

## How long does coronavirus live on surfaces? Scientists answer key questions about Covid-19 hygiene

Do you need to wash your shopping? Is it safe to touch a trolley? And is two metres really far enough away? Helen Rumbelow asks the experts

*Helen Rumbelow for The Times - Wednesday April 22 2020*

In the 2011 film *Contagion* Kate Winslet plays Dr Erin Mears, a scientist for the Centers for Disease Control and Prevention in America. At one point during her attempts to battle a fictional but highly believable viral epidemic, a colleague called Dave gets tired of all the paranoia, fuss and endless handwashing.

“My wife makes me take my clothes off in the garage,” Dave whines. “Then she leaves out a bucket of warm water and soap. And then she douses everything in hand sanitiser after I leave. I mean, she’s overreacting, right?”

Erin turns to Dave with a disinfecting stare and says: “Not really. And stop touching your face, Dave.”

It is the moment when it is meant to hit home: this is serious. Your threshold should be treated like some kind of airlock hatch to Chernobyl, everything removed and decontaminated. Yet in that film the scriptwriters gave their virus a death rate of 25 per cent — what about our relatively more fragile Covid-19? Should we all be like Dave, forced to shiver naked outside the front door while our beloveds shove our clothes into a bin liner with a metal prong? Or is that the fast track to crazy and rubbed-raw hands?

The trouble is we are not sure yet. Scientists have no consensus on issues such as why the common cold circulates more in winter, let alone a full understanding of the behaviour of the newest coronavirus on the block. So we decided to get a spectrum of advice from specialists in this field who can parlay the evidence we have into your home habits.

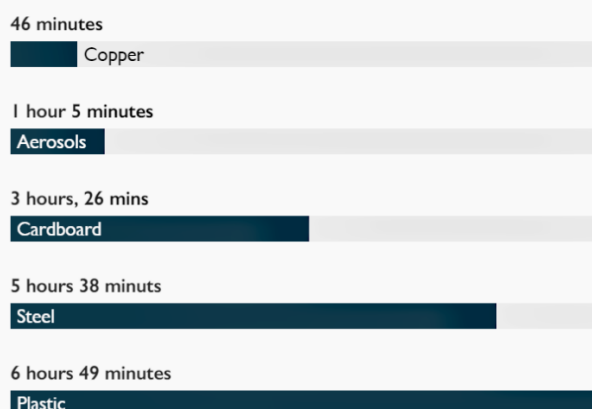
As ever, people will find themselves falling somewhere on this scale. We all assume that we are sensibly balanced, while the woman who hangs her newspaper on the washing line is neurotic and the jogger, whom you might as well have french-kissed for all the saliva vapour he left on your cheek, is downright disgusting.

Before we start, the main thing to bear in mind is that we only have one small study on the durability of Covid-19 on surfaces and in the air, published this month in *The New England Journal of Medicine*.

The results followed the pattern for other viruses, such as Sars and Mers. A review of 22 studies of the durability of other human coronavirus was published in the *Journal of Hospital Infection* in February. Glass performed in a similar way to plastic; the viruses generally lasted longer on hard, smooth surfaces such as glass, plastic and steel and died quicker on rougher, softer surfaces such as paper, cloth and latex gloves.

## Infected surfaces

Length of time Covid-19 is believed to remain viable



The length of time it takes for half of infectious matter to become unviable; it takes a lot longer for all infectious matter to deteriorate

Chart: The Times and Sunday Times • Source: The New England Journal of Medicine

The *New England Journal* study tested Covid-19 on four surfaces, copper, cardboard, plastic and stainless steel, as well as testing how long it lasted in the air. You may think that copper is a strange inclusion, but that's because this humble metal is an impressive antiviral (as well as antifungal and antibacterial). This has been known across many ancient civilisations since at least ancient Egyptian times, when soldiers sprinkled the filings from their bronze (an alloy of copper) weapons on their wounds to speed healing. Even better, because of the way copper destroys viruses, there is little chance of diseases mutating to become copper-resistant. Strangely, it is only recently that public health has woken up to how copper would be a wise choice in hospitals and high-traffic areas such as public transport and arenas, and far better than the virus-friendly but ubiquitous stainless steel. An independent study by the University of York Health Economics Consortium has shown that, taking the reduced costs of shorter patient stay and treatment into consideration, the payback time for installing copper fittings in hospitals is only two months. Strong arguments have been made for some fabulously designer-sounding copper hospital beds that a study published last year in *Applied and Environmental Microbiology* found harboured 95 per cent fewer bacteria than conventional beds. No surprise that the new Francis Crick Institute in London, alive to new research, has copper alloys installed on its doors throughout.

The *New England Journal* study found that all detectable Covid-19 was gone after four hours on copper, compared with 24 hours on cardboard and up to three days on plastic and stainless steel. Covid-19 appears to be particularly vulnerable to copper, which killed it in half the time it took to destroy Sars. Copper is essentially kryptonite to Covid-19, and anyone who fell for the fashion for copper kitchen counter tops that has been gaining ground over the past few years will be pretty smug.

As for the other surfaces, one of the leaders of the study, Vincent Munster, head of the virus ecology section at Rocky Mountain Laboratories in Montana, speculated that the natural fibres in cardboard may cause the virus to dry up more quickly than hard, smooth surfaces and get stuck on those fibres. The authors also gave a piece of reassurance to those who

imagine swarms of germs splattering their houses: even on hard surfaces the amount of virus dropped rapidly over the first few hours.

So what can we do with what little we know? Government advice has been pretty vague, other than the handwashing mantra. The NHS website advises only those at higher risk of Covid-19 to “clean surfaces you touch often” and “clean a shared bathroom each time you use it”. Do you ever find yourself spraying down the outside of a bottle of Dettol with more Dettol and wonder how you got here?

I put some questions to three experts: Lena Ciric, who leads the Healthy Infrastructure Research Group at University College London, which is aiming to find ways to reduce the spread of infectious disease; Primrose Freestone, associate professor in clinical microbiology at the University of Leicester, with a research interest in fresh produce safety; and Ian Jones, professor of virology at the University of Reading and a member of the Medical Research Council Infectious and Immunity Board. Each time I was essentially asking: how Dave are you?

**1. When I come in after being at the shops, should I take off my clothes and/or wash them? Should everything be at 60C now?**

*Jones:* No. Coming out of lockdown, we will all need to step up our sanitation practices, but they also need to be practical. The virus dies quite quickly on most surfaces by drying out. In addition it has to get to your nose or mouth, and while this is possible in a stepping-stone-like way via clothing, it is not likely.

*Freestone:* An important omission of the *New England Journal* study was how long the virus can persist on human skin, hair or clothing, so we don't know yet. It might be sensible to hang external jackets in a place where they can't touch your indoor clothes between use.

*Ciric:* If you keep away from others in the shop and touch as few items as possible with your body, then your clothes will likely not be contaminated. As an extra precaution, yes, it is wise to wash clothes you have worn to public places, such as shops, pharmacies, public transport etc, at 60C.

**2. What is the risk for the virus lingering on hair or beards after being out and about? Some people shower to get rid of pollen, so is this a good idea for viruses?**

*Freestone:* Washing one's beard or face thoroughly immediately one returns home or gets into work might not be a bad idea.

*Ciric:* This depends on where you have been. If you have spent some time in a public space (hours rather than minutes), then virus particles could settle on hair.

**3. Some people are spraying newspapers: is this ridiculous? What about other post that comes through the door, envelopes and parcels, do we need to leave them in quarantine for 24 hours?**

*Freestone:* While there is no evidence so far that newspapers are a source of the virus, washing your hands after reading the newspaper is probably sensible. I personally quarantine in my porch deliveries of non-perishables in cardboard boxes for a day now.

*Jones:* This is not required. A newspaper is not an ideal surface and any virus will die out quickly.

*Ciric:* For post, I would recommend that you open your post or parcel, dispose of the envelope/packaging and then wash your hands.

#### **4. Bringing home food shopping: do we need to disinfect each item? What about paper/cans/plastic, are there different rules? Special care with fruit?**

*Jones:* There is generally no need to disinfect normal items. If anyone wants “to be sure, to be sure”, then fine, but keep focused on the main route of transmission, aerosols sprayed directly from other people, as that will provide the best level of protection.

*Freestone:* There is no evidence as of yet that fruit and vegetables purchased can be a source of Covid-19 infection, and none were reported during the Wuhan outbreak — person-to-person contact was the main source of infections. However, wiping down food tins etc if intended for use in less than three days might not be a bad idea. Washing hands thoroughly after handling shopping is now very important.

*Ciric:* Again, it is unlikely that goods will be contaminated with the virus, and even if they are it would likely be in concentrations too low to cause infection. For fresh fruit and vegetables that you will eat raw, wash them thoroughly before eating.

#### **5. What about freezing or sunlight — can they be used to kill the virus?**

*Jones:* Freezing preserves the virus, not kills it; labs store stocks of viruses frozen. Sunlight generally kills it by drying and by UV directly. Before the freezer thing gets out of hand you have to ask if it is likely someone would pick up a frozen item, contaminate it by touch or coughing and then put it back. Possible, but unlikely. And most mass-produced items are machine-processed with the minimum of human handling. So a theoretical risk, but I wouldn't want frozen goods to be shunned, especially during lockdown.

*Freestone:* Heating - above 60C - particularly when combined with detergents, does destroy the virus very effectively. The effect of sunlight has not been proven. So I don't think you can claim sunlight can protect you from the virus unless the temperature reaches 60C+ (it might on some sun-baked surfaces). Also, hot and very sunny countries are still suffering pandemics, and the real issue in terms of coronavirus risk is of course person-to-person contact.

#### **6. At the shops is it OK to use shared baskets and trolleys or should we sanitise ourselves?**

*Jones:* Clearly these do have multiple contacts by many hands and most supermarkets are now providing sprays for their wire baskets and trolleys. Remember the need to wash hands regularly.

*Freestone:* The problem is that research studies have shown that the coronavirus can persist on plastic and stainless steel for up to three days. And every time a person's hands or body touch the trolley or basket they could leave a trace of the virus. Some supermarkets insist trolleys be wiped down before use, which is a good thing. Baskets do not seem to be a priority for cleaning before use, and I personally do not use a basket any more.

*Ciric:* I would recommend that you wipe down the handle of the trolley or basket before you start your shopping. You may also want to wear gloves while shopping. You will then need to remove and dispose of them properly — take care not to touch the outside of the gloves and place them in a bin.

**7. Exercise. Some studies suggest that the virus carries farther than we imagined in the air. How far is a reasonable distance to keep apart from others if you are running?**

*Jones:* Most studies of virus transmission are in some form of laboratory condition, and in more normal circumstances virus survival will be less. Unless running in a large group, which is now banned, the recommended two metres should be enough. Most viruses would normally transmit in the “locker room”-type circumstances that accompany sport, but as these are not happening, this possibility has gone away. Keep the social distance, avoid aerosols, enjoy your run.

*Ciric:* The virus particles will be well dispersed outdoors by the natural air flows around you, so it is unlikely that there will be a high enough concentration in the air that you breathe in to cause an infection. I think it would be wise not to run with others, even if you are keeping two metres or more distance from each other, as you would be interacting with them throughout the run. Passing an individual here and there should not be an issue.

*Freestone:* You will be breathing harder and expelling more saliva/mucus when you pant, and with hay fever on the rise, coughing or sneezing more is likely. Since the saliva and mucus of a cough is projected out into the air with force, a recent study showed the distance of the airborne droplets can be as far as eight metres. Therefore, if in hay fever mode, try to keep eight metres away, or roughly the length of a bus.

**8. Do we need to wipe down or clean the dog or cat?**

*Jones:* No. Follow normal pet hygiene rules; there is no enhanced risk. Although virus transmission can occur in a number of ways at some level, focusing on the most likely transmission route will have by far the biggest impact. So avoid aerosols generated by others however possible and sanitise the route of hand-to-mouth by increased handwashing. Remember to keep it up even if numbers are falling.

*Ciric:* It is unlikely that your pet will come into contact with an infected person if you are observing social-distancing measures. It would be wise not to let people other than those in your household touch your pet.

*Freestone:* You should, regardless of Covid-19, wash your hands after touching any pet as both cats and dogs can carry infectious-disease-causing microbes.

**9. How far are we from being able to test the surfaces of our homes ourselves? Is this science fiction?**

*Freestone:* It is not science fiction but science fact. However, at home it is for the majority completely unfeasible unless you are a molecular biologist with a nucleic acid extraction kit, a polymerase chain reaction kit, plus the Covid-19 genome oligonucleotide primers and a home thermocycler machine to run the PCR assays. It is simply easier to assume the virus is there and clean those suspect surfaces with a detergent, alcohol-based or bleach cleaner every few hours if in regular use by those coming from outside the home.

**10. Should you wash the table where you have unpacked your groceries**

*Freestone:* Yes. Unpack, wipe down the tins and bottles etc if you are using them in fewer than three days, and then wash your hands. Clean the surface, and then wash your hands again. This is good home hygiene practice that helps to avoid lots of food and shopping-associated infections, let alone Covid-19.