



COVID-19

The OEA, its Officers and Board of Trustees make no guarantee to any information contained below will totally ensure that mortuary service and or funeral home staff, embalmers, funeral directors, apprentices, attendants, livery or removal personnel will not contract the COVID-19 Virus. Information about this virus is changing everyday.

These are some suggestions for the treatment of a body suspected of having COVID-19. Here is a link to NFDA <https://www.nfda.org/news/in-the-news/nfda-news/id/4841/zs/kindl/zl/rcfi1>. The primary mode of transmission seems to be respiratory but secondary the virus can live on surfaces for varying lengths of time and could be passed to the embalmer by touch or inhalation. It does not appear to be a blood borne virus.

Licensed embalmers have had the training and education to handle these cases. Universal Precautions should be observed on all cases. There are some additional protocols that can be employed to reduce the amount of exposure should you have to handle a Corona Virus infected case. An additional information sheet by Sharon Gee - Mascarello for removals is also be included.

It is important for open communication between removal personnel, embalmer and funeral director at all times. Everyone should know with what they are dealing. Remember to wash hands frequently. Singing the "ABCs" or "Mary Had a Little Lamb" allows enough time to kill organisms and remove from the skin.

Operative Protocols

As stated earlier universal precautions should always be used. Quite simply we are not always told who is infectious. Moreover, some decedents may be asymptomatic and were never tested antemortem or postmortem. Here are some protocols that may help in reducing exposure.

- With all PPE being donned (see donning and doffing illustration see link) <https://www.cdc.gov/hai/pdfs/ppe/ppe-sequence.pdf>
- Covering the face of the deceased with a towel, N95 or equivalent, webril soaked in an approved disinfectant.
- Preliminary disinfection of the deceased should include spraying entire body with an approved disinfectant, paying particular attention to the nasal and buccal orifices.
- Having all instruments, fluids and equipment out and ready prior to embalming will prevent cross contamination of handles on drawers, cabinets etc.
- Place all waste/ debris in red bio hazard bags and dispose of appropriately
- Place the deceased with the head at the foot end of the table. This will allow drainage to be taken closer to the point of exiting the table. Use of a drain tube is highly recommend. Attach enough hose to reach into the sink, water closet etc. to avoid splashing.
- Another way of embalming is to not take any drainage. Use a waterless solution of 1-2 gallons and inject *slowly*. If this is done the body should not swell.

- Solution strength should be strong. According to a page found on the CDC website (link is below), the strength should be between 2-8%.
To make a 5% solution use 23 ounces per gallon of 28 index; 18 ounces per gallon of a 36 index.
Down load the Embalm Calc app for your smart phone, iPad etc. percentage can also be calculated by using $C' \times V' = C \times V$. (See Fig 1).
- Aspiration of the thoracic cavity might need to be avoided since this is a respiratory virus. Cavity fluid can be injected without aspiration. If aspiration is performed avoid splashing of aspirated materials for this can be an aerosol generating procedure (AGP).
- Terminal disinfection of the embalming room and equipment should be thorough.

Fig. 1

Fluid Solution Strength Chart
Ounces per gallon

	Index of Fluid						
	18	20	22	25	28	30	36
8	1.13	1.25	1.38	1.56	1.75	1.88	2.25
10	1.41	1.56	1.72	1.95	2.19	2.34	2.81
12	1.69	1.88	2.06	2.34	2.63	2.81	3.38
14	1.97	2.19	2.41	2.73	3.06	3.28	3.94
16	2.25	2.50	2.75	3.52	3.50	3.75	4.50
18	2.53	2.81	3.09	3.52	3.94	4.22	5.06
20	2.81	3.13	3.44	3.91	4.38	4.69	5.63
22	3.09	3.44	3.78	4.30	4.81	5.16	6.19
24	3.38	3.75	4.13	4.69	5.25	5.63	6.75
26	3.66	4.06	4.47	5.08	5.69	6.09	7.31
28	3.94	4.38	4.81	5.47	6.13	6.56	7.88
30	4.22	4.69	5.16	5.86	6.56	7.03	8.44

Disinfection

Bacteria and viruses are generally killed by breaking the cell wall or protein shell or denaturing the protein or “DNA” thus interrupting the ability to replicate or attach to the host. Much the way embalming denatures the protein. Actions of preservatives can be found in chapter 6 of the 5th Edition of Embalming; History Theory & Practice Robert G. Mayer, Jr. So what kills them?

The CDC has a list disinfectants or look for EPA rated disinfectants.
<https://www.cdc.gov/infectioncontrol/guidelines/disinfection/disinfection-methods/chemical.html>. In general these are products that kill Adeno virus, roto virus, noro virus, Hep A-C and or rated for emerging pathogens. Alcohols work in concentrations of 60-95%, with isopropyl (rubbing alcohol) alcohol being the most effective. Metriguard Spray by Metrex, specifically has Corona Virus listed as one that it destroys. Metricide 28 Day solution would also work. Follow manufactures instructions for use and be sure to allow the appropriate contact time to ensure destruction of the virus. An explanation of other chemical families and the control of microorganisms is found below.

Control of Microorganisms

- 3 levels of control
 - Sterilization
 - Disinfection
 - Antisepsis

- Sterilization – offers most control - is the complete destruction and removal of all life-forms, endospores or their products
- Disinfection – is the destruction of pathogenic agents by chemical or physical means by applying the disinfectant to an inanimate object. The process does not inactivate endospores but does kill most vegetative microorganisms.
- Antisepsis – is the process by which microorganisms are controlled on living tissue to prevent infection. (Mullins 2006, p301).

Physical Methods of Control

- Scrubbing – the mechanical act of removing debris and microorganisms
- Even the best sterilizers and disinfectants will not work effectively if large amounts of debris are left in place
 - On inanimate surfaces it should be vigorous
 - Be careful on the deceased as damage may occur if too much force is applied
- Heat
 - Dry – incineration and cremation
 - Moist – boiling, free flowing steam and steam under pressure
- Moist heat –
- Boiling – it takes 10 minutes to sterilize water. Endospores are not killed. *Clostridium botulinum* and *perfringens* can survive many hours of boiling
- Steam under pressure – autoclave – most effective. Higher temps can be reached and pressure allows steam to penetrate

Chemical Methods of Control

- Halogens – include chlorine, iodine, fluorine, bromine
- Chlorine – used as sodium hypochlorite, or household bleach.
- Iodine – available as a tincture. Only drawback is allergy to iodine
 - Betadine – common antiseptic
- Alcohols – classified as intermediate disinfectants
 - Both ethyl and isopropyl alcohol are often added to other disinfectants to improve their germicidal abilities
 - They do not kill spores
- Aldehydes –
 - Formaldehyde - effective on wide range of organisms. a greater contact time is required
 - Glutaraldehyde – excellent cold chemical sterilant and will kill spores
- Phenolics –
 - Phenol
 - Cresols
 - Hexachlorophene
- Phenol or carbolic acid - first used in mid 1800s by Joseph Lister. Until this time secondary infection killed most people post surgery. Lister soaked his bandages in phenol and greatly reduced the mortality rate
- Cresols – are derived from the chemical toluene.
- Cresols can be found in Creosote, tobacco, crude oil

- Lysol is a cresol
- Quaternary Ammonium Compounds
 - AKA – Quats
- Destroy surface tension of cell membrane
- Examples:
 - Benzethonium Chloride
 - Benzalkonium Chloride

Guidelines for the Transfer of Covid-19 Decedents from Residential Settings

In accordance with the protocols in place for the transfer of living patients, I make these suggestions for transferring deceased human remains from a setting other than a medical or forensic institution...i.e. the decedent is NOT already in a body bag!

The established modes of transmission for Covid-19 involve exhalation of the virus from the upper respiratory system (oral and nasal passages during sneezing, coughing, etc.), contact with soiled hands and with contaminated surfaces. The virus can survive 24 hours on inanimate surfaces. Universal Precaution protocol should be strictly followed.

Prior to entering the residence (Home, Hospice, Nursing Home, etc.), PPEs are donned by transfer personnel to provide full barrier protection: entire body Tyvek coveralls, shoe covers, head cover, N95 mask, double nitrile gloves and eye protection. A red biohazard bag accompanies the team for collection of used PPEs.

When addressing those present (i.e. likely caregivers with close contact with the deceased), consider substituting a non-contact gesture for the traditional hand shake greeting; such as a hand placed upon the heart with bowing of one's head. In this circumstance, a more formal greeting may show a higher level of respect as compared to the "elbow bump".

Prior to contact with the decedent, spray a liberal topical application of a broad-spectrum disinfectant over bedding and clothing, exposed skin surfaces and into the oral and nasal orifices. Pack these orifices with cotton (using forceps), then cover the decedent's mouth and nose with a barrier mask to contain any droplet aerosolization that may be caused during moving and transferring procedures. Plastic baggies may be placed onto the decedent's hands and secured with a rubber band for containment.

Wrap decedent fully in sheeting and transfer into a zippered pouch. Wipe the exterior of the pouch with disinfectant. Transfer to stretcher.

Spray remaining bedding with disinfectant and gather bedding into red biohazard bags for disposal (if laundering is required-follow CDC guidelines for soiled linens).

Doffing (and collecting for biohazard disposal) used PPE before exiting the residence and donning new PPE is prudent to avoid transfer of contaminants to vehicle door handles and the vehicle cockpit. Deliberate care should be exercised to avoid further contamination of surfaces with soiled gloves. Handwashing, for a minimum of 20 seconds, prior to donning and after doffing gloves, cannot be stressed enough!

Transfer vehicles, cots and instruments are disinfected after each transfer of Covid-19 cases.

Notify biohazardous waste removal companies prior to waste hauling. Clearly label collecting bins as containing Covid-19 waste materials.

At this time of heightened cautiousness, until more is known about virus transmission, direct cremation without viewing is the preferred protocol. However, I read an article today about the protocol for creating a Covid-19 vaccination. This sentence jumped out at me,

“The virus is killed with *Heat* or *Formaldehyde*”.

This begs the question, what about traditional arterial embalming with open caskets for Covid-19 cases?! In the dead body, the virus is readily killed. Take no blood drainage. But, if necessary, utilize a drain tube with enough plastic tubing to reach the drain. (P.S. Many of us remember the overreaction that drove direct cremation during the AIDS crisis.)

Sharon L. Gee-Mascarello
March 10, 2020

(USA Today, March 10, 2020: George Petras, Ramon Padilla, and Veronica Bravo. “*Why a coronavirus vaccine is more than a year away, despite medical researcher’s progress*”. Sources: Stanford University; Duke University; West Virginia University; Coalition for Epidemic Preparedness Innovations; National Institute of Allergies and Infectious Diseases; World Health Organization; Centers for Disease Control and Prevention; biocentury.com; vaccinestoday.eu; Department of Health and Human Services; [sciencemag.org](https://www.sciencemag.org))

Resources:

CDC

Embalming; History, Theory and Practice, Robert G. Mayer

Sharon L. Gee-Mascarello

Pathology and Microbiology for Mortuary Science, David F. Mullins

David G. Hicks