Update on the COVID-19 Coronavirus Outbreak: Blood Collection and Safety Implications

Moderator: Dr. Michael Busch is the chairperson of the ISBT TTID Working Party.

Presenters:

• Dr. Louie Katz the former chair of the FDA BPAC and CMO of ABC. He is now chair of the AABB TTD committee and is involved in the US response to this outbreak.

• Dr. Hua Shan led the REDS-II/III China programs.

The speakers will discuss the COVID-19 coronavirus outbreak and potential recommendations for blood safety interventions and needed research on levels of RNA/infectious virus in blood and consequent TT risk and PRT efficacy.
SARS-CoV-2: Relevance to transfusion medicine

Louis M. Katz MD
CMO, Mississippi Valley Regional Blood Center
Chair, AABB TTD Committee
Adj Clin Prof, Infectious Diseases: Carver College of Medicine, Iowa City

4 Mar 2020
7 human coronaviruses

- 229E
- NL63
- OC43
- HKU1

Endemic “common cold” coronaviruses

- SARS
- MERS
- SARS-CoV-2

“Bad” coronaviruses
SARS-CoV-2

- **Betacoronavirus**
  - Large (>29000 nucleotide)
  - Lipid-enveloped
  - Positive sense, SS-RNA

- 2/3 of *initial* cases in a cluster at Huanan Seafood Wholesale Market in Wuhan, China

- ≈80% sequence identity to SARS-CoV

- ≈ 88-96% whole genome identity with a bat coronavirus
  - “Didn’t find so many bats”* in the market, so suspect another or intermediate host.

- **Presumed droplet P2P spread in community & health care**
  - Role of fecal-oral transmission is speculative

Shou P *et al.* Nature. 2020
Wu F *et al.* Nature. 2020
Wu A *et al.* Cell Host and Microbe. 2020
Lu R *et al.* Lancet. 2020

*Brand S. WHO. CNBC. 11 Feb. 2020
COVID-19: 93,455 cumulative cases 3198 deaths) in 82 countries, 4 March 2020

96.7% China, Korea, Italy, Iran

Johns Hopkins CSSE
https://gisanddata.maps.arcgis.com/apps/opsdashboard/index.html#/bda7594740fd40299423467b48e9ecf6
China epidemic curves through 11 Feb 2020

By date of onset & date of diagnosis
44,672 confirmed cases

How bad is it??

44,672 confirmed Chinese cases as of 11 Feb 2020

Confirmed cases and deaths by age cohort

- 0-9: 50 cases (2%)
- 10-19: 40 cases (2%)
- 20-29: 450 cases (2%)
- 30-39: 750 cases (3%)
- 40-49: 1500 cases (6%)
- 50-59: 2500 cases (11%)
- 60-69: 3000 cases (13%)
- 70-79: 2000 cases (9%)
- ≥80: 1000 cases (4%)

Total confirmed cases: 36,160 (81%)

Deaths:
- 0-9: 5 deaths (2%)
- 10-19: 3 deaths (2%)
- 20-29: 2 deaths (2%)
- 30-39: 1 death (2%)
- 40-49: 5 deaths (2%)
- 50-59: 10 deaths (4%)
- 60-69: 10 deaths (4%)
- 70-79: 10 deaths (4%)
- ≥80: 200 deaths (96%)

Total deaths: 2027 (6%)

Severity of confirmed cases:
- Mild: 36,160 cases (81%)
- Severe: 6,168 cases (14%)
- Critical: 2,027 cases (5%)

China CDC Weekly 2020
Basic clinical & epi of COVID-19

Silverstein et al. Lancet. 2020

Basic reproductive number ($R_0$)
Incubation period
Serial interval
Case fatality rate
Infection fatality rate

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic reproductive number ($R_0$)</td>
<td>2.2 (95% CI 1.4-3.9)</td>
</tr>
<tr>
<td>Incubation period</td>
<td>5-6 d (range 0-14)</td>
</tr>
<tr>
<td>Serial interval</td>
<td>4.4-7.5 d</td>
</tr>
<tr>
<td>Case fatality rate</td>
<td>2-3% (evolving)</td>
</tr>
<tr>
<td>Infection fatality rate</td>
<td>0.3-1% (evolving)</td>
</tr>
</tbody>
</table>

WHO. Sit Rep 30. 20 Feb 2020
≥100 therapy trials in progress in China

- **Drugs:** ≥100 trials in progress in China
  - Lopinavir/ritonavir (HIV) ± ribavirin
  - Oseltamivir and favilavir (flu A drugs)
  - Remdesivir (failed Ebola rx)
  - Interferons in combination with various drugs
  - Chloroquine (malaria)
  - Traditional Chinese herbal compounds
  - Monoclonal antibodies

- **Convalescent plasma**
- **Menstrual blood stem cells**
- >11 vaccine trials in development
Infections in non-immune population from an index

<table>
<thead>
<tr>
<th>Disease</th>
<th>Transmission</th>
<th>$R_0$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measles</td>
<td>Airborne</td>
<td>12–18</td>
</tr>
<tr>
<td>Diphtheria</td>
<td>Saliva</td>
<td>6–7</td>
</tr>
<tr>
<td>Smallpox</td>
<td>Airborne droplet</td>
<td>5–7</td>
</tr>
<tr>
<td>Polio</td>
<td>Fecal–oral route</td>
<td>5–7</td>
</tr>
<tr>
<td>Rubella</td>
<td>Airborne droplet</td>
<td>5–7</td>
</tr>
<tr>
<td>Mumps</td>
<td>Airborne droplet</td>
<td>4–7</td>
</tr>
<tr>
<td>Pertussis</td>
<td>Airborne droplet</td>
<td>5.5</td>
</tr>
<tr>
<td>HIV/AIDS</td>
<td>Sexual contact</td>
<td>2–5</td>
</tr>
<tr>
<td>SARS</td>
<td>Airborne droplet</td>
<td>2–5</td>
</tr>
<tr>
<td>COVID-19</td>
<td>Airborne droplet</td>
<td>2.2–3.6</td>
</tr>
<tr>
<td>1918 Influenza</td>
<td>Airborne droplet</td>
<td>2–3</td>
</tr>
<tr>
<td>2014 Ebola</td>
<td>Body fluids</td>
<td>1.5–2.5</td>
</tr>
<tr>
<td>MERS</td>
<td>Airborne droplet</td>
<td>0.3–0.8</td>
</tr>
</tbody>
</table>
## Context: case-fatality rates

<table>
<thead>
<tr>
<th>Virus</th>
<th>Case fatality rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009 H1N1</td>
<td>0.02-0.4</td>
</tr>
<tr>
<td>SARS-CoV-2</td>
<td><strong>Evolving understanding (2-3%)</strong></td>
</tr>
<tr>
<td>SARS</td>
<td>9.6</td>
</tr>
<tr>
<td>MERS</td>
<td>34.4</td>
</tr>
<tr>
<td>H7N9</td>
<td>39</td>
</tr>
<tr>
<td>West Afr. Ebola</td>
<td>63</td>
</tr>
</tbody>
</table>

After Munster VJ *et al.*  *NEJM.* 2020
SARS outside respiratory/GI tracts

How does it get there?

*In situ* hybridization &/or EM at autopsy

- Circulating immune cells, spleen, nodes *et al*
- Kidneys
- Brain

**Coronavirus-like particles by EM in 6/22 SARS patients**

<table>
<thead>
<tr>
<th></th>
<th>Total cells Mean (SEM)</th>
<th>Cells with viral particles Mean (SEM)</th>
<th>Positive cells Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMNs</td>
<td>83.2 (6.9)</td>
<td>2.5 (0.4)</td>
<td>3.0</td>
</tr>
<tr>
<td>Monocytes</td>
<td>6.2 (0.9)</td>
<td>1.8 (0.4)</td>
<td>29.7</td>
</tr>
<tr>
<td>Lymphocytes</td>
<td>10.7 (1.0)</td>
<td>5.5 (0.7)</td>
<td>51.5</td>
</tr>
</tbody>
</table>

Gu J *et al.* JEM. 2005
What it takes to be a TTID

• **Asymptomatic** blood-borne phase
  • Chronic and/or acute

• Infectiousness by parenteral route

• Survival of agent in contemporary components

• Susceptible recipients

• Recognized disease in transfusion recipients

Our level of concern (should be) dependent on

• Incidence and prevalence, *especially* of pre- or asymptomatic infection

• Clinical severity

• Rate of growth of an epidemic
SARS-CoV-2 as TTID?

- Theoretically possible?
  - Its RNA can be amplified from patient blood
  - Presence of infectious virus not established
  - No respiratory viruses, including human coronaviruses, provide a precedent for TTI

- Routine donor screening practices will prevent symptomatic donors from giving

- Asymptomatic donors are our main concern

- Plasma derivatives should be safe

So, how precautionary must we be??
### RNAemia in 32 SARS pts.

<table>
<thead>
<tr>
<th>Days from fever</th>
<th>Samples (n)</th>
<th>Percent positive</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-4</td>
<td>20</td>
<td>50</td>
</tr>
<tr>
<td>5-7</td>
<td>12</td>
<td>75</td>
</tr>
<tr>
<td>8-11</td>
<td>11</td>
<td>64</td>
</tr>
<tr>
<td>12-16</td>
<td>8</td>
<td>38</td>
</tr>
</tbody>
</table>

Wang W-K et al. *JCM*. 2005

### Plasma RNA by RT-PCR in 135 SARS pts.


SARS-CoV-2 6/41 (14.6%) RNA positive
MERS-CoV RNA: respiratory tract vs. serum:
But what happens during the incubation period?

N = 37 pts.

SARS transfusion risk model, Shenshen, 2003: Estimated risk from a single RBC unit—would we see it?

Key inputs
- RNAemia = infectious viremia
- 0.75% asymptomatic infections

Mean = $14.11/10^6$
Max = $23.57/10^6$
# SARS-CoV-2 RNA detection (qPCR Ct values) after initial diagnosis & treatment

<table>
<thead>
<tr>
<th>Patient</th>
<th>Oral swab</th>
<th>Anal swab</th>
<th>Whole blood</th>
<th>Serum</th>
<th>Severe disease</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>33.5</td>
<td></td>
<td></td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td>30.3</td>
<td>24.3</td>
<td>Yes</td>
</tr>
<tr>
<td>3</td>
<td>30.3</td>
<td></td>
<td></td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td>32.1</td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>33.1</td>
<td>30.6</td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>7</td>
<td>32.7</td>
<td>30.2</td>
<td></td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td>33.1</td>
<td></td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
<td>31.4</td>
<td>34.5</td>
<td>No</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td>30.9</td>
<td>33.0</td>
<td>Yes</td>
</tr>
<tr>
<td>11</td>
<td>27.3</td>
<td></td>
<td></td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>12</td>
<td>34.4</td>
<td></td>
<td></td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>13</td>
<td>32.9</td>
<td>33.6</td>
<td></td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>14</td>
<td>32.3</td>
<td></td>
<td></td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>15</td>
<td></td>
<td></td>
<td>31.6</td>
<td></td>
<td>No</td>
</tr>
</tbody>
</table>

- 40% RNAemic in hospital, c.f. Huang *et al.* *Lancet.* 2020=14.6%
- Significance of fecal-oral RNA for transmission not known

Zhang W *et al.* *Emerg Microbes Infec.* 2020
What is the rate of asymptomatic infection?

- **Diamond Princess cruise ship epidemic:**
  - Quarantined at Yokohama from 03 Feb 2020 after cases confirmed.
  - 3011 PCR tests of 3707 passengers & crew PCR tested for SARS-CoV-2 as of 20 Feb at end of quarantine
    - 619 PCR-confirmed infections as of 20 Feb
    - 621 PCR positive specimens (20.6%)
    - 318 (51%) of confirmed passengers and crew asymptomatic *at time of specimen collection*

Zen koan: When and what when is asymptomatic?

Symptom screening & asymptomatic shedding?
Repatriation of travelers to Germany

126 board plane @ Wuhan

116 to medical assessment center

115 asymptomatic

114 throat swabs tested with PCR

6 with symptoms & 4 with contact to confirmed/suspected hospitalized
10/10 PCR negative

1 symptomatic
PCR negative

112 PCR negative

2 PCR positive

Hoehl S et al. NEJM. 2020
Chronology of onset in a family cluster:
Pre-symptomatic transmission during incubation

Case 1: 85-year-old **home-bound** man living with Case 4 in Shanghai

Cases 2 & 3: Asymptomatic relatives arriving from Wuhan
- 5d. before onset in case 1
- 8d. before onset in case 4

Cases 2 & 3 stay with cases 1+4

After Yu P *et al.* *JID.* 2020. See also Tong Z-D *et al.* *EID.* 2020.
Pathogen reduction

Activity demonstrated against SARS, MERS &/or other coronaviruses

• INTERCEPT™ (MERS, SARS)
• Mirasol® (MERS)
• Theraflex (SARS, MERS)
• UVC (MERS and SARS model)
• Solvent-Detergent (SARS)
Blood collector options

*Will vary by level of “local” P2P transmission*

- Watchful waiting
- “Passive” donor education with self-deferral
- Formal donor travel restrictions e.g. for “sustained” person-to-person transmission
- Donor interrogation re: symptoms, contact etc. *a la* SARS
- Product quarantine & donor call back for illness
- Pathogen reduction where available
- Testing
US collection facility status:
Have you implemented intervention(s)?

- Yes: 20, 42.6%
- No: 27, 57.4%

<table>
<thead>
<tr>
<th>Interventions</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Posting self-deferral info</td>
<td>17</td>
<td>70%</td>
</tr>
<tr>
<td>Handing out self-deferral info</td>
<td>5</td>
<td>25%</td>
</tr>
<tr>
<td>Querying donors before screening to allow self-deferral</td>
<td>4</td>
<td>20%</td>
</tr>
<tr>
<td>Simple travel deferral at screening</td>
<td>1</td>
<td>5%</td>
</tr>
<tr>
<td>More detailed queries at screening</td>
<td>3</td>
<td>15%</td>
</tr>
<tr>
<td>Other</td>
<td>5</td>
<td>25%</td>
</tr>
</tbody>
</table>

- Online survey of 47 organizations in ABC and ARC, comprising >90% of US collections. 14-29 Feb 2020.
- To be repeated
Collection facility infection control issues

• Sick donors *must know* not to present irrespective of SARS-CoV-2
  • Value of expanded symptom screening (esp. with epidemic overlapping with flu season)?
  • What is the predictive value of screening for contact with a case?
• IC & P: donor centers are not acute care facilities
  • Measures appropriate to *general public* should be applied.
  • Standard precautions include preventing droplet transmission, frequent handwashing, environmental disinfection
  • The role of masks for staff (outside acute care) controversial & when in short supply, should be reserved for use in acute care
• Optimal HR policies, esp. not penalizing illness absences

*Staff education and re-education on the virus & basic IC & P is critical*

*Talk to public health: are we are special re: social distancing measures?*


**US status**

AABB, FDA, & CDC not yet recommending specific action by blood collection establishments \(^1,^2,^3\)

- Voluntary deferral for travel to epidemic areas addresses *public concerns* about blood safety
- A range of options is available to blood collection establishments considering implementation of voluntary measures (i.e. those used for SARS)
  - Tool kit for available options available at AABB.org.\(^4\)

Sustained *local* P2P transmission complicates the blood safety response: 2009 Pandemic checklists being revised

My bottom line

• Transfusion transmission is theoretically possible, but unlikely based on precedent.

• Our major concern, after containment fails and mitigation is in effect, must be an adequate blood supply.

• Pandemic plans developed for influenza A can be quickly repurposed to SARS-CoV-2 esp.…. 
  – Donor access viz-a-viz social distancing
  – Triage of limited product
  – Staff safety
Risk-benefit considerations

“...transmission of a respiratory virus by transfusion is very unlikely to result in an infection in the transfused patient although... the possibility of transmission has to be considered ...


• Balance donor deferrals for protecting the blood supply with an estimate of any negative impact on the adequacy of the blood supply.
Maximize both **Blood Safety** and **Availability** when Dealing with an Emerging Infection

Hua Shan, MD, PhD
Professor
Stanford University
The INTEGRITY of Blood Supply

Integrity = Safety + Sufficiency
SARS-CoV-2: Impact on the integrity of blood supply

• The need to address a theoretical risk
  – Blood safety measures
    • Additional donor deferral
    • Products quarantine
    • Additional donor testing

• Compromised blood availability
  – Decreased available donors
    • Decrease number of healthy population
    • Public health measures restricting movement/contact
  – Loss of qualified donors from extra deferrals/testing
  – Interruption of blood system activities
Decrease of Availability: A Greater Impact

- Sickness
- Fear of acquiring infection
- Closing of business and schools
- Population movement/traffic control
- Possible increased demand

May 2003, during SARS epidemic, number of blood donors in Guangzhou dropped 50% comparing to same month previous year

- New blood safety measures
  - Additional deferral
  - Additional donor testing
  - Quarantine of blood products
We CAN predict with certainty:

- There WILL be other new infectious epidemics in the future
  - more zoonotic spillover
- Not all new epidemics are easily containable
  - In China, SARS-Cov-2 spread from one city to the whole country in 30 days
- Some epidemics will progress from local/regional to global (pandemic)
  - 2009 Influenza A H1N1: first identified in southern California April 15. By May 5, 2009, has spread to 41 U.S. states and 21 countries. 201,200 respiratory deaths due to H1N1 during 1st year
Preparedness Plan to Protect the INTEGRITY of Blood Supply: Essentials

Timely knowledge about an evolving new epidemic and assessment of risk to blood safety

- Organizations international and national
  - WHO, ECDC, US-CDC, country Ministries of Health, ISBT, AABB, C-CDC and CSBT
- National/international surveillance programs
- European Up-front Risk Assessment Tool (EUFRAT, an ECDC program)
- AABB TTD Committee “Facts Sheets”
- Scientific community (government, academic, industry)
- International collaborations
- NHLBI REDS Programs
International Collaborative Research on Assessing Blood Transfusion Risk

- Collaboration under NHLBI REDS-II, III, and VI (1989 to present)
  - US
  - Brazil
  - China
  - South Africa

Examples: SFTSV, Dengue, Zika...

- Providing valuable information for regulatory agencies and blood services to develop adequate response
When Faced with Unknown (Potential) Risk to Blood Safety:

The precautionary approach

– Public expectation and our responsibility: Maintaining trust in blood safety in times of uncertainty

• Proactive: be prepared and act early
• Appropriate to the suspected level of risk
• Implement measures to protect blood safety
• Understanding the impact on blood availability
• Take advantage of new technology
Features of Effective Precautionary Responses

- Timely updated understanding of the epidemic in local region/country
- Build-in adjustability and rapid implementation of changes (flexibility)
- Measures proportional to level of potential risk
- Preserving blood availability
- Operational impact
- Communication with community, donors and patients
- Staff and donor safety protection
- Take advantage of new technology
- Cost-effectiveness
Additional Challenges: Safety of Blood Donors

- **Improving donor service**
  - including providing transportation to donors

- **Enhanced safety precautions**
  - all donors wearing masks and hand sanitization

- **Avoid crowding at donation sites**
  - careful scheduling of donations
Additional Challenges: Safety of Blood Service Workers

- Staff education and training
- Optimize workflow to minimize crowding of workers
- Monitoring staff member health:
  - Daily body temp, short list of questions
- Frequent and effective cleaning of work surfaces
- Protective gear
Can Technology be of Assistance?

Pathogen Reduction Technology (PRT)

- Two PRT methods for platelets have been in use since 2005 (one product licensed for plasma in the U.S.)
- Another method has been used for treating plasma only
- Challenges:
  - Not yet licensed for RBC and whole blood
  - Supply
  - Cost effective considerations
- PRT may provide assistance by allowing
  - Relaxation of some donor testing and deferrals requirement
  - Reducing the impact on blood availability
  - Preserve availability of platelets
  - Enhance the safety of convalescent plasma
Other Technological Help

Examples:

• Artificial intelligence modeling to learn and encourage more people to donate

• Robotic blood collection (facilitating accurate access to donor vein)

• Drone for rapid blood product and blood specimen delivery

• Artificial blood
Chinese Blood Services Responding to SARS-CoV-2

Improved Chinese public health response infrastructure since 2003

- Elapsed time from 1st case to report to WHO
  - SARS-CoV  3 months
  - SARS-Cov-2  23 days
- Time for SARS-CoV to be identified (by WHO)
  - Five months
- Time for SARS-CoV-2 to be identified (by C-CDC)
  - Less than one month
Chinese Society of Blood Transfusion (CSBT): Recommendations

Donor evaluation:
In Hubei province, deferral for 4 weeks (28 days):
- A fever or symptoms of respiratory illness
- Close contact with fever or respiratory illness
- Close contact or epidemiological association with someone with confirmed COVID-2019 infection
- Direct contact with wild animal(s)

For donors outside Hubei or other communities with COVID-2019 outbreaks:
- Residence in or travel from Hubei province or communities with COVID-2019 outbreaks
- Close contact with someone described above

Center may elect to test for SARS-CoV-2 markers
Post-donation donor call-back

For regions with significant outbreaks: consideration of quarantining all blood products for 28 days,

Detailed recommendations about donor recruitment, managing the balance of supply and demand

Safety precaution for both staff and donors
Strategies: Protecting Blood Availability

• Amplifying recruitment efforts
• Enhanced communication about the need for voluntary donations
  – Media, messaging, WeChat, calling
• Organized workplace, college, military donations
• Mobilizing emergency reserve donors registry/group
• Mobile traveling to less affected locations/countryside townships…
• Import blood products to heavily affected regions
Balancing Supply with Clinical need

- Close communication with hospitals
- Patient blood management
- Reschedule elective surgeries
- Cross-regional support from other blood centers
“Three Blood Centers from Sichuan province ship 1,000 units of pRBC to Hubei province”.

(Feb 24 Xinhua Net News)
Protecting the INTEGRITY of Blood Supply

Integrity = Safety + Sufficiency

• Preparedness
• Understanding impact on blood availability
• New technology
• International collaboration
• RESEARCH

Source: techcentral.ie
Assessing the risks of transfusion-transmission for newly discovered pathogens

- Evaluate blood, tissues, and organs for the presence of the agent
- Characterize molecular characteristics, pathogenesis, persistence, and immunology

NAT and serology donation testing

- Understand the kinetics of viremia, immune responses, and assay-specific window periods
- Estimate incidence, prevalence, and residual risks for the blood supply (assay in place)
- Build repositories and tools for the wider scientific community

Track the presence of virus in the blood supply
Inform blood safety and public health responses

Positive donor prospective enrollment and follow-up

In vitro viability studies in stored blood components and derivatives

- Evaluate transfusion-transmission rates
- Understand the pathogenesis of the infection and disease outcomes

Animal inoculation experiments to relate viremia to infectivity

Transfusion-transmission studies and clinical evaluations of transfused recipients

Research studies in development for SARS-CoV-2

- **Is SARS-CoV-2 transmissible by blood transfusions?**
  - Transfusion transmission (TT) studies in macaques, humanized ACE-2 receptor murine and other animal model systems
  - Investigate recipients following donor post-donation reports of COVID-19 illness
  - TT studies could be conducted by Brazil REDS-IV-P program if outbreaks occur
  - *Documenting absence of TT would allow relaxation of donor deferrals*

- **Serosurveys using blood donor samples in outbreak regions**
  - Pre- and post-outbreak serosurveys with Coronavirus Ab EIAs, Arrays, RVPN
  - Ascertain seasonal incidence using blood donor populations (overall and by demographic subgroups) to correlate with reported case and death rates
  - Donor plasma samples are being archived in China, Brazil, and potentially the US linked to outbreaks

- **If NAT screening is implemented…**
  - Prospective MP-NAT screening implemented by some blood centers in China
  - Retrospective MP-NAT surveillance for arboviruses in REDS-III/IV-P Brazil HemoCenter could be extended to SARS-CoV-2 if outbreaks occur
  - Resolution of MPs to ID samples could trigger recipient lookback
  - If NAT+ donors are identified, prospective follow-up to characterize dynamics of viral and immunological markers, investigate pathogenesis and archive samples in repositories to advance development of diagnostics
Further questions & discussion

• ISBT forum: [WWW.isbtweb.org/forum](https://WWW.isbtweb.org/forum)
  – For discussion and unanswered queries
• Mike Busch: [MBusch@vitalant.org](mailto:MBusch@vitalant.org)
• Louie Katz: [LKatz@mvrbc.org](mailto:LKatz@mvrbc.org)
• Hua Shan: [HShan@stanford.edu](mailto:HShan@stanford.edu)

Webinar recording will be available at: [https://education.isbtweb.org/](https://education.isbtweb.org/)