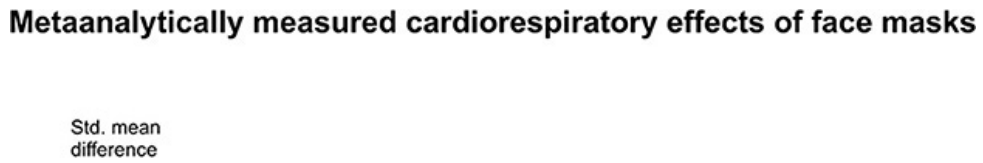
The effects of increased humidity and temperature under the mask aren't much better.

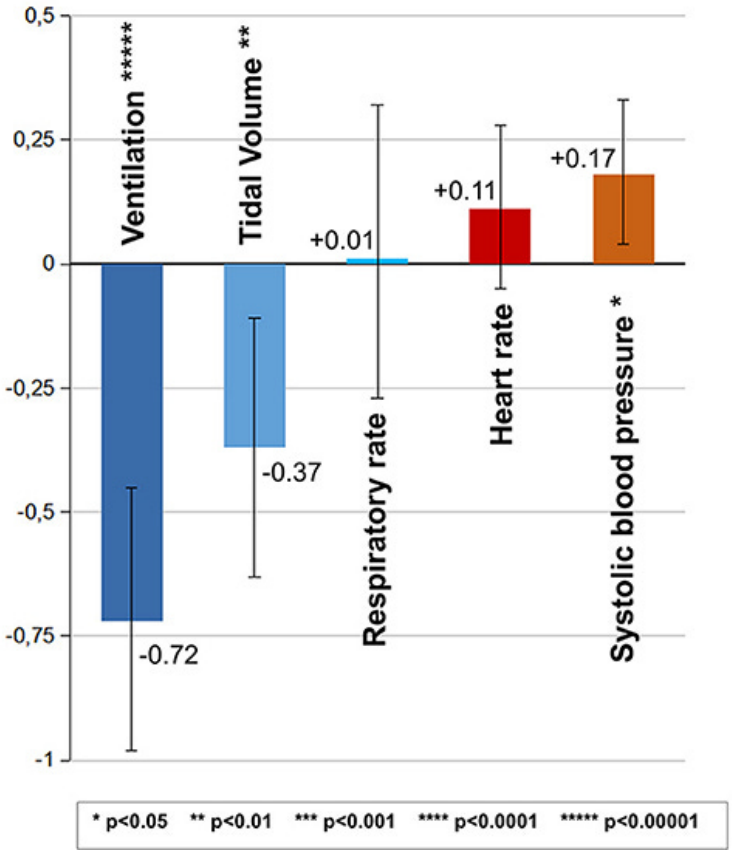
> Increased humidity and temperature can increase droplet and aerosol generation, which facilitate liquid penetration through the mask mesh. **This not only increases the chance of microorganism (fungal and bacterial pathogens) growth on and in masks** (134–136) causing increased risk for accumulation of fungal and bacterial pathogens (134, 136) including mucormycosis (137), **but also leading to re-breathing of viruses** that may be trapped and enriched within the moisturized mask meshwork...Additionally, **the high concentration of microbiome in masks can be a potential source of infection for the population**.

In other words, like hypoxemia, increased humidity and temperature under the masks may make infections worse. Oh, and there's evidence to back this hypothesis up too.

> The findings of Fögen (11) using data from the USA which shows that **mask use correlates with an increased mortality (case fatality rate of COVID-19)** could be due to these processes.

Kisielinski et al. also quantified the compensatory physiological mechanisms that result from mask-wearing. Results show significant decreases in ventilation (breathing volume) and tidal volume (the amount of air that moves in or out of the lungs with each respiratory cycle) and a significant increase in systolic blood pressure (the pressure in arteries when a heart beats).





Summary of pooled meta-analytic evaluation of cardiorespiratory effects during face mask use. The height of the bars reflects the SMD (standard mean difference), their error bars correspond to the confidence intervals. Clear effects for a decrease in ventilation and tidal volume are illustrated, no effect for respiratory rate and weak to low effect for increase in heart rate and systolic blood pressure. For ventilation there is a medium effect size of >0.5 with a small effect size of >0.2 for tidal volume of the standard mean difference values according to Cohen (102).

From the above results, they hypothesise about the effects of long-term masking, especially for the elderly and sick.

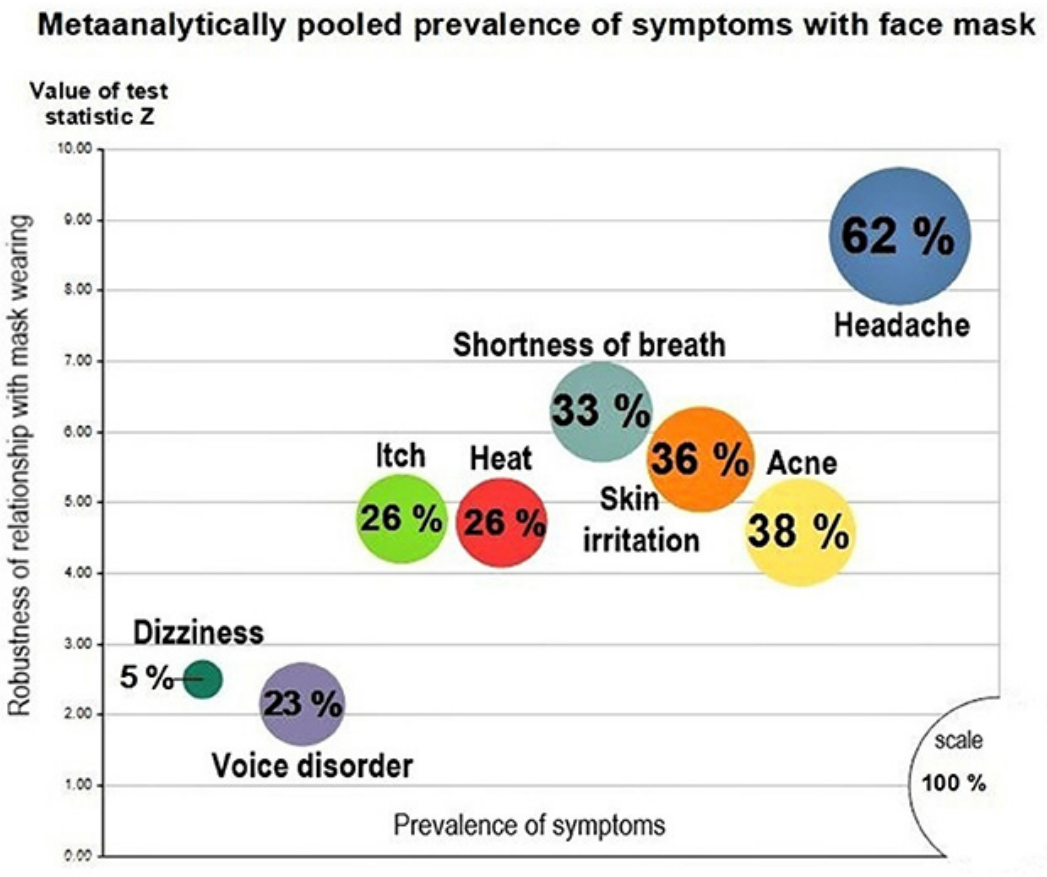
> Thus, prolonged masks use may lead to hypercapnic hypoxia like conditions. While short and acute hypercapnic hypoxia like conditions in healthy individuals can promote positive effects (sport, training, etc.) (143–145), a chronic/prolonged hypercapnic hypoxia (as also known from sleep apnea) is **toxic for the renal (146), nervous (147), and cardiovascular system (148) in the long run—causing metabolic syndrome (14) as well as additional effects on cognitive functions** (149).

This is just a hypothesis currently. But if it's true, countries full of long-term maskers may be expected to report excess cardiovascular-related deaths. Like Japan just so happened to

do in 2022, for example.

MIES as long-mask

Kisielinski et al. also meta-analysed the prevalence of various symptoms people suffer from mask-wearing. Just reading/hearing the word “mask” gives me headaches at this point.



Representation of symptom prevalence in % during face mask use as the area of the circles. Along the X-axis, the main recorded symptoms are listed. The higher the prevalence, the bigger the circles and the more often the symptoms. The Y-axis gives the probability of non-random occurrence of the symptoms and includes the statistical Z-value. Thus, the higher the circles are arranged, the more robust is the relationship to face mask wearing.

From these results and others, Kisielinski et al. ask an interesting question: Are some alleged symptoms of long-Covid actually symptoms of long-mask?

> **Nearly 40% of main long-COVID-19 symptoms** (171) **overlap with mask related complaints and symptoms** described by Kisielinski et al. as MIES (14) like **fatigue, dyspnea** [shortness of breath], **confusion, anxiety, depression, tachycardia** [a heart rate over 100 beats a minute], **dizziness, and headache**, which we also detected in the

> qualitative and quantitative analysis of face mask effects in our systematic review. **It is possible that some symptoms attributed to long-COVID-19 are predominantly mask-related.** Further research on this phenomenon needs to be conducted.

Don't expect any of that further research to be conducted in Japan though. The danger of long-Covid is pointed to by Japanese media as a reason to wear masks!

Unsafe and ineffective

No Covid-era study on masks would be complete without mentioning their effectiveness, or lack of, against viral transmission. Mask advocates have regularly claimed that universal masking kept Covid infections low in East Asia. Kisielinski et al. are no more impressed by this post-hoc reasoning than I am.

> there is evidence that COVID-19 rates have been able to expand swiftly when omicron hit (178) **even in societies where mask use was assiduously followed**—as in Korea, Taiwan, Hong Kong, and Singapore (179).

There's one other East Asian nation I would've mentioned. But since I started this blog as an antidote to the fawning coverage the western media gave to the mask obsession in this part of the world, it's nice to finally read a peer-reviewed article pointing to East Asia as evidence that masks don't work.

To end the paper, Kisielinski et al. make a point that essentially reflects my position since early 2020: forced masking is unethical.

> From the above facts, we conclude that a **mask requirement must be reconsidered in a strictly scientific way** without any political interference as well as **from a humanitarian and ethical point of view**. There is an urgent need to balance adverse mask effects with their anticipated efficacy against viral transmission. In the absence of strong empirical evidence of mask effectiveness, **mask wearing should not be mandated let alone enforced by law**.

And as anyone who's ever read my long (and recently updated) article on mask effectiveness will know, "strong empirical evidence" for mask effectiveness is absent and always will be.