Illinois Education Association
Pediatric COVID Disease

July 23, 2020
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Disclosures

• No financial disclosures

• The world has changed and is changing
  – What gets said here today may change based on new data and recommendations
  – Knowledge is moving rapidly, the fastest it has for any pandemic
Agenda

• Review of COVID-19
• Collateral damage
• Q&A
Epidemiology
Current Trends

Last updated on Monday, July 20, 2020 at 03:00 AM EDT

https://coronavirus.jhu.edu/data/new-cases
Illinois

https://www.dph.illinois.gov/covid19/covid19-statistics
Illinois

- The number of confirmed cases varies across the state
  - Rate of positive tests is around 2%-7% per day depending on region
  - Percent positive is rising slightly so part of the rise in absolute number of cases is due to more testing, but some due to accelerated spread
  - By county, percent of population infected is between 0.05%-2.1%

https://www.dph.illinois.gov/covid19/covid19-statistics
Routes of SARS-CoV-2 Transmission

- **Aerosols** (minimal)
  - < 5 µm diameter
  - > 6 feet distance

- **Droplet** (significant)
  - > 5 µm diameter
  - < 6 feet distance

- **Fomites** (occasional)

Infected Host

Susceptible Host

Modified from: clinicaloptions.com
Spread of COVID-19 Between People in the Same Age Group (Netherlands)

693 paired patients

Asymptomatic Spread of COVID-19

• Cluster of people aged 16-23 years old with COVID-19 in Hefei China exposed by a 22 year old
  
• Before the index case developed symptoms, he closely (couple of hours together, no masks) contacted 22 people - 15 friends and 7 family members
  
  – Transmission occurred to 7 other people aged 16-23

• Provides evidence of a high rate of infection in a group of late teens and young adults that was caused by a person who was asymptomatic
Epidemiology Take Home Points

• Cases are rising in our country
  – Our state is doing better than most others
• SARS-CoV-2 spreads mainly by droplet, less so by surfaces and even less by aerosol
• Children rarely spread the infection to adults or even each other
• People spread the infection before they are symptomatic
Prevention
Universal Masking and Distance

Absence of Apparent Transmission of SARS-CoV-2 from Two Stylists After Exposure at a Hair Salon with a Universal Face Covering Policy — Springfield, Missouri, May 2020

NO TRANSMISSION!!
Change In Absolute Risk With Increasing Distance (COVID-19, SARS, MERS)

Lancet. https://doi.org/10.1016/S0140-6736(20)31142-9
Adjusted Estimates For Association Of Face Mask Use With Infection (COVID-19, SARS, or MERS)

<table>
<thead>
<tr>
<th>Country</th>
<th>Virus</th>
<th>Setting</th>
<th>aOR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N95 respirator or similar vs no face mask</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seto et al (2003)</td>
<td>China</td>
<td>SARS</td>
<td>Health care</td>
</tr>
<tr>
<td>Ma et al (2004)</td>
<td>China</td>
<td>SARS</td>
<td>Health care</td>
</tr>
<tr>
<td>Wang et al (2020)</td>
<td>China</td>
<td>COVID-19</td>
<td>Health care</td>
</tr>
<tr>
<td>Alraddadi et al (2016)</td>
<td>Saudi Arabia</td>
<td>MERS</td>
<td>Health care</td>
</tr>
<tr>
<td>Random subtotal ($I^2=87%$)</td>
<td></td>
<td></td>
<td>0.04 (0.004-0.30)</td>
</tr>
</tbody>
</table>

Surgical face mask or similar (eg, 12–16-layer cotton) vs no face mask

| Wu et al (2004) | China | SARS | Non-health care | 0.30 (0.12-0.73) |
| Lau et al (2004) | China | SARS | Non-health care | 0.32 (0.17-0.61) |
| Yin et al (2004) | China | SARS | Health care | 0.78 (0.61-1.00) |
| Liu et al (2009) | China | SARS | Health care | 0.22 (0.08-0.62) |
| Nishiura et al (2005) | Vietnam | SARS | Health care | 0.29 (0.11-0.75) |
| Nishiyama et al (2008) | Vietnam | SARS | Health care | 0.08 (0.01-0.50) |
| Random subtotal ($I^2=76\%$) | | | 0.33 (0.17-0.61) |

Random overall ($I^2=88\%$)

Bayesian overall (Jefferson24 seasonal viruses)

Interaction p=0.090; adjusted for setting, p=0.17; adjusted for AGP, p=0.048

Lancet. https://doi.org/10.1016/S0140-6736(20)31142-9
Mask Material Efficiency and Fit

• Filtration efficiencies hybrid masks (such as cotton–silk, cotton–chiffon, cotton–flannel) is highest

• Enhanced performance of the hybrids is likely due to the combined effect of mechanical and electrostatic-based filtration
  – Cotton performs better at higher weave densities (i.e., thread count)

• Gaps (as caused by an improper fit of the mask) can result in over a 60% decrease in the filtration efficiency

https://dx.doi.org/10.1021/acsnano.0c03252 ACS Nano 2020, 14, 6339–6347
Prevention Take Home Points

• Isolate infected people

• Distance
  – >6 feet is the goal, 3 feet works well

• Masking
  – Cloth works to protect others, hybrids of two layers such as cotton–silk, cotton–chiffon, cotton–flannel work best
  – Fit is important- need it tight against the face with few gaps

• Face shields
  – Works almost as well as mask to protect others
  – Works almost as well as mask to protect the wearer from droplets, less so from aerosol

• Hand hygiene with soap and water for 20 seconds or with 60% alcohol based hand sanitizer gel

• Children under the age of 10 rarely transmit to others
  – Adult to adult transmission is the biggest risk

• Ventilation
  – Open windows, open doors, fresh air
  – Do not have fans blowing horizontally
Most Children And Many Adults Have No Symptoms

Primary Symptoms of COVID-19

Congestion or runny nose, new loss of taste or smell
Fatigue, muscle or body aches, fever or chills
Cough, sore throat
Shortness of breath or difficulty breathing
Nausea, vomiting, or diarrhea
Headache, confusion

“Symptoms may appear 2-14 days after exposure to the virus.”


Slide credit: clinicaloptions.com
## Symptoms and Time Course For Those With Illness

<table>
<thead>
<tr>
<th>Time of Exposure</th>
<th>Fever, cough, myalgia, short of breath, diarrhea</th>
<th>Low oxygen, fever, low blood pressure, blood clots</th>
<th>Acute respiratory failure</th>
<th>Recovery (or not)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>6</td>
<td>7</td>
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<td>20</td>
<td>21</td>
<td>22</td>
<td>23</td>
<td>24</td>
</tr>
</tbody>
</table>
### Chance of Getting Sick Relates to Age

<table>
<thead>
<tr>
<th>Age group (yrs) (no. of cases)</th>
<th>Hospitalization</th>
<th>ICU admission</th>
<th>Case-fatality</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–19 (123)</td>
<td>1.6–2.5</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>20–44 (705)</td>
<td>14.3–20.8</td>
<td>2.0–4.2</td>
<td>0.1–0.2</td>
</tr>
<tr>
<td>45–54 (429)</td>
<td>21.2–28.3</td>
<td>5.4–10.4</td>
<td>0.5–0.8</td>
</tr>
<tr>
<td>55–64 (429)</td>
<td>20.5–30.1</td>
<td>4.7–11.2</td>
<td>1.4–2.6</td>
</tr>
<tr>
<td>65–74 (409)</td>
<td>28.6–43.5</td>
<td>8.1–18.8</td>
<td>2.7–4.9</td>
</tr>
<tr>
<td>75–84 (210)</td>
<td>30.5–58.7</td>
<td>10.5–31.0</td>
<td>4.3–10.5</td>
</tr>
<tr>
<td>≥85 (144)</td>
<td>31.3–70.3</td>
<td>6.3–29.0</td>
<td>10.4–27.3</td>
</tr>
<tr>
<td><strong>Total (2,449)</strong></td>
<td><strong>20.7–31.4</strong></td>
<td><strong>4.9–11.5</strong></td>
<td><strong>1.8–3.4</strong></td>
</tr>
</tbody>
</table>
Factors Associated with Increased Severity

• Age
• Underlying health problems
  – Diabetes
  – Hypertension
  – Cardiac disease
  – Obesity (BMI>30)
  – Chronic lung disease (not asthma unless severe)
  – Cancer
Timing Of Tests Used for Diagnosis

Before symptom onset

Detection unlikely

PCR – Likely positive

PCR – Likely negative

After symptom onset

SARS-CoV-2 exposure

Increasing probability of detection

Nasopharyngeal swab PCR

IgM antibody

IgG antibody

Sethuraman, JAMA June 9, 2020; 323(22):2249-50
Clinical Take Home Points

- Many people that get COVID have no symptoms
  - This is especially true of children
  - Chronic diseases and age influence who will develop symptoms
- Diagnosis of acute infection is done by the PCR test from the nose (mouth is less sensitive)
- Antibody tests are of little use except for tracking the extent of the epidemic
  - Not useful to diagnosis of current respiratory disease
  - We don’t know if antibodies are protective and if so for how long
  - No value to deciding who will or won’t get sick if exposed
collateral damage

casualties or damage

military action: to make precision in bombing
Collateral Damage

- Well child care
  - Immunizations
  - Delays in care for chronic conditions
- Mental Health
  - Rising anxiety and depression
- Schools
  - Lost learning
  - Missed abuse and neglect cases
- Lost wages which translates into poverty, eviction, hunger, food insecurity

The New York Times

*Slowing the Coronavirus Is Speeding the Spread of Other Diseases*

Many mass immunization efforts worldwide were halted this spring to prevent spread of the virus at crowded inoculation sites. The consequences have been alarming.
Collateral Damage

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Is There Evidence School Closures Help with COVID-19?

• Why consider it?
  – School closure had been effective in reducing influenza incidence rates
    • But with influenza, attack rates are higher in children than in adults
  – SARS-CoV-2, affects mainly adults and elderly individuals
    – Children younger than 10 years account for only 1% of COVID-19 cases
    – In Taiwan, the risk of transmission of infection among children <10 years old in classrooms was very low even without masks
• Data to date (Europe and Asia) is not certain but most suggests closing schools isn’t necessary if low amount of circulating virus in community
  – May cause more harm than good

Proc Natl Acad Sci U S A. 2019;116(27):13174-13181
JAMA. 2020;323(13):1239-1242
Lancet Public Health 2020; 5: e271–78
JAMA. 2020;323(14):1341-1342
Science 29 Apr 2020: abb8001
School Recommendations

• Hand hygiene

• Face covering

• Social distancing

• Ventilation
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“The fishermen know that the sea is dangerous and the storm terrible, but they have never found these dangers sufficient reason for remaining ashore”

Vincent van Gogh
Thank you!

Resources, slides & recording of the session
https://www.echo-chicago.org/resources/covid19/
ieanea.org
www.iasaedu.org