

## Ofstead Executive Summary:

### Scientific evidence and new recommendations on COVID-19 and bronchoscopy

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#### Bronchoscopy has been used for diagnosing and treating patients with COVID-19

- Bronchoscopes become heavily contaminated because they are used to:
  - Inspect the airways and lungs of patients who have infections or are critically ill
  - Remove mucus, pus, other bodily fluids, tissue, or foreign debris
  - Collect samples by obtaining biopsies and bronchoalveolar lavage (BAL) fluid
  - Perform therapeutic procedures
- Bronchoscopy played a critical role in identifying and characterizing the virus in China:<sup>1</sup>
  - BAL samples were collected from early cases
  - The virus was isolated and the genome was sequenced from BAL samples
- CDC initially recommended collecting BAL samples for diagnosis<sup>2</sup>
- BAL was done on 33% (7/21) of COVID-19 patients in a study at a Washington State hospital<sup>3</sup>

#### Reprocessing of reusable bronchoscopes is often inadequate and ineffective

- In 4 US hospitals, microbes were detected in >50% of patient-ready bronchoscopes, including:
  - Gastrointestinal flora<sup>4</sup>
  - Waterborne pathogens<sup>4,5</sup>
  - Mold<sup>4</sup>
- In 7 US hospitals, auditors discovered serious breaches of reprocessing standards:
  - Steps were skipped or performed incorrectly<sup>4,6</sup>
  - Automated equipment was disabled or dirty<sup>4</sup>
  - Quality assurance steps were not done<sup>4,6</sup>
- In 1 hospital in Wuhan (China), an outbreak investigation was initiated in 2018:<sup>7</sup>
  - *Stenotrophomonas maltophilia* was found in 55.5% of BAL samples
  - Patients did not have symptoms
  - The same pathogen was found in the bronchoscope
  - Reprocessing breaches were identified
- In 1 US hospital, a superbug outbreak was linked to a dirty, damaged bronchoscope:<sup>8</sup>
  - 19 bronchoscopy patients were infected with superbugs and 10 patients died:
    - Multi-drug resistant *Pseudomonas aeruginosa*
    - Carbapenem-resistant *Klebsiella pneumoniae*
  - Both pathogens were found in the bronchoscope channel
  - Borescope exams revealed residual soil and damage in the channel
- Bronchoscopes are at a higher risk than other types of endoscopes because:<sup>6</sup>
  - They are used around the clock on patients with serious infections and other pathology
  - Reprocessing is performed by personnel from multiple departments
  - Training and supervision are inconsistent for clinical personnel involved in reprocessing
  - Delayed reprocessing frequently occurs with emergent and after-hours cases

#### Critical insight: Contaminated bronchoscopes can infect patients and compromise laboratory results

## Some patients with COVID-19 get other infections that can cause worse outcomes

- In Washington State, 19% of patients had co-infections, including influenza and *Pseudomonas*<sup>3</sup>
- In China, among patients with COVID-19:
  - 5-10% had fungal or bacterial co-infections<sup>9,10</sup>
  - Bacterial pathogens were found in BAL samples<sup>11</sup>
  - Viral co-infections (e.g., respiratory syncytial virus [RSV]) were also observed<sup>12</sup>
- Bacterial and fungal co-infections have been linked to significantly increased mortality risk:<sup>13</sup>
  - Researchers concluded: "...predictors of a fatal outcome in COVID-19 cases included age, the presence of underlying disease, the presence of secondary infection and elevated inflammatory indicators in the blood."

## Critical insight: Preventing bronchoscope-associated infection safeguards patients with COVID-19

### Bronchoscopy has risks for patients with COVID-19 and for healthcare personnel

- The virus has been detected in respiratory samples,<sup>11,14,15</sup> stool,<sup>14,15</sup> and blood<sup>15</sup>
- Asymptomatic patients had similar levels of virus as symptomatic patients<sup>16</sup>
  - Viral RNA was found in asymptomatic patients' cruise ship rooms 17 days after vacating<sup>17</sup>
- A lab study found viable SARS-CoV-2 persisted for 3 hours in aerosols and 3 days on surfaces<sup>18</sup>
- This type of virus should be readily eliminated by properly used normal disinfectants<sup>19</sup>
- Providers and personnel may be exposed to the virus while handling reusable bronchoscopes:
  - Point-of-care pre-cleaning requires:<sup>20</sup>
    - Handling and wiping a heavily contaminated bronchoscope
    - Flushing large volumes of fluid that could be aerosolized and requires disposal
  - Transport to reprocessing suites may contaminate transport containers or carts<sup>20</sup>
  - Leak testers are connected to bronchoscopes before manual cleaning or disinfection<sup>20</sup>
  - Manual cleaning:<sup>20</sup>
    - Is done using sinks and irrigation systems used for other instruments
    - Requires flushing and brushing that splash personnel with contaminated liquid
  - Sinks and counters are not customarily cleaned and disinfected between every use
  - PPE shortages and a lack of adequate PPE training could exacerbate risk

## Critical insight: Frequent environmental decontamination and careful PPE removal is essential

### You can take action to reduce the risk of bronchoscopy-associated infection transmission

- Bronchoscopy is currently discouraged for COVID-19 sample collection and elective procedures<sup>21</sup>
- New guidelines recommend:<sup>21</sup>
  - Bronchoscopy be performed only for life-saving care among patients with COVID-19
  - Sterile, single-use bronchoscopes be used whenever possible
  - Personnel wear sufficient respiratory and other personal protective equipment
- Ofstead recommends that institutions using reusable bronchoscopes:
  - Centralize reprocessing to one department with highly trained personnel
  - Sterilize any models that are compatible with available sterilization systems<sup>22</sup>
  - Implement stringent quality control measures and audits to ensure compliance<sup>22</sup>

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