Tarrant County Medical Examiner’s Office
Fort Worth, Texas

Interim Guidelines for Collecting, Handling, and Testing Clinical Specimens from Persons Under Investigation (PUIs) for Coronavirus Disease 2019 (COVID-19)

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## CONTENTS

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page #</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Texas Administrative Code</td>
<td>3</td>
</tr>
<tr>
<td>2. Overview</td>
<td>4</td>
</tr>
<tr>
<td>3. Operational Guidelines – Forensic Death Investigators</td>
<td>5</td>
</tr>
<tr>
<td>4. Investigative Questions at the Death Scene: FDIs/JP</td>
<td>6</td>
</tr>
<tr>
<td>5. Collection and Preservation of Personal Property and Evidence</td>
<td>7</td>
</tr>
<tr>
<td>8. Forensic Examination of Decedent with Exposure or Suspected Exposure to SARS-CoV-2</td>
<td>8</td>
</tr>
<tr>
<td>9. Attendees at Autopsy</td>
<td>8</td>
</tr>
<tr>
<td>10. Guidelines to Perform Autopsy on PUI</td>
<td>8</td>
</tr>
<tr>
<td>11. Collection of Specimens in a PUI Case</td>
<td>9</td>
</tr>
<tr>
<td>12. Collection of Postmortem Tissue Specimens</td>
<td>10</td>
</tr>
<tr>
<td>13. Guidance for Laboratories</td>
<td>11</td>
</tr>
<tr>
<td>14. FIT Testing</td>
<td>11</td>
</tr>
<tr>
<td>15. Social Distancing</td>
<td>11</td>
</tr>
<tr>
<td>16. Guidance Provided to Funeral Homes</td>
<td>12</td>
</tr>
</tbody>
</table>
Texas Administrative Code

**TITLE 25**
**HEALTH SERVICES**

**PART 1**
**DEPARTMENT OF STATE HEALTH SERVICES**

**CHAPTER 97**
**COMMUNICABLE DISEASES**

**SUBCHAPTER A**
**CONTROL OF COMMUNICABLE DISEASES**

**RULE §97.13**
**Death of a Person with Certain Communicable Diseases**

(a) If a physician has knowledge that a person had, at the time of death, a communicable disease listed in subsection (c) of this section, then the hospital administrator, clinic administrator, nurse, or the physician shall affix or cause to be affixed a tag on the body, preferably the great toe.

(b) The tag shall be on card stock paper and shall be no smaller than five centimeters by ten centimeters. The tag shall include the words "COMMUNICABLE DISEASE--BLOOD/BODY SUBSTANCE PRECAUTIONS REQUIRED" in letters no smaller than six millimeters in height. The name of the deceased person shall be written on the tag. The tag shall remain affixed to the body until the preparation of the body for burial has been completed.

(a) Diseases that shall require tagging are acquired immune deficiency syndrome (AIDS); anthrax; brucellosis; cholera; Hantavirus pulmonary syndrome; hepatitis, viral; human immunodeficiency virus (HIV) infection; novel coronavirus; novel influenza; plague; prion diseases, such as Creutzfeldt-Jakob disease (CJD); Q fever; rabies; Rocky Mountain spotted fever; smallpox; syphilis; tuberculosis (Mycobacterium tuberculosis complex); tularemia; and viral hemorrhagic fever.

(d) All persons should routinely practice standard infection control procedures when performing postmortem care on a deceased person who is known or suspected of having a communicable disease listed in subsection (c) of this section.

**Where to Report SARS-CoV-2 (Novel coronavirus)**

All positive cases shall be reported to the local health department in the county where death had occurred. Number to call in Tarrant County, Texas: *(817) 321-5350 (24/7).*
Overview

Patients with acute respiratory illness due to COVID-19 may show typical symptoms including (a) fever, (b) cough and (c) shortness of breath. The Center for Disease Control (CDC), has not fully defined the incubation period, and based on what has been seen previously established incubation period of MERS\textsuperscript{1}, believes that the symptoms of COVID-19 may appear within 2 days to 14 days after exposures. Current estimates of the incubation period range from 2 to 14 days with a median of 5 to 6 days. Recent case reports suggest that the incubation period may be as long as 24 days, which is longer than the 14 days that WHO and the CDC have predicted.\textsuperscript{2}

Coronavirus have existed since 8000 BCE and were first described in 1960. They are enveloped spherical RNA viruses about 120 nm in diameter. They cause diseases in mammals and birds. In humans, coronaviruses cause respiratory tract infections that are typically mild, such as the common cold, though rarer forms such as SARS, MERS, and COVID-19 can be lethal.\textsuperscript{3}

There are four genera described including:

1. Alphacoronavirus including human coronavirus (a) 229E, (b) OC43, (c) NL63 and (d) HKU1 plus various bat corona virus. They human corona virus cause common cold with running nose, and sometimes adenitis as well as pharyngitis.

2. Betacoronavirus are non-human viruses infecting bats and murine (rodents). SARS-CoV (Severe acute respiratory syndrome coronavirus) which started in China causing pandemic in 2002-2003, and MERS-CoV (Middle East respiratory syndrome coronavirus) which caused epidemic in 2012 in Saudi Arabia are zoonotic Betacoronavirus crossing from animals to man. The current, now officially a “pandemic” (World Health Organization (WHO)) is also a Betacoronavirus and is named SARS-

\textsuperscript{1} Middle-East Respiratory Syndrome. It was first reported in Saudi Arabia in 2012 and has since spread to several other countries, including the United States. Most people infected with MERS-CoV developed severe respiratory illness, including fever, cough, and shortness of breath. Many of them have died.


CoV-2. Disease caused by SARS-CoV-2 has been named COVID-19 by WHO.

3. Gammacoronavirus: Beluga whale
4. Deltacoronavirus: Pigs and birds (Bulbul)

Structure and Infectivity

SARS-CoV-2 has been sequenced. A phylogenetic analysis has found a bat origin for the SARS-CoV-2. There is a diversity of possible intermediate hosts for SARS-CoV-2, including pangolins, but not mice and rats.

There are many similarities of SARS-CoV-2 with the original SARS-CoV. Using computer modeling, Xu et al. 4 found that the spike proteins of SARS-CoV-2 and SARS-CoV have almost identical 3-D structures in the receptor-binding domain that maintains van der Waals forces. SARS-CoV spike protein has a strong binding affinity to human ACE2 receptors, based on biochemical interaction studies and crystal structure analysis. SARS-CoV-2 and SARS-CoV spike proteins share 76.5% identity in amino acid sequences and, importantly, the SARS-CoV-2 and SARS-CoV spike proteins have a high degree of homology. Yet this dissimilarity requires that the vaccine, which is currently under investigation and funded by US government, is going to be different.

Operational Guidelines – Forensic Death Investigators: COVID-19

For the purpose of death scene investigation, TCME will consider all reported deaths as “Person Under Investigation” (PUI) whether they have the following history or not: (a) overt symptoms (see below) or (b) who have traveled recently within the United States or abroad and who have returned home within the past 21-days or (c) who have encountered a person known to be exposed to COVID-19.

In all such cases, the Forensic Death Investigators (FDI) performing scene visitation shall be attired in personal protective equipment (PPE) which shall include a N-95 mask, face shield, head cover (disposable surgical headcover) gloves and a full-length disposable apron. After use, the PPE shall be bagged in a biohazard plastic bag, sealed and discarded.

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appropriately on return to the medical examiner’s office. All FDIs must first undergo “Fit Test” to ensure that correct size of N-95 mask they wear.

Finally, the FDI must leave his or her death scene investigation kit in the vehicle to prevent contamination. If it is unavoidable, the case of the kit must be decontaminated by 1:10 dilution bleach before returning to the ME Office.

The decedent shall be transported to the Tarrant County Central Morgue wrapped in a white sheet and secured in a body bag. The body bag should be decontaminated at the scene with 1:10 liquid bleach (Sodium hypochlorite) using a spray bottle and labelled “Biohazard” before placing the body in a transport vehicle. The body bag will remain sealed until a medical examiner is ready to examine the body.

Investigative Questions at the Scene by FDI/JPs on PUI

1. Has the decedent travelled recently in the past 21 days?
   a. In the United States? ( ) No ( ) Yes. If yes, which area of the United States: ________________________
   b. Overseas: ( ) No ( ) Yes. If yes, what country ________________________

2. Has the decedent been around anyone who has travelled recently in the United States or overseas: ( ) Yes ( ) No

3. Is there a general concern that the deceased may have been exposed to COVID-19? ( ) Yes ( ) No

4. Was the decedent experiencing any of these symptoms?
   ( ) Fever
   ( ) Diarrhea
   ( ) Headache
   ( ) Muscle Pain
   ( ) Vomiting
   ( ) Abdominal pain
   ( ) Cough
   ( ) Shortness of breath
5. About the cough:
   a. Has the cough lasted more than 2 weeks? ( ) Yes ( ) No
   b. Is the cough dry? ( ) Yes ( ) No

6. Is the decedent an organ recipient? ( ) Yes ( ) No

7. Did the decedent receive bone marrow transplant? ( ) Yes ( ) No

8. Did the decedent suffer from auto-immune disease such as systemic lupus, rheumatoid arthritis, Sjögren’s syndrome, or Crohn’s disease.? If Yes, state what type: __________________________.

9. Was the decedent’s spleen removed? ( ) Yes ( ) No

10. Was the decedent on chemotherapy for cancer? ( ) Yes ( ) No

11. Did the decedent have history of HIV infection? ( ) Yes ( ) No

Collection and Preservation of Personal Property and Evidence by Forensic Death Investigators/JP's

A. Personal Property

1. When family is present at the scene of death, the personal property on the remains shall be released to the family.

2. In the absence of family at the scene of death, the personal property shall be brought back to TCME. The property shall be decontaminated in Level-2 morgue using 1:10 liquid bleach spray before packaging and storage in the property room. FDI shall wear PPE when decontaminating personal property.

3. Personal clothing that needs to be released to the funeral home shall be bagged in a biohazard bag and released to the funeral home.

B. Evidence: Evidence such as drugs, drug paraphernalia and other items on or near the body shall be sent with the remains to TCME and removed in the morgue. Decontamination procedures shall be adopted in the morgue if deemed necessary by the medical examiner before storage.
Forensic Examination of Decedent with Exposure or Suspected Exposure to SARS-CoV-2

Deaths reported to TCME will fall under three major categories:

1. Hospitalized patient with clinically established diagnosis of COVID-19: Jurisdiction in all such cases will be terminated.

2. Unattended death with confirmed diagnosis of COVID-19 and who is quarantined at home:
   a. Older patient (> 60 years) with or without co-morbidities or younger (< 60 years) with known co-morbidities: No autopsy will be performed. In such cases:
      i) Inquest may be performed in absentia,
      ii) Jurisdiction may be terminated or
      iii) Inspection only performed.
   b. Decedent <60 years with no known co-morbidities: Complete autopsy or limited (chest only) autopsy shall be performed.

3. PUI who has travelled in the United States or abroad in the preceding 21-days or in contact with someone who has travelled in the United States or abroad or who has clinical symptoms (see above) suggestive of exposure to SARS-CoV-2 and on whom diagnostic nasopharyngeal test has not been performed: Complete autopsy or limited (chest only) autopsy shall be performed based in clinical history and scene findings.

Attendees at Autopsy

TCME will continue with the policy of allowing law enforcement agents to attend autopsies where they have expressed legitimate interest. All attendees present during the autopsy shall be attired in PPE including a NP-95 mask, face shield and a full-length gown. An attendee should be alerted to risk of exposure to SARS-CoV-2 and be allowed to leave the morgue if he or she feels uncomfortable.

Guidelines to Perform Autopsy on PUI

General Autopsy Guidelines

1. All examination shall be conducted in level-2 morgue.
2. Only one physician and one autopsy technician shall perform the examination and only one person to cut at a given time.
3. There shall be no attendees.
4. Use caution when handling needles or other sharps, and dispose of contaminated sharps in puncture-proof, labeled, closable sharps containers. Do not change scalpel blade during the autopsy. Have several blades ready prior to exam.
5. All containers, test tubes and any other specimen collected should be clearly marked and labelled a biohazard sticker.
6. An oscillating bone saw should be avoided for confirmed or suspected cases of COVID-19. Consider using hand shears as an alternative cutting tool. If an oscillating saw is used, attach a vacuum shroud to contain aerosols. If the saw does not have a “built-in vacuum”, impede air-borne dispersal of bone dust and blood droplets by applying a wet sponge to the cutting surface,
7. Alert the laboratory staff of potential biohazard (on the “CRYPT”)
8. Dispose contaminated PPE in biohazard trash bag.
9. Wash hands before leaving the morgue for 20 seconds with warm water and soap
10. Autopsy technician shall decontaminate all work surfaces, floors and instrument with 1:10 diluted bleach.
11. The following PPE should be worn at a minimum:
   a. Wear nonsterile, nitrile gloves when handling potentially infectious materials. Use two pairs.
   b. If there is a risk of cuts, puncture wounds, or other injuries that break the skin, wear heavy-duty gloves over the nitrile gloves.
   c. Wear a clean, long-sleeved fluid-resistant or impermeable gown to protect skin and clothing.
   d. Use a plastic face shield, face mask (N-95) and plastic face shield to protect the face, eyes, nose, and mouth from splashes of potentially infectious bodily fluids.

Collection of Specimens in a PUI Case

A. General Guidelines

1. In all decedents classified as “PIU”, TCME will collect nasopharyngeal swabs for COVID-19.

2. TCME will be using Quest Laboratory for analysis. Quest Test Code is “39433”.

9
C. Storage of Specimens for RT-PCR.

Specimens collected should be stored at 2-8°C and shipped overnight to Quest on ice pack. Label each specimen container with the patient’s name and ME Case #.

D. Specific Guidelines: Nasopharyngeal swab

Use only synthetic fiber swabs with plastic shafts. Do not use calcium alginate swabs or swabs with wooden shafts, as they may contain substances that inactivate some viruses and inhibit PCR testing. Place swabs immediately into sterile tubes containing 2-3 ml of viral transport media. Refrigerate specimen at 2-8°C as noted above.

*Collection of Nasopharyngeal swab:* Insert a swab into the nostril parallel to the palate. Leave the swab in place for a few seconds to absorb secretions.

Collection of Postmortem Tissue Specimens for Histology

The preferred specimens should be a minimum of eight blocks which represent samples from the respiratory sites listed below in addition to specimens from major organs (including liver, spleen, kidney, heart, GI tract) and any other tissues showing significant gross pathology.

The recommended respiratory sites include:

1. Trachea (proximal and distal).
2. Central (hilar) lung with segmental bronchi, right and left primary bronchi.
3. Representative pulmonary parenchyma from right and left lung.

Collection of tissue samples roughly 4-5 mm in thickness (i.e., samples should fit in a tissue cassette) is recommended for optimal fixation. The volume of formalin used to fix tissues should be 10x the volume of tissue. Place tissue in 10% buffered formalin for three days (72 hours) prior to processing for histology.
Guideline for Laboratories

Clinical and forensic laboratories performing diagnostic tests on serum, blood, or urine specimens should follow standard laboratory practices, including Standard Precautions, when handling potential COVID-19 patient specimens. For additional information, see Biosafety in Microbiological and Biomedical Laboratories (BMBL) – Fifth Edition (page 225).

FIT Testing

Fit Testing is a required component of any Occupational Safety and Health Administration (OSHA) written respiratory protection program in which works are required to wear tight-fitting respirators. If your respirator doesn't fit your face properly, contaminated air can leak into your respirator facepiece, and you could breathe in hazardous substances. So before you wear a tight-fitting respirator at work, the employee must pass the FIT test which is provided to TCME employees by Tarrant County Health Department.

For the respirator fit test, the respirator user will perform seven exercises for one minute each:

- Normal breathing
- Deep breathing
- Moving head side to side
- Moving head up and down
- Bending over
- Talking
- Normal breathing again

If the worker doesn't detect any odor or irritation during these exercises, the fit test is passed and the worker is safe to wear their respirator.

Following employees shall perform a Fit Test: (a) Medical Examiners (b) Autopsy Technicians and (c) Forensic Death Investigators.

Social Distancing

To slow the spread of COVID-19 through our communities, the U.S. Centers for Disease Control and Prevention has encouraged us to practice "social
distancing" measures. The CDC defines social distancing as it applies to COVID-19 as "remaining out of congregate settings, avoiding mass gatherings, and maintaining distance (approximately 6 feet or 2 meters) from others when possible."

**Guidance Provided to Funeral Homes**

**A. Funeral Home Picking Up Remains At TCME**

1. Inspection of remains at TCME: Should the funeral home representative wish to verify the name of the decedent on the body and inventory the clothing, he or she should be allowed to do so. Inspection shall be carried out in Level-2 morgue under the supervision of an autopsy technician or the FDI. The funeral home representative shall be provided a NP-95 mask, gloves and a full-length gown.

2. Release of Bodies: A body tested for COVID-19 may be released to a funeral home before completion of the test. The funeral home shall be informed that the decedent was tested for COVID-19 and a notation made on the Funeral Home Release form and the toe tag. ("Decedent Tested for COVID-19").

**B. Guidance Provided to Funeral Home**

Tarrant County Medical Examiner’s Office cannot provide guidance regarding transportation, embalming, cremation, burials or visitation to a funeral home. The following information is provided based on Center for Disease Control (CDC) guidelines. It is the duty of each funeral home to verify this information by visiting the CDC website as well as the website of National Directors Association (NFDA).

1. Embalming: According to the CDC, bodies of those who die of confirmed or suspected COVID-19 can safely be transported and embalmed.

2. Cremation or Burial: At this time, the CDC states that decedents with COVID-19 may be buried or cremated according to the family’s preferences. However, they should “check for any additional state and local requirements that may dictate the handling and disposition of the remains of individuals who have died of certain infectious diseases.” Transporting bodies in a body bag and disinfecting the bag with a product that contains EPA-approved emerging viral pathogens claim should suffice. Generally, 1:10 liquid bleach is the disinfectant of choice and kills SARS-CoV-2 in 1 minute. Since the virus can survive up to 9 days
on inanimate object, it is required that all surfaces contaminated with biological fluids should be disinfected with 1:10 bleach.

Additional guidance can be found at https://www.nfda.org/covid-19

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