Dry indoor environment -

Cause for seasonal flu in temperate climate ?

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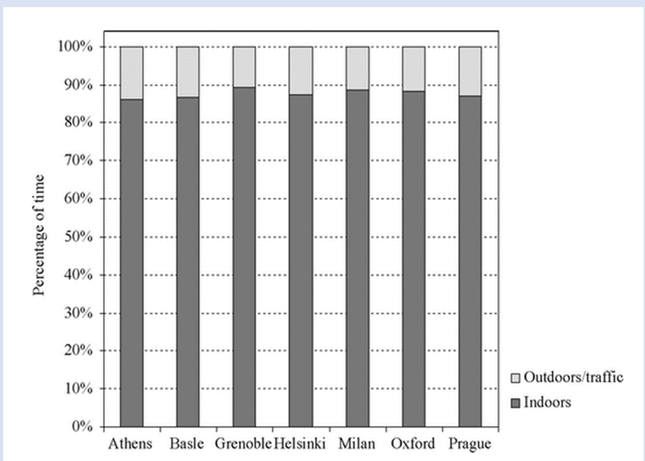
Two recent publications on the worldwide epidemiology of seasonal influenza [1,2] confirm again with impressive statistical significance the fact that in our temperate climate:

„minimal temperature and **absolute humidity“** and **«seasonal flu» coincide or follow each other….**

The reason for this coincidence, observed throughout many decades, is regarded as unknown. The impressive consistency of the climatic correlation is evidence for a **dominant, reliable and annually recurring climatic factor: Our indoor climate and <u>not</u> the outdoor climate!**
Here's why:

Contact rate

Person to person contacts are a key pre-condition for any epidemic spread of respiratory infections. Since we spend more than 90 percent of our time in buildings and means of transportation [3], the pathogen transmissions **must** occur indoors.



Outdoor and Indoor Climate

Research provides a strong Pearson correlation between «low temperature/ low absolute humidity» **outdoors** and «low relative humidity» **indoors** in winter trimester [6].

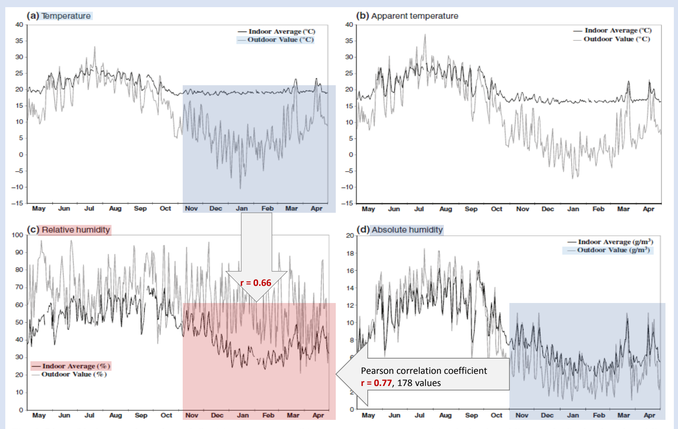
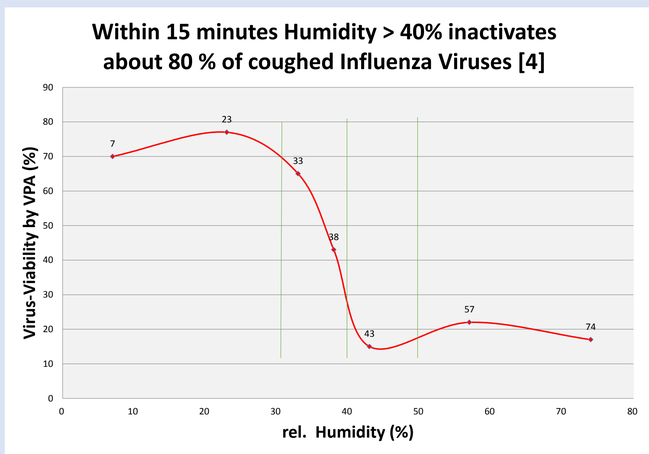


Fig. 2 Plot of indoor and outdoor daily (a) temperature, (b) apparent temperature, (c) relative humidity, and (d) absolute humidity from May 2011 to April 2012, Greater Boston, Massachusetts, USA

Survival and Transmission

Dry indoor air is an ideal environment for the survival of influenza [4], RS- and Corona-Virus and for their aerosol transmission [5]. In interiors aerosol transmission is most likely the main transmission mode [9].



High occupancy of buildings/public transportation vehicles and low humidity between 20 and 40 percent [7,8] provide causal explanation for the strikingly high seasonal occurrence of influenza in winter [9].

Optimal ambient humidity for aerosol survival drives the seasonal detection frequency of respiratory viruses …

"Winter-Viruses"

The coated viruses (**Influenza-, Corona- und RS-Virus**) remain contagious for a considerable time in humidity of 20 to 30 %. Humidity above 40 % inactivates them within minutes.
Detection exclusively in winter, occasionally two viruses together.

"All Season-Viruses"

The uncoated **Adeno- and Rhinoviruses** survive longest in humidity around **80 %** but can survive a short period in dryness.

Detection all-season.

"Summer-Viruses"

The uncoated **Enteroviruses** are inactivated immediately when exposed to humidity below 55 %.

Detection mainly in summer.

Mid 19th century the idea of a strong link between dry indoor air and increased incidence of respiratory infections was popular and broadly accepted by researchers and the public.

Indirect evidence for the linkage was proven right in **five prospective intervention studies**, published between 1966 and 1985 [10-14]. **Humidification of indoor air prevented respiratory infectious disease during winter months by 50 percent in children and by 25 percent in adults.**

Conclusion: Humidification offers a yet unused preventive measure against the most common human disease: viral respiratory infections. Humidity levels of around 50 percent, experienced as pleasant by people, are deadly for winter-viruses, including the flu – let's use this to our advantage!

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