Guidelines for health care workers caring for children with suspected Covid-19

Essential things health workers need to know about COVID-19

Typical clinical features: 2-5 (up to 14 day incubation period) days after exposure, sore throat, then dry cough, fever, runny nose, then some develop drip pneumonia.
Droplet spread: Coughing, sneezing, 2m away
Aerosol spread: Covid-19 virus stays in the air for up to 3 hours if aerosolised, especially important at risk procedures such as suctioning, nebulisation or intubation.
Contact spread: in public – door handles, handrails, buses, medical equipment etc.
Faecal-oral spread – some children have diarrhoea and excrete the virus in stool
The virus lives on hands for at least 10 minutes, but if you touch your mouth, nose, face, eyes → infection.
When the virus comes in contact a metal or plastic surface it can live for up to 72 hours or more. Cleaning with bleach is needed to remove it (see below).
Normal laundry detergent kills the virus from clothes. The sun kills the virus, so drying clothes in the sun helps.

Children and COVID-19

Symptoms and signs

URTI, cough, runny nose, most common (70-80%), very mild illness
Average age in other countries of COVID-19 proven cases in children is 7 years, but infants and young children under 5 are more commonly hospitalised.
Pneumonia: 5% of infected children are hypoxic; most just need oxygen for a few days
0.6% are critical and need intensive care
Fever, cough and diarrhoea or vomiting (a more general viral syndrome) has been described in children with COVID-19 in China. Shock, myocarditis, encephalitis, coagulopathy are very rare in children.

Outcomes in COVID-19 infected children

The small number of paediatric deaths (8 globally as of April 2nd) are mostly in adolescent patients.
Of over 2000 children in one report from China, only one child died
No children have died in Italy, despite over 6000 adult deaths

Transmission from children

Children are much less likely to become seriously ill, and much less likely to transmit the virus to adults. This is important for health care workers to know, it should not lead to complacency, but should calm some fears. Nonetheless, wearing PPE (personal protective equipment) when caring for a child with COVID-19 is essential.

Testing

A "real-time PCR" test is available, this identifies new infection. Small proportion of false negative results at presentation on the initial test. Retest in 5 days with a highly suspected case.
One PCR method uses GeneXpert machines (the same *machines* we use for Xpert MTB, but using new COVID-19 cartridges "SARS COV-2"). Test results within an hour.

Rapid antibody test kits are also available, but antibodies may not develop for 14 days after the onset of infection, so many children presenting with cough and fever will not yet have antibodies to COVID-19. Useful to know if a patient has had a recent or past infection.

Treatment

Treatment is supportive. Check oxygen saturation, triage emergency signs and examine for signs of respiratory distress.

Hospitalise a suspected case if the child is hypoxic, or has any other signs of severe pneumonia or any danger signs (inability to feed, severe respiratory distress, obstructed breathing, cyanosis, shock) – Give oxygen therapy, other standard therapies for pneumonia (standard antibiotics for moderate or severe pneumonia).
Put a surgical or N95 mask on any patient with COVID-19 if they are on oxygen therapy. Put the oxygen prongs on first, and fit the mask. This will provide added protection for staff.

If no signs of severe disease, manage at home, and instruct the family to isolate as best as they can for 14 days.
Check immunization status and update if needed.

Hydroxychloroquine (chloroquine) may help in severe cases of COVID-19, but these will be rare in children. Hydroxychloroquine *may* reduce the number of days a patient has Covid-19 virus in their nose, and therefore may reduce the risk of transmission, and potentially the risk of developing severe disease. Further research will clarify the role of this drug, but it is not a magical cure, and there are potential side effects.

Covid-19 in pregnancy and the newborn baby

Pregnant women don't seem to be more likely to get COVID-19 than other healthy people of the same age. Most pregnant women who get coronavirus will probably have only mild or moderate symptoms. Coronavirus does not seem to pass from mothers to unborn babies during pregnancy, and unborn babies do not seem to be at increased risk during pregnancy. **Do not separate babies from mothers who have tested positive to COVID-19.**
There is currently no evidence that the virus is carried in breastmilk. The main risk of breastfeeding for a mother who has COVID-19 is close contact between the mother and your baby leading to transmission of the virus, yet babies who get COVID-19 do not seem to get very sick. However we know that babies who don't get breast-milk get very sick, become malnourished and often die. And babies who are separated from their mothers are at increased risk of other infections, attachment and feeding problems. **So it is best to keep the baby with the mother.** Breast milk is best for babies, even if the mother has COVID-19. **They should isolate together**, and most likely they will both get over it.

Staff protection

Remember children are much less likely to transmit COVID-19 than adults, but there are higher risk procedures in a very unwell child when aerosolisation of virus can occur, including suctioning, nebulisation, intubation. The vast majority of children with COVID-19 have a mild illness, and those who get sick the majority only need oxygen and isolation.
During the Coronavirus SARS outbreak, there were no cases where a health care worker was infected from a paediatric patient with SARS, in hospitals where they followed full precautions.
Protect staff from getting COVID-19 by hand washing, hand washing, hand washing, wearing protective equipment (PPE), and surface cleaning.
Wash hands – 5 moments:

1. Before touching the patient
2. After touching the patient
3. After body fluid exposure / risk
4. Before and after any procedure
5. After touching the patients surroundings

Isolate the patient

PPE – Personal Protective Equipment (PPE) for health workers when caring for a case of COVID-19

- Wear a clean gown if you can, and know how to take it off without contaminating yourself
- Wear a mask if you are caring for a case of COVID-19, know how to put it on so it is airtight at the nose, and fully covers the chin. Know how to take it off without contaminating yourself
- Gloves and hand washing (hand washing is most important)
- Eye protection
- If you have none of these, be "bare to the elbows" and wash your hands, **distancing and avoiding contact is important to limit spread and infecting yourself**
- Do not give a nebuliser to a patient with COVID-19 if you are not wearing a mask and eye protection, because nebuliser aerosolises virus particles and that is how some health workers have become infected.
- **Do not touch surfaces**, such as the patient's bed, trolley. We just need to get used to not touching objects when we do not need to.
- Wash your clothes in laundry detergent and dry them in the sun.

Restrict visitors on the wards

Restrict visitors / caregivers in all hospital wards. No more than one caregiver at a time for all patients.

General prevention measures

Wash your hands often with soap and water – for at least 20 seconds, or use hand sanitiser containing at least 60% alcohol. Do the 5 moments of hand hygiene.

"Social distancing" – this is very important

- Do not congregate in large groups, no more than 2 at a time
- Stay 2m away from other people if you can
- Reduce the number of people on a ward round to the minimum needed
- Keep all potentially infected people away from the elderly
- **Do not shake hands** – wave and smile instead
- Stay home when you are sick

Cough etiquette

- Cover your cough or sneeze in your elbow, or with a tissue, then dispose of the tissue in the bin
- **Do not touch your face**, especially eyes, nose, and mouth, unless your hands are fully cleaned first.

Surface and equipment cleaning

- Regularly clean and disinfect touched objects and surfaces, trolleys, door handles using dilute bleach (0.5% sodium hypochlorite), at least twice a day. This will remove COVID-19 virus.
- Wash all oxygen equipment (nasal prongs) thoroughly with bleach (see recipe below for making 0.5% sodium hypochlorite) and dry in the sun, this will eliminate COVID-19 contamination. Clean oxygen concentrators daily with bleach.
- If you need to use a stethoscope, clean thoroughly between patients with 60%+ alcohol solution.

Cleaning oxygen and other medical equipment with bleach (0.5% sodium hypochlorite)

Preparation of 0.5% sodium hypochlorite solution. Dilute household bleach with the volume of tap water described in the table below. Bleach comes in various strengths of the active ingredient (sodium hypochlorite), check that on the bottle first, then dilute with the appropriate volume of water in a 1L container. Make up a fresh container every day, so that you have enough for cleaning all equipment and touched surfaces.

To make up disinfectant bleach solution (0.5% sodium hypochlorite) in a 1L container

% of sodium hypochlorite in household bleach	Volume of bleach	Volume of water
1%	500ml	500ml
2%	250ml	750ml
3%	170ml	830ml
4%	125ml	875ml
5%	100ml	900ml

Protective equipment must be worn while cleaning any equipment: wear a mask, goggles for eye protection, a fluid-resistant apron, and gloves.

First decontaminate equipment by mechanically cleaning oxygen tubing and other equipment of mucus and secretions. Then soak equipment in 0.5% sodium hypochlorite solution for 30 minutes. Thoroughly rinse the oxygen delivery devices before reuse. Do hand hygiene with soap and water or 60%+ alcohol before cleaning and after removing personal protective equipment.

Make sure the container of bleach (sodium hypochlorite) cleaning fluid has a secure top, is clearly marked as dangerous, and kept out of reach of children.

Oxygen concentrators and ward set-up

Oxygen concentrators are safe and effective for children and other patients with COVID-19, and safe for staff. The residual gas from an oxygen concentrator (which is nearly all nitrogen after oxygen is extracted) is expelled from the machine into the room atmosphere, but this is *not* the gas that is exhaled from the patient. It is room air which goes through the canisters, minus the oxygen which goes to the patient.

If the patient exhales virus particles they could recirculate through the concentrator. This is much less likely if the concentrator is sufficiently away from the patient. Use longer oxygen tubing, and put the concentrators a distance of >2m from the patient. Concentrators have a fine-particle (internal) and large particle filter (at the back). They can also have an additional HEPA filter attached which will filter out all virus particles.

Install exhaust fans in wards and ED where respiratory patients are managed, if you can

We cannot reproduce “negative pressure isolation rooms” as in rich countries, but having exhaust fans in a ward, on the wall above each bed ideally, will extract any recirculating air, and make it much less likely that staff would inhale aerosolised virus. A 3m perimeter outside the ward would need to be fenced off, to keep others outside safe. Exhaust fans are fairly cheap and available, and hospitals should be encouraged to install them.

Increase bed spaces to 2m apart if possible, with ideally a barrier between them. This is often considered impractical, but in SARS a major contributor to spread in a ward was bed-spaces being too close together.

Remember during the previous SARS outbreak, no paediatric health care worker was infected from a child with SARS. This is no reason for complacency, as many doctors and nurses have been affected by COVID-19, but it does give some reassurance to child health workers that if we take proper precautions we will be safe.