COMMONWEALTH of VIRGINIA

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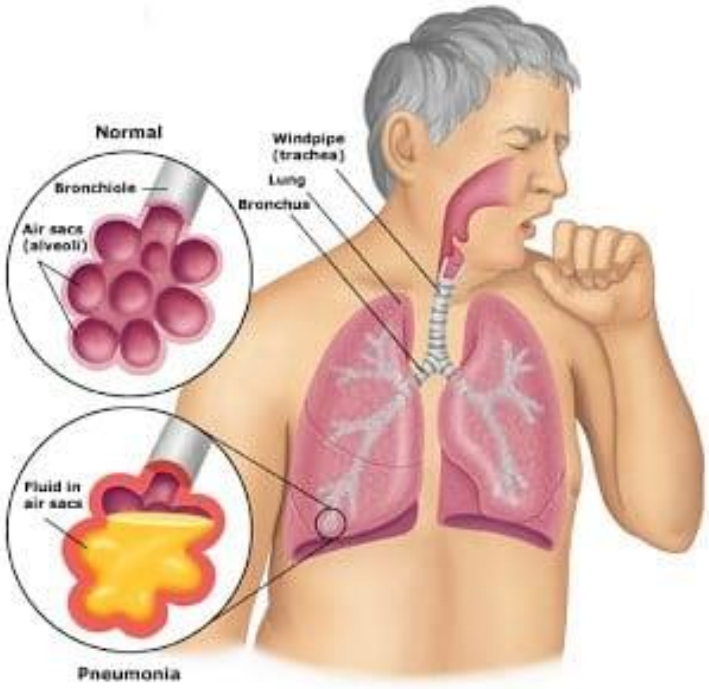
Office of Integrated Health

Aspiration Pneumonia Health & Safety Alert

Pneumonia versus Aspiration Pneumonia

Pneumonia is a respiratory tract infection of the lungs. Pneumonia is caused by an infectious agent, such as bacteria, fungi, viruses, etc. or a combination of several infectious agents. However, bacteria is the most common cause of pneumonia. For example, if an individual has congestive heart failure and the fluid around their heart leaks into the lungs and develops into an infection, the infection in their lungs would simply be called **pneumonia**. If the infection in the lungs is caused by something being in-haled into the lungs, it is then referred to as **aspiration pneumonia** (28) (16).



What Causes Aspiration Pneumonia?

The normal route for foods, liquids, saliva and mucous starts in the mouth, then moves to the esophagus, which leads to the stomach. Aspiration pneumonia occurs when food, liquids, vomit, saliva, or mucous takes the wrong route and accidentally drains, or is accidentally inhaled into the trachea (windpipe), it is then deposited into the lungs. Once a substance is inhaled into the lungs, it is then in the perfect environment for bacteria to grow. The process of bacteria growing and replicating is called an infection (6).

For example, if you contract COVID-19, you have a viral infection, which causes excessive mucous to build up in your lungs. The mucous in your lungs, provides the perfect medium for bacteria to grow, and replicate, which may progress into pneumonia. If this occurs, the body would then be fighting both a viral infection (the COVID-19 virus) and a bacterial one (the pneumonia). Similarly, the common cold, which is also a virus lasting approximately 14 days, can progress, and develop, into a sinus infection, and/or pneumonia.

Since both aspiration pneumonia and pneumonia are treated similarly, physicians usually do not order the extensive testing which is required, in order to determine which type of pneumonia an individual actually has. It is therefore impossible to know the true number of aspiration pneumonias cases which exist among individuals. However, it has been estimated that up to 15% of all community acquired pneumonias are actually caused by aspiration events (26).

Individuals with Intellectual Disabilities (I/DD)

Anyone diagnosed with an intellectual or developmental disability has some type of neurological, brain damage, or abnormal functioning within their brain, which increases their risk for aspiration pneumonia. Adults with intellectual disabilities are 20.8 times more likely to die from aspiration pneumonia than adults in the general population (12). The reason is quite simple, any type of abnormal functioning within the brain, will have an adverse impact on how the body functions. Therefore, any individual who has neurological damage will be at higher risk for all types of health-related conditions (19).

Aspiration pneumonia occurs most frequently in individuals with some type of neurological or neuromuscular damage because neurological damage often impairs the gag reflex. Individual's with I/DD are at increased risk of both dysphagia and aspiration pneumonia, because they lack the muscle strength and neurological coordination to be able to cough well enough to clear their airway (8).

Individuals with I/DD are at increased risk for the following disorders and conditions, due to the accompanying neurological damage, which in turn, increases their risk for aspiration pneumonia.

- Being diagnosed with a genetic syndrome, which results in an intellectual disability and neurological (brain) damage.
- Dysphagia (swallowing dysfunction).
- GERD (Gastroesophageal Reflux Disease).
- Difficulty controlling the head and neck muscles.
- Impaired consciousness (side effects of medications, impaired mental status).
- Seizure activity.
- Lack of posture control (unable to sit upright without supports, unable to reposition self).
- Oral malformation and/or impaired dentition (missing teeth), lack of muscle control (tongue thrusting).
- Anatomical variations such a narrow esophagus (strictures) or a large tongue.
- Behaviors such as over filling mouth or eating too quickly.
- Neurological Disorders (Dementia, Parkinson, Multiple Sclerosis).
- Respiratory devices, such as a tracheostomy (tube for breathing).
- Dementia.

Other factors which complicate the impact of IDD and increase the risk of aspiration pneumonia to an even greater degree, may be related to:

- Age.
- Polypharmacy (taking more than 4 medicines).
- History of stroke.
- General Anesthesia.
- Dehydration.
- Suctioning.
- Mealtime supports (G-Tube, being fed) (14).

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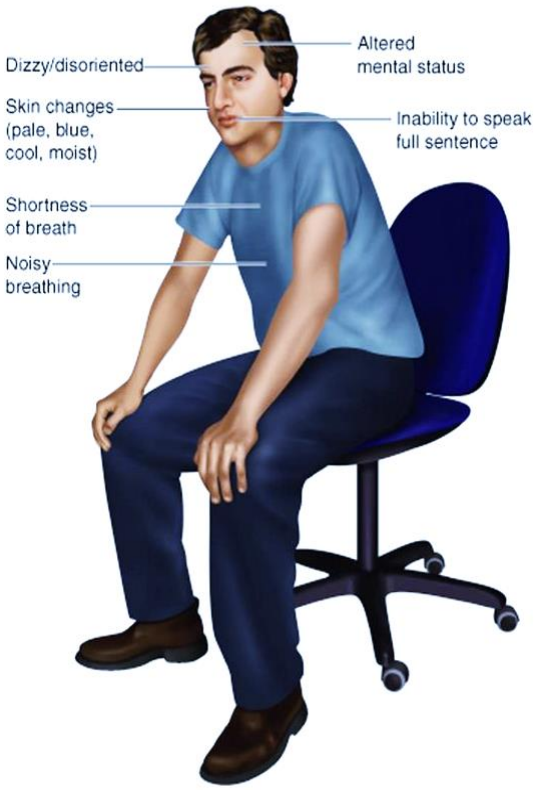
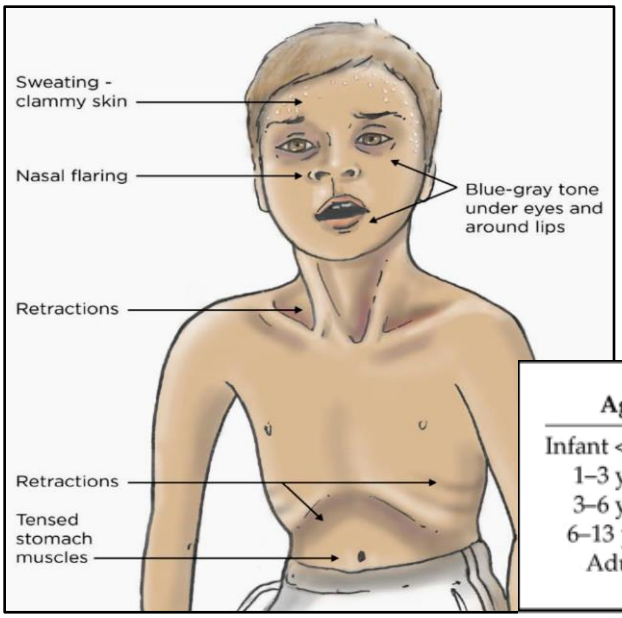
Signs and Symptoms of Aspiration Pneumonia

- Fever (body temperature greater than 100.4 degrees Fahrenheit).

All respiratory distress symptoms:

- Inability to speak a full sentence without pausing to breathe.
- May appear distressed, panicked or confused.
- Less than 100% oxygen saturation levels when checking with a pulse oximeter.
- Cyanosis (pale, ashen, blue or grayish coloring around eyes, mouth or under nail beds).
- Hypoxia (lower than normal oxygen saturation levels in the blood).
- Noisy breathing (raspy, gurgling, wheezing, etc.).
- Chest retractions (can be seen in the neck or abdomen).
- Tachycardia (fast heart rate--90 beats per minute or greater).
- Tachypnea (fast breathing rate—21 breaths per minute or greater).
- “Crackles” upon listening to lung sounds via a stethoscope.
- Sweating or clammy skin (damp/moist) skin.
- Leaning forward to breathe.
- Decreased breath sounds.
- Altered mental status.
- Malaise (not feeling well).
- Refusing to eat.
- Chest pain.
- Cough.
- Wheezing.
- Nausea and vomiting (8).





Age	HR (Beats/Min)	RR (Breaths/Min)
Infant < 1 year	110–160	22–55
1–3 years	80–150	22–30
3–6 years	70–120	16–24
6–13 years	60–110	16–22
Adults	60–100	12–20

If the resting heartbeat is higher or lower than the numbers above, for each age category, seek help immediately or call 911.

If resting breaths are higher or lower than the numbers above while an individual is awake, for each age category, seek help immediately or call 911.

Aspiration Pneumonia – Course of Illness

The severity of the aspiration pneumonia is dependent on many variables. The amount of fluid or substance ingested, the substance itself, and the overall condition of the individual. Some individuals may present with very mild symptoms while others may have a swift progression to respiratory distress, sepsis, acute respiratory distress, or respiratory failure, especially if they have a previous history of aspiration pneumonia, respiratory distress or sepsis. (8). Medically frail individuals or individuals with many other chronic disorders, may be more likely to have a quick progression to a more serious course of illness.

Aspiration pneumonia can progress to sepsis and/or acute respiratory failure very quickly in some individuals. Early recognition and treatment are essential to quick recovery. Individuals with intellectual and developmental disabilities are at greater risk for developing sepsis due to the higher incidence of pneumonia, urinary tract infections, bowel obstructions, and respiratory infections in general (1). For more information on Sepsis, refer to the OIH Sepsis Health & Safety Alert, and the OIH Sepsis Training (email the RNCC in your Region for information about upcoming trainings).

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Other Conditions which Increase Risk for Aspiration Pneumonia

Rumination

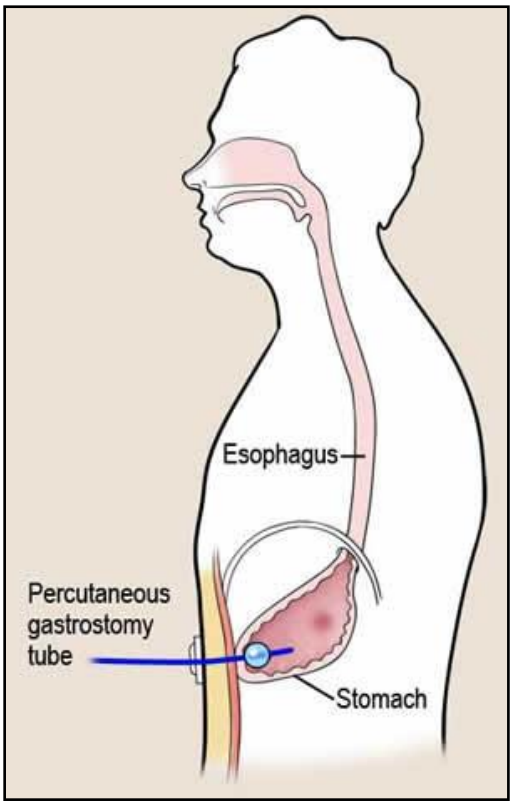
Rumination refers to voluntarily bringing gastric contents up from the stomach into the pharynx (throat) or oral cavity. The difference between vomiting and rumination is vomiting is involuntary, and is the body's way of getting rid of the contents of the stomach.

Rumination is an intentional, and controlled action with the goal of bringing swallowed contents up into the mouth, so the individual can then re-swallow them. Rumination is thought to be a self-stimulating behavior. Rumination increases the risk of aspiration pneumonia. (22) (17) (10).

Gastrostomy Feeding Tubes

Although G/J tubes offer individuals a means of receiving hydration and nutrition, they are not without risk of complications. Lowering risk of aspiration for individuals who have a gastrointestinal tubes starts with having protocols in place to ensure staff and caregivers have written guidance for the care, use, and monitoring of an individual. Protocols should include guidelines on positioning during and after feedings, frequency of feedings, schedule of hydration, and instruction on providing nutrition (20) (29).

Staff and caregivers employed by providers licensed through DBHDS require training by a medical professional to ensure they are competent in providing medication administration by gastrostomy tube. Training for medication administration via g-tube available through the "DBHDS-Preparing to administer medication via gastrostomy tube" curriculum approved by the Board of Nursing. Staff must have completed and passed the 32 hour Medication Aide Training as a prerequisite. The 32 hour Medication Aide Training curriculum does not train staff to administer medications via a jejunostomy tube. In the event of suspected aspiration during or after using a g-tube, the individual should be evaluated by a medical professional immediately. This may include the agency nurse, PCP, Urgent Care, or ER. Steps to address suspected aspiration should also be addressed in the individual's Aspiration Protocol.



NPO Status

NPO is a medical abbreviation which means nothing by mouth. Many individuals with gastrostomy tubes are deemed "NPO". Staff should be educated on the danger of giving individuals even a small bite or taste of their favorite food, if they are ordered to be NPO by their PCP. When food is introduced to the mouth the saliva glands increase in production causing the individual to aspirate on the food item as well as saliva. In some cases pleasure feedings are possible, however a speech language pathologist (SLP) will provide guidance to the PCP, who will then consider all of the individual's health issues in entirety, and will then make the decision and will write the order. Pleasure feedings should never be given unless specified by a physician's written order.

Silent Aspiration

Silent aspiration occurs when there is no obvious choking event and no obvious symptoms of something aspirating into the lungs. Sometimes, the even occurs during the nighttime, or when the individual is lying in a recumbent position. Individuals who have neurological issues, have a tendency to keep food in their mouths after eating. This may be due to their inability to clear their mouth with their tongue.

Sometimes food gets stuck on the palate or roof of their mouth and falls down their windpipe while they are sleeping. Individuals may not even realize any contents have been inhaled into the lungs, or may lack the ability to communicate the event occurred (11). Aspiration pneumonia can be difficult to recognize as it can initially present with very non-specific symptoms such as fever, headache, nausea, vomiting, confusion, and discomfort (32). Individuals with dysphagia are at much greater risk of aspiration pneumonia.

Dysphagia

Dysphagia refers to difficulty swallowing. As food/liquid moves from the mouth down the esophagus, a series of muscle and structure movements take place. This is a complicated process. When the muscles do not work properly, food/liquid enter the trachea, which is a part of the airway system (15). A study focusing on adults with intellectual disabilities and a diagnosis of dysphagia revealed 30% experienced recurrent respiratory infections (19).

Epilepsy

Epilepsy increases the risk for developing respiratory infections. In a 2017 study, Individuals with intellectual disabilities diagnosed with dysphagia and epilepsy 29% suffered a respiratory infection. Within the same study, it was determined participants with swallowing difficulties were five times more likely of developing a respiratory infection than peers with no swallowing difficulty (19). For more information on Dysphagia, refer to the OIH Dysphagia Health & Safety Alert.

Diagnosing Aspiration Pneumonia

Physicians may utilize several different tests to determine aspiration pneumonia and the severity of infection. A thorough health history may be the starting point. Below are listed diagnostic tools which may be used:

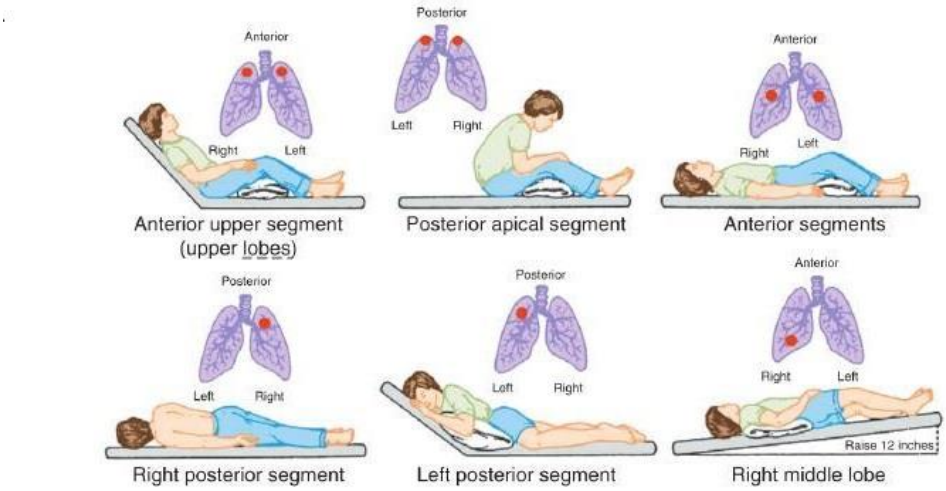
- Chest X-Ray: Chest radiograph (X-ray) will reveal if there are infiltrates in the lungs. The right lower lung lobe is the most common site for infiltrate. If aspiration occurs while standing contents can infiltrate lower lobe areas (5).
- Arterial Blood Gas: used to assess the blood oxygen and pH status (7). If pneumonitis is present the ABG result may show acute hypoxemia.
- Lactate level: used as an early marker for sepsis (13).
- BMP (Basis Metabolic Panel): checks the electrolytes, BUN (Blood Urea Nitrogen), and creatinine level (9). BMP assesses fluid status.
- Serum BUN and Creatinine: evaluates renal function. Renal function may influence antibiotic therapy (4). Used to determine if sepsis has caused renal injury.
- Blood Cultures: used to screen for bacteremia Results may take up to 3-5 days to receive. (3).
- Sputum Culture: used to determine gram-negative bacteria. Results may take up to 3-5 days to receive (27).
- Bronchoscopy: This procedure is not used with every situation, when aspiration of a foreign body or food material is suspected, structures can be visualized for abnormalities and materials retrieved (25).

Chest Physiotherapy

The goal of all chest physiotherapy is to improve gas exchange within the lungs and as a result, improve oxygen saturation within the blood. Mucous secretions which pool in the small airways increases the risk for infections to develop and hinders gas exchange, which drops oxygen saturation levels in the blood (5).

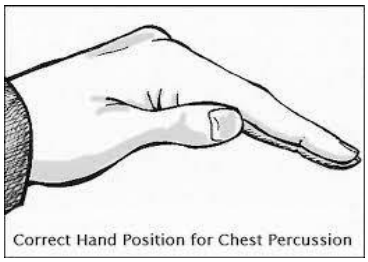
To be clear, chest physiotherapy itself, does not lower the risk of aspiration in any way, and may not be recommended or ordered for some individuals. Regardless of the chest physiotherapy method ordered, a respiratory therapist or physical therapist should provide training on the specific technique caregivers should use and will recommend frequency of the physiotherapy and duration at each session, which should be included on the written order (24).

Chest physiotherapy is most frequently ordered when a pneumonia is present, to quicken the individual's recovery. Chest physiotherapy may also be initially ordered for inpatient treatment, but the discharge instructions may specify that treatments are to continue at the individual's home for many weeks, or on an ongoing basis. Ongoing chest physiotherapy is aimed at loosening and breaking up chest congestion, before an infection can develop. Loosening and breaking up chest congestion, increases the likelihood that individuals might be able to cough the mucous up before it makes them ill.

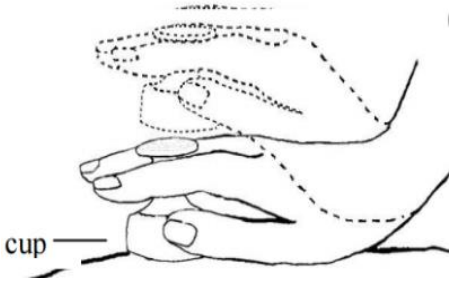


Manual (Hand) Chest Physiotherapy Methods

Manual chest physiotherapy is a non-invasive technique aimed at breaking up mucous in the individual's lungs, so it can be then be coughed up. Manual chest physiotherapy may include a combination of percussion (clapping or cupping) done with the cupped hand. The pictures below depict the correct position of the hand while doing chest physiotherapy and an example of what it might look like as it takes place.


Correct Hand Position for Chest Percussion

Manual percussion cups are another means of loosening and moving lung secretions. The cup is tapped or clapped against the area to loosen secretions. The person lies in various positions as demonstrated in the previous diagram (30).



Mechanical Chest Physiotherapy Methods

A chest physiotherapy vest provides a mechanical alternative to doing manual (hand) chest physiotherapy for both children and adults. A chest physiotherapy vest produces mechanical vibrations at a fast rate of speed, which loosens secretions. The goal is exactly the same as with manual physiotherapy: to improve gas exchange within the lungs and as a result, improve oxygen saturation within the blood (2). After the individual wears the vest for a set period, they are encouraged to cough or huff up secretions. Chest physiotherapy has demonstrated a decrease in hospitalizations for children with disorders such as Cystic Fibrosis, Cerebral Palsy and those with a poor cough reflex, due to neurological damage (21).

Reducing the Risk of Aspiration Pneumonia

Aspiration pneumonia is a serious issue for individuals with intellectual and developmental disabilities. There is no way to prevent aspiration pneumonia, but caregivers can lower the individual's risk for aspiration pneumonia. If you suspect an individual may be aspirating, seek medical help immediately. The following recommendations for lowering risk, have been outlined by researchers in a review published in 2017, focused on individuals with intellectual disabilities and dysphagia (23).

- Regular measuring of vital signs can catch aspiration in its earliest stage, which may reduce the risk of it progressing to a more serious infection, or sepsis. If the individual is at high risk for aspiration pneumonia, ask the PCP to outline parameters for reporting vital signs. A sample protocol is on the following page.
- Start with a medical evaluation to determine respiratory status and establish if the individual requires further tests or a referral to a Speech Language Pathologist.
- A swallow study, ordered by the PCP.
- Comply with food and liquid orders written by the PCP or the SLP (Speech Language Pathologist).
- The Speech Pathologist will recommend the best positioning for mealtimes. Develop a protocol for staff, based on the SLP's recommendations.
- Provide assistance with oral health care. Bacteria from the mouth can be aspirated and increases the individual's risk for pneumonia.
- Train staff on preparation to ensure consistency in all provider settings.
- Ensure special utensils or eating tools are available in every setting.
- Train caregivers on all aspects of dysphagia.
- Train caregivers on the connection between dysphagia and aspiration pneumonia.
- Ensure individuals are up to date on their Pneumococcal vaccine.
- Request a pharmacist review of medications contributing to dysphagia.
- Functional training for the individual (exercises to improve swallowing and cervical range of motions) (23).

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Vital Signs Order and Protocol for:

First Name **Last Name**

Vital signs should be measured _____ per day for _____ days.

Vital signs should be measured _____ times per day, until order is rescinded.

Body temperature should be measured using the following method:

____ orally _____ axillary _____ rectally _____ forehead _____ ear

Check If Ordered	Vital Sign	If Lower Than:	If Higher Than:	If Lower Than:	If Higher Than:
	Blood Pressure				
	Respirations				
	Body Temperature				
	Heart Rate				
	O2 Sat Levels		N/A		N/A
		Call Physician Indicated	**Call Physician Indicated**	**Call 911**	**Call 911**

Physician's Signature: _____ **Date:** _____

Office Address: _____

_____

Phone #: _____

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