

Coronavirus and the Sun that HEALS!



Richard Hobday

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Coronavirus and the Sun: A Lesson from the 1918 Influenza Pandemic

By Richard Hobday

Fresh air, sunlight and improvised face masks seemed to work a century ago; and they might help us now.

When new, virulent diseases emerge, such SARS and Covid-19, the race begins to find new vaccines and treatments for those affected. As the current crisis unfolds, governments are enforcing quarantine and isolation, and public gatherings are being discouraged. Health officials took the same approach 100 years ago, when influenza was spreading around the world. The results were mixed. But records from the 1918 pandemic suggest one technique for dealing with influenza — little-known today — was effective. Some hard-won experience from the greatest pandemic in recorded history could help us in the weeks and months ahead.



Influenza patients getting sunlight at the Camp Brooks emergency open-air hospital in Boston. Medical staff were not supposed to remove their masks.

Put simply, medics found that severely ill flu patients nursed outdoors recovered better than those treated indoors. A combination of fresh air and sunlight seems to have prevented deaths among patients; and infections among medical staff.[1] There is scientific support for this. Research shows that outdoor air is a natural disinfectant. Fresh air can kill the flu virus and other harmful germs. Equally, sunlight is germicidal and there is now evidence it can kill the flu virus.

`Open-Air' Treatment in 1918

During the great pandemic, two of the worst places to be were military barracks and troopships. Overcrowding and bad ventilation put soldiers and sailors at high risk of catching influenza and the other infections that often followed it.[2,3] As with the current Covid-19 outbreak, most of the victims of so-called `Spanish flu' did not die from influenza: they died of pneumonia and other complications.

When the influenza pandemic reached the East coast of the United States in 1918, the city of Boston was particularly badly hit. So the State Guard set up an emergency hospital. They took in the worst cases among sailors on ships in Boston harbour. The hospital's medical officer had noticed the most seriously ill sailors had been in badly-ventilated spaces. So he gave them as much fresh air as possible by putting them in tents. And in good weather they were taken out of their tents and put in the sun. At this time, it was common practice to put sick soldiers outdoors. Open-air therapy, as it was known, was widely used on casualties from the Western Front. And it became the treatment of choice for another common and often deadly respiratory infection of the time; tuberculosis. Patients were put outside in their beds to breathe fresh outdoor air. Or they were nursed in cross-ventilated wards

with the windows open day and night. **The open-air regimen remained popular until antibiotics replaced it in the 1950s.**

Doctors who had first-hand experience of open-air therapy at the hospital in Boston were convinced the regimen was effective. It was adopted elsewhere. If one report is correct, it reduced deaths among hospital patients from 40 per cent to about 13 per cent.[4] According to the Surgeon General of the Massachusetts State Guard: *“The efficacy of open-air treatment has been absolutely proven, and one has only to try it to discover its value.”*

Fresh Air is a Disinfectant

Patients treated outdoors were less likely to be exposed to the infectious germs that are often present in conventional hospital wards. They were breathing clean air in what must have been a largely sterile environment. We know this because, in the 1960s, Ministry of Defence scientists proved that fresh air is a natural disinfectant.[5] Something in it, which they called the Open Air Factor, is far more harmful to airborne bacteria — and the influenza virus — than indoor air. They couldn't identify exactly what the Open Air Factor is. But they found it was effective both at night and during the daytime.

Their research also revealed that the Open-Air Factor's disinfecting powers can be preserved in enclosures — if ventilation rates are kept high enough. Significantly, **the rates they identified are the same ones that cross-ventilated hospital wards, with high ceilings and big windows, were designed for.**[6] **But by the time the scientists made their discoveries, antibiotic therapy had replaced open-air treatment. Since then the germicidal effects of fresh air have not featured in infection control, or hospital design. Yet harmful bacteria have become increasingly resistant to antibiotics.**

Sunlight and Influenza Infection

Putting infected patients out in the sun may have helped because it inactivates the influenza virus.[7] It also kills bacteria that cause lung and other infections in hospitals.[8] During the First World War, military surgeons routinely used sunlight to heal infected wounds.[9] They knew it was a disinfectant. What they didn't know is that one advantage of placing patients outside in the sun is they can synthesise vitamin D in their skin if sunlight is strong enough. This was not discovered until the 1920s. Low vitamin D levels are now linked to respiratory infections and may increase susceptibility to influenza.[10] Also, our body's biological rhythms appear to influence how we resist infections.[11] New research suggests they can alter our inflammatory response to the flu virus.[12] As with vitamin D, at the time of the 1918 pandemic, the important part played by sunlight in synchronizing these rhythms was not known.

Face Masks Coronavirus and Flu

Surgical masks are currently in short supply in China and elsewhere. They were worn 100 years ago, during the great pandemic, to try and stop the influenza virus spreading. While surgical masks may offer some protection from infection they do not seal around the face. So they don't filter out small airborne particles. In 1918, anyone at the emergency hospital in Boston who had contact with patients had to wear an improvised face mask. This comprised five layers of gauze fitted to a wire frame which covered the nose and mouth. The frame was shaped to fit the face of the wearer and prevent the gauze filter touching the mouth and nostrils. The masks were replaced every two hours; properly sterilized and with fresh gauze put on. They were a forerunner of the N95 respirators in use in hospitals today to protect medical staff against airborne infection.

Temporary Hospitals

Staff at the hospital kept up high standards of personal and environmental hygiene. No doubt this played a big part in the relatively low rates of infection and deaths reported there. The speed with which their hospital and other temporary open-air facilities were erected to cope with the surge in pneumonia patients was another factor. Today, many countries are not prepared for a severe influenza pandemic.[13] Their health services will be overwhelmed if there is one. Vaccines and antiviral drugs might help. Antibiotics may be effective for pneumonia and other complications. But much of the world's population will not have access to them. If another 1918 comes, or the Covid-19 crisis gets worse, history suggests it might be prudent to have tents and pre-fabricated wards ready to deal with large numbers of seriously ill cases. Plenty of fresh air and a little sunlight might help too.

References

1. Hobday RA and Cason JW. The open-air treatment of pandemic influenza. *Am J Public Health* 2009;99 Suppl 2:S236–42. doi:10.2105/AJPH.2008.134627.
2. Aligne CA. Overcrowding and mortality during the influenza pandemic of 1918. *Am J Public Health* 2016 Apr;106(4):642–4. doi:10.2105/AJPH.2015.303018.
3. Summers JA, Wilson N, Baker MG, Shanks GD. Mortality risk factors for pandemic influenza on New Zealand troop ship, 1918. *Emerg Infect Dis* 2010 Dec;16(12):1931–7. doi:10.3201/eid1612.100429.
4. Anon. Weapons against influenza. *Am J Public Health* 1918 Oct;8(10):787–8. doi:10.2105/ajph.8.10.787.
5. May KP, Druett HA. A micro-thread technique for studying the viability of microbes in a simulated airborne state. *J Gen Micro-biol* 1968;51:353e66. Doi:10.1099/00221287-51-3-353.

6. Hobday RA. The open-air factor and infection control. *J Hosp Infect* 2019;103:e23-e24 doi.org/10.1016/j.jhin.2019.04.003.
7. Schuit M, Gardner S, Wood S et al. The influence of simulated sunlight on the inactivation of influenza virus in aerosols. *J Infect Dis* 2020 Jan 14;221(3):372–378. doi: 10.1093/infdis/jiz582.
8. Hobday RA, Dancer SJ. Roles of sunlight and natural ventilation for controlling infection: historical and current perspectives. *J Hosp Infect* 2013;84:271–282. doi: 10.1016/j.jhin.2013.04.011.
9. Hobday RA. Sunlight therapy and solar architecture. *Med Hist* 1997 Oct;41(4):455–72. doi:10.1017/s0025727300063043.
10. Gruber-Bzura BM. Vitamin D and influenza-prevention or therapy? *Int J Mol Sci* 2018 Aug 16;19(8). pii: E2419. doi: 10.3390/ijms19082419.
11. Costantini C, Renga G, Sellitto F, et al. Microbes in the era of circadian medicine. *Front Cell Infect Microbiol.* 2020 Feb 5;10:30. doi: 10.3389/fcimb.2020.00030.
12. Sengupta S, Tang SY, Devine JC et al. Circadian control of lung inflammation in influenza infection. *Nat Commun* 2019 Sep 11;10(1):4107. doi: 10.1038/s41467-019-11400-9.
13. Jester BJ, Uyeki TM, Patel A, Koonin L, Jernigan DB. 100 Years of medical countermeasures and pandemic influenza preparedness. *Am J Public Health.* 2018 Nov;108(11):1469–1472. doi: 10.2105/AJPH.2018.304586.

The Best Disinfectant Is Sunlight...

by Richard Hobday

If we're going to spend ever more time indoors, we need to at least let the sunshine in.



We spend, on average, **more than 90% of our time indoors**. Most of this time is now spent in our homes. The impact of such behaviour on our health is largely unknown. But we do know that lighting levels inside houses are much lower than those outside — unless our homes let in the sun.

Without the time-cues given to us by the sun, the **underlying rhythms of many biological processes** in our bodies can become disturbed. Light levels indoors these days are not usually high enough to keep us fully

synchronized. Health problems may follow. Disruption of these internal rhythms is known to **increase the risk** of depressive illness. It may also do the same for other **serious conditions**, such as obesity, cancer, heart disease and bone disorders. Significantly, these illnesses are also strongly linked to another hazard that living indoors brings with it: vitamin D deficiency.

The sun, besides being our external timekeeper, is also our main source of vitamin D. There is little of this in a normal diet. **We get 90% of it from exposure to the sun.** Or, we should. Surveys have found alarmingly high rates of vitamin D deficiency throughout Europe, North America, the Middle East and North Africa and elsewhere. According to one estimate, **a billion people worldwide** may be affected. One reason for this is that half of the world's population now live in urban areas. The amount of sunlight available to them can be severely limited if they live indoors, or if outdoor spaces are not planned properly, or if the air is polluted.

SUNLIGHT AND INFECTION

Now one thing that low vitamin D levels and disrupted rhythms both do is compromise the body's immune system; and research suggests that in doing so they **reduce resistance** to infection. This is a pressing issue. One of the greatest threats to global public health comes from tuberculosis and other bacterial infections. Many are now highly resistant to antibiotics and so are hard to treat. Also, new viruses are emerging and causing **epidemics**. Some of the older long-established ones, such as influenza, are mutating and could become even more dangerous than they already are.

Health threats similar to these we now face were around in the past. And measures were put in place to try to stop them; including planning towns, cities, hospitals and houses for the sun. Not so long ago, architects designed buildings to promote health, rather than simply keep the occupants comfortable. **Clean fresh air through open windows, and sunlight** were central to this.

NIGHTINGALE KNOWS BEST

In 1929, architect Richard Neutra built the famous “Health House” in the Hollywood Hills of Los Angeles. His brief was to design a home that strengthened the health and well-being of its owner, Dr. Philip Lovell. The Health House provided Dr. Lovell with access to plenty of sunlight and fresh air. Such thinking informed the work of other architects of the period, such as Le Corbusier. In his influential manifesto **The Athens Charter**, Le Corbusier argued bringing in the sun was the architect’s new and most urgent duty.

However, many years before Neutra and Le Corbusier — and before the effects of sunlight exposure were investigated scientifically — Florence Nightingale had already identified sunlight as key to promoting health in hospitals. She wrote:

“Direct sunlight, not only daylight, is necessary for speedy recovery, except, perhaps in certain ophthalmic and a small number of other cases.”

Florence Nightingale insisted on sunlight because she believed it helped her patients get better and that it had a **“purifying” effect**: it cleaned the air and so reduced the

risks of infections spreading. Later, in 1877, two British scientists showed that light, and especially sunlight, does have a bactericidal effect — even after it had passed through glass. Their work encouraged other scientists to study the effects of putting bacteria in sunlight. Soon, the sun was called “**nature’s disinfectant**” and considered a valuable weapon in the fight against tuberculosis and other infections. And so, before antibiotics became widely available, **sunlit rooms** and hospital wards were believed to be hygienic. Those that kept the sun out were not. Today, in marked contrast, the germicidal properties of sunlight are rarely considered when buildings are planned.

Research findings support much of what Florence Nightingale wrote about sunlight in the 1850s. Solar radiation is the most powerful germicide in the environment. It kills germs that cause respiratory and other infections. Whether sunlight’s disinfecting powers can keep down infection rates in hospital patients is uncertain. No one has ever tested it properly. But tests do show sunlit wards help patients recover from surgery, heart attacks and psychiatric disorders.