Disinfection devices: Boon or bane?

Various disinfection innovations have sprung up around the world, including in Singapore, with the aim of keeping Covid-19 at bay. Cheryl Tan looks at whether these devices are effective and safe.

**Devices: How they work and what they claim to do**

**Disinfection tunnels, booths and showers**

Tunnels spray disinfectant on people who walk through them, in an attempt to kill viruses and bacteria on a person’s clothes and exposed skin. The tunnels typically require an individual to spend around 20 to 30 seconds in them, as disinfectant is sprayed all over.

- In February, a huge tunnel was installed outside an industrial complex in the Chinese city of Chongqing (right). With schools beginning to reopen across the country, more such disinfection technologies are being utilised, requiring pupils to sanitise their hands, clothes and personal belongings before they are allowed to enter the premises.
- Other versions include a disinfection booth being trialled in Hong Kong International Airport (right, bottom), where individuals undergo a 40-second full body spray.
- And in South Korea, disinfection ‘showers’ are being installed in places such as schools and malls, where individuals are lightly sprayed with disinfectant for two seconds as they pass through building entrances.

**Ultraviolet light-emitting machines and intelligent sterilisation robots**

A spectrum of UV light, known as UVC, is effective in killing the virus, and is frequently used for sterilisation, particularly in hospitals, airplanes and factories. However, it is extremely dangerous when exposed to the human skin – the most dangerous out of the three types of UV radiation.

- In China, UVC is being used to disinfect buses, clean floors in hospitals, and even disinfect money in banks.
- Similarly, in Hong Kong, robots fitted with a UV light steriliser (right) help to maintain the cleanliness of public toilets and important operating areas in the airport.
- New York’s Metropolitan Transportation Authority also said this week that it will use UV light to disinfect its fleet of subways, buses and commuter trains.

**UV LED-treated escalator handrails**

- Popular in malls in South Korea and Thailand, this machine automatically cleans escalator handrails with liquid disinfectant, followed by lint-free rollers which remove dirt and grease residue.

**Far-UVC light**

A new type of UVC has been discovered. It is said to be less dangerous to handle, but it is still effective in fighting viruses and bacteria.

- The Centre for Radiological Research at Columbia University said it developed a lamp technology that is able to emit far-UVC light, which can kill germs without harming one’s eyes, skin and other tissues.
- The centre has conducted lab experiments where the light was shone on hairless mice for eight hours a day, over a duration of 60 weeks. So far, after 40 weeks, there have been no signs of pre-cancerous lesions or eye damage, according to a New York Times report.
- Manufacturers are beginning to increase production of the far-UVC fixtures.

**The science behind the devices**

**Disinfectants**

- **Effectiveness**
  - While these disinfectants may be helpful in removing viruses and bacteria on surfaces, they would not be useful in killing the virus in an infected individual.
- **Potential dangers**
  - Experts have warned that chemical agents, which may be safe and effective in the form of hand sanitisers, could be toxic and unsafe if sprayed or aerosolised on large surfaces of the skin.

- **Direct aerosol contact with the eyes and skin may cause irritation or damage.**
- **The duration and frequency of exposure – such as when someone frequently enters a disinfection tunnel – could also be harmful.**

**Advisory on usage**

- Experts also warn that using them could give people a false sense of security and make them more lax about other hygiene and safe distancing measures.

**Potential dangers**

- It can damage the eyes and skin within seconds, and causes skin cancer.

**UV light**

- **Effectiveness**
  - UVC light can destroy coronaviruses in minutes. Radiation from this obscure part of the light spectrum is filtered out by the ozone layer before it reaches human skin, but it can be produced artificially and it is commonly used for sterilisation in hospitals and airplanes, for instance.

- **Potential dangers**
  - Only those with proper training and equipment can use it safely.

**Advisory on usage**

- The World Health Organisation has warned people not to use UV light – including the two other types of UV light from the sun, UVA and UVB – to sterilise their hands or any other skin surface.
- Any type of UV light is capable of damaging cells and genetic material.