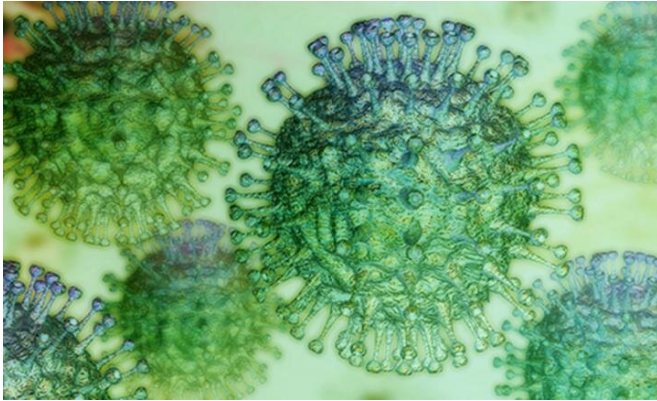# Patterns of common coronavirus infections could aid understanding of COVID-19

27 April 2020

Coronavirus. Credit: European Centers for Disease Control

Coronavirus infections are a common cause of mild colds, infecting thousands of people every year in the UK. They mostly circulate in the winter in temperate regions where they are often referred to as 'seasonal coronaviruses." However, in contrast to many other infectious diseases, not much is known about how often, and in whom, these viruses cause illnesses requiring medical attention. Data describing their patterns of infection are lacking because they are often not tested for.

Now, new research led by the MRC -University of Glasgow Centre for Virus Research and published in the Journal of Infectious Diseases, sheds light on when these viruses are most prevalent in different healthcare settings and how these viruses interact with other kinds of respiratory viruses. The work—one of the most detailed studies of coronaviruses in a patient population—could be important for understanding and predicting the behaviour of COVID-19.

Researchers used unique data from over 70,000 NHS Greater Glasgow and Clyde patients with respiratory illness, attending General Practice surgeries and hospitals between 2005 and 2017, who were tested for a panel of respiratory viruses, including common seasonal coronaviruses, to look for patterns related to age and seasonal frequency, and any variation between the different coronavirus types.

They found that different types of coronaviruses coexist in most winter seasons in the UK, although they exhibit structured seasonal patterns with some appearing to generate illnesses in the community at the same time. However, other coronaviruses appeared to circulate in their own unique pattern.

The findings could suggest that SARS-CoV-2, the coronavirus causing COVID-19, may find itself in competition with current seasonal coronaviruses and either struggle to persist in the long term, or, that it may push out one or more of the existing seasonal coronaviruses.

In the event of an emerging infectious disease pandemic such as COVID-19, in the absence of epidemiological information about the new pathogen, possible infection patterns are informed by other similar diseases. These infection patterns help to inform modelling predictions of the disease spread and to assess control strategies. , So far COVID-19 appears to be more similar to flu than to seasonal coronaviruses in terms of the fraction of cases leading to severe illness and their older age profile, although this comparison is currently complicated by data biases. Detailed information on seasonal coronaviruses will be important for predicting what will happen to COVID-19 in the long term, and its impact on other respiratory viruses.

Lead author Dr. Sema Nickbakhsh, Research Associate at the CVR, said: "When data on age and seasonal risk profiles are lacking, particularly early on in an outbreak, we can learn from other infectious diseases that spread in a similar way.

"So by looking at the robust data we have on other

coronaviruses from Scottish patients from 2005 to 2017, we can improve our understanding of normally-occurring seasonal coronaviruses, which is greatly needed to guide future COVID-19 science and to prepare for the post-pandemic era."

The researchers also found that common seasonal coronaviruses were detected among all ages; which differs from COVID-19, where cases in children have rarely been reported. It is unclear whether children are less susceptible to infection with SARS-CoV-2 virus; or whether they are susceptible, and spread infection, but are protected from severe illness requiring hospitalization.

Dr. Nickbakhsh said: "More research is needed to understand whether infection with seasonal coronaviruses in young children provides lasting immunity, and whether seasonal coronaviruses can also protect against SARS-CoV-2.

"And as we move forward, studies investigating age patterns of exposure to SARS-CoV-2 in the community are needed, capturing people without or with mild symptoms, as well as those that are sick."

The study also found that seasonal coronaviruses more often co-infect with particular common respiratory viruses, adenovirus and parainfluenza, than with other groups of respiratory virus. This suggests that coronaviruses are likely to form cooperative, rather than competitive, forms of relationships with other groups of respiratory virus.

The paper, "Epidemiology of Seasonal Coronaviruses: Establishing the Context for the Emergence of Coronavirus Disease 2019," is published in the *Journal of Infectious Diseases*.

More information: Epidemiology of seasonal coronaviruses: Establishing the context for COVID-19 emergence doi: doi.org/10.1101/2020.03.18.20037101

Provided by University of Glasgow