# Covid vaccine effects on people with underlying medical conditions.

Team members: Monica Müller, Renée Sæthre

In hope of ending the global COVID-19 pandemic, several vaccines have been rapidly developed. However, vaccine hesitancy partially due to safety concerns has hindered its usage. Phase 2 and 3 clinical trials showed promising results regarding efficacy and adverse effects also in people with underlying medical conditions1.

In this project, the effect of two different vaccines (Pfizer and AstraZeneca) on populations with different types of underlying diseases will be analysed. This should shed more light on the safety of such vaccines on people with different comorbidities. Specifically, the following questions will be answered:

* **Is the mortality the same in vaccinated vs. non-vaccinated people? Is it the same when comparing vaccinated and non-vaccinated people with the same comorbidities?**
* **How common are adverse events? Are they more common in people with (specific) underlying medical conditions?** (Medical events after the second vaccine will be considered and compared to unvaccinated people in a similar time frame.) If more adverse events occur in a vaccinated population compared to the non-vaccinated population, the time course of adverse events will be plotted.

If time permits, the following questions may also be investigated:

* Is the mortality the same in people with a history of myocarditis (and related diseases) with the vaccination compared to without vaccination?
* Is the preventive effect of the vaccines on getting COVID-19 the same for people with and people without underlying medical conditions? What about specific groups of comorbidities (diseases of the circulatory vs. respiratory system)?
* Is number of hospitalization the same in vaccinated vs. non-vaccinated populations? Is it the same when comparing vaccinated and non-vaccinated people with the same comorbidities?
* What is the effect of the covid vaccine on children?

For retrieving the comorbidities, the **TPP GP clinical** dataset from the UK Biobank (UKBB) will be used and ic-10 codes used to classify the diseases into broader categories. To get the vaccination status, the **Covid-19 TPP GP Scripts** dataset will be used and different vaccines called using their SNOMED codes. For the mortality data, the **Death Linkage** dataset will be used, as also done by Xiang et al.2. Bar plots of the different groups will be created and data will be analysed using the Chi-squared test. A line plot would be used for time-related data. Euler will be used, as it is a large dataset.

**References**

1 Choi, W. S. & Cheong, H. J. COVID-19 Vaccination for People with Comorbidities. *Infect Chemother* **53**, 155-158, doi:10.3947/ic.2021.0302 (2021).

2 Xiang, Y., Feng, Y., Qiu, J. & So, H.-C. Association of COVID-19 vaccination with risks of hospitalization due to cardiovascular and other diseases: A study of the UK Biobank. *medRxiv*, 2021.2008.2015.21262097, doi:10.1101/2021.08.15.21262097 (2021).