### Steckbrief COVID-19 – Clinical characteristics in children and adolescents

*updated 17 March 2020*


<table>
<thead>
<tr>
<th>Causative agent</th>
<th>SARS-CoV-2(^1)</th>
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| **Receptor**    | • Angiotensin-Converting Enzyme 2 (ACE2 receptor)\(^2\)  
• convalescent sera from SARS-1 patients block SARS-CoV-2 entry via ACE2\(^3\) |
| **Transmission**| • droplet, contact  
• virus survives for hours to days on inanimate surfaces (plastic, metal)\(^4\)  
• viral transmission can start 1-2 days before the onset of symptoms («serial interval» < incubation period\(^5\); recovery of virus from NPA before onset of symptoms (Woelfel R, medRxiv)\(^6\)  
• viral RNA in NPA from children until 6-22 days after disease onset\(^7,8\)  
• viral RNA in feces from day ~5 to > 4 weeks after disease onset\(^8-10\)  
• viral load in NPA does not correlate with severity of COVID-19 in adults\(^11\)  
• CDC recommends two consecutive negative RT-PCR tests within >24h before discontinuing isolation in hospitalized patients |
| **Incubation period** | 4-6 days (range, 1 to >14 days) |
| **Epidemiology** | • basic reproduction rate \(R_0\) 2.2 (90% CI, 1.4-3.8)\(^12,13\)  
• high risk for «superspreader events» (dispersion parameter \(k\)↓)\(^13\)  
• age <15 years: 0.9% of all cases (China CDC Weekly)\(^14,15\)  
• transmission to children mainly within families\(^8,10,16\)  
• mortality in symptomatic cases (adjusted case fatality rate) age 0-9 years, 0%; age 10-19 years, 0.25%; all ages, 1.5% (Riou J, medRxiv) |
| **Clinical manifestations** | • common: asymptomatic, e.g. in children < 6 years of age\(^17\)  
• common: fever (may be of short duration or absent)\(^8,14,16-19\)  
• common: cough\(^8,14,17,19\)  
• common: malaise, headache, myalgias  
• infrequent: rhinorrhea, pharyngitis, wheezing\(^8,14,16,19\)  
• infrequent: diarrhea, other intestinal manifestations\(^8,14\)  
• co-infections reported (e.g. Influenza A/B, *M. pneumoniae*)\(^17\) |
| **Laboratory findings** | CBC differential, CRP, PCT, chemistry generally uncharacteristic  
• common: leucopenia < 4.5 G/l; lymphopenia < 1.5 G/l, thrombocytopenia < 150 G/l\(^14,19,20\)  
• CRP/PCT at first presentation normal to moderately elevated\(^8,17,19\) |
**Microbiology**
- RT-PCR from NPA (ifik, private laboratories and NAVI HUG Geneva)
- seroconversion ~1 week after onset of symptoms (Woelfel R, medRxiv)
- serum IgM/IgG tests under development, not routinely available²¹

**Radiology**
- conventional CXR: normal or non-specific findings
- chest CT: unilateral or bilateral, uni- or multifocal, peripheral, commonly subpleural lesions; focal lesions typically with central consolidation and halo sign or ground glass opacities (GGOs)¹⁷,¹⁹,²²
- no pleural effusion¹⁷,²²
- no hilar lymphadenopathy¹⁷,²²

**Clinical course**
- common: asymptomatic (reported in infants⁷,⁸,¹⁶ and children⁸,²³)
- common: upper respiratory tract infection (children an healthy adults)⁸
- common: pneumonia (with absent, mild or moderate clinical disease)¹⁷,¹⁹
- very rare: progressive lung disease with respiratory failure¹⁰,¹⁹
- fatal cases in children have not been reported to date

**Clinical course - immunodeficiency**
- severe disease in immunocompromised children has not been reported to date
- mortality in adults with cancer is elevated (China CDC Weekly)

**Clinical course - pregnancy**
- infections reported mainly in 3rd trimester; characteristic complications have not been reported to date²⁴,²⁵
- no evidence for vertical transmission and fetal infection²⁵-²⁷

**Clinical course - neonates**
- asymptomatic infection in neonates (including normal chest CT) has been reported¹⁰,¹⁷,²⁶
- complicated perinatal/postnatal courses among non-infected neonates of COVID-19 infected mothers have been reported²⁸

**Treatment**
- mainly supportive
- currently no evidence from clinical trials available
- drugs with antiviral activity against SARS-CoV-2 in vitro: remdesivir (nucleoside analog)²⁹,³⁰, lopinavir/ritonavir (Kaletra®)⁳⁰, darunavir/ritonavir, chloroquine/hydroxychloroquine (Plaquenil®)³¹
- immunomodulation with tocilizumab (Actemra®, anti-IL6 mAb) reported
- ACE2/viral entry blocker (TMPRSS2 inhibitors, e.g. Nafamostat) effective in vitro³,³²
- recommendations not to use NSAID (e.g. ibuprofen; upregulation of ACE2 receptor expression?) currently lack a firm scientific basis

**Prevention**
- Inpatients: precautions according to Swissnoso/PIGS
- Outpatients: precautions according to BAG, KAZA
- Neonates: no separation of mother/child pairs (Swissnoso/PIGS, SGGG, WHO)
- IMPORTANT: scheduled routine immunizations in children < 2 years of age should not be postponed (EKIF/BAG/SGP)
Literatur


