

B Distance, Dose, Dispersion: An experts' guide on Covid-19 risks in South Africa and how to manage them

By Covid-19 academics and medical professionals • 26 June 2020

Understand the three things that can make the most difference to easing the lockdown and reopening South Africa with the least risk, whether you are using a taxi, socialising, working, working out, or running a shop.

This piece is written by the professionals listed at the foot of the article.

Our lives have been turned upside down by the coronavirus pandemic and by the lockdown, and further confused by shifting information. You might be wondering about the role of masks, whether to wipe down your groceries, and if the lifting of lockdown means we can all relax now. You might have concerns about how you can safely travel to work, what steps to take as you reopen your business, whether to attend a religious gathering, or what to tell your grandmother about how to stay safe.

It has become clear that some countries in Asia and Europe rapidly contained their epidemics through simple and relatively easy behaviour changes, rather than relying on changes in immunity or prolonged lockdown strategies. Our aim here is to share some basic essentials about how to minimise risk. Nothing is risk-free (for example, we take risks getting into cars, buses or taxis). But we can manage risks, which requires understanding how they intersect and amplify each other. It turns out that with this new coronavirus, open windows, masks and physical distancing are more important than obsessive hand sanitising and temperature taking.

Understand that we may be in for a long haul, adjusting our lives for at least the next few years. Some of these changes may be permanent (and may be things we should have done anyway, for TB and seasonal 'flu). We need to enable businesses to survive, our institutions to open as safely as possible, while we live our lives as naturally social animals.

We cannot be saved by government policy alone – the things we can all do are what will save South African lives. And those things are pretty simple.

Our Summary:

- Do everything possible **Outdoors**;
- **Open Windows**;
- wear **Masks**;
- keep at least one metre **Distance** (two metres is better) from people,
- **Avoid Crowded** spaces,
- be **Quick**.

What causes the problem?

The way the virus spreads is that when we cough, sneeze, talk, sing or simply breathe, we spray very small drops of moisture into the air; these are respiratory particles. If someone is infected, the live virus will be present in these particles. These particles in our breath can spray quite far (several metres). If there is poor ventilation and no air movement, they can hang around in the air. They can land on surfaces (where the virus may survive for some hours) and if you are close to someone they can land on your eyes, nose or mouth. Most people who become infected get the coronavirus by direct contact with an infected person. It is also possible, but less common, to be infected from touching your mouth, nose or eyes when your hands have the virus on them from touching a surface.

What is the impact of the three Ds?

Distance: The further away you are from someone who is infected, the less likely you are to be infected by them or to breathe in particles they have breathed out.

Dose: To become infected you need to have contact with a minimum dose, which takes time and exposure to people with the virus. The *longer* you are exposed to an infectious person, the *more people* you are exposed to, and the *fewer barriers* (like cloth masks) between you, the more likely you are to be exposed to the virus. People who have symptoms or are about to develop symptoms, including mild illness, are generally more infectious – i.e., are able to produce larger doses of infected respiratory particles.

Dispersion: Because smaller particles hang around in the air, the *movement* of air makes a really big difference. The particles disperse quickly if you are outside, particularly if there is a breeze or wind. We also know that sunlight breaks down the virus. Small, enclosed spaces with closed windows are high risk, especially when they are crowded.

The three Ds interact! If you are outdoors, at least one metre (but preferably two metres) apart from others, for less than 10 minutes, your risk of becoming infected is

incredibly low. On the other hand, if you are stuck in a room with closed windows, with someone with symptoms, your risk of getting the disease increases, whether or not you wear a cloth mask. Large known outbreaks have arisen in indoor functions in churches, weddings, music events, and restaurants or bars: places where a crowd of people are indoors, close together and talking and singing for hours.

Businesses, factories, workers and families urgently need to pay attention to the interaction of the three Ds. Physical distancing is very effective when outdoors or for short encounters (10 minutes); once you are in a closed space, its effectiveness dramatically diminishes. *Masks and two metres distance are not enough if you are with people in an unventilated space all day.* Evaluate your office, place of worship, business, planned funeral or other event in terms of the intersection of the three Ds.

What can we do?

Physical distance: This is your major defence from infection. The good news is that although the virus spreads easily, short periods of contact will not get you infected. Passing someone in a supermarket, paying for your groceries, brushing past a runner in a park is no problem. But sitting in a taxi with closed windows, being alongside a sick co-worker at a work station, or singing in a packed church, is.

Go for outdoors and open all windows: Outside air is your best friend, and we may all have to start dressing more warmly in winter as many activities move outdoors and windows stay open. Open windows whenever possible on public transport, in shops or at work. Unfortunately, the interaction of the three Ds means that taxi rides of more than 15 minutes are risky, even if everyone is wearing a mask – *unless the windows are open.*

Businesses, factories, offices – look at your windows and work out how to get air flow. Open all windows and utilise outside space. Restaurants, bars and shebeens should consider outdoor seating wherever possible. Streets with a number of restaurants should inquire into closing the street a few evenings a week, or every day, and putting tables and chairs outside.

Socialise outside if you can, keeping a two-metre distance. An outside braai or picnic is much safer than visiting someone in their house. Avoid visiting people or being visited inside homes for more than a few minutes. Have work meetings outdoors, if possible. If you want to have a gathering, such as a religious gathering or funeral, do it outside if you can. An outside shebeen, with physical distancing, is far safer than an indoor shebeen with masks and obsessive hand washing. Outdoor sport is very low risk, unless involving close prolonged contact. (Even outdoors, don't talk to someone up close for long; maintain distance.)

Wear masks: There is now lots of evidence on the effectiveness of wearing cloth masks in the community. A cloth mask traps the virus-containing respiratory particles during breathing, coughing or talking, and helps prevent them from moving away from the mask-wearer. (But why has mask advice changed? *See our comment at the end.) People who have very mild symptoms or are about to develop symptoms can spread the virus – this means that each of us might spread the virus unknowingly. If everyone wears a mask the amount of virus in the air is much reduced: we all protect each other. Therefore you *should always wear a mask whenever you are close to people other than those in your household, especially*

indoors. It is also vital that you wear your mask correctly – it must cover from the bridge of your nose to over your chin at all times. Wash your mask daily with soap or detergent.

Offices, factories, banks, shops, malls, government services – any indoor space where people come into contact – must require everyone to wear masks. Employers should distribute reusable cloth masks to employees. Reusable cloth masks should be distributed in communities where people can't afford them.

As important as masks are, in an indoor space they are not a substitute for ventilation and distancing – you need all three.

Work in homes: If you work in someone's home (domestic workers, plumbers, etc) or someone comes in to work in your home, insist on windows being open and don't be in rooms at the same time as them for long. Wear a cloth mask, carry and use your own hand sanitiser, and keep your distance.

Soap and surfaces: The virus is incredibly fragile, and washing your hands with any soap for 20 seconds kills the virus. Make soap and water (or hand sanitisers with an alcohol solution of at least 70 percent) as widely available as possible at workplaces, malls, shops, transport and offices. Soap works much better than alcohol-based sanitiser, is cheaper, and will result in less cracked hands. Invest in mobile handwashing stations in areas with a high concentration of people, like hospitals and clinics.

It is unclear how likely you are to contract the virus from surfaces, but it is wise to clean commonly touched workspaces and public areas often. Minimise touching and wipe down frequently touched surfaces – like door handles, lift buttons, railings, credit card machines. The virus dies quickly on surfaces; in laboratories it has been found in low doses beyond 24 hours on plastic and steel (but not on porous surfaces such as park benches, or grass). Whether this is enough virus to infect you is unknown, but surface transmission is very unlikely to be the major way you will be infected. Washing your clothes after going out, or washing your car, and wiping all your groceries is not necessary; just wash your hands and keep surfaces around you clean and dry.

If there is an outbreak in a venue, or an employee tests positive, wiping surfaces down with soap and water, followed by bleach, or other common disinfectants, is very effective in removing any viral particles that may still be present. And if you can leave the venue open and ventilated for 24 hours, this should be enough. There is no need for special chemicals, or “deep cleansing” or “fogging” or “disinfection tunnels”; they are no more effective than soap and water, and are associated with other health risks, including making asthma, eye and skin conditions worse. There is no need to shut down a facility for days; once surfaces have been cleaned, dried and disinfected, and spaces ventilated, work can continue.

Gloves are unnecessary for most people: you still need to wash them so you may as well just wash your hands. The one exception may be someone who handles lots of items – like a dishwasher or a cashier, where exposure may be higher (and they must wash their hands after taking the gloves off).

Air-conditioning: Employers, businesses, restaurants, offices: understand your air-conditioning system. A system that recirculates air is very risky, and has been linked to several call centre and restaurant outbreaks. You are essentially guaranteeing that everyone breathes everyone else's air. On the other hand, an air-conditioning system that extracts air and brings in air from outside makes an indoor space safer. But simply opening windows, where possible, especially if combined with use of a fan, may be more effective if it increases the movement of air. If well ventilated, a room can be safe in minutes, even if someone is coughing and highly infectious.

Hours: All shops and businesses that can extend opening hours to reduce crowding should do so. Limit the number of people in shops. Lines on the floor to signal distancing requirements have been very successful. Consider discounts for coming in at unpopular hours. All shops should consider having a pensioner-only (or also people with a health-risk note) hour at the beginning of the day. Older people, and people with diabetes, hypertension, HIV, cancer and obesity may be more at risk (we are still learning about the extent of risk), and enabling them to shop when it is least crowded, and when other people have not yet been into the shop, helps protect them. Consider leaving hotel rooms empty and ventilated for a day after someone leaves, and ask guests to open the windows when they leave, to protect cleaning staff. Factories, mines, offices and other workplaces should consider staggering work hours or days so that not every employee comes in at the same time or on the same day. Take turns in lifts (and always wear cloth masks). Tea and break rooms must be well ventilated and break times staggered to reduce crowding.

Family: We are social creatures; we need human contact. Many extended families have regular get-togethers. Unfortunately, if you are indoors with people who don't live in the same home, you are seriously increasing the risk of spread to your family. Even if you know who each person has been in contact with in the past two weeks (and you may not), one person who was exposed in a shop or transport or work, who is not yet showing symptoms, can expose a whole extended family, who can then expose everyone they work with. A high percentage of people are infected in their own homes and take the virus to work. In China, many infections occurred in the home, so homes with vulnerable members in them should consider wearing masks at home. Meet outdoors wherever possible.

We know that children are much less likely to be infected with the virus and even when infected have no or mild symptoms. Going to school is unlikely to be dangerous for them (though schools have to think about protecting teachers). Children are probably also less likely to pass it on others. But, sadly, you still may want to hold off from children hugging vulnerable grandparents for a while. One of the hardest parts of the lockdown has been stopping children from playing together. There is no easy answer here. From current knowledge it seems that there is likely to be some risk, and children's behaviour when they are together is a challenge to all three Ds. If children play together, encourage outdoors, masks or face shields and lots of handwashing (before, during and after). Consider who they come into contact with at home (an elderly grandparent, someone with diabetes) when deciding about play arrangements. Perhaps discourage hugging and kissing.

Personal risk factors: People of all ages and levels of health have become very ill and have died of Covid-19. But we know that some people are at much higher risk

than others. The most significant risk factors for being badly affected are older age (especially over 65), diabetes, hypertension, HIV, uncontrolled asthma and obesity. If you or your family member has one of these factors, consider getting someone less vulnerable to do the shopping, consider going to shops at opening time, before anyone else has been in them. Vulnerable people should avoid taxis, trains, buses and gatherings if they can.

Protect others: Stay home if you have any of these symptoms: a fever, a cough, body aches, difficulty breathing, loss of sense of smell or taste. Encourage workers to stay home if they have these symptoms. When you are not at home, wear a cloth mask to protect others, especially indoors. Wearing a cloth mask protects other people – and they protect you.

When should you test? Getting a PCR test for coronavirus is less useful than many people think. A test that comes back negative does *not* mean you don't have the virus; it has a very high "false-negative" rate – almost a third of tests. Unless you need hospital care (in which case you will be tested), the test won't affect how you look after yourself, and if you have symptoms you should isolate anyway as you may be infected.

How should you isolate? If you have symptoms or have been in close contact with someone who has tested positive, try to self-quarantine. Once you understand the three Ds, self-quarantining is not difficult to understand. If living with people, try to spend time in a room on your own or spend time outdoors. Try to avoid communal spaces wherever possible; when you can't avoid using these (the kitchen or bathroom), try to spend as little time as possible, wipe surfaces, wear cloth masks, and open windows.

Public toilets: There is some evidence that flushing a toilet sprays particles in the air which can have the virus in them. Tell customers, employees, and passengers on planes to put toilet seats down before flushing. Consider adding signs in all public restrooms with this message.

What about thermometers? Thermometers, especially the "point at your forehead" or oral ones, are actually very poor at telling your temperature, and may falsely create the impression that an infected person is not infectious. At a business or venue entrance they require close contact with the person with the thermometer. A person who has a fever from Covid-19 is likely to have other symptoms, so a simple symptom check is all you need.

Can you fly? Planes have very good air-circulation systems with particle filters that remove the virus from the air, which means that they are very low risk during the flight. But be careful of surfaces, and on short trips avoid the toilet if you can. You are far more likely to contract the virus in the airport while queuing, or waiting in a lounge or restaurant, than on the plane.

Communicate: Have clear communication about how to manage risk at work. Managers and policy advisers should realise that although policies need to be clear and not too complicated, at the same time advice that is nuanced but actually doable has better results than advice that is very simple but unrealistic in practice. Compare telling people they can prevent HIV by *never having sex* rather than by giving information about safe sex practices. The former is simpler but does not result in

HIV prevention; it may be true but it doesn't help because it is not realistic. Businesses should anticipate they might have to shut down for a day and openly communicate.

No shaming: Don't judge or stigmatise people with Covid-19. Getting infected does not mean they were careless or have bad hygiene. Anyone can get infected, millions of people worldwide have been, and in South Africa, for every case diagnosed there are likely to be 10 others who have it but have not been tested, and may not have symptoms; it may be you. A workplace may have an outbreak despite taking all necessary measures. There is no need to shout at people exercising outdoors without a mask but at a distance, or in the park with their family; they are not going to infect you. Be kind.

Take it seriously: Covid-19 is real! If we all act together and help each other, we can dramatically limit spread, reduce deaths and protect our hospitals. Remember that anyone can get Covid-19 and become very sick. Those who were seriously ill can take a long time to fully recover. Even if you are not high-risk for severe illness, your actions create risks for others. Covid-19 is spreading rapidly in South Africa and this is the time for more, not less, vigilance.

This is in our hands: Covid-19 is here to stay for a while and is rapidly spreading; but we need to live, to see each other and to work. South Africa had an early and strict lockdown, but we always knew we couldn't do this for long. The easing of the lockdown does not mean the threat of infection has decreased. In fact, the opposite is true. We must not give up on containing spread: there is a lot practically that we as individuals, commuters, workers, managers and trades unions can do to protect ourselves and each other as South Africa reopens.

Why has information on masks changed? Early on we were advised not to wear masks, now we're told everyone should wear masks – what gives? Three things. First, as this new pandemic hit, there was a worldwide shortage of masks that healthcare and other emergency workers needed. It was more important for them than for the rest of us to get the masks, as they are more exposed, and also expose more people. Second, we were told initially that masks are more important for sick people than for protecting those not infected. This hasn't changed, but what has changed is understanding how much spread could be caused by people who have mild symptoms or do not yet have symptoms. This means that everyone is potentially a sick person who is spreading, and if we all wear masks we limit spread. Third, the world is learning fast about this new disease: more information is emerging all the time about how much of an impact universal mask-wearing can have on reducing spread. **DM/MC**

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This piece has been produced by an interdisciplinary group of academics working on Covid-19 and responses to it. The technical input is provided by members with medical expertise and has also been fact-checked by a number of other medical professionals, in accordance with the latest science.