# Article information:

Risk of SARS-CoV-2 infection and hospitalization in individuals with natural, vaccine-induced and hybrid immunity: a retrospective population-based cohort study from Estonia | Scientific Reports  
<https://www.nature.com/articles/s41598-023-47043-6>

# Article summary:

1. This population-based cohort study from Estonia compared the effectiveness of natural immunity, vaccine-induced immunity, and hybrid immunity (both infection and vaccination) against SARS-CoV-2 infection and hospitalization.

2. During the Delta period, natural immunity provided strong protection against infection and hospitalization compared to no immunity. However, during the Omicron period, individuals with natural immunity faced a higher risk of infection.

3. Individuals with hybrid immunity had lower rates of reinfection than those with natural immunity during the Delta period, but this difference diminished during the Omicron period. Vaccine-induced immunity was associated with a higher risk of infection during both periods compared to natural immunity.

# Article rating:

Appears moderately imbalanced: The article provides some useful information, but is missing several important points or pieces of evidence that would be required to present the discussed topics in a balanced and reliable way. You are encouraged to seek a more balanced perspective on the presented issues by exploring the provided research topics and looking at different information sources.

# Article analysis:

The article titled "Risk of SARS-CoV-2 infection and hospitalization in individuals with natural, vaccine-induced and hybrid immunity: a retrospective population-based cohort study from Estonia" published in Scientific Reports presents a detailed analysis of the effectiveness of different types of immunity against SARS-CoV-2 infection and COVID-19 hospitalization. While the study provides valuable insights into the real-world effectiveness of natural, vaccine-induced, and hybrid immunity, there are several potential biases and limitations that need to be considered.

One potential bias in the study is the reliance on data from the national electronic eHealth system. This may introduce selection bias as not all individuals may be included in this system, particularly those who have not sought medical care or have not been tested for SARS-CoV-2. Additionally, there may be variations in data quality and completeness across different healthcare providers contributing to the database.

Another limitation is that the study focuses on a specific population from Estonia, which may limit its generalizability to other populations with different demographic characteristics or healthcare systems. The findings may not be applicable to countries with different vaccination strategies or levels of SARS-CoV-2 transmission.

The article also presents some unsupported claims without providing sufficient evidence. For example, it states that "Seroprevalence surveys suggest that more than half of the global population had been infected with SARS-CoV-2 by 2022." However, no specific references or citations are provided to support this claim. Without proper evidence, such claims should be treated with caution.

Furthermore, while the study compares the effectiveness of natural immunity, vaccine-induced immunity, and hybrid immunity against SARS-CoV-2 infection and hospitalization, it does not explore potential confounding factors that could influence these outcomes. Factors such as age, underlying health conditions, and exposure risk are known to affect susceptibility to infection and severity of disease but are not adequately addressed in the analysis.

The article also lacks a discussion of potential risks associated with natural, vaccine-induced, and hybrid immunity. For example, the study does not address the potential risks of reinfection or breakthrough infections in individuals with different types of immunity. It is important to consider these risks when evaluating the overall effectiveness and durability of different immune responses.

Additionally, the article does not present counterarguments or alternative perspectives on the topic. While it acknowledges that there are gaps in the literature regarding the magnitude and durability of different types of immunity, it does not discuss potential limitations or conflicting findings from other studies. A more balanced presentation of evidence would strengthen the credibility and reliability of the study's conclusions.

In conclusion, while the article provides valuable insights into the effectiveness of natural, vaccine-induced, and hybrid immunity against SARS-CoV-2 infection and hospitalization, it has several limitations and biases that need to be considered. The reliance on data from a national electronic eHealth system introduces potential selection bias, and the generalizability of findings may be limited to specific populations. Unsupported claims, missing considerations, unexplored counterarguments, and lack of discussion on potential risks weaken the overall strength of the study. Further research is needed to confirm and expand upon these findings in diverse populations with careful consideration of confounding factors and potential risks associated with different types of immunity.

# Topics for further research:

* Factors influencing susceptibility to SARS-CoV-2 infection and severity of COVID-19
* Risks of reinfection and breakthrough infections in individuals with different types of immunity
* Magnitude and durability of natural
* vaccine-induced
* and hybrid immunity against SARS-CoV-2
* Conflicting findings on the effectiveness of different types of immunity against COVID-19
* Long-term effects and potential complications of natural
* vaccine-induced
* and hybrid immunity
* Variations in vaccination strategies and their impact on immune response to SARS-CoV-

# Report location:

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