• Please note that you have been muted upon entry into this WebEx event

• There has been time allotted to answer questions at the end of the presentation

• If you have a question, please use the chat feature to submit it
Presenters

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DISCLOSURES: CONSULTANT (NATIONAL GEOGRAPHIC, 20TH CENTURY FOX, INTERNATIONAL MEDICAL CORPS)
• SARS-CoV-2
• Wuhan, China
• Severe respiratory illness

<table>
<thead>
<tr>
<th></th>
<th>Cases</th>
<th>Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worldwide</td>
<td>&gt;6.6 million</td>
<td>&gt;390,000</td>
</tr>
<tr>
<td>United States</td>
<td>&gt;1.8 million</td>
<td>&gt;107,000</td>
</tr>
<tr>
<td>California</td>
<td>&gt;117,000</td>
<td>&gt;4,300</td>
</tr>
</tbody>
</table>

https://coronavirus.jhu.edu/
Pediatric COVID-19

• Less than 2% of cases worldwide
• Severe disease rare
• ICU admission rare
• Little known about transmission and epidemiology

• Pediatric symptoms:
  – Fever
  – Cough
  – Nasal congestion
  – Rhinorrhea
  – Sore throat

**TABLE. Signs and symptoms among 291 pediatric (age <18 years) and 10,944 adult (age 18–64 years) patients* with laboratory-confirmed COVID-19 — United States, February 12–April 2, 2020**

<table>
<thead>
<tr>
<th>Sign/Symptom</th>
<th>Pediatric</th>
<th>Adult</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fever, cough, or shortness of breath†</td>
<td>213 (73)</td>
<td>10,167 (93)</td>
</tr>
<tr>
<td>Fever§</td>
<td>163 (56)</td>
<td>7,794 (71)</td>
</tr>
<tr>
<td>Cough</td>
<td>158 (54)</td>
<td>8,775 (80)</td>
</tr>
<tr>
<td>Shortness of breath</td>
<td>39 (13)</td>
<td>4,674 (43)</td>
</tr>
<tr>
<td>Myalgia</td>
<td>66 (23)</td>
<td>6,713 (61)</td>
</tr>
<tr>
<td>Runny nose¶</td>
<td>21 (7.2)</td>
<td>757 (6.9)</td>
</tr>
<tr>
<td>Sore throat</td>
<td>71 (24)</td>
<td>3,795 (35)</td>
</tr>
<tr>
<td>Headache</td>
<td>81 (28)</td>
<td>6,335 (58)</td>
</tr>
<tr>
<td>Nausea/Vomiting</td>
<td>31 (11)</td>
<td>1,746 (16)</td>
</tr>
<tr>
<td>Abdominal pain¶</td>
<td>17 (5.8)</td>
<td>1,329 (12)</td>
</tr>
<tr>
<td>Diarrhea</td>
<td>37 (13)</td>
<td>3,353 (31)</td>
</tr>
</tbody>
</table>

*Pneumonia reported in 26 (9) pediatric patients. Diarrhea reported in 11 (4) pediatric patients.
• **Hydroxychloroquine?**
  – FDA cautions against use of hydroxychloroquine or chloroquine for COVID-19 outside of the hospital setting or a clinical trial due to risk of heart rhythm problems

• **Remdesivir?**
  – **NIH guideline:** treatment of COVID-19 in hospitalized patients with severe disease, defined as $\text{SpO}_2 \leq 94\%$ on ambient air (at sea level), requiring supplemental oxygen, mechanical ventilation, or extracorporeal membrane oxygenation
    – Not approved by the FDA
    – Available through an FDA emergency use authorization for the treatment of hospitalized adults and children with COVID-19

• **Otherwise supportive care**

https://www.covid19treatmentguidelines.nih.gov/whats-new/
• Multiple vaccine trials ongoing
• Vaccine rollout in 2021?

• NIAID, WHO

https://www.niaid.nih.gov/diseases-conditions/coronaviruses-therapeutics-vaccines
Kawasaki Disease Outbreaks?

- Kawasaki-like illness
- Fever
- Rash
- Red eyes
- Systemic inflammation
- Shock
- Coronary artery aneurysms
NYC 2020 Health Alert #13: Pediatric Multi-System Inflammatory Syndrome Potentially Associated with COVID-19

- 15 cases compatible with multi-system inflammatory syndrome in NYC
- Fever and features of Kawasaki disease and/or toxic shock syndrome;
  - abdominal symptoms common
- Cases may require ICU admission for cardio/respiratory support
- PCR testing for SARS-CoV-2 may be positive or negative
Kawasaki Disease

• Acute, self-limited inflammatory process
• fever of 5 or more days duration
• presence of at least 4 of the following 5 clinical signs:
  – Rash
  – Cervical lymphadenopathy (at least 1.5 cm in diameter)
  – Bilateral conjunctival injection
  – Oral mucosal changes
  – Peripheral extremity changes
• Coronary artery aneurysms
A child with Kawasaki syndrome with conjunctivitis. Note the absence of conjunctival discharge.

Figure Legend:
From: **Kawasaki Disease**

Red Book® 2018, 2018

**Figure Legend:**

A child with Kawasaki syndrome with striking facial rash and erythema of the oral mucous membrane

Copyright © 2020 American Academy of Pediatrics. All rights reserved.
From: Kawasaki Disease

Red Book® 2018, 2018

Figure Legend:
The 1-year-old white child in the previous 3 images presented with this erythema multiforme-like rash most pronounced over the back. The clinical course was characteristic of Kawasaki disease. Courtesy of George Nankervis, MD
Kawasaki Disease: Epidemiology

- Peak age: 18-24 months
- 50% younger than 2 years
- 80% younger than 5 years
- Male: female → 1.5:1
- US: 4,000-5,500 cases/year
- Asian ethnicity
- Clusters in winter and spring
- Coronary artery abnormalities: 20% to 25% of untreated children
Toxic Shock Syndrome

Staph Toxin-Induced Cytokine Storm

• Fever: temperature greater than or equal to 102.0°F (greater than or equal to 38.9°C)
• Rash: diffuse macular erythroderma
• Desquamation: 1-2 weeks after onset of rash
• Hypotension: systolic blood pressure less than or equal to 90 mm Hg for adults or less than fifth percentile by age for children aged less than 16 years
• Multisystem involvement (three or more of the following organ systems):
  – Gastrointestinal: vomiting or diarrhea at onset of illness
  – Muscular: severe myalgia or creatine phosphokinase level at least twice the upper limit of normal
  – Mucous membrane: vaginal, oropharyngeal, or conjunctival hyperemia
  – Renal: blood urea nitrogen or creatinine at least twice the upper limit of normal for laboratory or urinary sediment with pyuria (greater than or equal to 5 leukocytes per high-power field) in the absence of urinary tract infection
  – Hepatic: total bilirubin, alanine aminotransferase enzyme, or aspartate aminotransferase enzyme levels at least twice the upper limit of normal for laboratory
  – Hematologic: platelets less than 100,000/mm³
  – Central nervous system: disorientation or alterations in consciousness without focal neurologic signs when fever and hypotension are absent
Facial erythroderma secondary to Staphylococcus aureus toxic shock syndrome in a woman who was obtunded and hypotensive on admission.
Erythroderma that blanches on pressure in a patient with toxic shock syndrome. The mortality rate for staphylococcal toxic shock syndrome is lower than that of streptococcal toxic shock syndrome.

Figure Legend:
Erythroderma that blanches on pressure in a patient with toxic shock syndrome. The mortality rate for staphylococcal toxic shock syndrome is lower than that of streptococcal toxic shock syndrome.
Differential Diagnosis

- Kawasaki Disease
- Incomplete Kawasaki Disease
- Toxic Shock Syndrome (staphylococcal, streptococcal)
- Streptococcal disease (Scarlet fever, Rheumatic fever)
- Murine Typhus
- Measles
- Adenovirus
- EBV
An outbreak of severe Kawasaki-like disease at the Italian epicentre of the SARS-CoV-2 epidemic: an observational cohort study

Lucio Verdoni, Angelo Mazza, Annalisa Gervasoni, Laura Martelli, Maurizio Ruggeri, Matteo Ciuffreda, Ezio Bonanomi, Lorenzo D’Antiga
• Bergamo Province, Italy
• Outbreak of Kawasaki-like disease
• Looked at KD cases before (5 years) and after COVID-19 arrived
• Cases managed in accordance with AHA KD protocols
An outbreak of severe Kawasaki-like disease
Verdoni et al. Lancet

<table>
<thead>
<tr>
<th></th>
<th>Group 1</th>
<th>Group 2</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time of presentation</td>
<td>Until February, 2020</td>
<td>March–April, 2020</td>
<td>NA</td>
</tr>
<tr>
<td>Number of patients</td>
<td>19</td>
<td>10</td>
<td>NA</td>
</tr>
<tr>
<td>Age at onset, years</td>
<td>3.0 (2.5)</td>
<td>7.5 (3.5)</td>
<td>0.00035</td>
</tr>
<tr>
<td>Incidence</td>
<td>0.3 per month</td>
<td>10 per month</td>
<td>&lt;0.00001</td>
</tr>
<tr>
<td>Sex</td>
<td>NA</td>
<td>NA</td>
<td>0.13</td>
</tr>
<tr>
<td>Female</td>
<td>12</td>
<td>3</td>
<td>NA</td>
</tr>
<tr>
<td>Male</td>
<td>7</td>
<td>7</td>
<td>NA</td>
</tr>
<tr>
<td>Incomplete Kawasaki disease</td>
<td>6/19 (31%)</td>
<td>5/10 (50%)</td>
<td>0.43</td>
</tr>
<tr>
<td></td>
<td>Group 1</td>
<td>Group 2</td>
<td>p value</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>------------------</td>
<td>------------------</td>
<td>-----------</td>
</tr>
<tr>
<td>Platelets, $\times 10^9$ per L</td>
<td>457 (96)</td>
<td>130 (32)</td>
<td>$&lt;0.00001$</td>
</tr>
<tr>
<td>Kobayashi score $\geq 5$</td>
<td>2/19 (10%)</td>
<td>7/10 (70%)</td>
<td>0.0021</td>
</tr>
<tr>
<td><strong>MAS$^{18}$</strong></td>
<td>0/10 (0%)</td>
<td>5/10 (50%)</td>
<td>0.021</td>
</tr>
<tr>
<td><strong>KDSS$^{14}$</strong></td>
<td>0/10 (0%)</td>
<td>5/10 (50%)</td>
<td>0.021</td>
</tr>
<tr>
<td>Abnormal echocardiography</td>
<td>2/19 (10%)</td>
<td>6/10 (60%)</td>
<td>0.0089</td>
</tr>
<tr>
<td>Adjunctive steroid treatment</td>
<td>4/19 (16%)</td>
<td>8/10 (80%)</td>
<td>0.0045</td>
</tr>
<tr>
<td>Inotropes treatment</td>
<td>0/19 (0%)</td>
<td>2/10 (20%)</td>
<td>0.11</td>
</tr>
<tr>
<td>Response to treatment</td>
<td>19/19 (100%)</td>
<td>10/10 (100%)</td>
<td>1</td>
</tr>
</tbody>
</table>
Key points:

• Group 2: 8/10 positive for IgG or IgM, or both

• Group 1 vs group 2
  – Incidence (0·3 vs ten per month)
  – mean age (3·0 vs 7·5 years)
  – cardiac involvement (two of 19 vs six of ten)
  – KDSS (zero of 19 vs five of ten)
  – MAS (zero of 19 vs five of ten)
  – need for adjunctive steroid treatment (three of 19 vs eight of ten)
  – all p<0·01
Key Messages:

• A pediatric multi-system inflammatory syndrome characterized by persistent fever and features of Kawasaki disease and/or toxic shock syndrome is being reporting by hospitals in the United Kingdom and New York City. It is possible that this syndrome is associated with COVID-19 infection.

• Early recognition and specialist referral are essential, including referral to critical care if warranted.

• Healthcare providers are asked to report possible cases by phone within one working day.
Actions Requested of Providers:

- Immediately refer patients with a picture of toxic shock or atypical Kawasaki Disease to a specialist in pediatric infectious disease, rheumatology, and/or critical care, as indicated.
  - Early diagnosis and treatment of patients meeting full or partial criteria for Kawasaki disease is critical to preventing end-organ damage and other long-term complications.

- Consider testing patients with Kawasaki disease, atypical Kawasaki disease, and/or toxic shock syndrome-like for COVID-19.

- Report possible cases to LAC DPH. Any patient less than 21 years of age with persistent fever (four or more days) AND either typical Kawasaki disease, atypical Kawasaki disease, and/or toxic shock syndrome-like presentation; AND no alternative etiology identified that explains the clinical presentation.

Note: patients should be reported regardless of SARS-CoV-2 PCR test result.
CDC Case Definition for MIS-C

• An individual aged <21 years
• Fever
• Laboratory evidence of inflammation
• Evidence of clinically severe illness requiring hospitalization
• Multisystem (>2) organ involvement (cardiac, renal, respiratory, hematologic, gastrointestinal, dermatologic or neurological)
• No alternative plausible diagnoses
• Positive for current or recent SARS-CoV-2 infection by RT-PCR, serology, or antigen test; or COVID-19 exposure within 4 weeks prior to the onset of symptoms

http://publichealth.lacounty.gov/acd/ncorona2019/MISC.htm
Take-Aways from the First Pediatric Infectious Disease Society Town Hall Re: MIS-C & COVID-19

- MIS-C cases being reported to occur approximately 4 weeks after the start of documented SARS-CoV-2 transmission in communities
- MIS-C appears to be a distinct syndrome
- The majority of reported patients (≥ 65%) with MIS-C progress to shock
- All patients develop ≥ 1 organ dysfunction - most frequently with myocardial impairment suggesting a cardiac injury similar to myocarditis; renal/AKI, GI/hepatitis, hematologic, CNS/neurologic, etc.
- Echocardiographic findings early on often demonstrate impaired left ventricular function of variable severity as well as coronary artery dilations and rarely, coronary artery aneurysms

MIS-C Case Laboratory Findings

- **Elevated:**
  - C-reactive protein (CRP)
  - Erythrocyte sedimentation rate (ESR)
  - Fibrinogen
  - Procalcitonin
  - D-dimer
  - Ferritin
  - Lactic acid dehydrogenase (LDH)
  - Interleukin 6 (IL-6)
  - Neutrophils

- **Reduced:**
  - Lymphocytes
  - Albumin

http://publichealth.lacounty.gov/acd/n-corona2019/MISC.htm
SUSAN WU, M.D.
DIVISION OF HOSPITAL MEDICINE
MEDICAL DIRECTOR, QUALITY AND CLINICAL EFFECTIVENESS
ASSOCIATE PROFESSOR OF CLINICAL PEDIATRICS, KECK SCHOOL OF MEDICINE OF USC

DISCLOSURE: I HAVE NO RELEVANT FINANCIAL DISCLOSURES FOR THIS PRESENTATION
Multi-disciplinary Action Plan (MAP) Program

- Evidence-based clinical pathways
  - Common diagnoses
  - High practice variation
  - High risk for morbidity/mortality
  - High resource utilization
- Johns Hopkins Evidence-Based Practice model
- Literature summary
- Diagnosis, Treatment, Follow-up
- Outcome measures
- Patient and family education
- Power Plans in KIDS
MIS-C MAP Pathway

Fever ≥3 days AND < 2 symptoms/exposures*
- Initial labs:
  - CBC DIFF, Chem 14
  - ESR, CRP
  - UA + micro
  - SARS-CoV-2 PCR
  - SARS-CoV-2 Ab
- Depending on age and clinical suspicion:
  - Urine culture
  - Blood culture
  - CXR
- Well appearing?
  - No
    - Labs abnormal:
      - CRP ≥ 3, ESR ≥ 40, ALC < 1000, platelets < 150K, Na < 135
      - Toxic appearing
        - Hypotension
        - Signs/sx heart failure
        - Poor perfusion
      - Yes
    - No
      - Clinical suspicion for MIS-C without clear source of fever
      - Yes
      - Well-appearing?
        - Yes
        - No
          - No
  - Yes
    - Yes to

Fever 2-3 days AND 2 or more symptoms/exposures*
- Yes to

Fever ≥5 days
- Yes to

Fever ≥1 day AND Ill appearing
- Yes to
SIGNS/SYMPTOMS:
- Rash (any)
- Non-purulent conjunctivitis
- Redness and/or swelling of hands and/or feet
- Erythema of oral mucosa
- Hypotension or shock
- Cardiovascular (lab, clinical, or echo evidence myocardial dysfunction, pericarditis, valvulitis, or coronary abnormalities)
- Hematologic: abnormal PT, PTT, or D-Dimer

EXPOSURES:
- Gastrointestinal (diarrhea, vomiting, abdominal pain)
- Renal insufficiency/AKI
- Respiratory symptoms
- Neurologic (mental status changes, meningitis, headache, irritability, lethargy)

- SARS-CoV-2 PCR positive
- SARS-CoV-2 IgG positive
- Contact with a person with SARS-CoV-2 within 4 weeks
Who to refer for evaluation

- Fever \( \geq 3 \) days and 1 signs/symptoms
  - If well appearing, no clinical suspicion, alternative diagnosis to explain fever, can observe without w/u
- Fever \( \geq 2 \) days and 2 or more signs/symptoms
- Fever \( \geq 5 \) days and no other signs/symptoms
- Fever of any duration and ill appearing

**RECOMMENDATION:**
Refer to ED for evaluation
CBC diff, Chem 14, ESR, CRP, UA, COVID-19 PCR and Ab
Refer to Infectious Disease clinic for follow-up
**MIS-C MAP Pathway**

**Admit to Med-Surg**
- **Secondary labs:**
  - DIC panel, ferritin, LDH
  - T cell subsets extended
  - Red top hold for cytokines
  - Anti-phospholipid Antibodies
- If SARS-CoV-2 NP PCR negative, send rectal swab
- Echocardiogram, EKG
- **Consults:**
  - ID and cardiology
  - If abnl T cells, consult A/I

**Echo abnormal?**
- Yes: BNP, troponin
  - Repeat echo, EKG in 1-2 days

**SARS-CoV-2 Ab positive?**
- No: Consider Incomplete KD
  - Consider Repeat Echo, EKG
  - Consult Rheumatology
  - OFF PATHWAY
- Yes: Repeat echo, EKG in 2-3 days

**Clinically improved**
- Labs downtrending
  - Yes: Continue treatment
  - No: Consider treatment:
    - IVIG 2 g/kg + /- methylprednisolone
    - Treatment failure: anakinra
Intravenous Immunoglobulin

- Mechanism of action unknown but probably immune modulation, toxin neutralization
- Single large dose more effective than smaller doses over more days
- No clear advantage of any brand/formulation
- Decrease risk of coronary abnormalities by 2/3

RECOMMENDATION:
IVIG 2 g/kg over 10-12 hours
As early as possible, and within 10 days of onset
Aspirin

- Used for anti-inflammatory and anti-thrombotic effects
- No difference between high dose (80-100 mg/kg/day) and low dose (3-5 mg/kg/day) in development of coronary aneurysms or duration of fever

**RECOMMENDATION:**
ASA moderate dose 30-50 mg/kg/day div Q6h until afebrile 48h, then 3-5 mg/kg/day for 6-8 weeks
Treatment failure

- Persistence or recurrence of fever >36 hours after completing IVIG
- Occurs in 10-20% of patients
- Associated with higher risk of aneurysms
- Risk factors:
  - Infants <12 months old
  - Abnormalities on initial echo
  - Asian and Hispanic race?
  - Higher ESR or CRP or low albumin
Infliximab

- Anti-TNF-α monoclonal antibody
- Earlier resolution of fever vs 2nd dose IVIG
- Less progression of coronary abnormalities
- Shorter hospital length of stay
- Well tolerated, rash most common ADR

**RECOMMENDATION:**
If initial IVIG fails, infliximab 10 mg/kg over 2 hours
ALT: 2nd dose IVIG or IVIG plus steroids

If that STILL doesn’t work...consult rheumatology
Options: anakinra, cyclosporine
Treatment options for MIS-C without shock

- Evolving, no clear recommendations
- If KD spectrum, treat as KD
  - Would give steroids with IVIG per high risk regimen
  - ASA for KD spectrum, but role in MIS-C unclear
- Consider antibiotics if sepsis not ruled out
  - Ceftriaxone 50 mg/kg

**RECOMMENDATION:**
IVIG 2g/kg over 10-12 hours + methylprednisolone
Ceftriaxone 50 mg/kg IV Q24h if possible sepsis

Anticoagulation: probably ppx for post-pubertal
Treatment - MIS-C + Shock

Treatment considerations for PIMS/MIS-C with shock

- If KD spectrum, treat as KD shock syndrome
- If Toxic shock or septic shock, treat as TSS or sepsis
  - Ceftriaxone, vancomycin, clindamycin
  - IVIG (1 g/kg x 1 day followed by 0.5 g/kg x 2 days)
  - Fluid management - 10-20 ml/kg at a time, reassess
- Low threshold for PICU - rapid deterioration with cardiogenic shock is common

**RECOMMENDATION:**
IVIG 2g/kg over 10-12 hours + methylprednisolone
Ceftriaxone, vancomycin, clindamycin
Judicious fluid management, early initiation of pressors
Anticoagulation: probably ppx for post-pubertal
Treatment

Anakinra

- Anti-IL-1 receptor antagonist
- Used in other multisystem inflammatory syndromes (NOMID, periodic fever, RA)
- Excellent safety profile
- Short duration of action

**RECOMMENDATION:**
If initial IVIG fails, consult rheumatology
Options: anakinra, infliximab, tocilizumab
• Approx. 20-30% will have coronary abnormalities on initial echocardiogram
  – Majority of these are dilatation (z score 2-2.5)
  – 5% will have aneurysms (z score ≥2.5)
  – <1% will have giant aneurysms (z score ≥10)
• Most dilatation resolves by 6-8 weeks
• Mortality 0.17%, peak 15-45 days after onset
• Rare complications:
  – Kawasaki Shock Syndrome
  – Arrhythmia
  – Aneurysm rupture
  – Gangrene from peripheral artery inflammation
  – Valvulitis -> AR, MR
Long term consequences:
• Remodeling, fibrofatty change, calcification
• Stenosis leading to myocardial ischemia
  – 5% of MI’s in < 40 y.o. due to KD
• Abnormal vasodilation and reactivity
• Rare valvulitis leading to valve replacement

Risk of cardiac event in 15 year follow-up:
• z score ≤10: 1%
• z score ≥10 and ≥8 mm: 48%

RECOMMENDATION:
Cardiology f/u is needed for all patients at least 1 year, and indefinitely for those with aneurysms at any point.
Prognosis generally good
• More than half need ICU w/vasoactive medications
• Median LOS 7-10 days
• In majority of patients - cardiac function resolves before discharge; few with residual mild dysfunction
• Coronary aneurysms less common

A few mortalities reported:
• At least 3 mortalities in NY, possibly 2 additional
• 2 reported in UK

RECOMMENDATION:
Cardiology f/u is needed for all patients with abnormalities on echo or EKG
• CHLA usually cares for about 50-65 children with Kawasaki Disease per year

  – April: 2 cases in 2018, 2 cases in 2019
  – May: 0 cases in 2018, 3 cases in 2019
Cases in April and May 2020

• April 2020: 8 patients
• May 2020: 13 patients

• Total: 21 patients since April 1 with symptoms consistent with the syndrome (patients on a spectrum of Kawasaki type symptoms to patient with hemodynamic instability/shock)
• All of these patients had negative PCR testing for SARS-CoV2 at the time of admission

• All of these patients had antibody testing performed (anti-SARS CoV2 IgG)
  – 6 out of 21 have been positive
• So far 6 of these patients meet criteria for MIS-C

• Ages: 4 months to 8 years old

• 5 had symptoms similar to Kawasaki Disease and 1 had hemodynamic instability/shock
• 2 patients have giant aneurysms (age 8 months and 19 months at time of diagnosis)

• 1 patient had a moderate aneurysm during acute illness, now with small aneurysm (age 2 y.o.)

• No deaths

• All successfully discharged home
• Now offering antibody testing to all of the patients we have treated with Kawasaki Disease since January 1, 2020

• One patient from March 2020 meets the criteria for MIS-C and had positive antibody testing thus far
WE ARE THANKFUL TO ALL OF YOU AS WE MOVE FORWARD TOGETHER, TO PROVIDE THE BEST POSSIBLE CARE FOR THESE CHILDREN
Questions

Michael Smit, MD, MSPH
Epidemiologist, Medical Director, Infection Prevention and Control, Children’s Hospital Los Angeles
Assistant Professor of Clinical Pediatrics, Keck School of Medicine of USC

Susan Wu, MD
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Please log-in to the EEDS App for CME attendance credit

Activity Code: 34pule