Science of the Total Environment (STE) accepts our paper “*Can pollen explain the seasonality of flu-like incidence?*“. STE is a respected, peer-reviewed journal of Elsevier Science with an impact factor of 6.5 (2019). The impact factor is based on the average number of citations per year.

In this second study, we explain the seasonality of flu-like incidence including COVID-19. In summary, the study looks at recent medical explanations of the protective effects of seasonal allergens and allergies in relation to influenza and COVID-19. Further, we tested associations between seasonal allergens and flu-like incidence. Finally, we controlled outcomes for meteorological variables.

An independent Chicago study (not yet peer-reviewed) confirms our findings, ads mold spores to the bioaerosol count, and provides some additional pathophysiological explanations: https://www.medrxiv.org/content/10.1101/2021.02.07.21251322v1

In the published preliminary study, we already identified pollen as an inhibitor of flu-like incidence.

Media coverage pre-print

Prior to its publication, the study is still available as a preprint on medRxiv. Preprint servers are a wonderful tool to share new insights and collect feedback during the peer-review process of a journal.

At first, the popular medical website News Medical picked up the pre-print. Followed by the French Medisite.fr, and Thailand Medical News, covering our findings extensively as well. Also, Yahoo Japan mentions the outcomes, based on an item in the South-Korean newspaper □□□□ (Central Daily News). Further, Naked Science (RU) summarizes and LIFE (RU) and Izvestia (RU) discuss the outcomes as well as Shafaaq (Iraq), Eg24 (Egypt). The South China Morning Post says “Pollen could play a role in reducing [the] spread of coronavirus, Dutch study finds.” In Chinese, there are many items. For example, in Asia News, QianZhan.com, QQ.com, PPfocus.com, Isanji.com, etc.

> *Indeed, the appearance of a large amount of pollen in the air can lead to the binding of micro-droplets containing the virus, which slows its spread.*
>
> *OLEG BATISHCHEV, ASSOCIATE PROFESSOR OF THE DEPARTMENT OF BIOPHYSICS AT THE MOSCOW INSTITUTE OF PHYSICS AND TECHNOLOGY. SOURCE: NEWSPAPER IZVESTIA (RU).*

Regional Dutch newspapers on October 16, 2020, published an interview about the implications for the second wave of COVID-19. I expect it to be longer than the first wave and end around week 10 of 2021 (+/- 4 weeks). The end will be similarly abrupt as the ending of the first wave. In the Netherlands, the government follows a flatten-the-curve policy. Not a hard containment policy like in East Asia and the Pacific.

The first newspaper to pick the story up is *FD*. Next follows an interview in *De Telegraaf*, the most read Dutch newspaper, provoking extensive online discussions. Someone posted an English translation of it. Also, *RTL News* (NL) had an item (@2m10s) about it as well. It’s clear that COVID-19, hay fever, and multi-cycle pandemics are big subjects, as is the riddle of flu-like-seasonality. We identified a key predictor.

Below, the *abstract* of the paper. My co-authors are Eric van Gorp, professor of virology at Erasmus MC, and Ellen Hoogeveen, internal medicine at Jeroen Bosch Ziekenhuis.

Abstract “Can Pollen Explain the Seasonality of Flu-Like Incidence?” (including COVID-19)

By Martijn Hoogeveen (corresponding author), Eric van Gorp & Ellen Hoogeveen.

Background

Current models for flu-like epidemics insufficiently explain multi-cycle seasonality. Meteorological factors alone, including the associated behavior, do not predict seasonality, given substantial climate differences between countries that are subject to flu-like epidemics or COVID-19. Pollen is documented to be allergenic, it plays a role in immuno-activation and defense against respiratory viruses, and seems to create a bio-aerosol that lowers the reproduction number of flu-like viruses. Therefore, we hypothesize that pollen may explain the seasonality of flu-like epidemics, including COVID-19, in combination with meteorological variables.

Methods

We have tested the Pollen-Flu Seasonality Theory for 2016-2020 flu-like seasons, including COVID-19, in the Netherlands, with its 17.4 million inhabitants. We combined changes in flu-like incidence per 100K/Dutch residents (code: ILI) with pollen concentrations and meteorological data. Finally, a predictive model was tested using pollen and meteorological threshold values, inversely correlated to flu-like incidence.

Results

We found a highly significant inverse correlation of $r(224)= -0.41$ ($p < 0.001$) between pollen and changes in flu-like incidence, corrected for the incubation period. The correlation was stronger after taking into account the incubation time. We found that our predictive model has the highest inverse correlation with changes in flu-like incidence of $r(222) = -0.48$ ($p < 0.001$) when average thresholds of 610 total pollen grains/m^3, 120 allergenic pollen grains/m^3, and solar radiation of 510 J/cm^2 are passed. The passing of at least the pollen thresholds preludes the beginning and end of flu-like seasons. Solar radiation is a co-inhibitor of flu-like incidence, while temperature makes no difference. However, higher relative humidity increases with flu-like incidence.

Conclusion

We conclude that pollen is a predictor of the inverse seasonality of flu-like epidemics, including COVID-19, and that solar radiation is a co-inhibitor, in the Netherlands.

Read further: Covid-19 Lab, News, Covid-19, pollen

Martijn Hoogeveen

Founder and CEO of Icecat NV. Investor through iMerge. PhD Multimedia at Delft University of Technology. Former Professor at Open University Netherlands/Technical Sciences & Environment.