



Department  
of Health &  
Social Care

# **SARS-CoV-2, SARS-CoV-1 and MERS-CoV**

**Epidemiology and clinical characteristics in children**  
**A narrative review using systematic review methodology**

Dr Nisha Mehta MA(Oxon) MRCPsych MRCPGP

Clinical Advisor to the Chief Medical Officer

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# OUTLINE

- **Epidemiology and transmission dynamics of COVID-19 in children**
- **Comparison with novel coronaviruses causing disease in humans (SARS, MERS)**
- **To inform decisions about clinical and public health measures for children**
- **Timescale for production – 1 week**
- **Peer review** *‘comprehensive and well written. The quality of papers was low and we have a limited set of inconclusive data about COVID-19 in children’*
- **Presentation to SAGE 10<sup>th</sup> March 2020**

# METHODS

- **Medline search for abstracts**

*coronavirus OR Severe acute respiratory syndrome OR covid-19 OR nCoV OR COVID OR SARS OR MERS OR middle east respiratory syndrome) AND (Child OR Children OR childhood OR preschool OR infant OR babies OR baby OR neonates OR paediatric OR paediatric OR pediatrics OR pediatric*

- **Hand search and title screen of:**

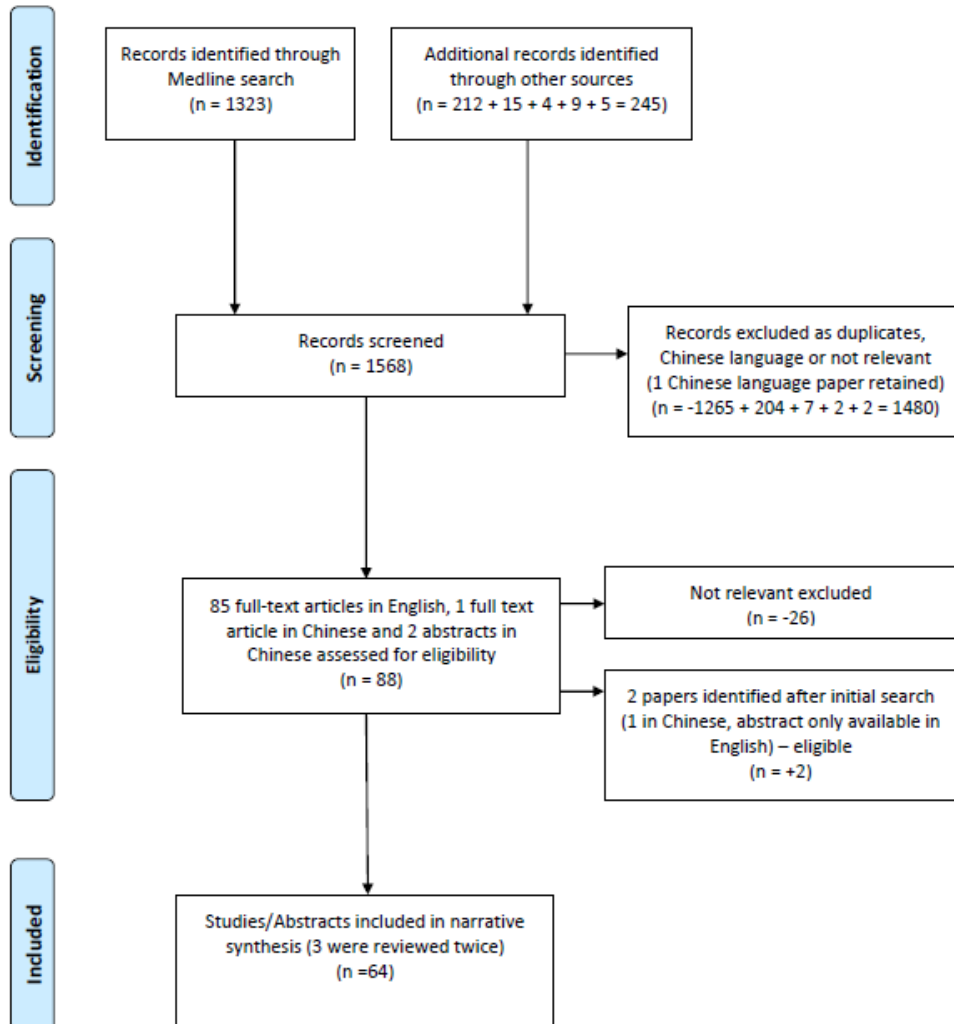
- WHO COVID-19 database
- COVID-19 resource centres of 10 major journals and publishers
- medRxiv pre print database

- **Inclusion of major epidemiology papers from daily PHE library summaries**

- **Snowballing and alerts during writing week**



## PRISMA 2009 Flow Diagram



- **64 papers included in narrative synthesis**
- **Data extraction distributed between 8 reviewers**
- **Quality rating guidance issued**

From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097

# RESULTS – Infection Rates

- **From large epidemiological datasets children appear to be less affected by SARS-CoV-2**
  - 72,314 cases CDC China 0-9 yrs = 0.9% of cases, 10 -19 yrs = 1.2% of confirmed cases (1 death)
  - Observational study (crowdsourced data) 507 patients with COVID-19 in and outside China. RR <0.5 in <15yrs
- **Infection rate in children may be higher than those with clinical symptoms in SARS-CoV-2**
  - MedRxiv pre print paper with results highlighted in Nature
  - Follow up of 1286 close contacts from 391 confirmed cases for 12 days or longer (95%)
  - Attack rates similar across age categories (elevated in older groups)
  - Infection rate in children under 10 (7.4%) similar to the population average (7.9%)
- **SARS-CoV-1 and MERS-CoV – lower confirmed infection rates in children than adults**
  - SARS-CoV-1 approximately 100 cases out of 8096 (no deaths)
  - MERS-CoV 31 cases out of 2449 (2 deaths)

# RESULTS – Clinical Outcomes

- **Very poor quality data**
  - Small case series, individual case reports, unreferenced narrative reviews, anecdote
- **Emerging themes include family clustering, mild and asymptomatic cases**
  - Asymptomatic infection in several case reports and a case series of 31 children (13%)
  - All hospitalised infants in China (9) – family clustering in all and mild/asymptomatic only. None required ICU or MV
  - Reported symptoms in case series of 10: Fever, cough, sore throat, nasal congestion, sneezing and rhinorrhoea
  - Chest XR - ‘unilateral patchy infiltrate’ in 4/10 admitted cases in China (all mild)
  - CT Chest (15 confirmed, Eng abstract) ‘early images....mostly small nodular ground glass opacities’
- **SARS-CoV-1 and MERS-CoV**
  - SARS - Young children <12 generally had a milder course. Symptoms in teenagers more akin to those in adults
  - SARS – 6mth FU studies in clinically recovered children - abnormal HRCT (16/47) and reduced aerobic capacity and LF
  - MERS. Adult CFR 34.5%. In children 13/31 were asymptomatic and identified through contact tracing, 2 deaths

# RESULTS – Transmissibility

- **No data for SARS-CoV-2 and children**
  - WHO Joint Mission to China
  - One report of a 3 month old unwell infant whose parents became symptomatic days later
- **SARS-CoV-1**
  - No documented cases of spread from children to children or children to adults in the community
  - All infected children strictly isolated from the outset so difficult to interpret
  - Risk stratified seroprevalence study suggests community transmissibility was low
- **MERS-CoV**
  - No data