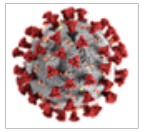
Evidence current as of 14/5/2020



Covid-19

Rapid Review for the EC

Thursday, 14 May 2020

Review 9

Compiled by Dr Luke Bush, Dr Lauren Lai King and Dr Kamlin Ekambaram
Reviewed and input by Dr Andrew Redfern and Dr Jessica Head

The purpose of this regular review, is to present COVID-19 related questions in Emergency Medicine

We accept that available literature on the topics covered in these reviews may be scarce or incomplete, but shared discussion of novel front line strategies may be a tool to augment our clinical practice and develop future policy

Topic:

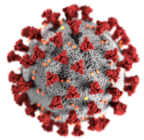
- **COVID-19 in Paediatrics**

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Paediatrics

COVID-19



Fortunately, children appear relatively protected from infection and severe illness.

There are likely to be other significant impacts on child health associated with the pandemic - these have the potential to reverse gains made in reducing morbidity and mortality for children under the age of 5.

As the pandemic has progressed it is clear that very few children and adolescents have suffered from severe illness. This is manifested by very low age-related case fatality rates compared to adults(1) and early estimates of infection fatality rates that are markedly lower than adults(2).

Children are more likely than adults to have asymptomatic or have very mild illness, but until such time as there is community testing to establish the seroprevalence, this percentage of children is currently unknown - most data is from testing contacts of positive adult cases and ranges between 10-30% depending on child age.

There were initial concerns that children would be potential 'super spreaders', but there is increasing evidence that this may not be the case. Because of physical distancing measures and school closures associated with lockdowns(3) we do not have a clear picture of paediatric infection in an unmitigated scenario. The evidence thus far is that it is uncommon for children to be the index case within a household(4) and that they may be less likely than adults to transmit the virus(5).

There is conflicting evidence as to the attack rate* on children exposed to the virus with recent evidence suggesting a lower attack rate than in adults(6-8) - again without seroprevalence data this remains to be conclusively determined.

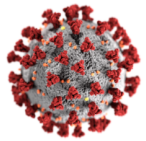
There are a couple recent papers that report specific concerns that may be of importance and of interest: (see page 4)

- Placental involvement
- Hyperinflammatory shock
- Skin manifestations of COVID-19

* Attack rate is the percentage who develop infection after being exposed to the virus.

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References, resources & comments via QR code



COVID-19 in paediatric age group (9-11)

In the Western Cape 3% of positive cases are in children aged <10 years

Covid-19
Rapid Review for the EC

Children appear to be relatively protected from COVID-19 and can mostly be managed at home.

Children under the age of 13 represent only a very small proportion of those requiring in-patient management.

Infants <1 year of age may account for a larger proportion of children who present, and those with cardiac or respiratory comorbidity appear to have increased risk for severe disease.

Clinical Presentation

"There appears to be little in the way of clinical signs in children to differentiate COVID-19 from other childhood respiratory virus infections(12)."

In symptomatic children the most common symptoms are(13)

- General features: fever (42-50%), poor feeding, fatigue, headache.
- Respiratory: pharyngitis (45%), cough (38-48%), rhinitis (8%), shortness of breath.
- Gastrointestinal: diarrhoea (9%), vomiting (6%).

Burden of disease

Data from the US of 150 000 cases found that the age group 0-9 represented only 0.7% of all COVID-19 positive cases(CDC) despite representing 1.5% of the population(US census).

- 1-2% of confirmed cases of COVID-19 were among persons aged <19 years (USA, Italy, China, Spain)
- In the USA a third of these are aged 15-17 and infants < 1 year old accounted for 15% of those <18 years
- Up to 90% had exposure to a known adult case

In an Italian prevalence study (tested 70% of a town's population) finding 2.6% of people infected, they found no infections in children < 10 years(14).

Clinical Course

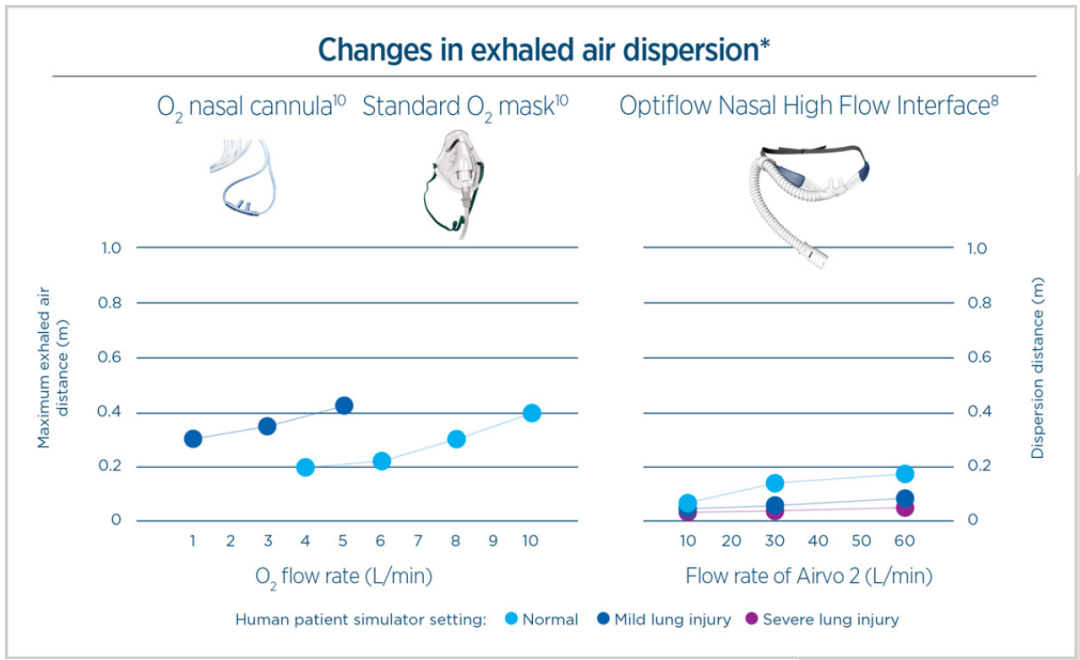
Relative to adults' fewer children require admission to hospital (6-20%), ICU admission (0.6-2%) and death is extremely rare.

The spectrum of disease for those presenting to hospital is also **milder than adults**:

- Asymptomatic (no clinical signs or symptoms with normal chest imaging): 4%
- Mild (mild symptoms, including fever, fatigue, myalgia, cough): 51%
- Moderate (pneumonia with symptoms or subclinical disease with abnormal chest imaging): 39%
- Severe (dyspnoea, central cyanosis, hypoxia): 5%
- Critical (acute respiratory distress syndrome [ARDS], respiratory failure, shock, or multi-organ dysfunction): 0.6%

Paediatric practice in the EC

Prioritising tests to improve turnaround times for those hospitalised will protect staff and other hospitalised patients



Testing*

Most children who develop COVID-19 and present can be managed at home and will do well – current DOH guidance is to test children with symptoms. Whether this is practical and/or useful in our setting remains to be proven[x].

Those at high risk for infection i.e. all symptomatic children who have a positive contact, or a healthcare contact or a contact with flu-like illness should be tested.

So who should we possibly be testing in our setting, if testing resources are limited or there are delays from symptom onset or to test result?
Click on QR code for some thoughts

*RT-PCR tests have a 30% false negative rate (15).
[x] Models for disease suppression and containment suggest that positive patients need to tested within 24hrs of symptoms and be informed of their results with 24-48hrs (16-18).

CPAP and HFNC(19)

There is concern, particularly in adults, regarding the aerosol risk to staff and the use of CPAP and HFNC. Quantifying this risk is difficult in adults, but most countries with these resources available have included them in their management plans with improved outcomes for adult patients.

Extrapolating this risk to paediatrics is also problematic since nasal CPAP is frequently used. It is important to recognise that all oxygen flow devices create air dispersal that may pose a risk to staff, but that this is limited for appropriately sized HFNC.

These respiratory supportive measures should remain part of management plans for children presenting with respiratory distress and hypoxia, as the benefits of their use out-weight their risk and many children that need HFNC/CPAP will not have COVID-19. When used they should be used as per local guidelines in conjunction with PPE guidelines.

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Studies of interest

THE LANCET

Hyperinflammatory shock in children during COVID-19 pandemic

This study describes a cluster of cases presenting with Kawasaki's-like features, to paediatric services in London. These children developed vasoplegic shock, requiring inotropes and were identified because of a sudden increase in these cases.

With further cases being described in the UK, USA, Spain and Italy, the temporal association with SARS-CoV-2, and many of the children seropositive, it is a possibility that this Kawasaki-like hypersensitivity may be related to SARS-CoV-2 infection.

We need to be aware of this as a possibility for children presenting with unrelenting fever, rash, conjunctivitis, peripheral oedema, extremity pain, gastrointestinal symptoms and who develop shock. Since this is a delayed response patients may test RT-PCR negative and will need tertiary care.

RCPCH
Royal College of Paediatrics and Child Health
Leading the way in Children's Health

Guidance: Paediatric multisystem inflammatory syndrome temporally associated with COVID-19

BJD

Classification of the cutaneous manifestations of COVID-19: a rapid prospective nationwide consensus study in Spain with 375 cases

Four dermatologists in Spain reviewed images of skin manifestations that may be associated with COVID-19. Acral oedema with vesicular eruptions or pustules were more common in children but other patterns include maculopapular, other vesicles, urticarial and livedo or necrosis.

We should recognise that there are likely exanthems associated with COVID-19.



A mechanistic analysis placental intravascular thrombus formation in COVID-19 patients

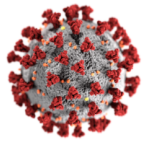
There is no evidence for direct viral infection of the placenta but there is evidence of placental dysfunction demonstrated by thrombosis in large vessels in the foetal circulation of the placenta.

The patient group in the study were all approaching term when diagnosed with COVID-19 and all had mild disease; all infants were delivered between 38-40 weeks gestation with no complications noted.

COVID-19 infection earlier in pregnancy raises concern for placental insufficiency and the effects this may have.

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The impact of COVID-19

The pandemic is likely to amplify suffering within society at all levels and those that are most insecure and vulnerable, the children, are unlikely to escape this.

We need to be cognisant not just of the medical concerns related to COVID-19, but all the factors that may affect children in continuing to provide services most necessary to their care.

Delayed presentations

Because of mitigation strategies (lockdown), fear and diversion of resources, there is a risk that children will present late to hospitals with other illnesses or not be investigated appropriately at primary care. Community trust in healthcare may also be affected with further potential to delay necessary care.

Primary health care

The impact of the pandemic on this level of care may result in decreased immunisation rates and failure to recognise early growth faltering or other social concerns amenable to intervention or investigation. This may have profound long term effects on child health, development and well-being, reversing gains in mortality and morbidity in children <5yrs.

Social concerns

There may be increased levels of child abuse, self-harm and deterioration in mental health across all ages. Loss of economic opportunities in families will have an effect on food security and loss of access to services, such as electricity during winter, may result in increased risk of fire as alternative energy sources are used. There are a myriad of social implications that will have an effect on health and well-being over the short, medium and long term.

Service provision

As health services are burdened with COVID-19 patients, resources are being reallocated. If this resource reallocation at hospital level affects paediatric services significantly, this may result in increased morbidity and mortality across the full spectrum of paediatrics (primary care, secondary and tertiary services).

MESSAGES FOR MOTHERS
In response to COVID-19

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