To: (10)(2e) (10)(2e) ((10)(2e) @gmail.com)[(10)(2e) @gmail.com]
Cc: (10)(2e) (10)(2e) (10)(2e) (10)(2e) @rivm.nl]
From: (10)(2e) (10)(2e) (10)(2e)
Sent: Tue 5/12/2020 12:25:33 PM
Subject: COVID19 and climate/seasonality
Received: Tue 5/12/2020 12:25:33 PM

Beste (10)(2e)

Omdat je tijdens het 2de BES OMT nog specifiek navraag deed naar de seizoens/climaatinvloeden en COVID stuur ik je een interessant overzicht, zie hieronder.

From: (10)(2e) < (10)(2e) @gmail.com>
Sent: zaterdag 2 mei 2020 13:22
To: (10)(2e) (10)(2e) < (10)(2e) @rivm.nl>
Subject: Re: covid19 respons in Nederland

Beste (10)(2e)

Yesterday I joined a rich session of WHO modelers group where researchers from Harvard and the University of Chicago presented three studies Please find below a summary note with links to these three studies. I want to highlight that all studies have found correlations between temperature, humidity and UV radiation and the basic transmission rate of SARS-CoV-2, which means that in temperate countries it is likely we will observe a slower transmission rate over the summer and elevated levels of transmission in the fall and winter months [second wave]. This is good news in terms of opportunities to adapt containment and suppression strategies while therapeutics and a vaccine become available, including intermittent distancing. However, as we highlighted on Wednesday, all researchers concur that once there is widespread community transmission, neither temperature, nor humidity or UV radiation, will in of itself be sufficient to contain the virus.

Very best wishes,

(10)(2e)

Summary: Modelers Group – Session on Seasonality and Covid-19
1 May 2020

WHO convened a session of the modelers group to discuss new studies and findings on Covid-19 seasonality and the effects of temperature, humidity and UV radiation on the transmission of the virus. Three studies were presented:

The first one, by (10)(2e) (10)(2e) (Harvard epidemiologist) concluding that "while we may expect modest declines in the contagiousness of SARS-CoV-2 in warmer, wetter weather and perhaps with the closing of schools in temperate regions of the Northern Hemisphere, it is not reasonable to expect these declines alone to slow transmission enough to make a big dent". Crucially, the study looked at beta-coronaviruses as proxies and found that one-time social distancing will not be enough to achieve herd immunity (it will only delay it). Based on the estimates by the researchers of mild vs severe and critical cases, several years of intermittent distancing might be required to get herd immunity without overwhelming healthcare systems. The study can be found here:

The second study, by Mauricio Santillana (Harvard) considered whether temperature and humidity had an effect on the transmission of the virus (i.e., variability of basic R) across multiple provinces in China (not differentiating open and indoor environments). Environmental variables alone did not explain this variability. "Our findings suggest that changes in weather alone (i.e., increase of temperature and humidity as spring and summer months arrive in the Northern Hemisphere) will not necessarily lead to declines in case count without the implementation of extensive public health interventions". The study can be found here.

And the third study, by Tamma Carleton (climate economist at University of Chicago), found a strong correlation between growth of confirmed cases of COVID-19 and local environmental conditions, in particular ultraviolet radiation. This study is the most rigorous (i.e., control and sensitivity through a global sample with the same populations observed under different conditions). It combined the most spatially disaggregated global dataset of daily cases assembled to date, consisting of 3,235 administrative units across 173 countries, with a statistical model isolating random variation in daily weather conditions. The analysis indicates a strong negative effect of UV radiation on daily COVID-19 growth rates (and weak or inconsistent lagged effects of local temperature, specific humidity, and precipitation):

- "The seasonal implications of our findings with respect to UV show that estimated UV effects imply decreases in COVID-19 growth rates of 1.18 percentage points (±0.47) in the extra-tropical Northern Hemisphere and increases of 2.1 percentage points (±0.83) in the extra-tropical Southern Hemisphere between April and July 2020."
- "Seasonality in UV dictates the inverse pattern for January 2021, with COVID-19 growth rates rising by 5.5 percentage points (±2.18) in the extratropical Northern Hemisphere and falling by 4.82 percentage points (±1.91) in the extra-tropical Southern Hemisphere, relative to April 2020."
- "These effects are substantial when compared to the average in-sample COVID-19 growth rate of 13.21 percent."
- "Although many factors will influence future COVID transmission, our findings suggest a need for adjustment of COVID-19 containment policies for the seasonality of UV."
- Note that the study did not consider nonlinear relationships for humidity and temperature, nor the interaction between these variables.

The study can be found here: