Presentation and care of COVID 19 in children and young persons admitted with moderate to severe COVID-19

UNIVERSITEIT VAN PRETORIA
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YUNIBESITHI YA PRETORIA

Faculty of
Health Sciences

Fakulteit Gesondheidswetenskappe
Lefapha la Disaense tša Maphelo

Presented by:
Jeané Cloete

Make today matter

Agenda

1. Epidemiology of disease in South Africa
2. Severity of illness
3. Disease presentation
4. Severe COVID vs Multisystem inflammatory syndrome
5. Management

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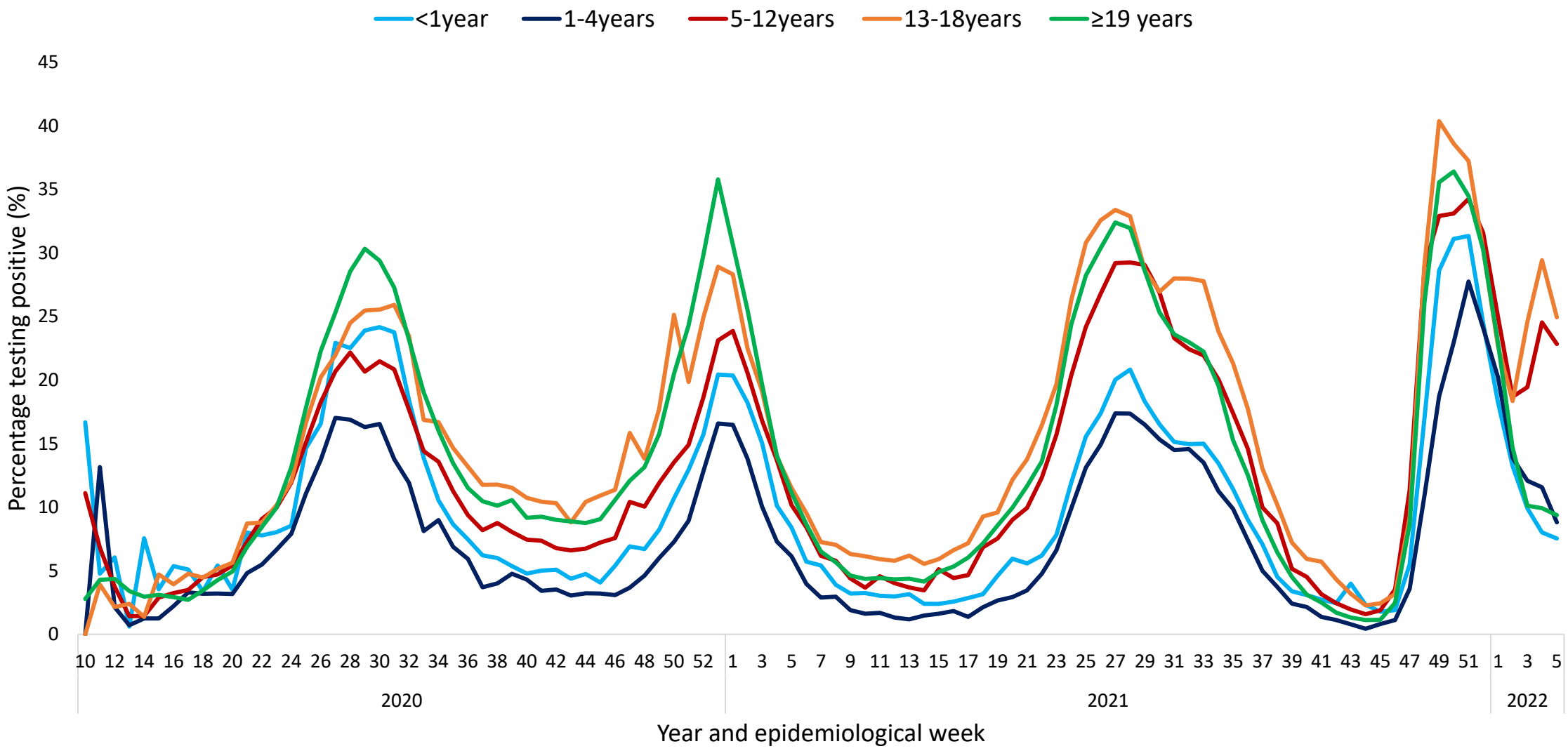
Epidemiology paediatric COVID 19 - Rate of SARS-CoV-2 % testing positive in South Africa



Used with permission DATCOV Hospital surveillance data - prepress Dr Waasila Jassat et al

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Severity of illness

Mild or moderate disease	Severe disease	Critical disease
• No new • Increased supplemental oxygen • Other supportive treatment	• Supplemental oxygen • Increased requirement from baseline • Additional care and management	• Noninvasive or invasive mechanical ventilation • Sepsis, multiorgan failure • Rapidly worsening clinical trajectory

COVID-19 admissions, severe disease, and in-hospital deaths among children, in D614G, Beta, Delta and Omicron waves, South Africa *p<0.001; **p>0.05

Variant wave	n with outcome	% (n) received oxygen	% (n) treated in ICU	% (n) severe	% (n) died
<1 year					
D614G	581	15.3 (89) *	9.5 (55) *	27.4 (159) *	6.7 (39) *
Beta	955	22.8 (218) *	8.3 (79) *	30.9 (295) *	4.8 (46) *
Delta	1988	20.0 (397) *	8.0 (160) *	30.8 (613) *	5.2 (104) *
Omicron	2389	14.8 (353)	4.4 (106)	21.2 (507)	2.4 (58)
1-4 years					
D614G	217	10.6 (23) *	8.3 (18) *	18.0 (39) *	0.9 (2) **
Beta	294	15.3 (45) *	6.1 (18) *	22.8 (67) *	3.4 (10) *
Delta	744	15.1 (112) *	3.2 (24) **	20.7 (154) *	0.7 (5) **
Omicron	853	9.3 (79)	2.5 (21)	14.1 (120)	0.9 (8)
5-19 years					
D614G	1529	13.1 (200) *	7.1 (108) *	20.8 (318) *	3.9 (59) *
Beta	1471	20.9 (308) *	5.4 (80) *	29.0 (427) *	4.8 (70) *
Delta	4212	18.2 (768) *	4.9 (206) *	25.1 (1056) *	2.9 (121) *
Omicron	3503	11.0 (384)	3.4 (118)	16.9 (593)	1.8 (62)

Used with permission from Presentation: DATCOV: Hospital surveillance for COVID-19 Omicron-dominated fourth wave – 4/02/2022

Compiled by Lovelyn Uzoma Ozougwu, Dr Waasila Jassat, Prof Lucille Blumberg, Richard Welch and DATCOV team

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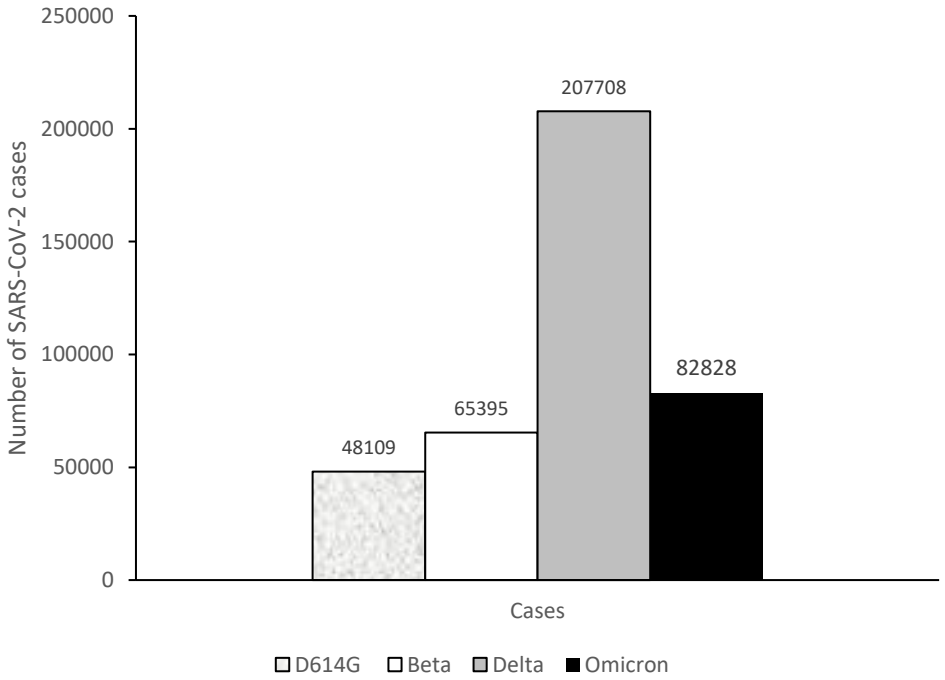
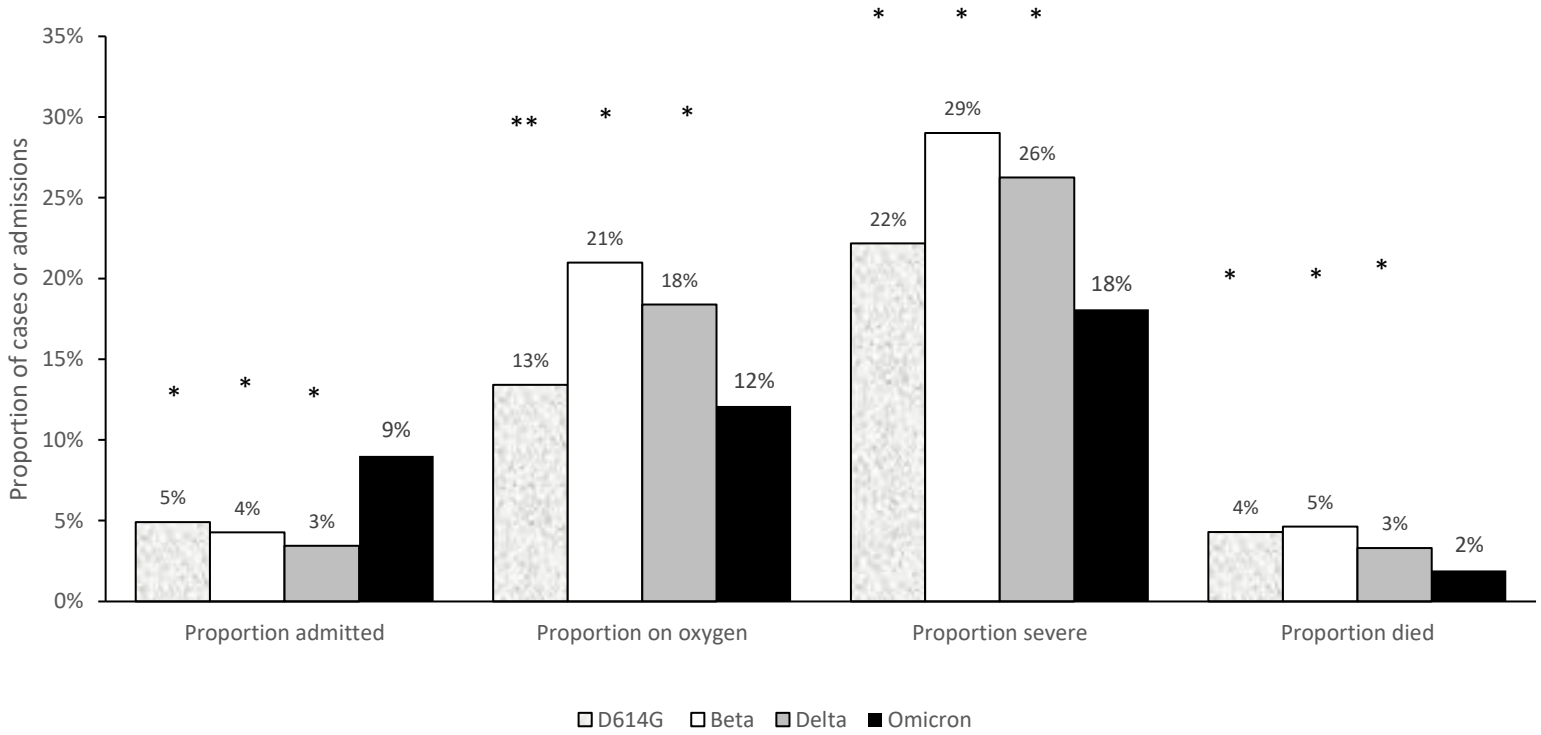
COVID-19 admissions, severe disease, and in-hospital deaths amongst individuals <20 years, in D614G, Beta, Delta and Omicron waves, South Africa





"Severe" defined as respiratory distress, oxygen, mechanical ventilation, high care / ICU care or death
** p<0.05; ** p>0.05*

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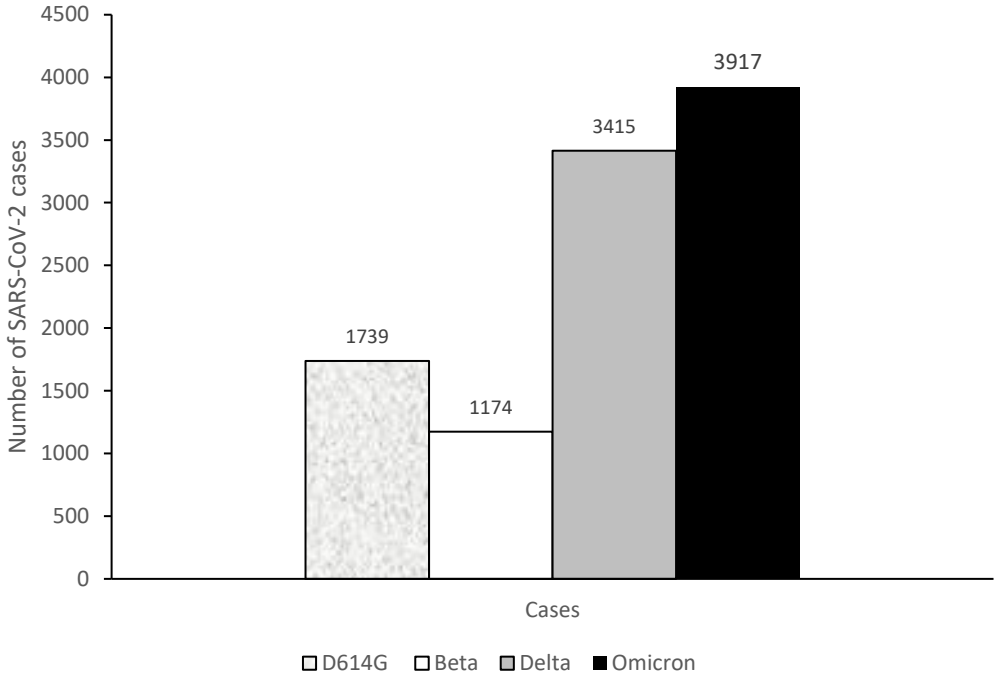
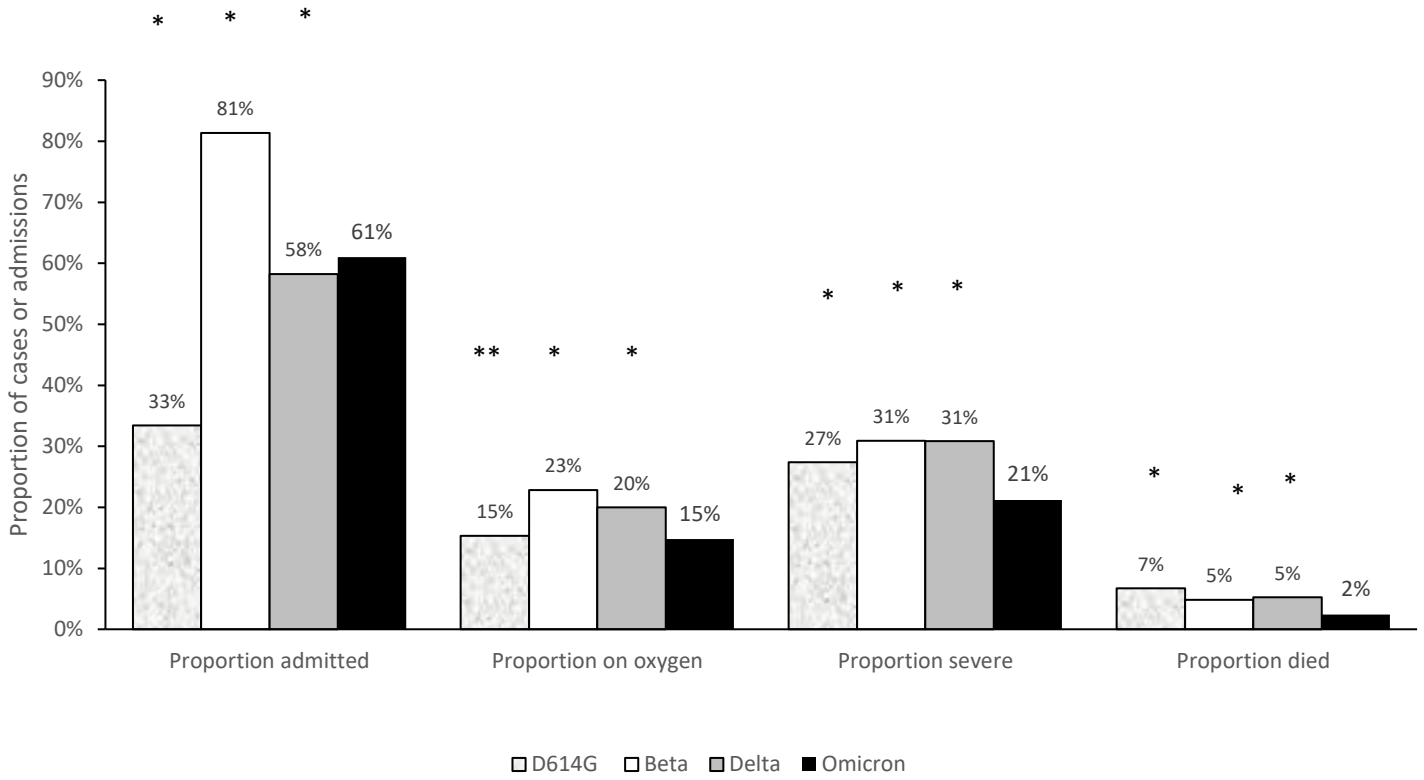
COVID-19 admissions, severe disease, and in-hospital deaths amongst individuals <1 year, in D614G, Beta, Delta and Omicron waves, South Africa





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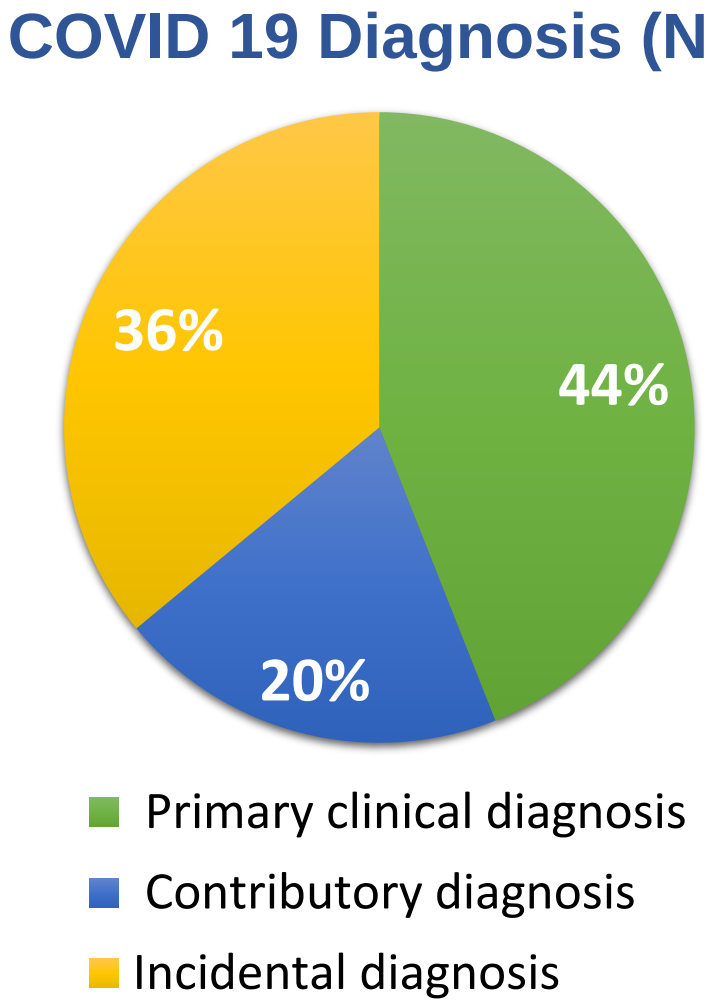
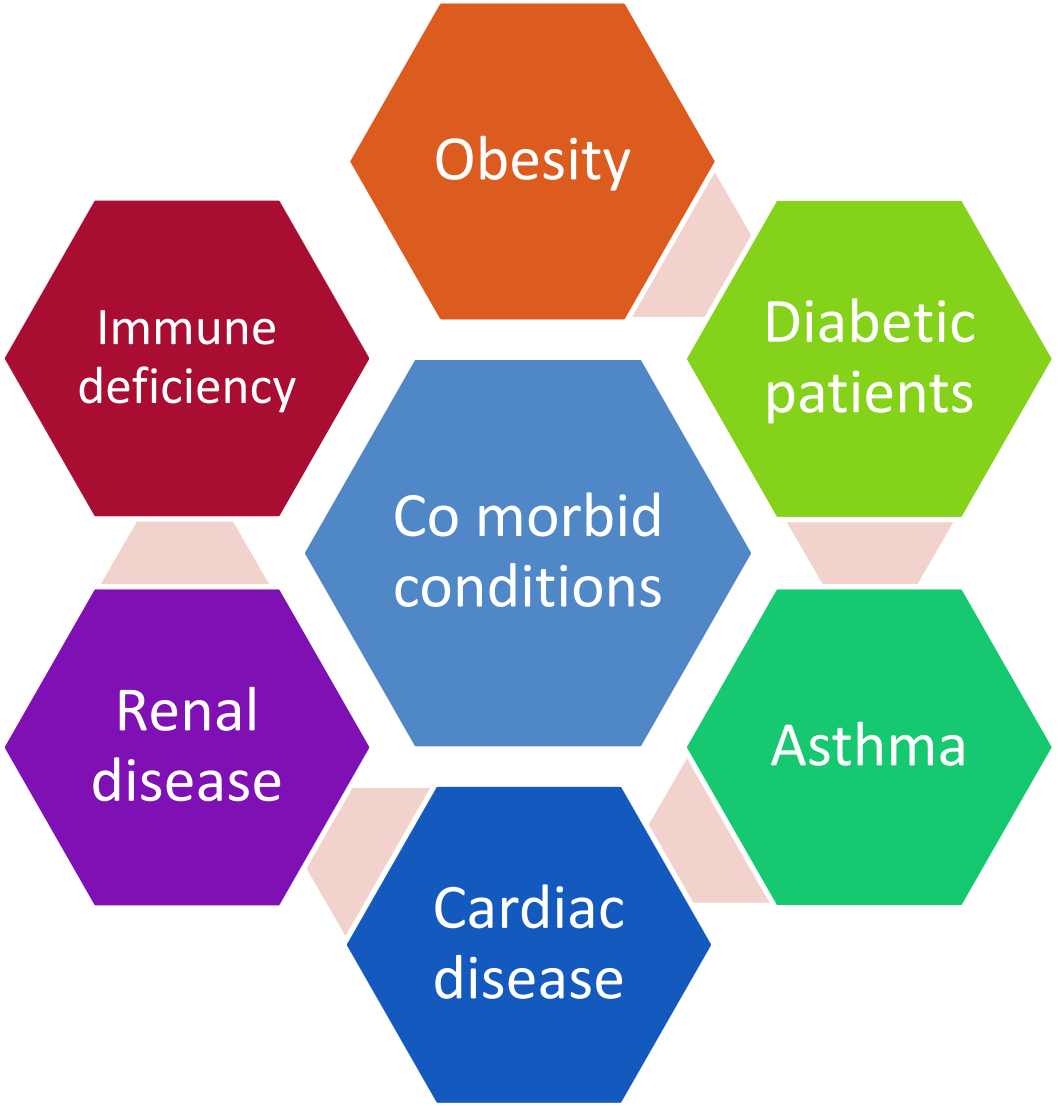
Pediatric hospitalisations due to COVID-19 during the first SARS-CoV-2 omicron (B.1.1.529) variant wave in South Africa: a multicentre observational study- *Jeané Cloete, Annelet Kruger, Maureen Masha et al. Lancet Child and Adolescent Health 2022*



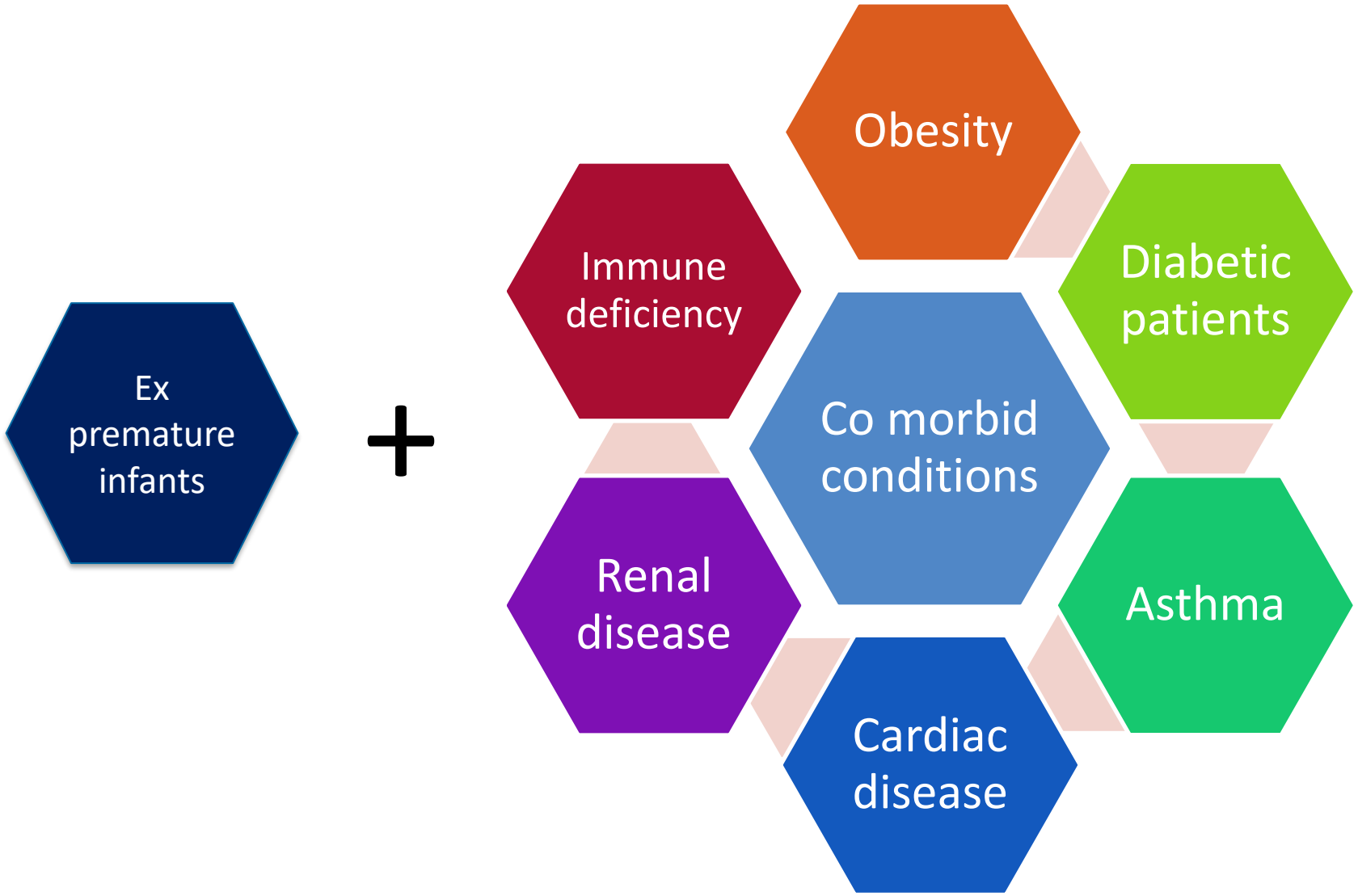
- Combine Primary + Contributory: 64%
- Incidental accounted for 1/3 of patients admitted
- Mainly surgical patients that were swabbed for emergency or elective procedures
- Mainly asymptomatic for COVID 19

Co morbid diseases



DeBiasi RL, Song X, Delaney M et al. Severe COVID 19 in children and young adults in the Washington DC metropolitan region. *Journal of Paediatrics* (2020). Doi:https://doi/org/10,1016/j. jpeds.2020,05,07

Co morbid diseases



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Summary

- More children < 19 years admitted during Omicron wave
- Severity of illness was not worse
- Deaths were less
- Confounding factors: Other viral pathogens impact the numbers
- South African Children > 12 years were eligible to vaccinate as of October 2021

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Disease presentation

- Respiratory illness
- Gastro-intestinal illness
- Neurological manifestation
- Other

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Symptoms (N=125)

Fever	58 (46%)
Cough	50 (40%)
Vomiting	30 (24%)
Difficulty in breathing	28 (22%)
Diarrhoea	25 (20%)
Seizures	25 (20%)
Headache	7 (6%)
Skin rash	4 (3%)
Other	4 (3%)

- Most common symptom was fever
- 1/5 of patients had gastro-intestinal symptoms
- 1/5 of patients had seizures

Respiratory illness

- Mild to moderate respiratory distress
- Needing oxygen support if needed
- Co –infection with other respiratory viruses
- High risk infants – ex premature infants

Gastro-intestinal

- Presenting with Abdominal pain
- Vomiting and diarhoea
- Omicron: Not MIS-C but COVID 19
- Moderate disease – needing supportive management

Neurological

- Marked increase in seizure presentation with Omicron
- High fever + febrile seizures
- Patients < 1 year and older than 5 years that presented with seizures
- Other pathology was excluded

Other

- Skin and joint manifestations – rare
- Self limiting
- No need for admission

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Multisystem inflammatory syndrome in children

Child or adolescent < 19 years of age
Fever 38,5 C > 3days

And

At least 2
1.Rash, conjunctivitis or muco-cutaneous inflammation.
2.Hypotension or shock.
3.Features of myocardial dysfunction, pericarditis, valvulitis, or coronary abnormalities
4.Evidence of coagulopathy
5.Acute gastrointestinal problems

And

Evidence of COVID 19 infection and/or contact or Antibody positive

And

Elevated inflammatory markers: ESR, CRP PCT

And

No other obvious microbiological cause

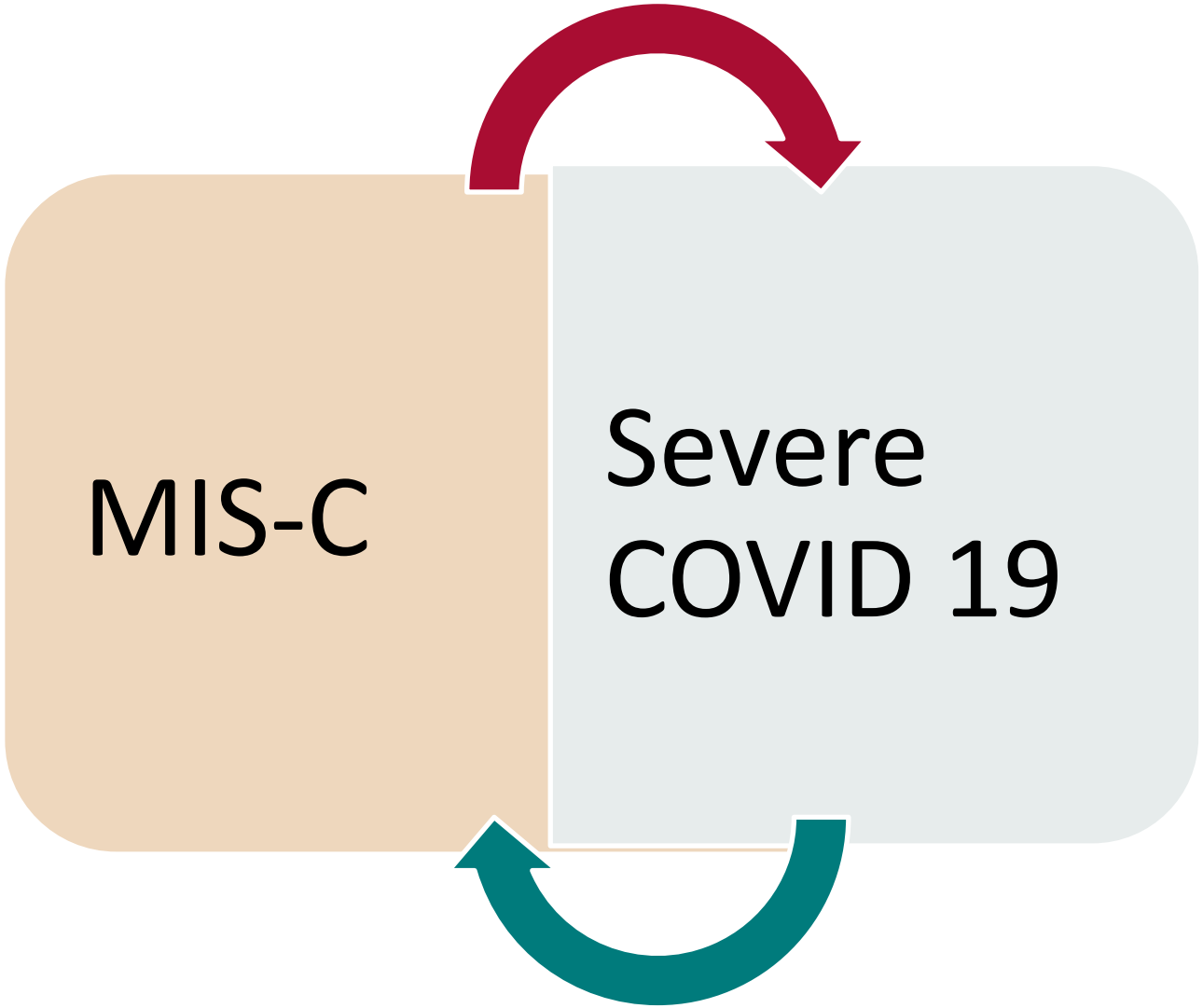
*Multisystem inflammatory syndrome in children and adolescents with COVID-19. Scientific brief 15 May 2020
https://www.who.int/news-room/commentaries/detail/multisystem-inflammatory-syndrome-in-children-and-adolescents-with-covid-19

MIS-C vs Severe COVID 19

	MIS-C	Severe COVID 19
Age group	Mostly older children >6yrs Post omicron increase younger patients with MIS-C	Younger infants
Underlying pathology	Previously Healthy	Co morbid diseases
Clinical presentation	Gastrointestinal symptoms – more severe Mucocutaneous symptoms – more common Cardiovascular abnormalities: More common Hypotension and shock Severe Cardiac dysfunction Respiratory symptoms – Present with cardiovascular disease	Gastro-intestinal symptoms – often milder Cardiovascular abnormalities: Can have myocarditis – less frequent Respiratory symptoms – Present more often with absence of Cardiovascular disease
Laboratory findings	Extreme inflammation White cell count: Raised Neutrophil count, mild lymphopaenia Lower Platelet count Coagulopathy: more abnormal Cardiac enzymes often higher	Mildly raised Inflammatory markers White cell count: Lymphopaenia Coagulopathy: might abnormal

Characteristics and Outcomes of US Children and Adolescents With Multisystem Inflammatory Syndrome in Children (MIS-C) Compared With Severe Acute COVID-19 – L Feldstein et al JAMA 24/02/2021
Multisystem Inflammatory Syndrome in Children (MIS-C), a Post-viral Myocarditis and Systemic Vasculitis—A Critical Review of Its Pathogenesis and Treatment Front. Pediatr., 16 December 2020. J Mcmurray et al

Spectrum of MIS-C and Severe COVID 19



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Principles of management

- It is a virus
- Basic management principles

Supportive Management

Respiratory illness

- Admission for moderate to severe cases
- Oxygen therapy – nasal prongs
- β2 agonist if wheezing - given with spacer

Gastro-intestinal illness

- Intravenous fluids
- Continue normal feeds
- Anti-emetics if needed

Neurological manifestation

- Standard Care for seizures
- Complex febrile seizures

Other

- Fever – Paracetamol/Acetaminophen/Ibuprofen

Management of children and young persons with COVID 19

- No place for routine antibiotics
  - Indications for antibiotics
  - Except
    - If a secondary bacterial infection
    - Atypical bacterial infection is suspected
- Severe and critically ill patients transferred to a center with paediatric intensive care unit
- Remember atypical presentation of patients with MIS-C that may need earlier referral

Drug treatments for children and young persons with severe COVID 19

- Steroid
  - Patients that need high flow or ventilatory support
    - Dexamethasone
  - MIS-C
    - Hydrocortisone - early

- Immune modulation therapies
  - Intravenous immunoglobulins – MIS-C
  - Anti - IL-10 monoclonal/polyclonal antibodies

Thank you for you attention

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- SAMRC research team
- Laboratory team:

  Zoonotic arbo and Respiratory virus research group

  Department of Medical Virology, University of Pretoria

  National Health Laboratory Service Tshwane Academic division Department

  Medical Virology

References

1. South African Department of Health COVID 19 dashboard
2. National Institute of Communicable Diseases. Epidemiology and clinical characteristics of laboratory confirmed COVID-19 among individuals aged ≤19 years, South Africa, *March 1, 2020– 4 Feb, 2022.* https://www.nicd.ac.za/wp-content/uploads
3. National Institute for Communicable Diseases. Daily Hospital surveillance system (DATCOV) report. https://www.nicd.ac.za/diseases-a-z-index/disease-index-covid-19/surveillance-reports. 2021
4. National Institute of Communicable Diseases. COVID-19 weekly *epidemiological update.* https://www.nicd.ac.za/diseases-a-z-index/disease-index-covid-19/surveillance-reports/national-covid-19-daily-report/
5. Dong Y, Dong Y, Mo X, et al. Epidemiology of COVID-19 among children in China. Pediatrics 2020;145(6).
6. Up to date – Management of children with COVID 19 disease
7. Yasuhara J, Kuno T, Takagi H, Sumitomo N. Clinical characteristics of COVID-19 in children: A systematic review. Pediatric Pulmonology 2020;55(10):2565–75.
8. *https://www.who.int/news-room/commentaries/detail/multisystem-inflammatory-syndrome-in-children-and-adolescents-with-covid-19*Characteristics and Outcomes of US Children and Adolescents With Multisystem Inflammatory Syndrome in Children (MIS-C) Compared With Severe Acute COVID-19 – L Feldstein et al JAMA 24/02/2021
9. Karim SSA, Karim QA. Omicron SARS-CoV-2 variant: a new chapter in the COVID-19 pandemic. Lancet (London, England) [Internet] 2021;Available from: http://www.ncbi.nlm.nih.gov/pubmed/34871545
10. Differentiating between MIS-C and severe COVID-19 – M Hester https://www.contemporarypediatrics.com/view/differentiating-between-mis-c-and-severe-covid-19
11. Multisystem Inflammatory Syndrome in Children (MIS-C), a Post-viral Myocarditis and Systemic Vasculitis—A Critical Review of Its Pathogenesis and Treatment Front. Pediatr., 16 December 2020. J MCmurray et al
12. Callaway E. Heavily Mutated Omicron Variant Puts Scientists on Alert. Scientific American 2021
13. BMJ. "Further evidence does not support hydroxychloroquine for patients with COVID-19: Adverse events were more common in those receiving the drug." ScienceDaily. ScienceDaily, 15 May 2020. www.sciencedaily.com/releases/2020/05/200515174441.htm
14. Wang et al*. Remdesivir in adults with severe COVID-19: a randomised, double-blind, placebo-controlled, multicentre trial.* Lancet 2020; 395:1569-78