Manage TB
National Institute for Research in Tuberculosis, Chennai

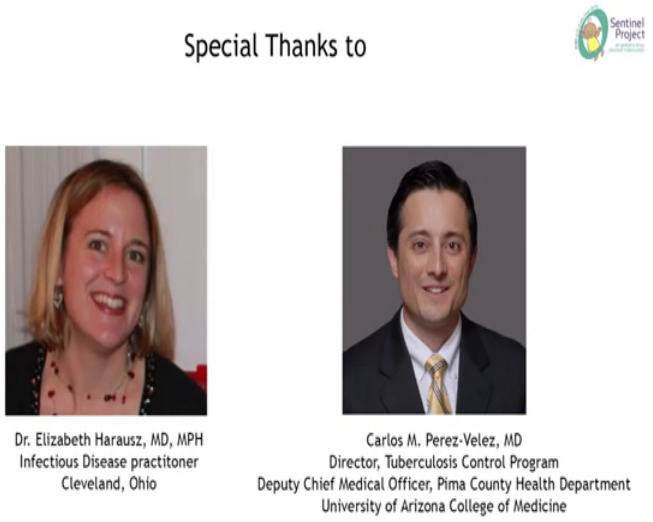
Lecture - 28
Video - demonstration of gastric aspirate technique in infants

Welcome to the Video demonstration of gastric aspiration technique in infants.

(Refer Slide Time: 00:16)

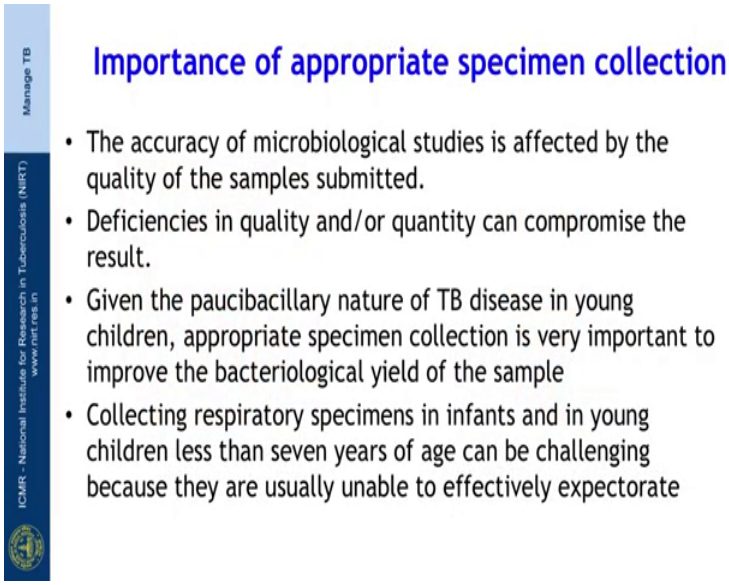
The Sentinel TB project on Pediatric Drug Resistant Tuberculosis had developed an 18 minute video on gastric aspirate technique in children on 14th March 2014 as part of a Webinar. So, we have adopted that video for this course and we thank them for permitting us to adapt the video.

(Refer Slide Time: 00:39)



A special thanks are to Dr. Elizabeth and Dr. Carlos for their contribution in the performance of the gastric aspiration procedure and for the development of the video.

(Refer Slide Time: 00:52)



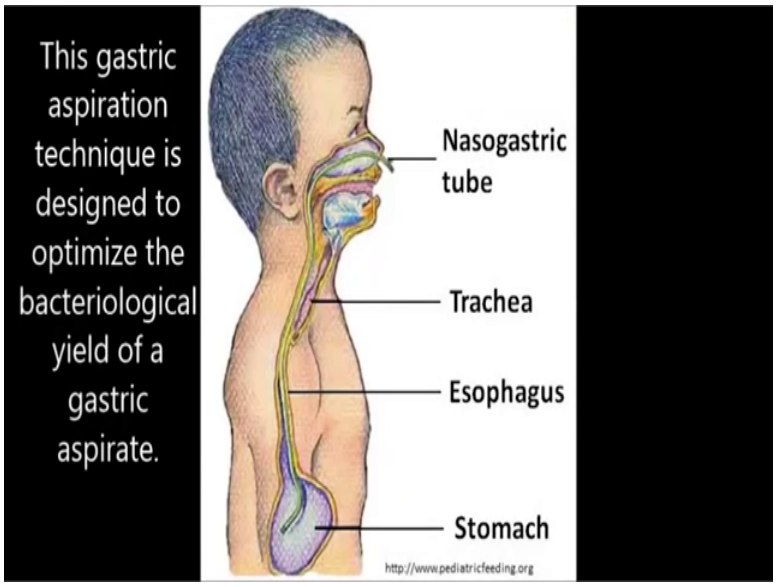
We all know that the accuracy of microbiological studies is affected by the quality of sputum sample submitted. And the deficiencies in quality and or quantity can compromise the result. Given the paucibacillary nature of TB disease in young children, appropriate specimen collection is very important to improve the bacteriological yield of the sample. However, collecting respiratory specimens in infants and in young children

especially less than 7 years of age can be very challenging because they are usually unable to be effectively expectorate. So, what is the principle behind this gastric aspiration technique?

(Refer Slide Time: 01:35)

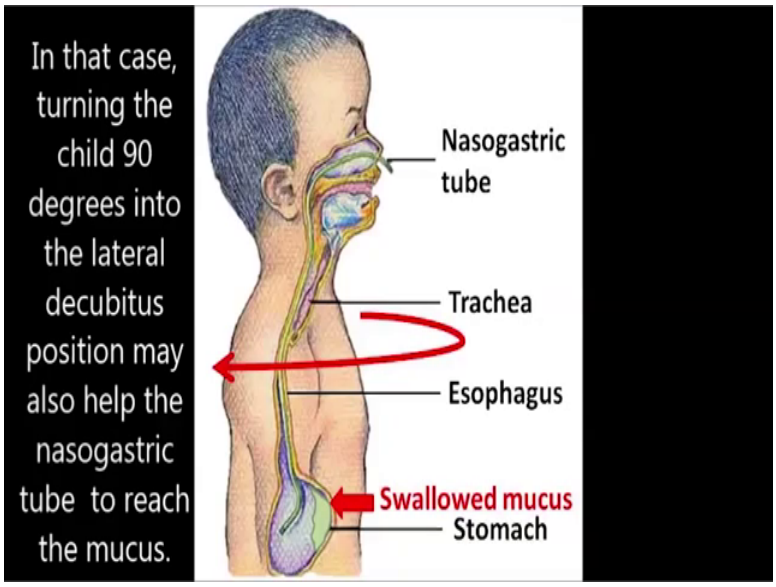
While the child is awake or asleep the mucociliary system moves the mucus to the upper airway where it is then swallowed and move down the oesophagus to the stomach where it remains until gastric emptying occurs.

(Refer Slide Time: 01:52)



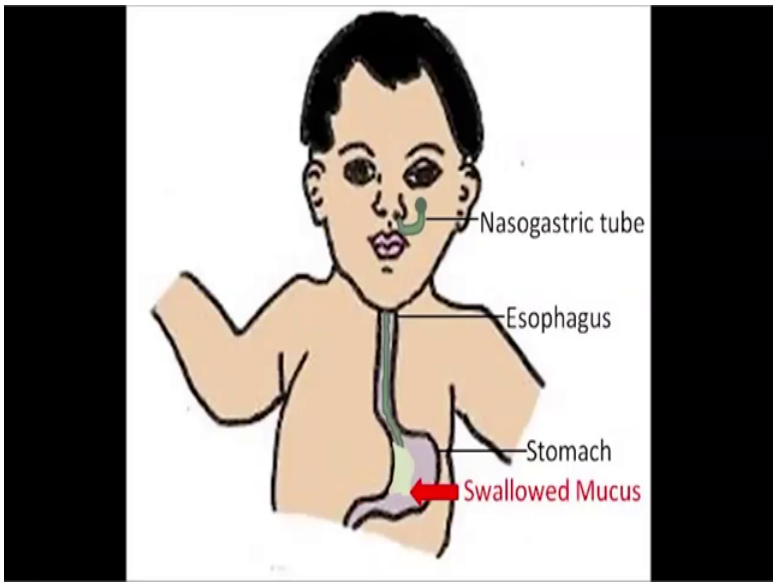
This aspiration of gastric contents is designed to optimize the bacteriological yield of a gastric aspirate. So, the nasogastric tube is passed through the nose, this is then passed through the esophagus into the stomach to collect the gastric contents. Gastric aspiration is often not successful because a nasogastric tube does not come in contact with the mucus. This can be because the gas nasogastric tube is not advanced far enough to reach the mucus.

(Refer Slide Time: 02:38)



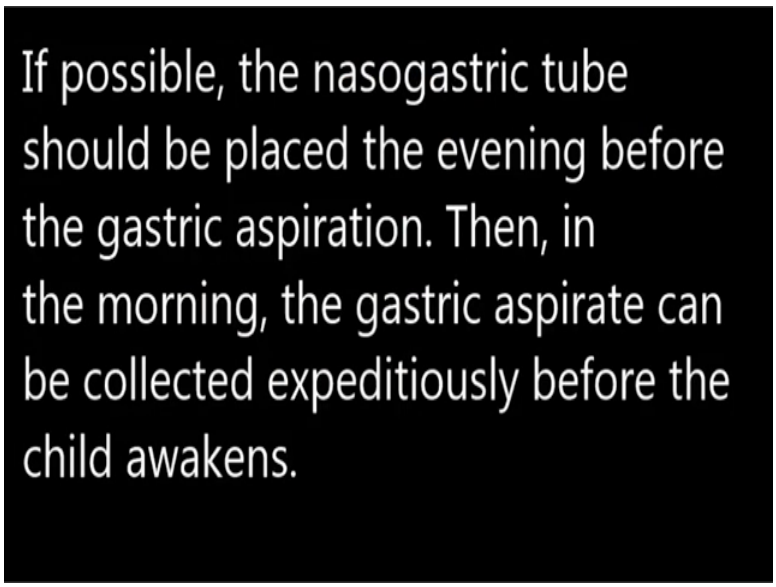
In that case advancing the nasogastric tube can allow the mucus to be aspirated or the nasogastric tube may be in a different section of the stomach than the mucus.

(Refer Slide Time: 02:42)



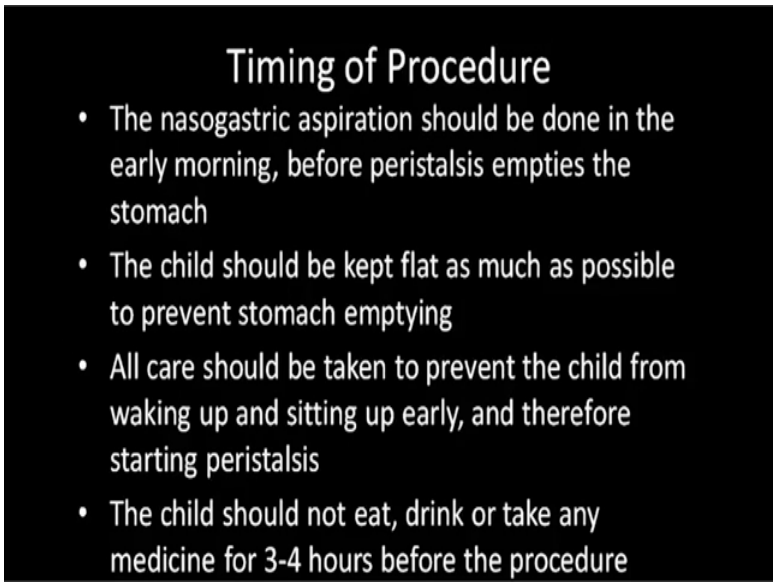
In that case turning the child 90 degrees into the lateral decubitus position may also help the nasogastric tube to reach the mucus.

(Refer Slide Time: 02:48)



If possible the nasogastric tube should be placed the evening before the gastric aspiration. Then in the morning the gastric aspirate can be collected expeditiously before the child awakens.

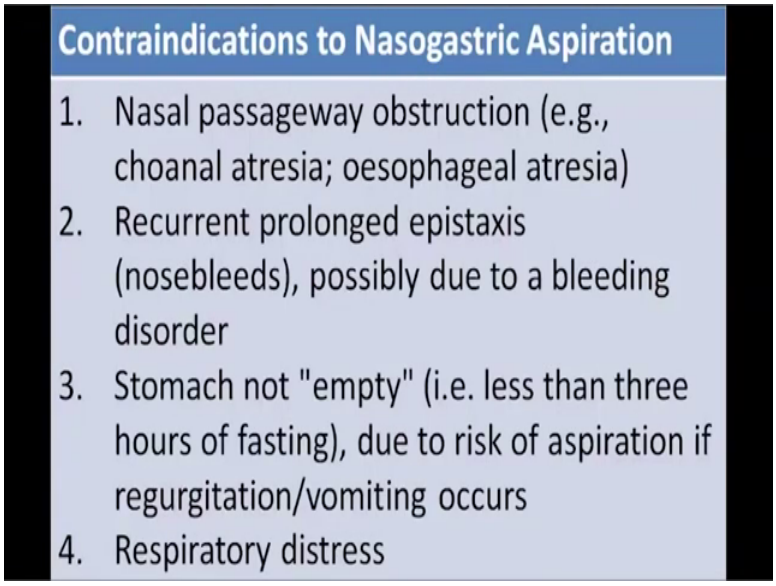
(Refer Slide Time: 03:01)



The timing of the procedure; the nasogastric aspiration should be done in the early morning before peristalsis empties the stomach. The child should be kept flat as much as possible to prevent stomach emptying.

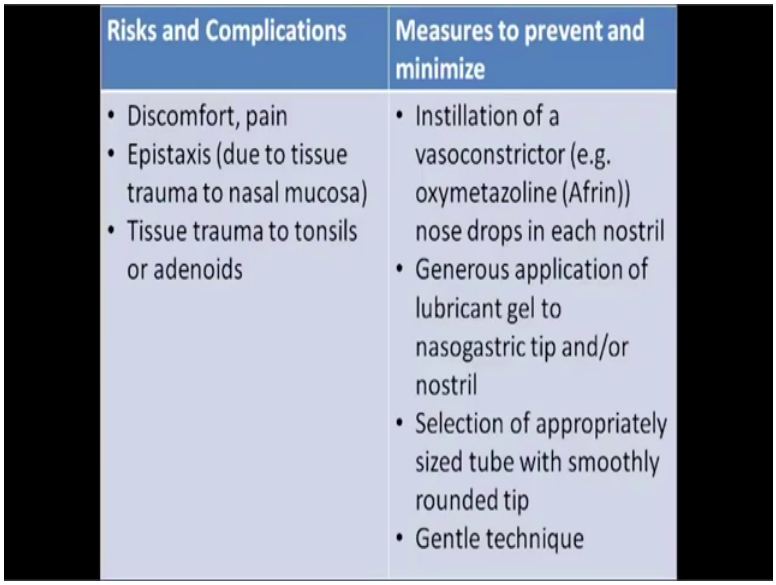
All care should be taken to prevent the child from waking up and sitting up early and therefore starting peristalsis. The child should not eat drink or take any medicine for 3 to 4 hours before the procedure.

(Refer Slide Time: 03:31)



There are few contraindications to nasogastric aspiration; the nasal passage way obstruction, for example, due to choanal atresia or oesophageal atresia, recurrent prolonged epistaxis on nose bleeds, possibly due to a bleeding disorder, the stomach not being empty that is less than 3 hours of fasting, due to risk of aspiration if regurgitation of vomiting occurs and in case of respiratory distress.

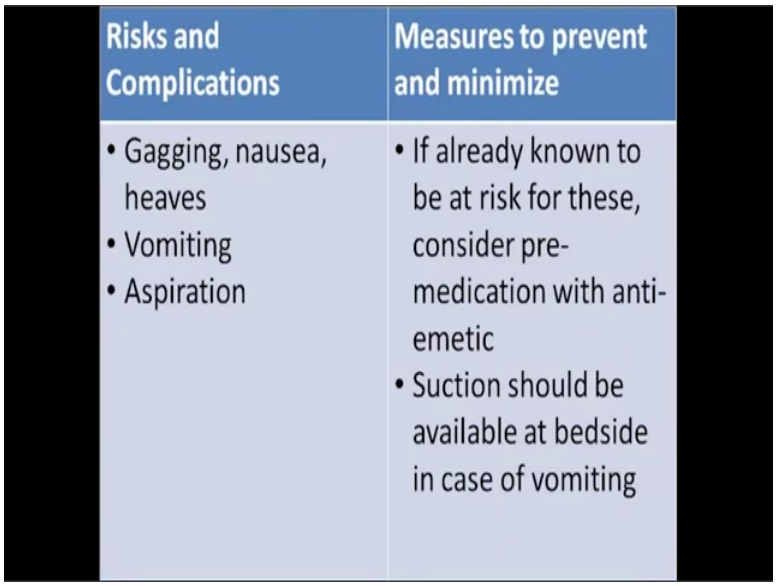
(Refer Slide Time: 04:05)



The risks and complications of nasogastric aspiration; the risks and complications include discomfort and pain, epistaxis due to tissue trauma to nasal mucosa or tissue trauma to tonsils or adenoids. The measures to prevent and minimize this risks involve installation of an vasoconstrictor.

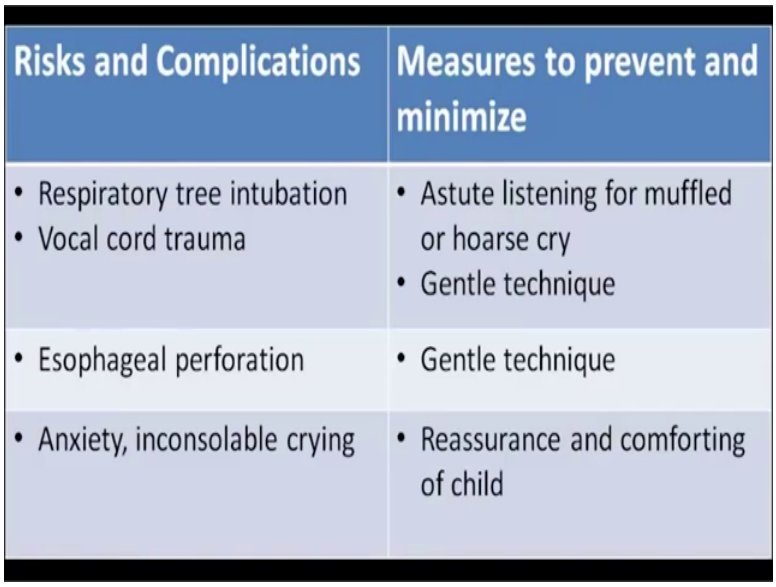
For example, oxymetazoline nose drops in each nostril, generous application of lubricant gel to nasogastric tip and or nostril, selection of an appropriately sized tube with smoothly rounded tip and then by using the technique in a gentle manner.

(Refer Slide Time: 04:44)



Other risks and complications include gagging, nausea or heaves, vomiting and aspiration. If already known to be at risk for these it premedication with antiemetic should be considered and suction should be available at bedside in case of vomiting.

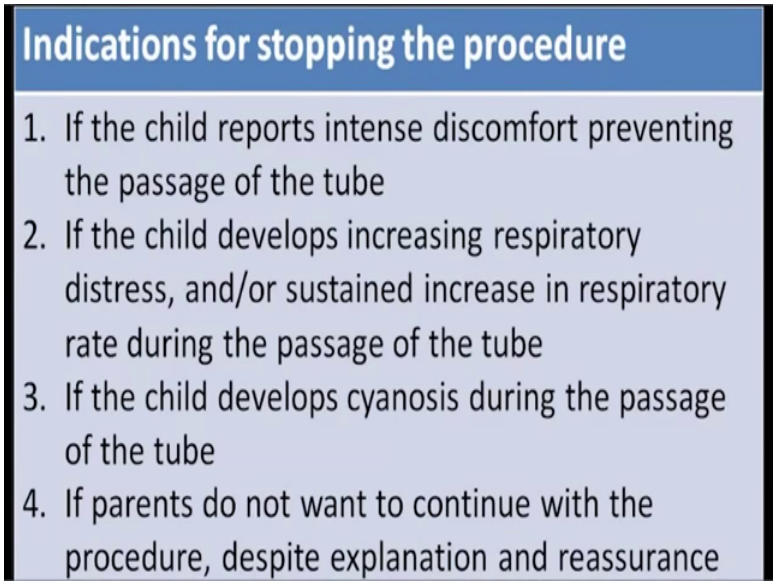
(Refer Slide Time: 05:04)



Further risks and complications include respiratory tree intubation or vocal cord trauma. This can be minimized by astute listening for muffled or hoarse cry and by gentle technique. Esophageal perforation can be minimized by a gentle technique of this gastric

aspiration procedure, anxiety and inconsolable crying can be minimized by reassurance and comforting the child.

(Refer Slide Time: 05:33)

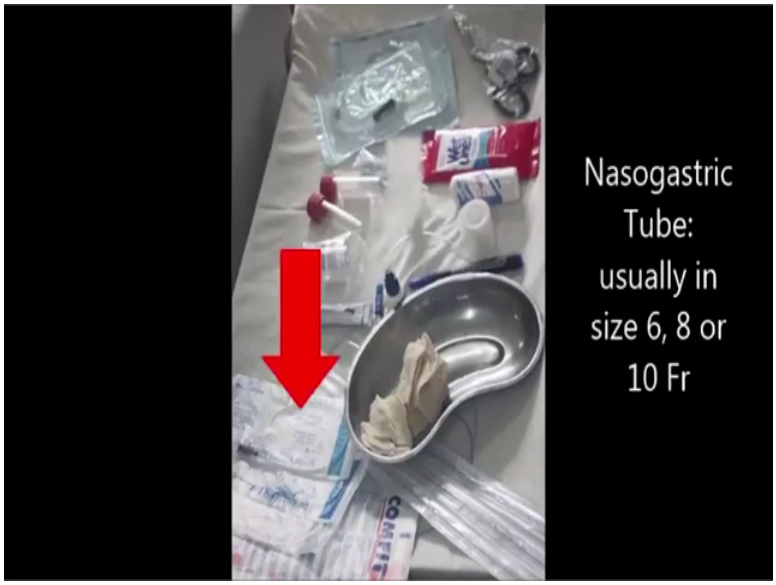


Indications for stopping the procedure; if the child reports intense discomfort preventing the passage of the tube, if the child develops increasing respiratory distress and or sustained increase in respiratory rate during the passage of the tube, if the child develops cyanosis during the passage of the tube or if parents do not want to continue with the procedure despite explanation and reassurance.

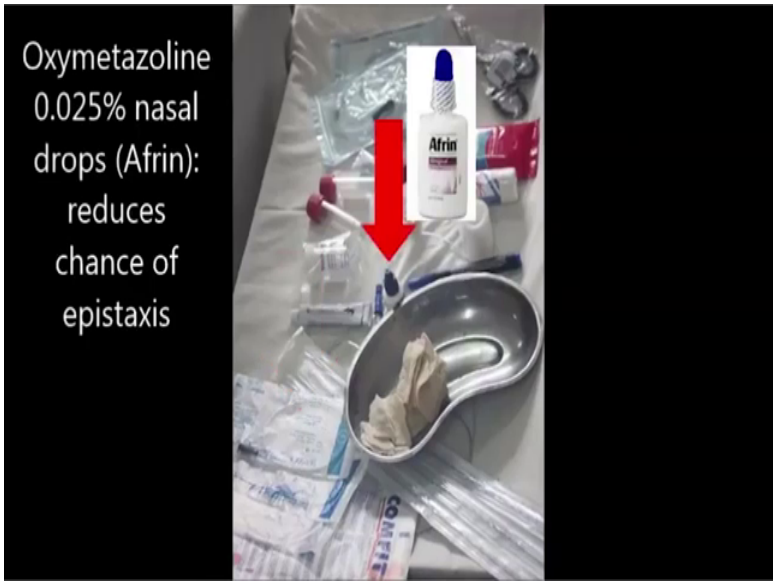
(Refer Slide Time: 06:01)

The equipment and materials required for the gastric aspiration technique involves nasogastric tube usually in the size of 6, 8 or 10 Fr.

(Refer Slide Time: 06:05)

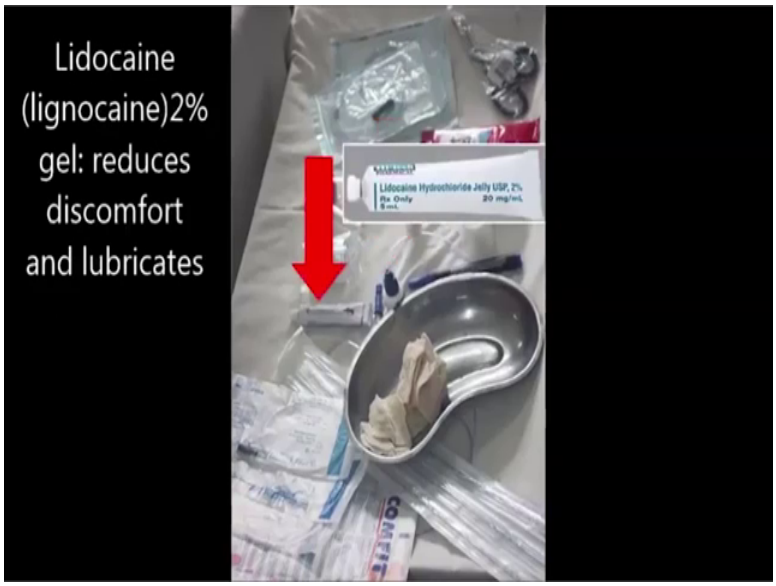


(Refer Slide Time: 06:12)



Oxymetazoline nasal drops to reduce a chance of epistaxis.

(Refer Slide Time: 06:18)

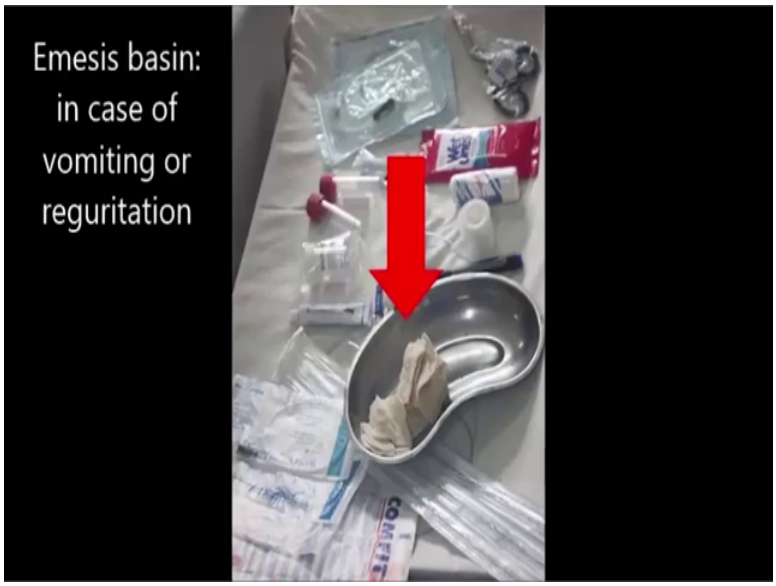


Lignocaine 2 percent gel to reduced discomfort and it also has an lubrication.

(Refer Slide Time: 06:24)

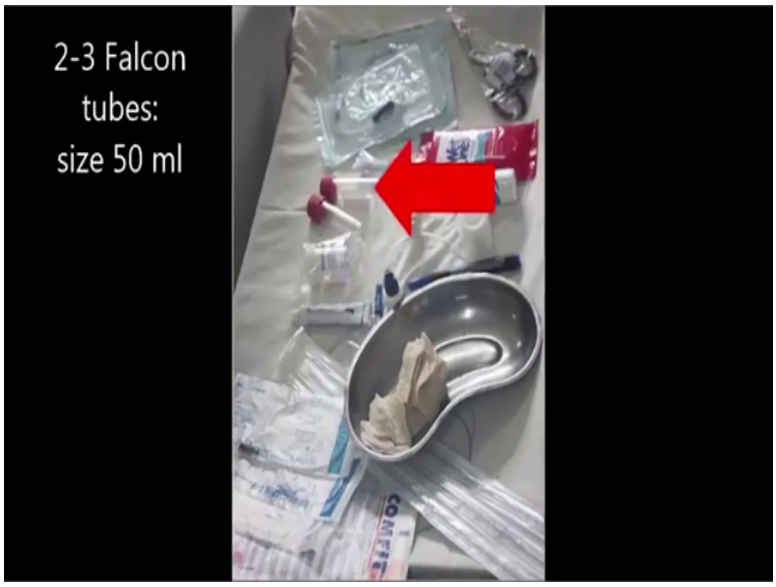
Waterproof marker pen.

(Refer Slide Time: 06:27)



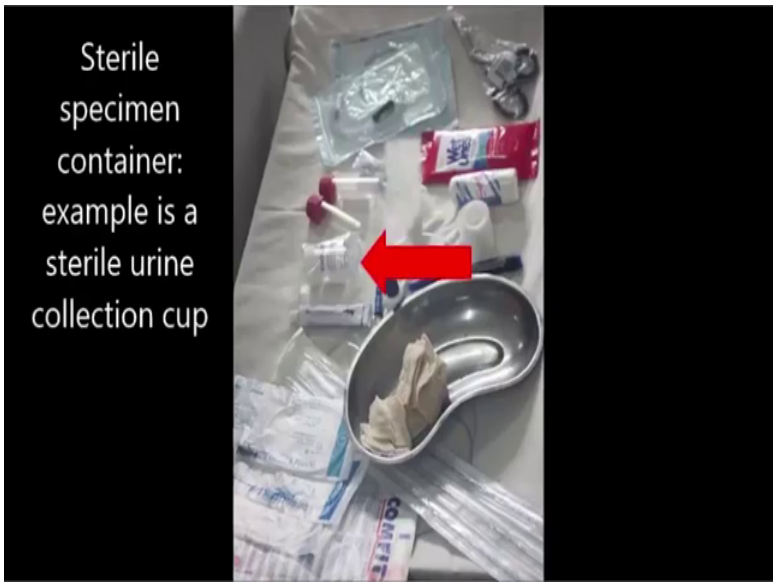
Emesis basin; in case of vomiting or reguritation.

(Refer Slide Time: 06:30)



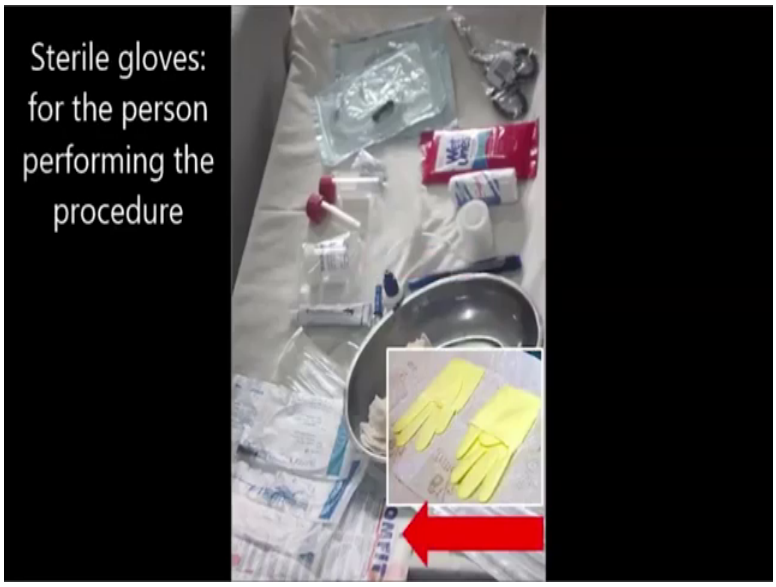
2 to 3 Falcon tubes of size 50 ml.

(Refer Slide Time: 06:34)



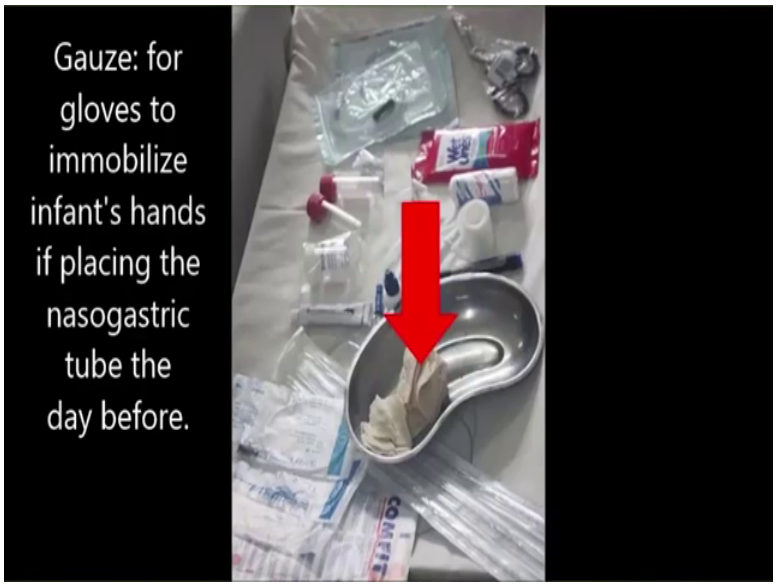
Sterile specimen container; example is a sterile urine collection cup.

(Refer Slide Time: 06:39)



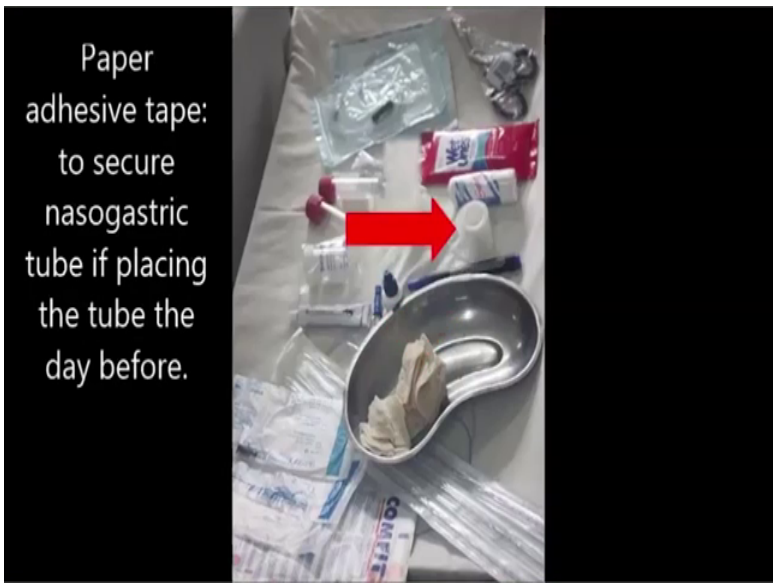
Sterile gloves for person performing the procedure.

(Refer Slide Time: 06:43)



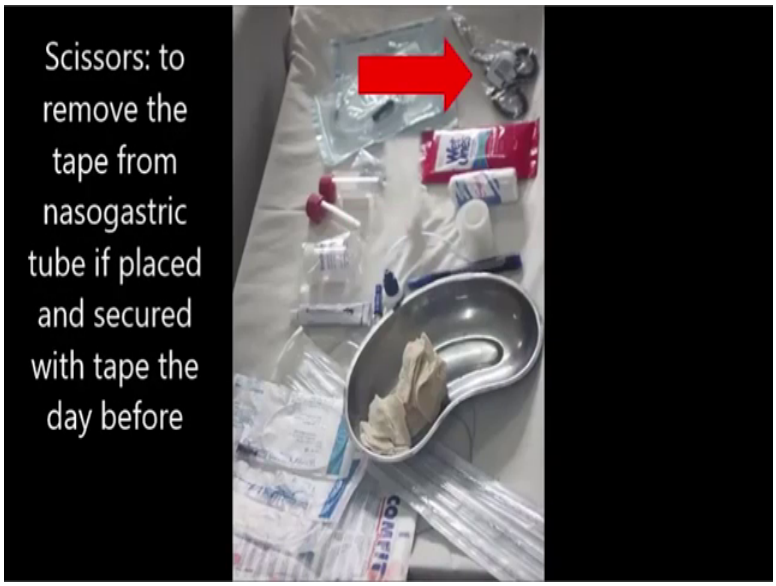
The gauze: for gloves to immobilize the infant's hands if placing the nasogastric tube the day before.

(Refer Slide Time: 06:50)



Paper adhesive tape: to secure the nasogastric tube if placing the tube the day before.

(Refer Slide Time: 06:57)



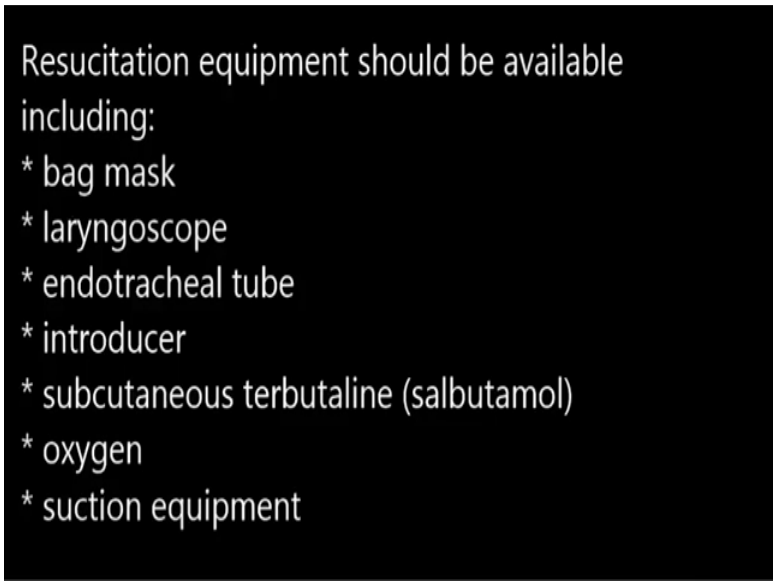
Scissors to remove the tape from the nasogastric tube if place and secured with tape the day before.

(Refer Slide Time: 07:03)

Disposable gloves, flashlight, stethoscope, 20 ml syringe.

(Refer Slide Time: 07:07)

(Refer Slide Time: 07:09)



Resucitation equipment should be available include bag mask, laryngoscope, endotracheal tube, introducer, subcutaneous terbitaline, oxygen and suction equipment.

(Refer Slide Time: 07:20)

Personal protective equipment.

(Refer Slide Time: 07:24)

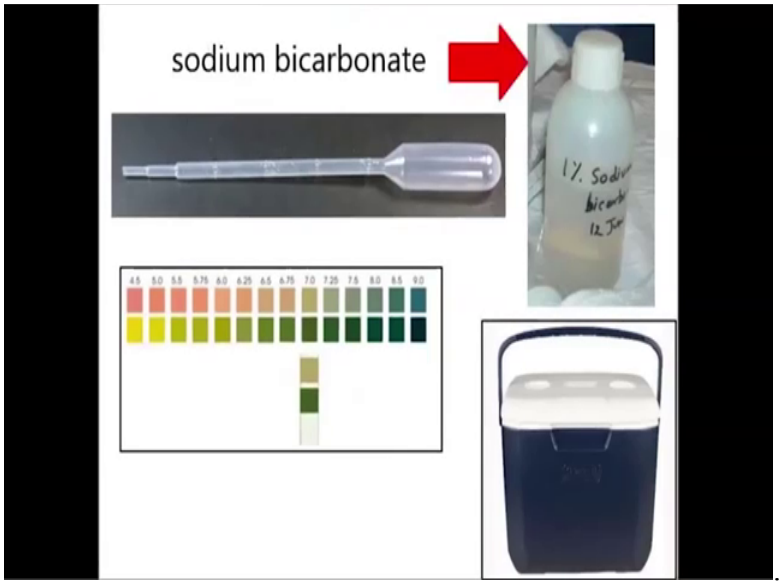
They include protective gown, N95 mask, protective eyewear and sterile field.

(Refer Slide Time: 07:29)

(Refer Slide Time: 07:34)

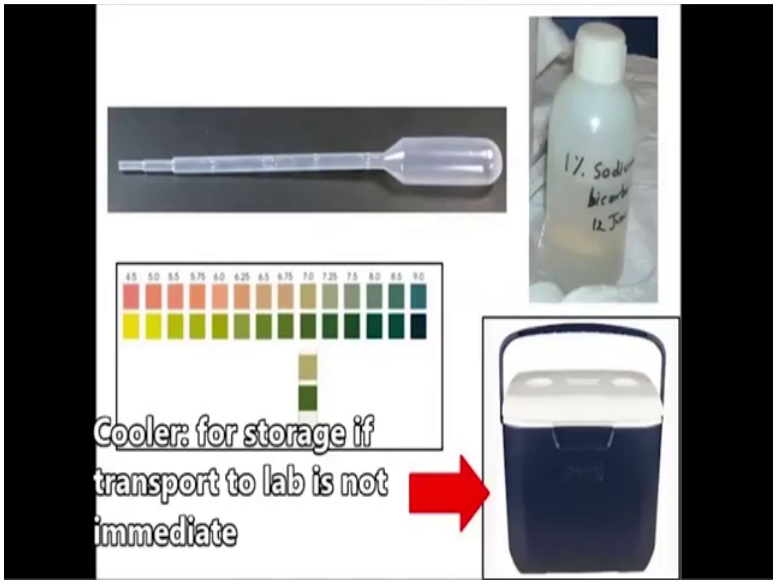
Materials to process the specimen include sterile dropper single use which is disposable, sodium bicarbonate, pH indicator strips preferably in 0.5 increments.

(Refer Slide Time: 07:36)



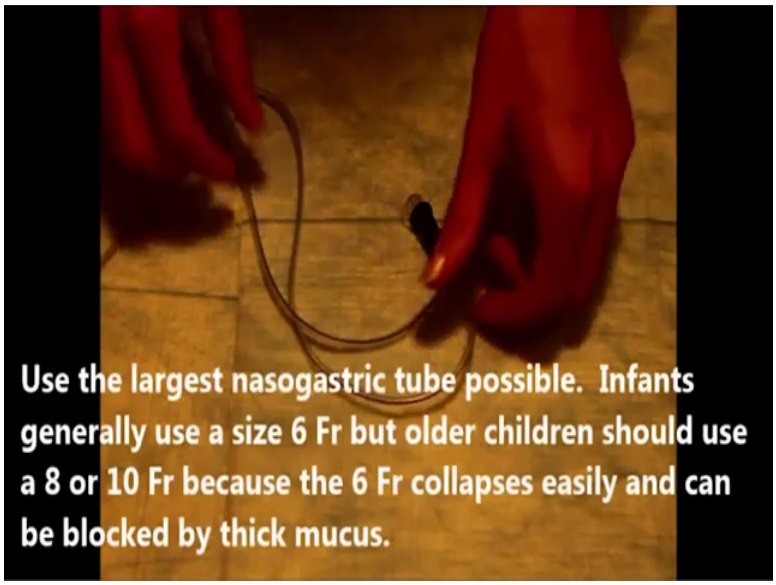
(Refer Slide Time: 07:39)

(Refer Slide Time: 07:45)



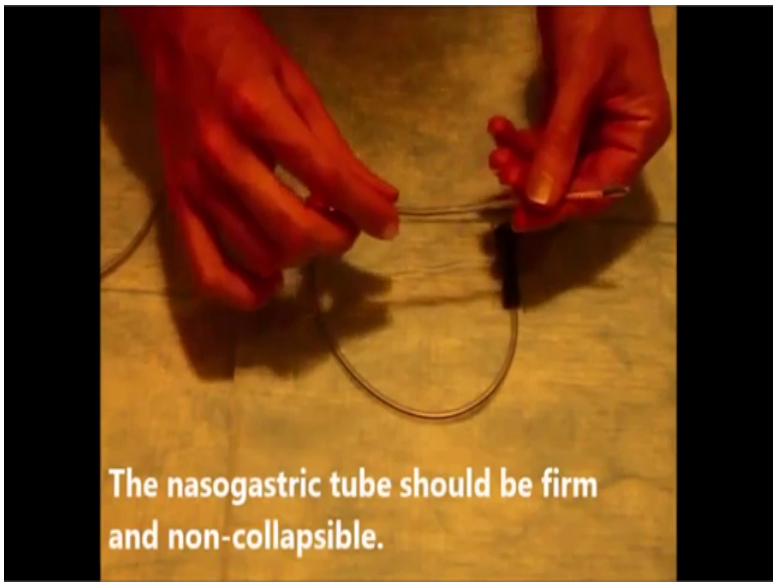
Cooler for storage if transport to lab is not immediate.

(Refer Slide Time: 07:50)



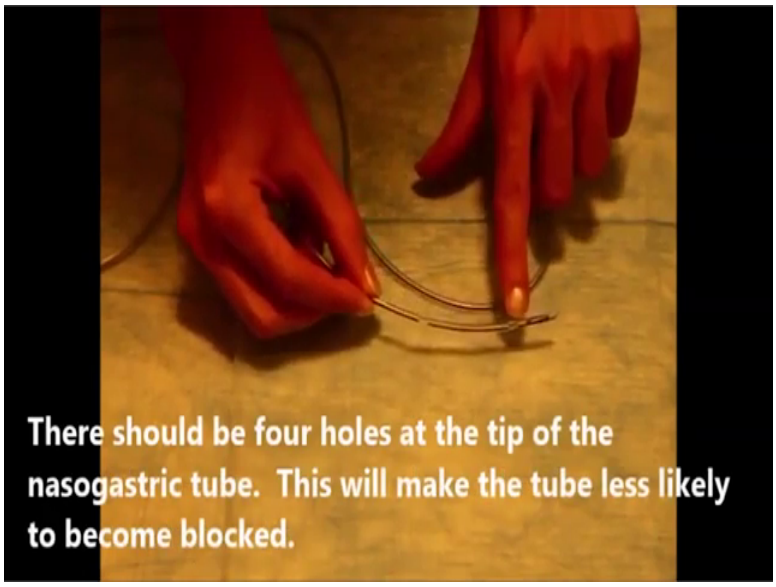
Elements of a good nasogastric tube; use the largest nasogastric tube possible. Infants generally use as size 6 Fr but older children should use an 8 or 10 Fr because the 6 Fr collapses easily and can be blocked by thick mucus.

(Refer Slide Time: 8:06)



The nasogastric tube should be firm and non collapsible.

(Refer Slide Time: 08:10)



They should be 4 holes at the tip of the nasogastric tube. This will make the tube less likely to become blocked.

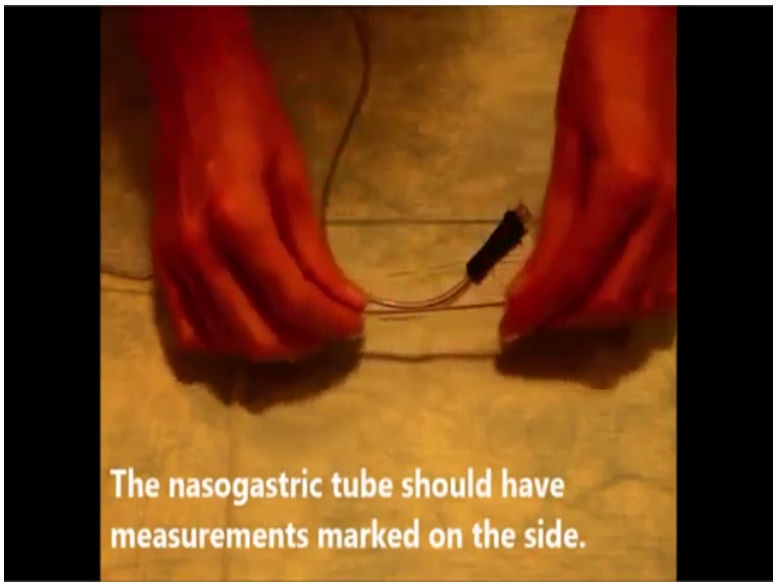
(Refer Slide Time: 08:19)

The nasogastric tube should be quoted to reduce friction.

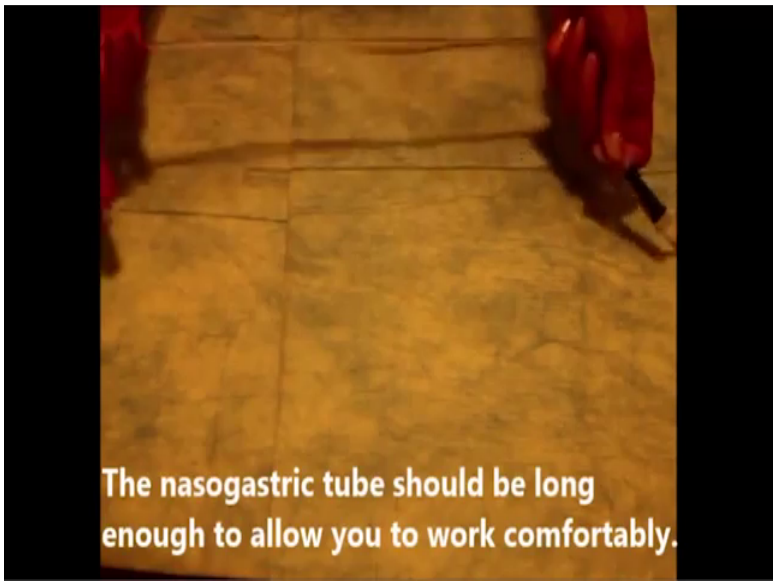
(Refer Slide Time: 08:23)

There should be a cap to prevent gastric fluid leaks, especially if the tube is placed the day before.

(Refer Slide Time: 08:32)



(Refer Slide Time: 08:38)



The nasogastric tube should have measurements marked on the side. The tube should be long enough to allow you to work comfortably.

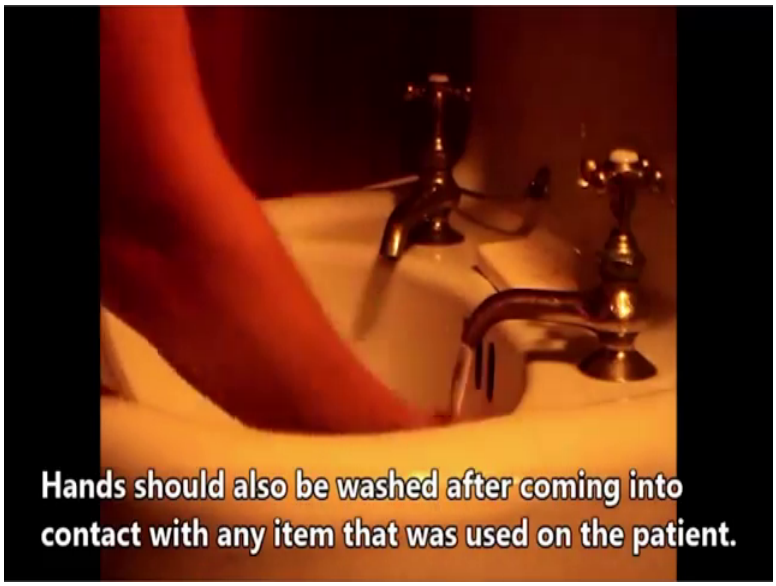
(Refer Slide Time: 08:43)

Sterile technique is very important to prevent contamination of the specimen.

(Refer Slide Time: 08:52)

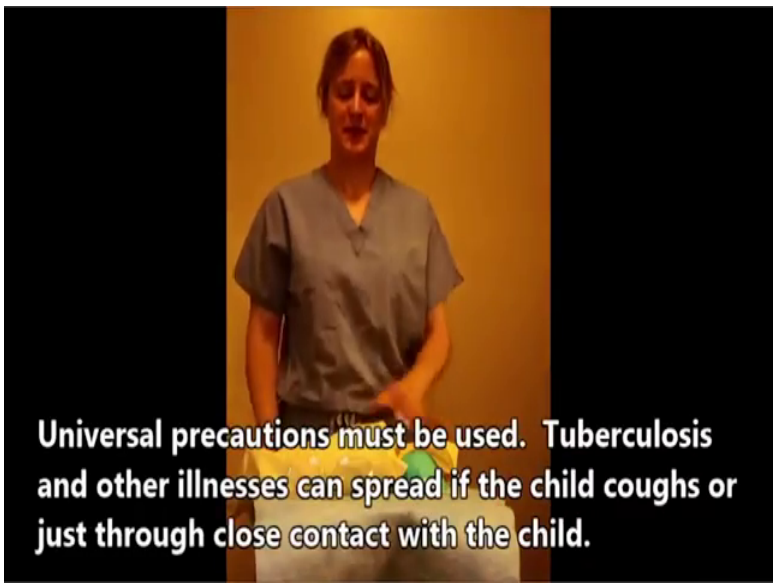
Hand washing should be performed before and after patient contact.

(Refer Slide Time: 08:52)



Hands should also be washed after coming into contact with any item that was used on the patient.

(Refer Slide Time: 09:06)



Universal precautions must be used. Tuberculosis and other illnesses can spread if the child coughs or just through close contact with the child.

(Refer Slide Time: 09:16)

All people involved in the procedure should wear a protective gown.

(Refer Slide Time: 09:20)

Everyone in the room should wear a well fitting N95 respirator.

(Refer Slide Time: 09:28)

If the respective is deformed becomes wet with sweat or soiled with blood or other biological fluid it should be discarded.

(Refer Slide Time: 09:38)

Protective eyewear should be worn by anyone performing the procedure that is not wearing eye glasses.

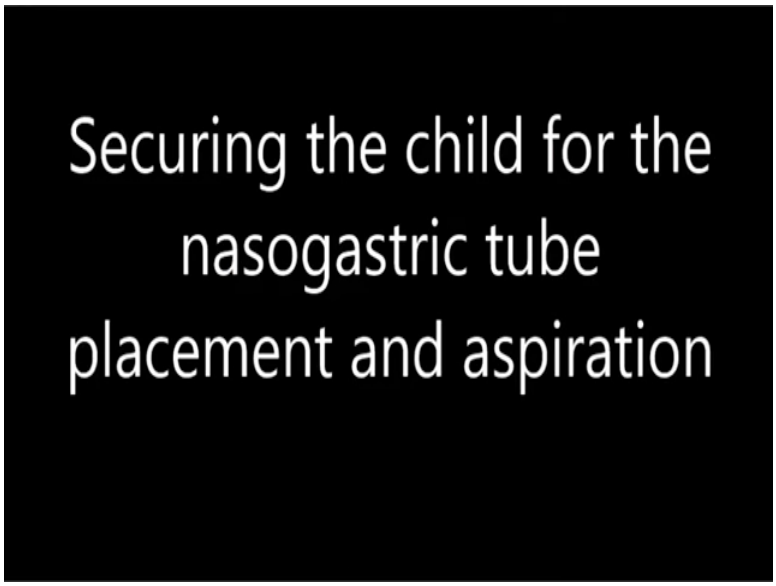
(Refer Slide Time: 09:46)

Sterile gloves should also be worn by the person performing the procedure.

(Refer Slide Time: 09:59)

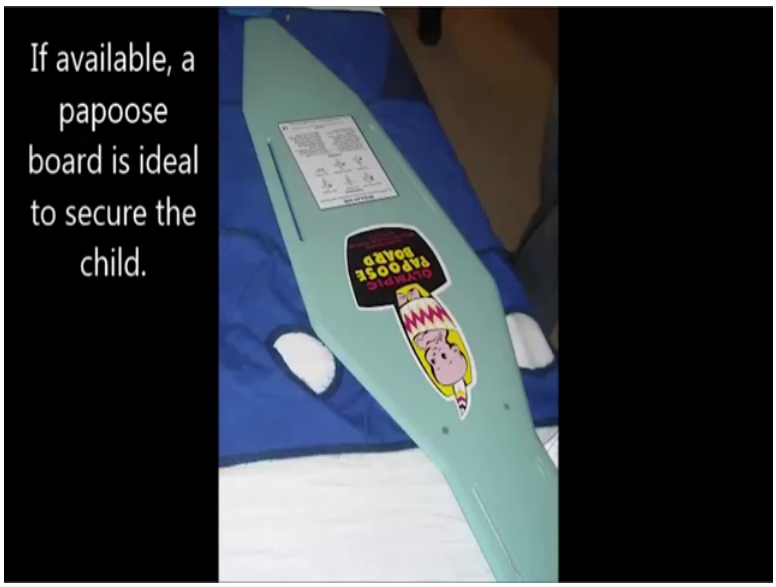
The wrapping of the sterile gloves can be used as the sterile field during the gastric aspiration.

(Refer Slide Time: 10:18)

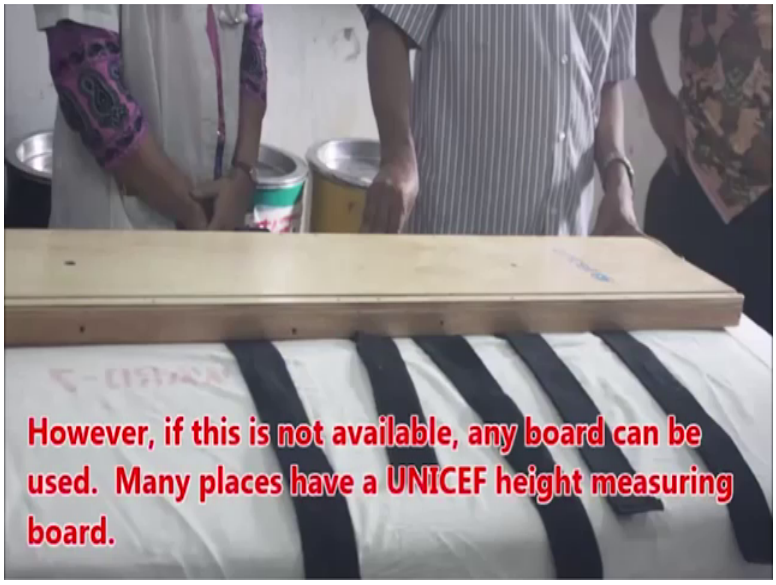


Securing the child for the nasogastric tube placement and aspiration; if available a papoose board is ideal to secure the child.

(Refer Slide Time: 10:23)

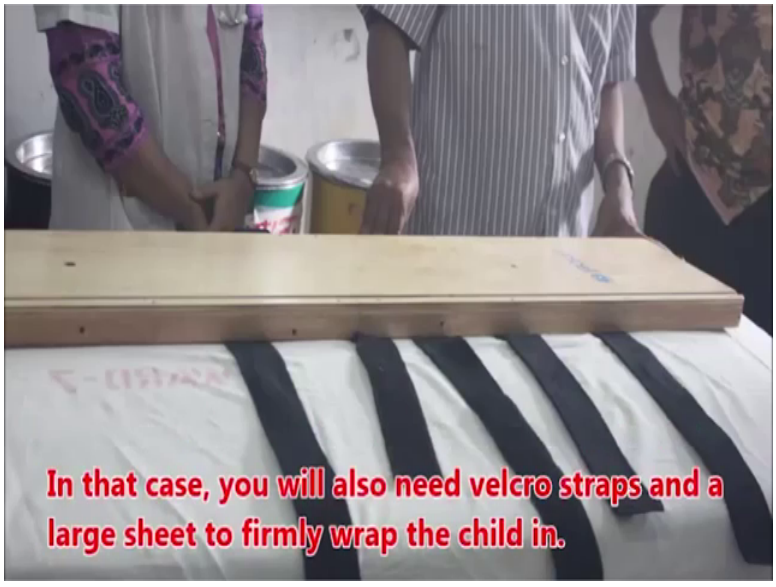


(Refer Slide Time: 10:29)



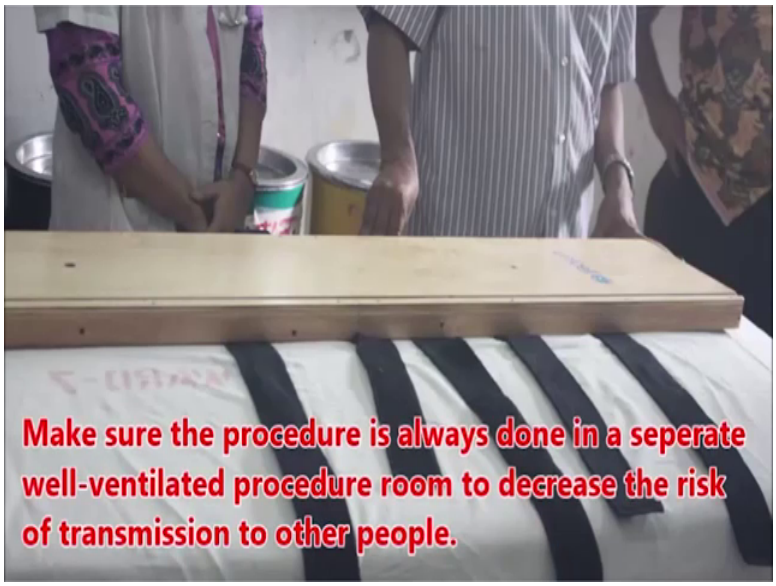
However, if this is not available any board can be used. Many places have a UNICEF height measuring board.

(Refer Slide Time: 10:35)



In that case, you will also need velcro straps and a large sheet to firmly wrap the child in.

(Refer Slide Time: 10:44)



Make sure the procedure is always done in a separate well ventilated procedure room to decrease the risk of transmission to other people.

(Refer Slide Time: 10:54)

It is important to wrap the child securely.

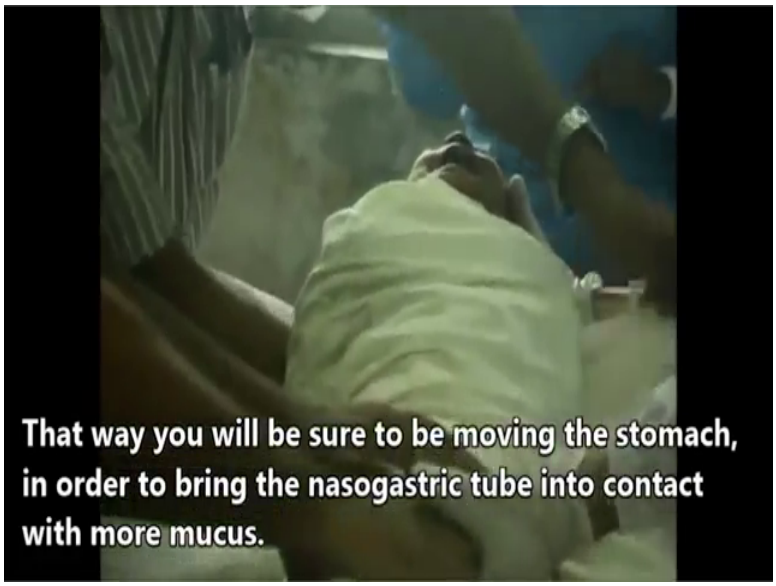
(Refer Slide Time: 11:00)

Not only does this keep the child from flailing and pulling out the nasogastric tube.

(Refer Slide Time: 11:08)

It also assures that when you turn the child you are turning the whole child including the child’s thorax. You will not just on the head.

(Refer Slide Time: 11:20)

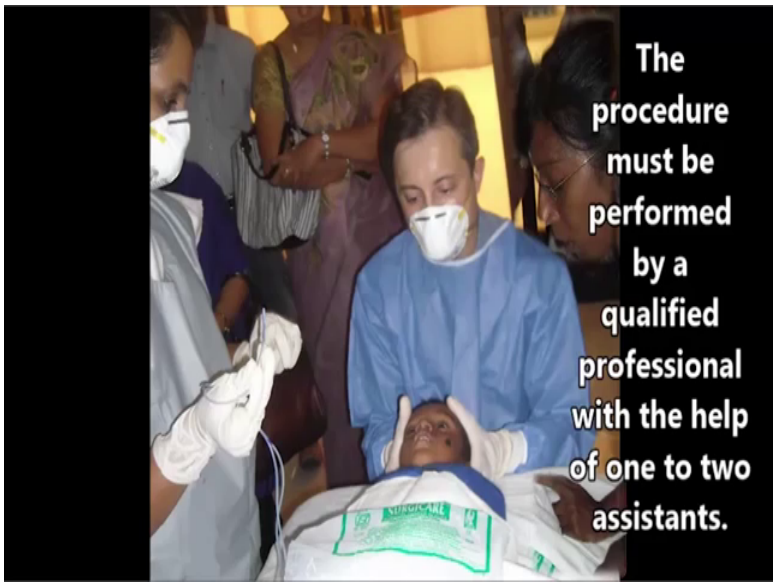


That way you will be sure to be moving the stomach in order to bring the nasogastric tube into contact with more mucus.

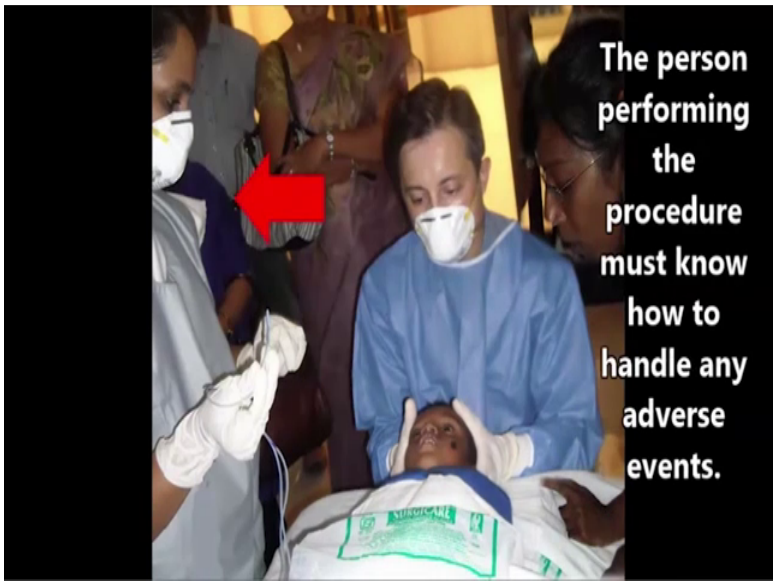
(Refer Slide Time: 11:34)

Make sure the velcro is securely fastened. Performing the procedure; the personnel, the procedure must be performed by a qualified professional with the help of one to two assistants.

(Refer Slide Time: 11:47)

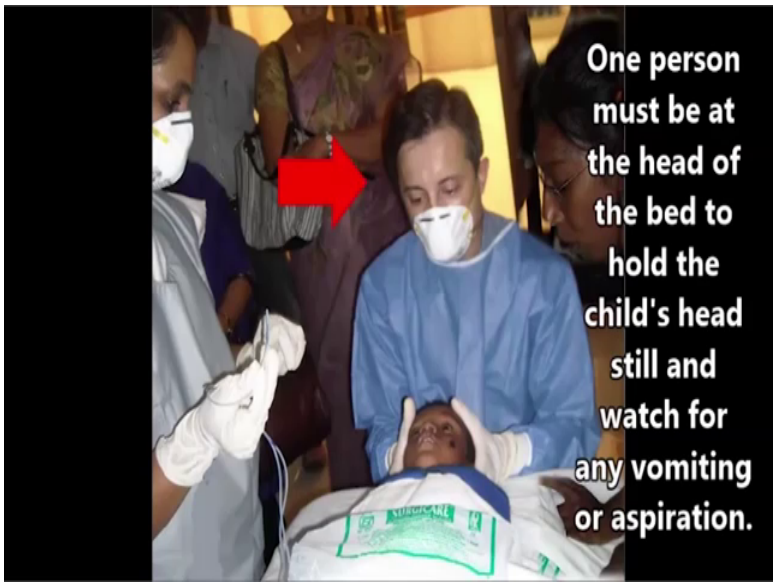


(Refer Slide Time: 11:53)



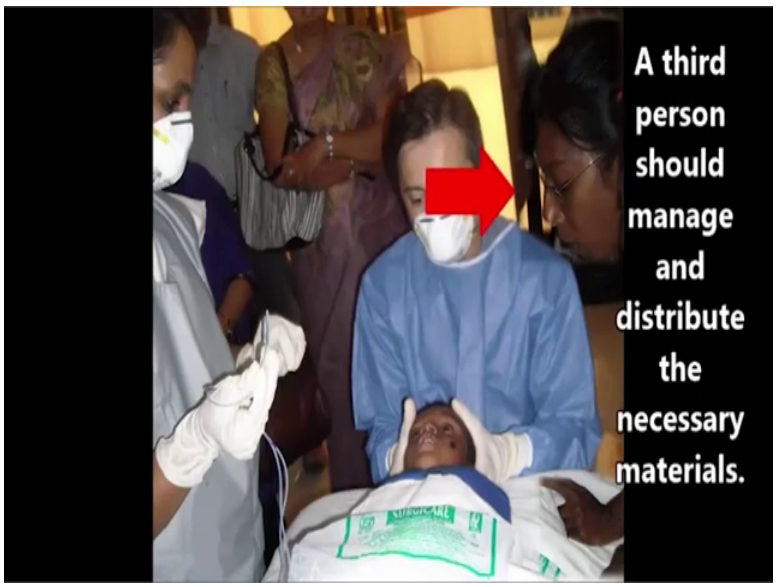
The person performing the procedure must know how to handle any adverse events.

(Refer Slide Time: 11:58)



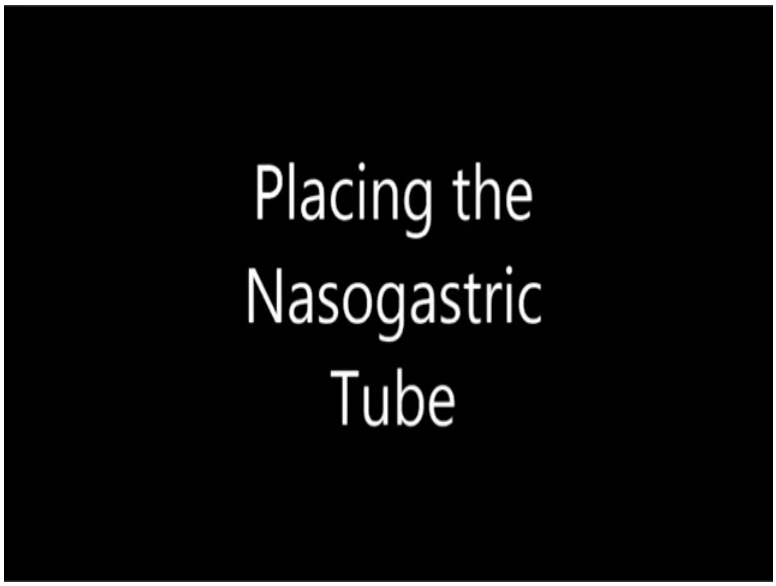
One person must be at the head of the bed to hold a child's head still and watch for any vomiting or aspiration.

(Refer Slide Time: 12:05)



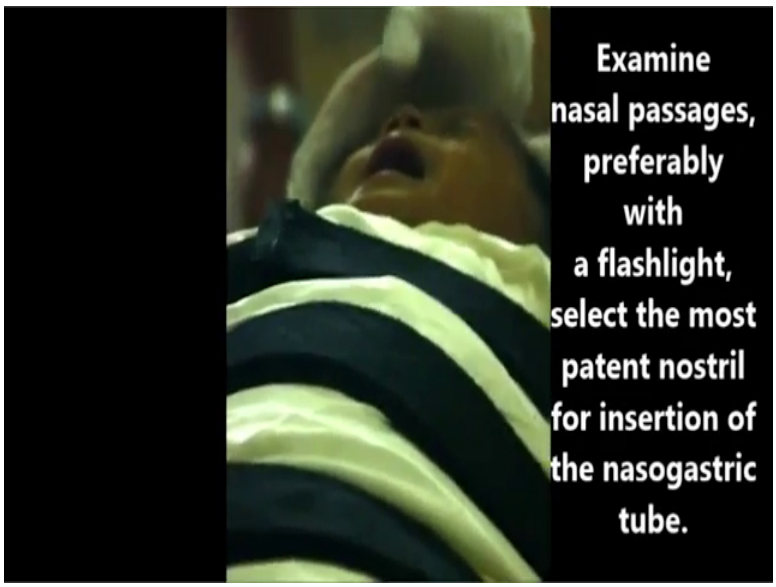
A third person should manage and distribute the necessary materials.

(Refer Slide Time: 12:09)

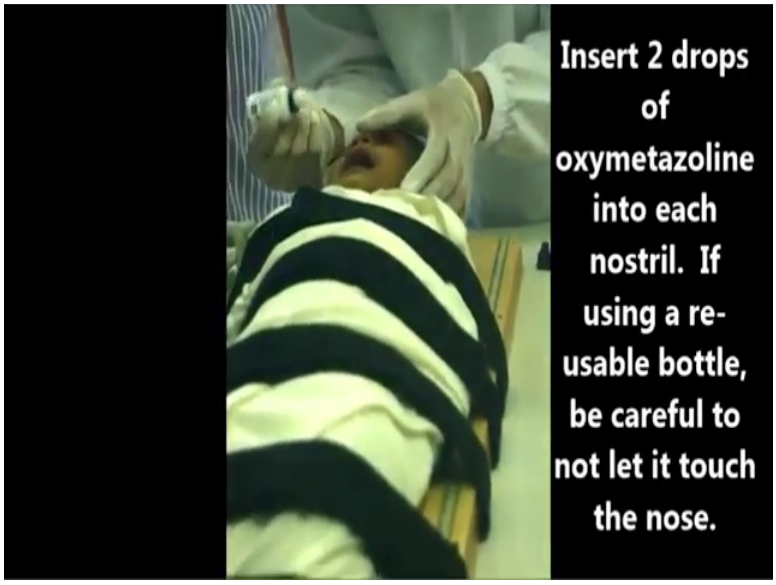


Placing the nasogastric tube; examine the nasal passages preferably with the flashlight, select the most patent nostril for insertion of the nasogastric tube.

(Refer Slide Time: 12:12)



(Refer Slide Time: 12:21)

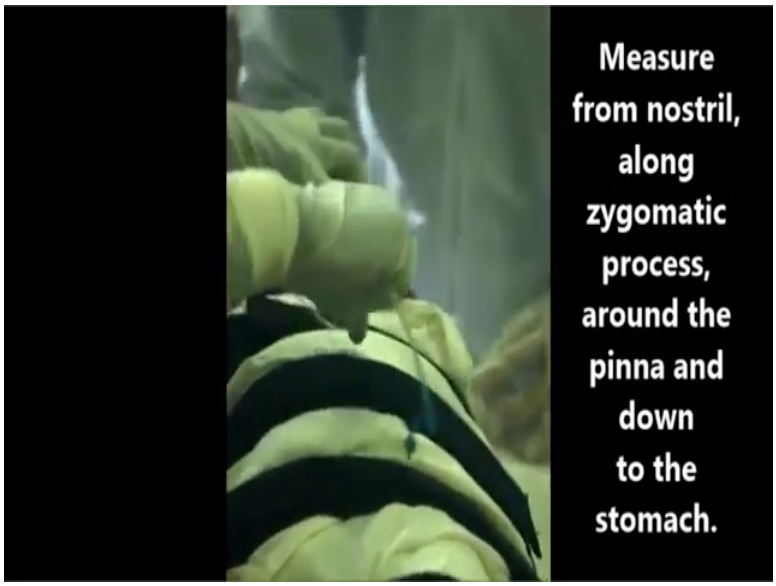


Insert 2 drops of oxymetazoline into each nostril. If using a reusable bottle be careful to not let it touch the nose.

(Refer Slide Time: 12:42)

Measure the approximate insertion length for the nasogastric tube.

(Refer Slide Time: 12:46)



Measure from nostril along zygomatic process, around the pinna and down to the stomach.

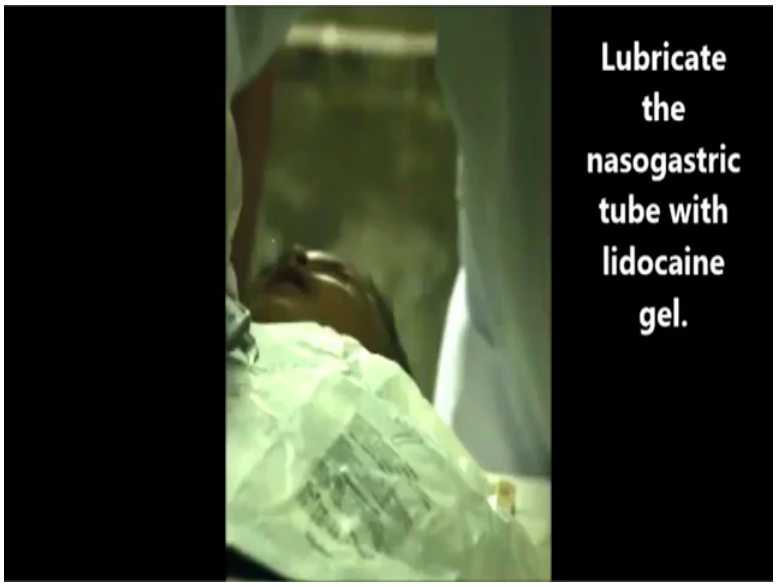
(Refer Slide Time: 12:53)

Mark that length with a waterproof pen.

(Refer Slide Time: 12:57)

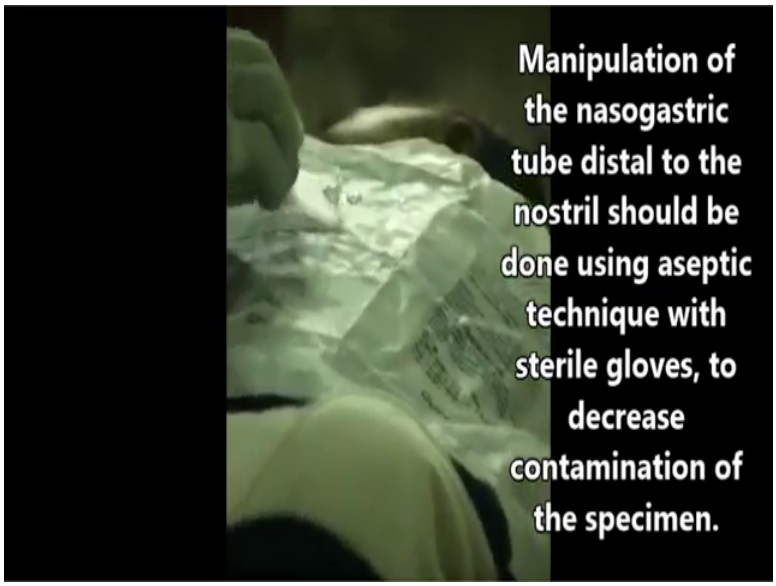
Use a sterile field to decrease contamination of the specimen.

(Refer Slide Time: 13:02)



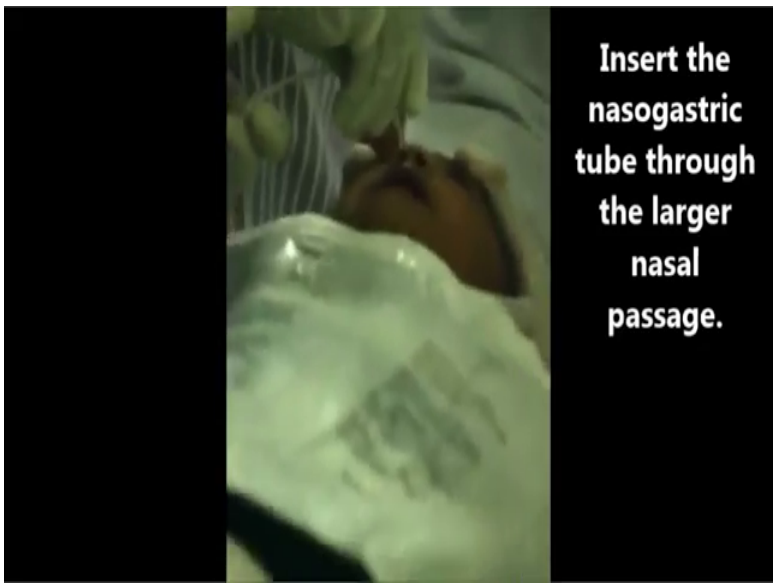
Lubricate the nasogastric tube with lidocaine gel.

(Refer Slide Time: 13:07)



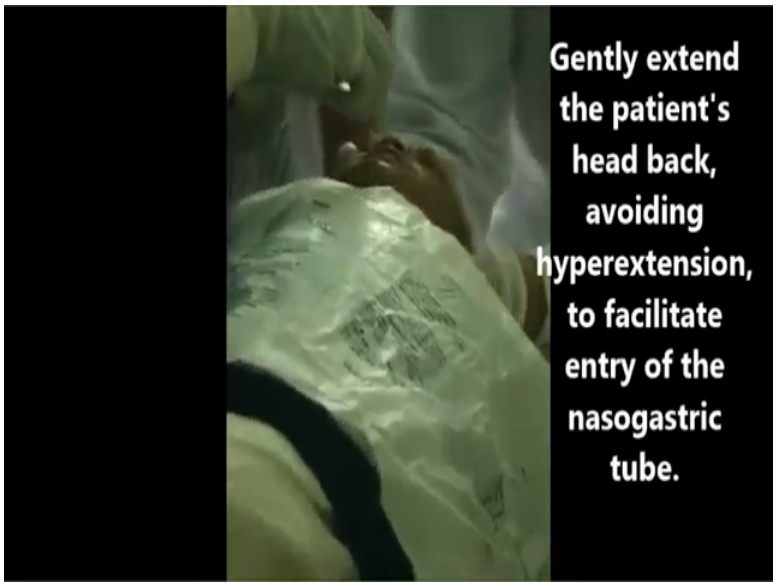
Manipulation of the nasogastric tube distal to the nostril should be done using aseptic technique with sterile gloves to decrease contamination of the specimen.

(Refer Slide Time: 13:19)



Insert the nasogastric tube through the larger nasal passage.

(Refer Slide Time: 13:24)

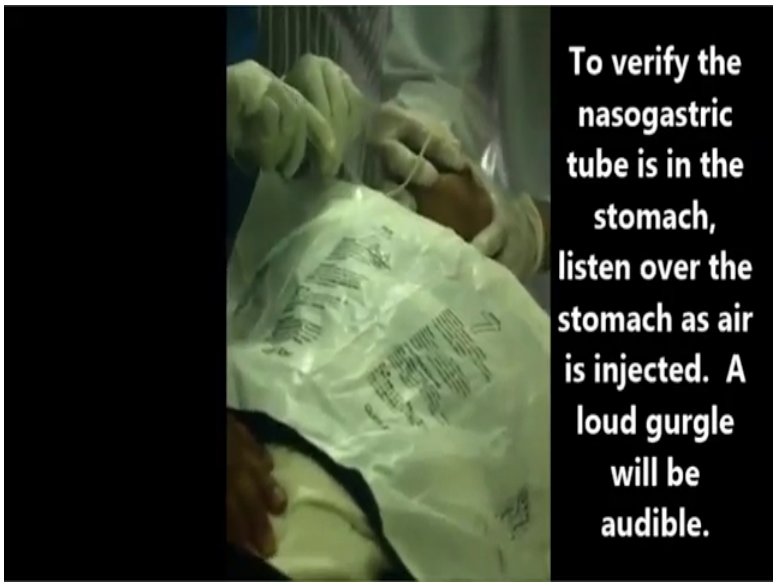


Gently extend the patients head back avoiding hyperextension to facilitate entry of the nasogastric tube.

(Refer Slide Time: 13:32)

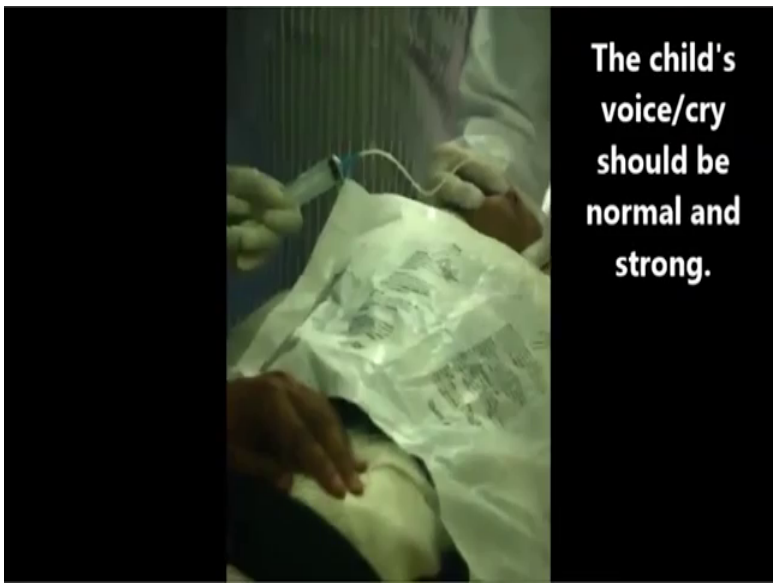
When the nasogastric tube is through the nasal passage, flex the neck slightly.

(Refer Slide Time: 13:37)



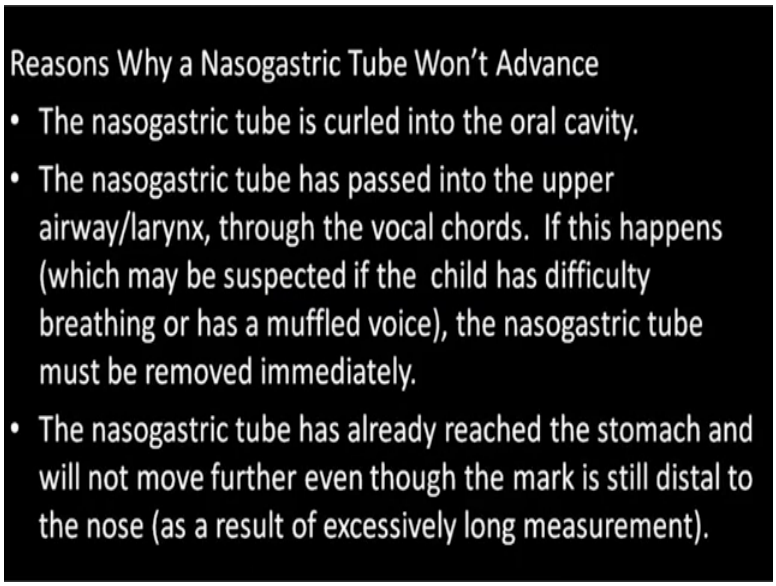
To verify the nasogastric tube is in the stomach, listen over the stomach as air is injected a loud gurgle will be audible.

(Refer Slide Time: 13:46)



The child’s voice or cry should be normal and strong. Nasogastric tube will not advance for the due to the following reasons.

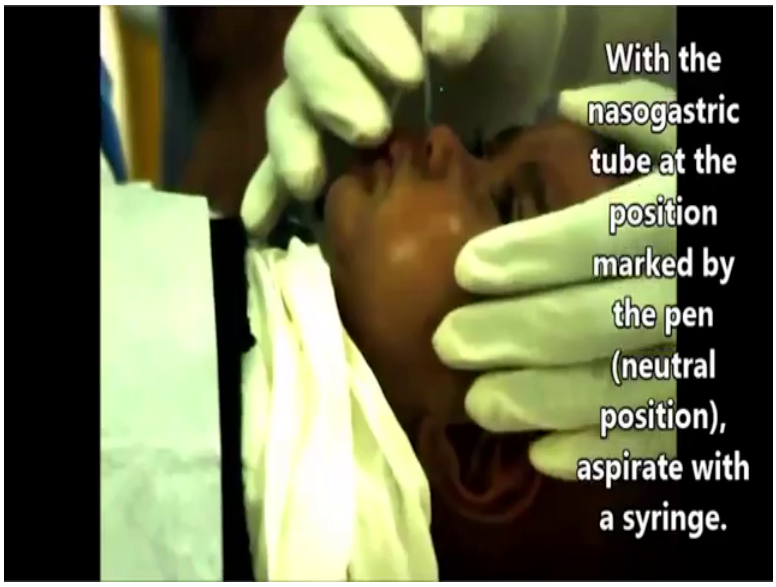
(Refer Slide Time: 13:50)



If the nasogastric tube is the curled into the oral cavity, if the tube has passed into the upper airway or larynx through the vocal chords; if this happens which may be suspected if the child has difficulty in breathing or has a muffled voice the nasogastric tube must be removed immediately.

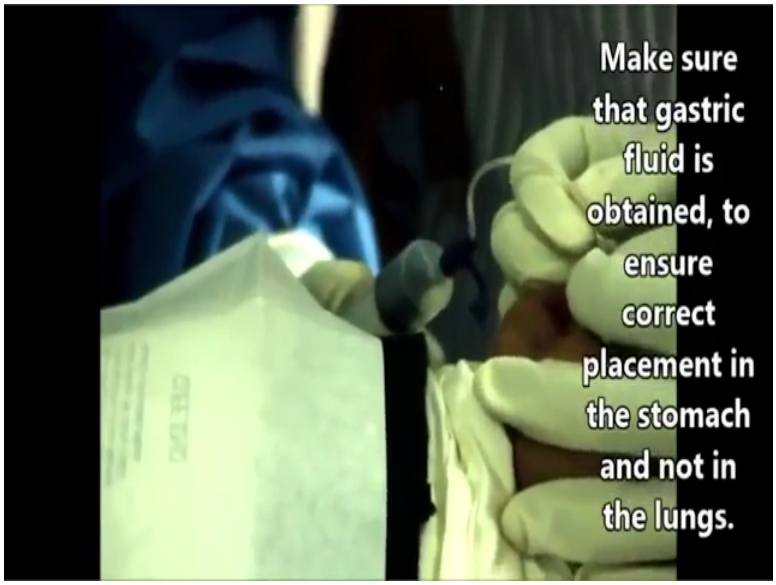
The nasogastric tube has already reached the stomach and will not move further even though the mark is still distal to the nose as a result of excessively long measurement.

(Refer Slide Time: 14:27)



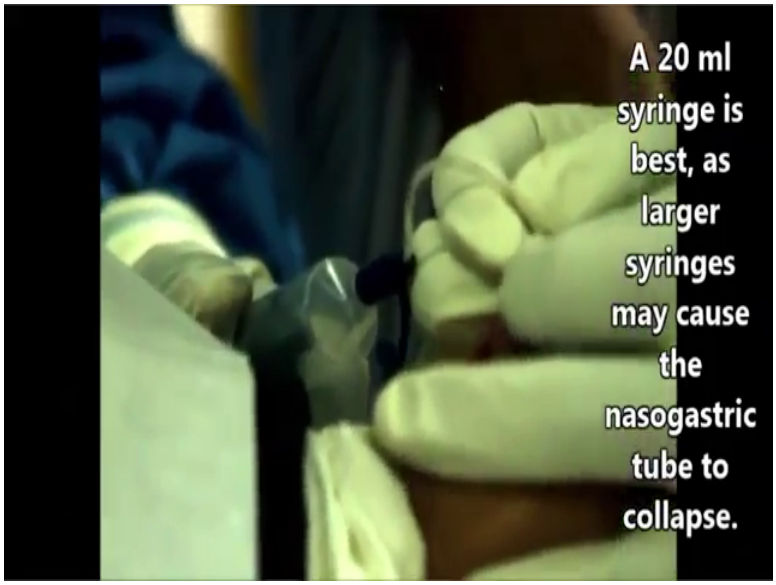
With the nasogastric tube at the position marked by, the pen which is a neutral position aspirate with a syringe.

(Refer Slide Time: 14:37)



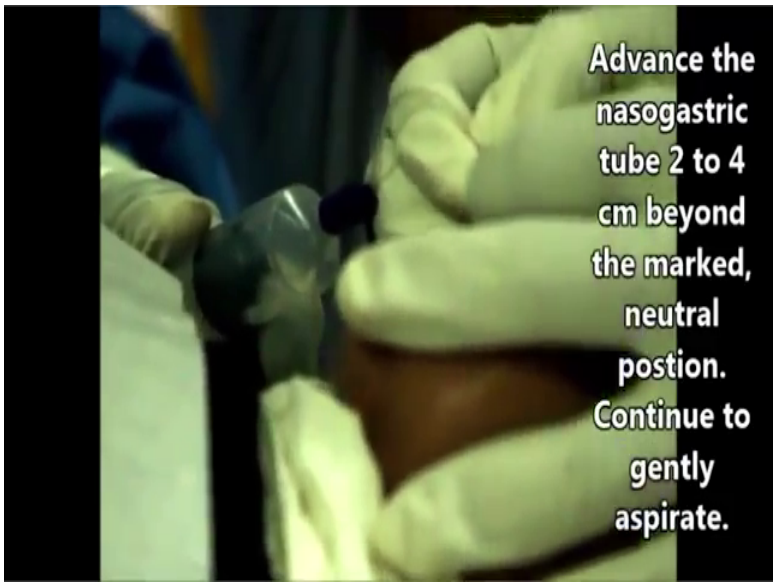
Make sure that gastric fluid is obtained to ensure correct placement in the stomach and not in the lungs.

(Refer Slide Time: 14:48)



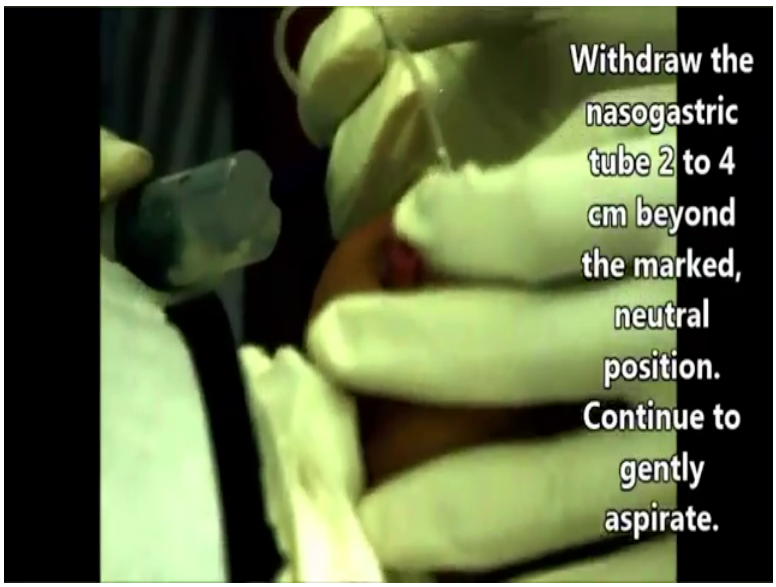
A 20 ml syringe is best, as large syringes may cause the nasogastric tube to collapse.

(Refer Slide Time: 14:55)



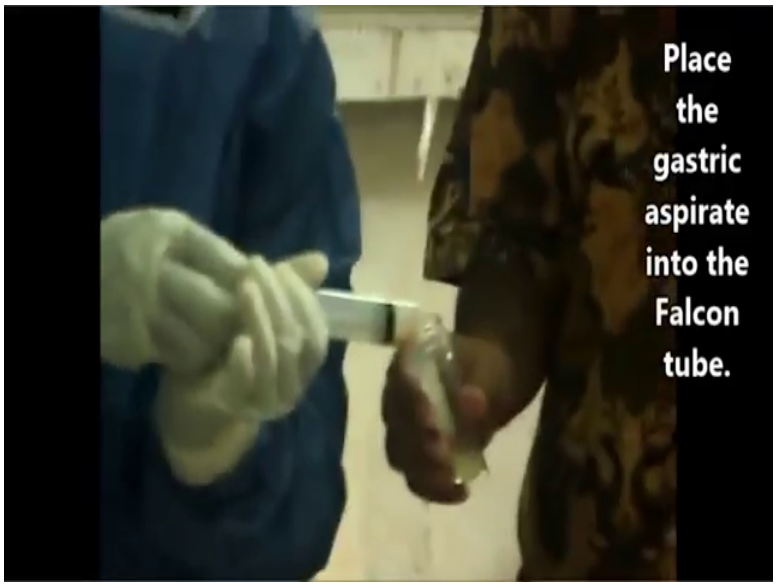
Advance the nasogastric tube 2 to 4 centimeter beyond the marked, neutral position. Continue to gently aspirate.

(Refer Slide Time: 15:05)



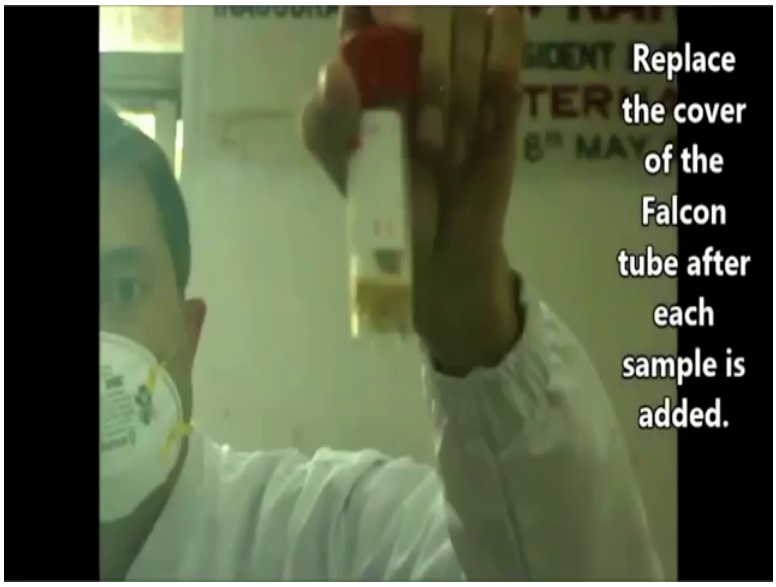
Withdraw the nasogastric tube 2 to 4 centimeter beyond the marked, neutral position. Continue to gently aspirate.

(Refer Slide Time: 15:21)



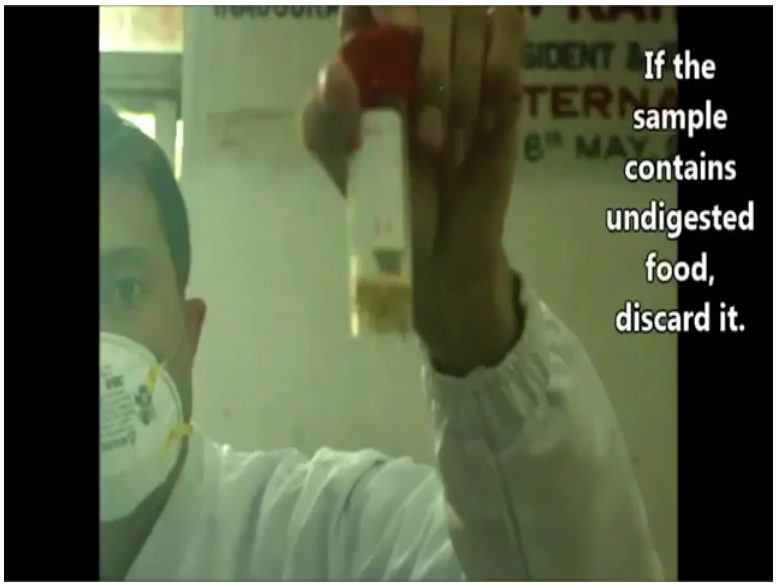
Place the gastric aspirate into the Falcon tube.

(Refer Slide Time: 15:26)



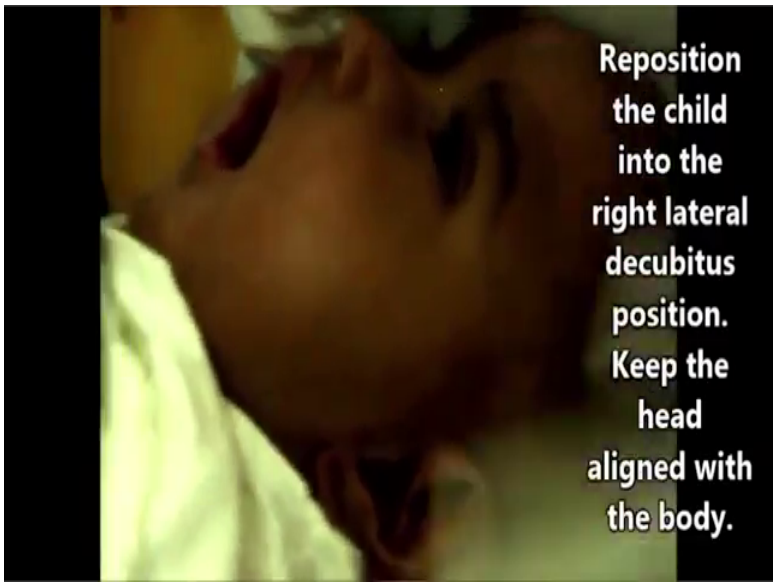
Replace the cover of the falcon tube after each sample is added.

(Refer Slide Time: 15:30)



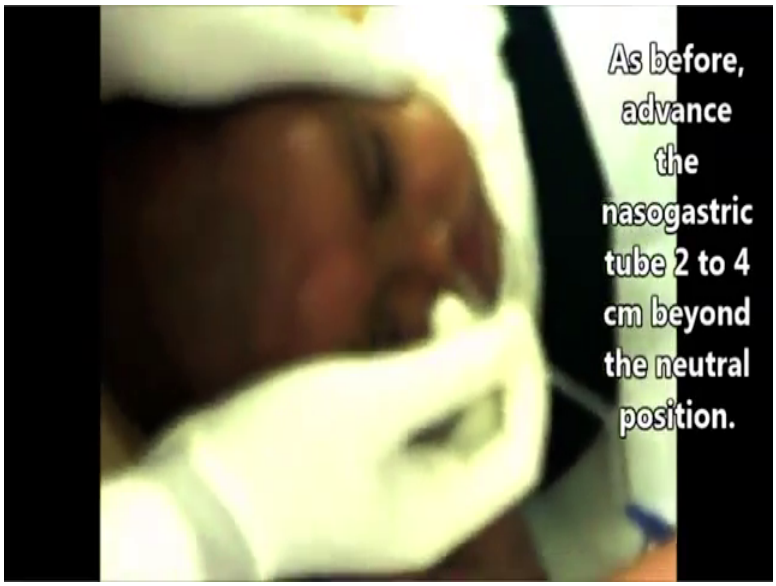
If the sample contains undigested food discard it.

(Refer Slide Time: 15:36)



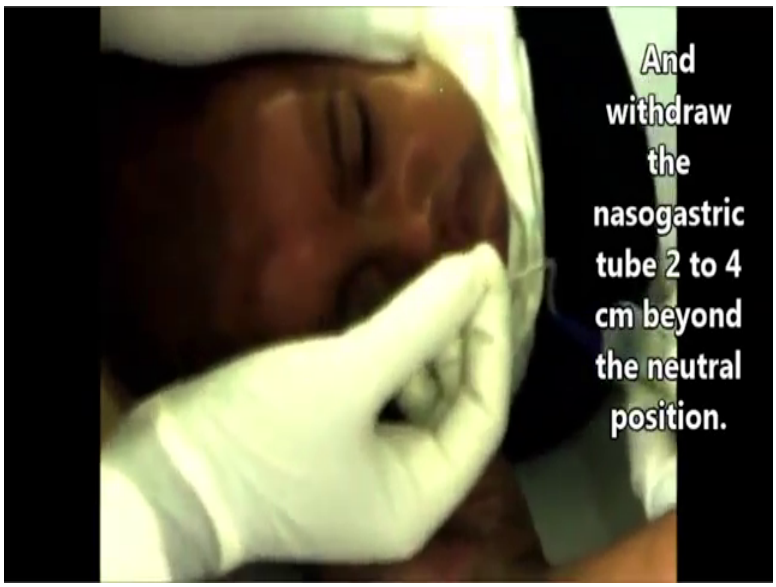
Reposition the child into the right lateral decubitus position. Keep the head aligned with the body.

(Refer Slide Time: 15:46)



As before, advance the nasogastric tube 2 to 4 centimeter beyond the neutral position and withdraw the nasogastric tube 2 to 4 centimeter beyond the neutral position.

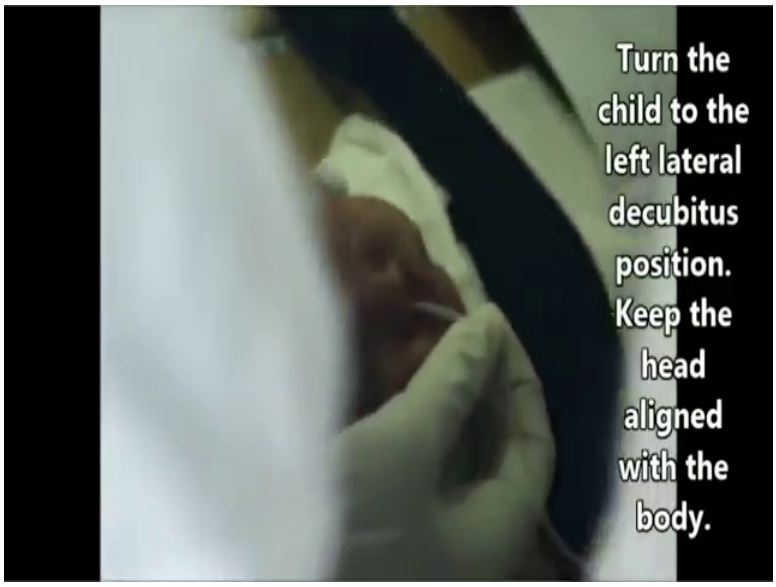
(Refer Slide Time: 15:57)



(Refer Slide Time: 16:12)

Continue to gently aspirate the entire time.

(Refer Slide Time: 16:25)

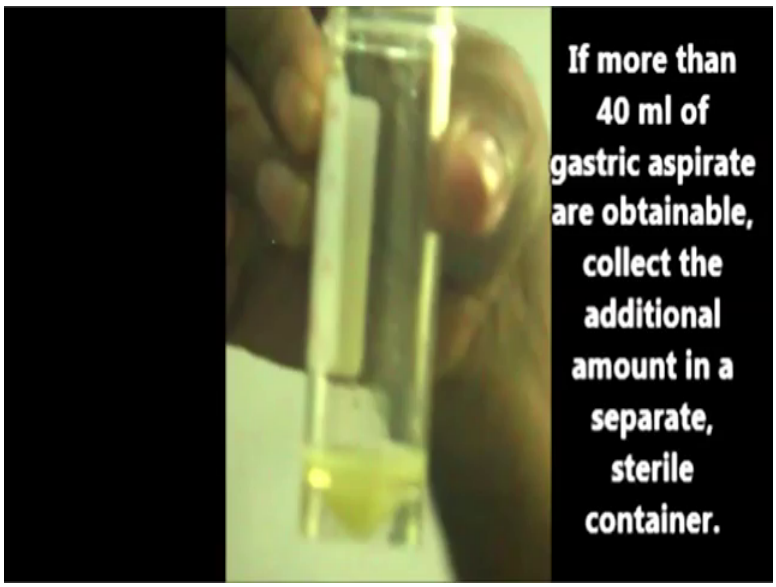


Turn the child to the left lateral decubitus position and keep the head aligned with the body.

(Refer Slide Time: 16:33)

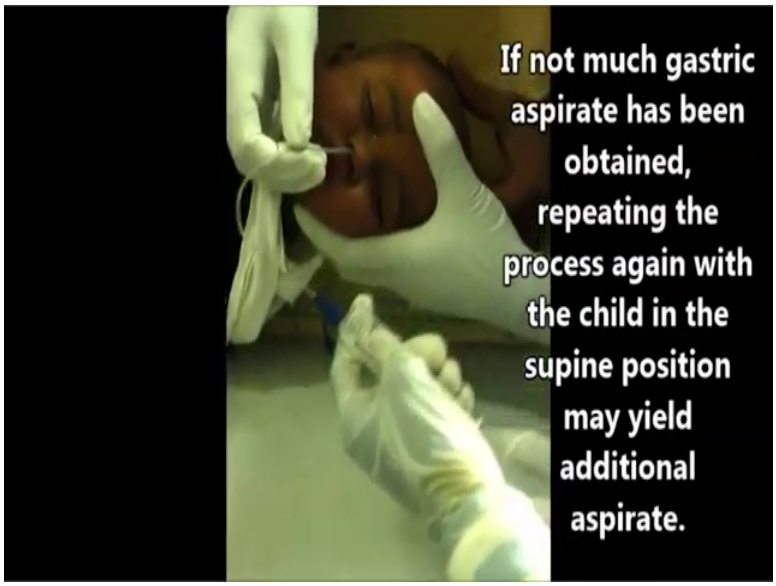
Repeat the same steps as before with advancing and withdrawing the nasogastric tube 2 to 4 centimeter beyond the neutral position. Continue to aspirate.

(Refer Slide Time: 17:19)



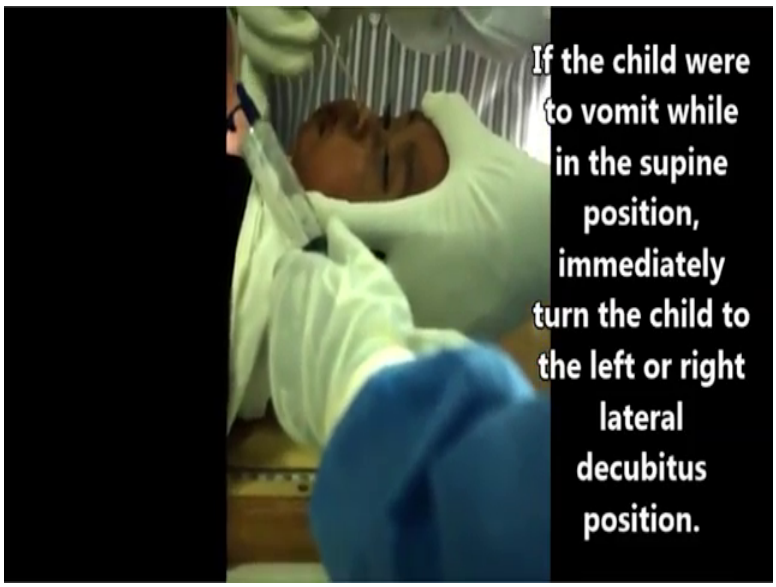
If more than 40 ml of gastric aspirate is obtained collect the additional amount in a separate sterile container.

(Refer Slide Time: 17:27)



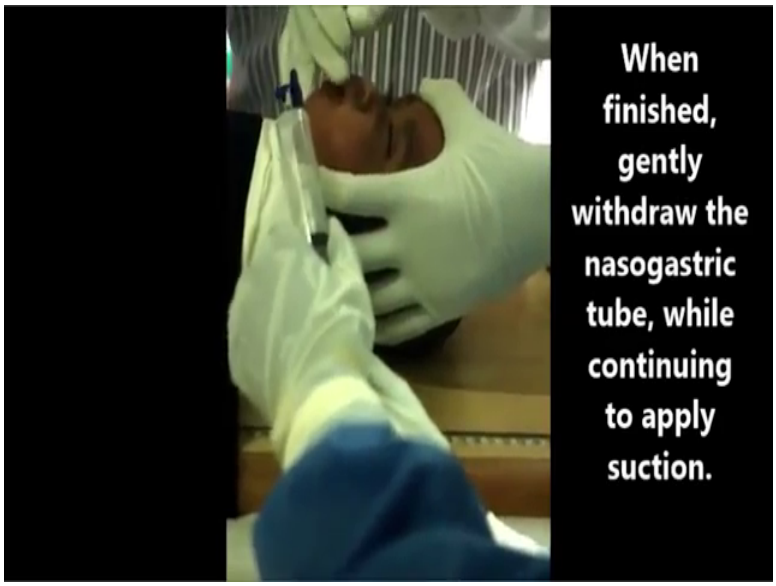
If not much gastric aspirate has been obtained, repeat the process again with the child in the supine position which may yield additional aspirate.

(Refer Slide Time: 17:45)



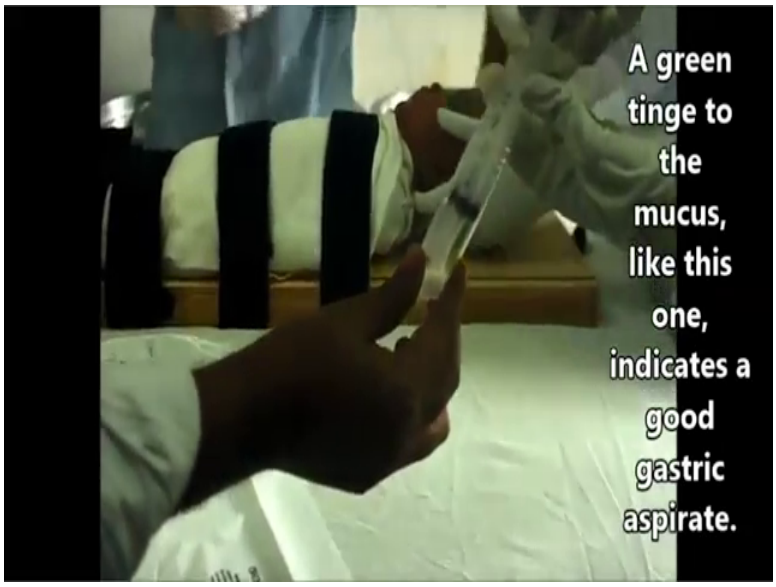
If the child were to vomit while in the supine position immediately turn the child to the left or right lateral decubitus position.

(Refer Slide Time: 18:00)



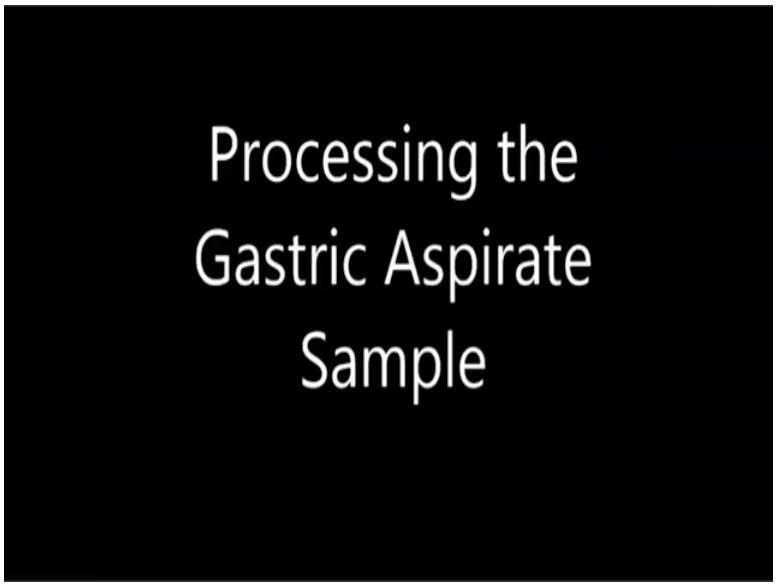
When finished gently withdraw the nasogastric tube while continuing to apply suction.

(Refer Slide Time: 18:23)



A green tinge to the mucus like this one indicates a good gastric aspirate.

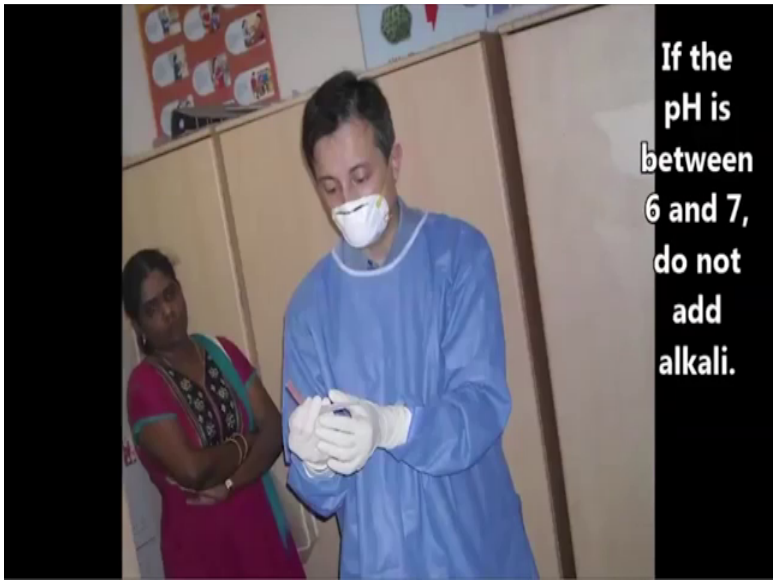
(Refer Slide Time: 18:37)



Processing the gastric aspirate sample; measure and record the baseline pH.

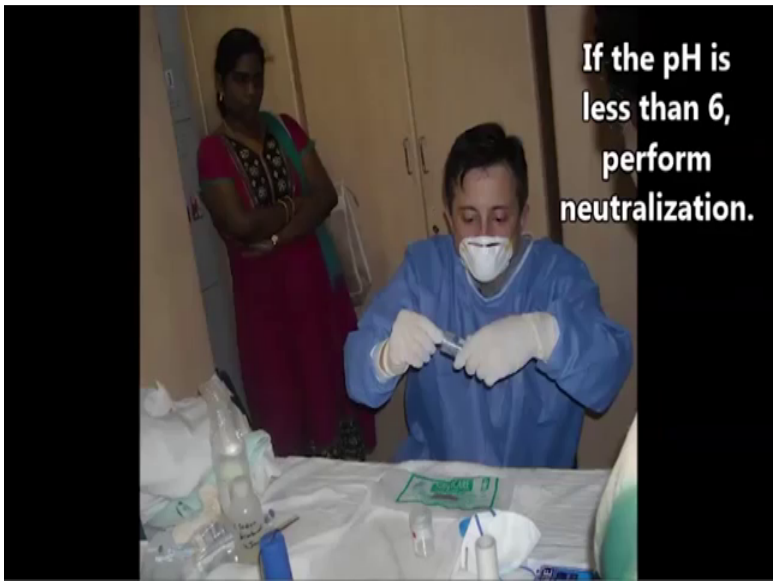
(Refer Slide Time: 18:44)

(Refer Slide Time: 18:49)



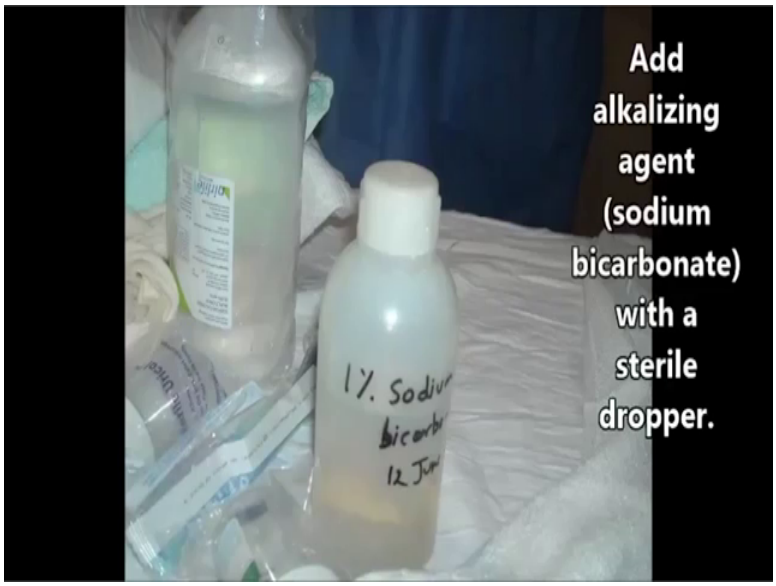
If the pH is between 6 and 7 do not add alkali.

(Refer Slide Time: 18:54)



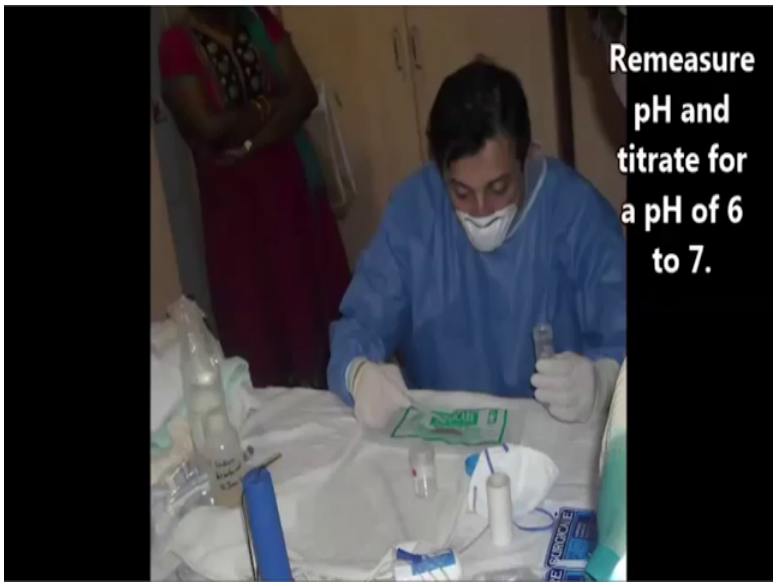
If the pH is less than 6 perform neutralization.

(Refer Slide Time: 18:59)



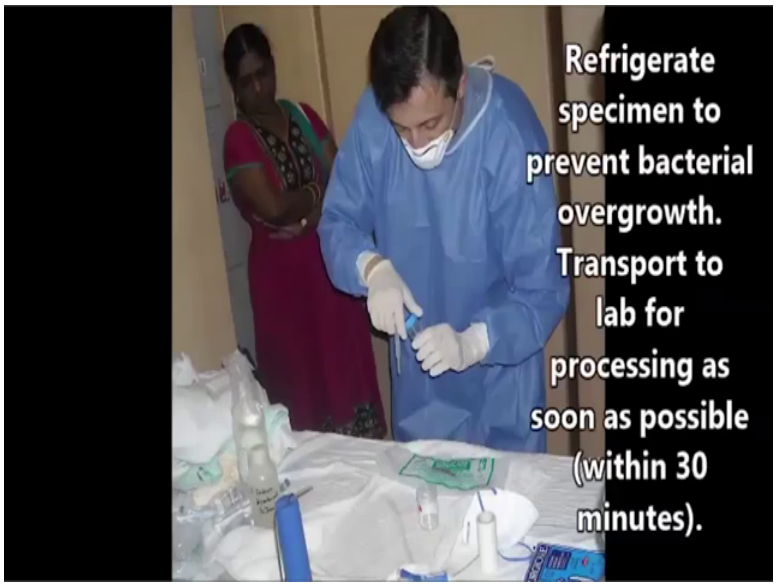
Add alkalizing agent that is sodium bicarbonate with a sterile dropper.

(Refer Slide Time: 19:04)



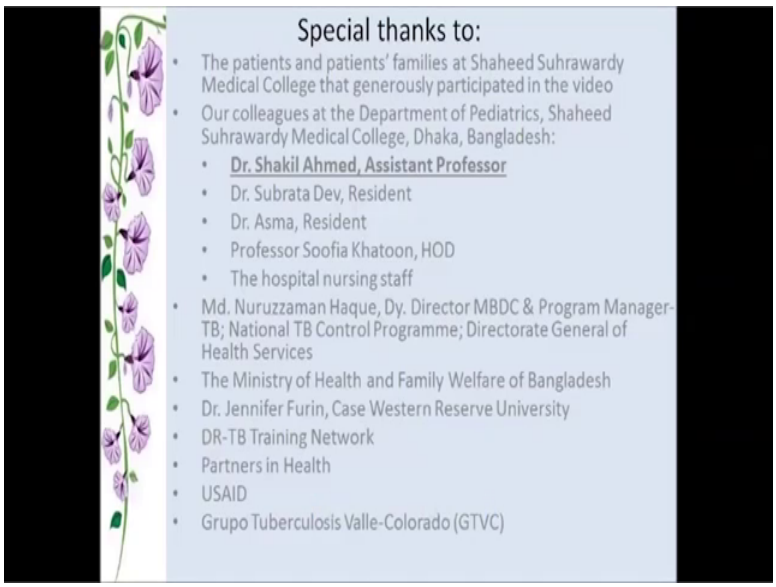
Remeasure the pH and titrate for a pH of 6 to 7.

(Refer Slide Time: 19:10)



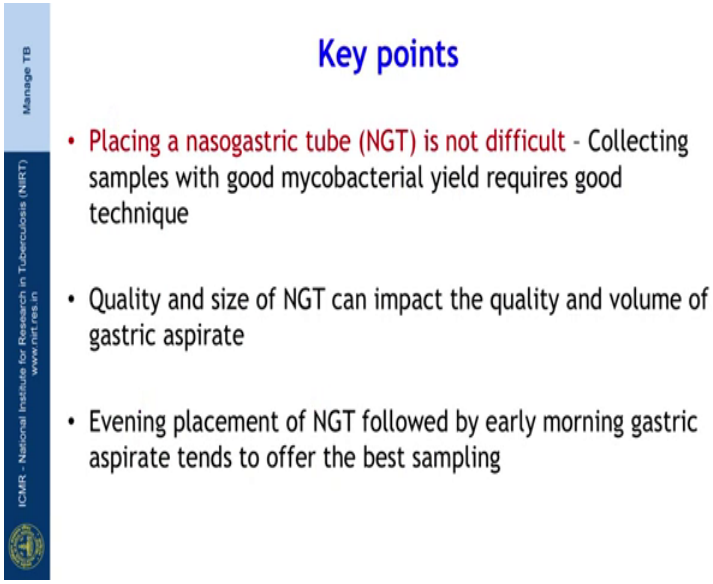
Refrigerate the specimen to prevent bacterial overgrowth. Transport to lab for processing as soon as possible that is within 30 minutes.

(Refer Slide Time: 19:20)



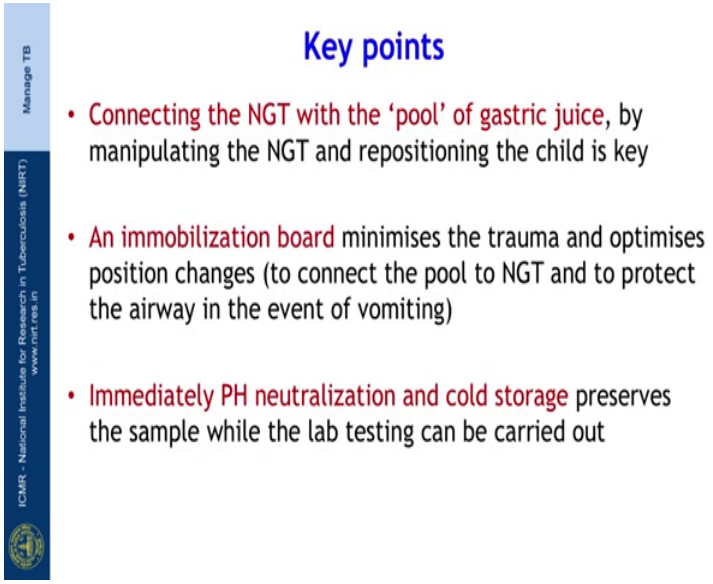
With this we come to the end of the session of the video demonstration of gastric aspiration technique. Special thanks to all the partners and the sentinel TB project.

(Refer Slide Time: 19:31)



The key messages include placing a nasogastric tube is not too difficult; however, collecting samples with good mycobacterial yield requires a good technique. The quality and size of the nasogastric tube can impact the quality and volume of the gastric aspirate. Evening placement of nasogastric tube followed by early morning gastric aspirations tends to offer the best sampling.

(Refer Slide Time: 19:58)



Connecting the nasogastric tube with a pool of gastric juice by manipulating the nasogastric tube and repositioning the child is the key to this procedure. An

immobilization board minimizes trauma and optimizes position changes that is to connect the pool to the nasogastric tube and to protect the airway in the event of vomiting. Immediately pH neutralization and cold storage preserves the sample while the lab testing can be carried out.

Thank you.