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	Department/Section:	Respiratory Therapy Services
	Document Title:	PULMONARY FUNCTION TEST

PURPOSE:

To discuss the steps involved in performing Pulmonary Function Test.

SCOPE:


Applies to all Respiratory Therapy Services staff of Dr. Pablo O. Torre Memorial Hospital

PERSON RESPONSIBLE:

Respiratory Therapists

GENERAL GUIDELINES:

1. The policy on Two Patient Identifiers shall be practiced prior to any treatment or procedure.
2. The universal precaution by the Infection Prevention and Control Unit shall be observed for proper handling and disposal of Respiratory equipment and supplies.
3. The patient shall be instructed to refrain from smoking for 4-6 hours before the test and withhold medications (if there is any) such as bronchodilators for 6-8 hours until test is performed.
4. Patient shall refrain from taking coffee or beverages including caffeine before the test because it can affect the result thus making the test less accurate.
5. Patients shall be advised to take a light meal. Having a full stomach will decrease their ability to take a deep breath and therefore could not perform the test well.
6. Procedures may vary depending on the type of PFT machine being used.
7. After the pre-bronchodilator test is performed and the result is below the normal range of 75% (Forced Expiratory Volume) FEV, it is recommended that the patient shall be given a bronchodilator to help differentiate between reversible and irreversible obstructive disease as ordered by the physician.
8. Pulmonary Function Test is used for the following reasons:


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- 8.1. Screening for the presence of obstructive and restrictive disease.
- 8.2. Evaluating the patient prior to surgery – this is especially true of patients who:
 - a) are 60 years of age and above;
 - b) are known to have pulmonary disease;
 - c) are obese (as in pathologically obese);
 - d) have a history of smoking, cough or wheezing;
 - e) will be under anesthesia for a lengthy period of time;
 - f) are undergoing an abdominal or a thoracic operation.

Note: A vital capacity is an important preoperative assessment tool. Significant reductions in vital capacity (less than 20 cc/Kg of ideal body weight) indicates that the patient is at a higher risk for postoperative respiratory complications. This is because vital capacity reflects the patient's ability to take a deep breath, to cough, and to clear the airways of excess secretions.

1. Evaluating the patient's condition for weaning from a ventilator. If the patient on a ventilator can demonstrate vital capacity (VC) of 10-15 ml/Kg of body weight, it is generally thought that there is enough ventilatory reserve to permit (try) weaning and extubation.
2. Documenting the progression of pulmonary disease – restrictive or obstructive.
3. Documenting the effectiveness of therapeutic intervention.

OBSTRUCTIVE PULMONARY DISEASE is characterized by the reduced ability to exhale gases due to premature bronchiolar collapse. Disproportionate reduction in the FEV1 as compared to the FVC (and therefore the FEV1 – to – FVC ratio, also called FEV 1%) is the hallmark of obstructive lung diseases. This physiologic category of lung diseases includes but is not limited to asthma, acute and chronic bronchitis, emphysema, bronchiectasis, cystic fibrosis, pneumonia, alpha1-antitrypsin deficiency, and bronchiolitis. The expiratory flow at any given expiratory volume is reduced. The mechanism responsible for the reduction in airflow can be bronchial spasm, airway

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inflammation, increased intraluminal secretions, and/ or reduction in parenchymal support of the airways due to loss of lung elastic recoil.


RESTRICTIVE PULMONARY DISEASE is characterized by the reduced ability to inspire gases due to such things as vascular weakness, pain fibrous tissue or anatomical abnormalities. Reduction in the FVC with a normal or elevated FEV1-to-FVC ratio defines the classification of restrictive lung diseases as assessed by spirometry. Because the FEV1 is a fraction of the FVC, it also is reduced, but the FEV1-to-FVC ratio is preserved at a normal or elevated level. Measuring the TLC and residual volume (RV) can confirm restriction suggested by spirometry.

Causes of restriction on spirometry include obesity, cardiomegaly, ascites, pregnancy, pleural effusion, pleural tumors, kyphoscoliosis, pulmonary fibrosis, neuromuscular disease, diaphragm weakness or paralysis, space-occupying lesions, lung resection, congestive heart failure, inadequate inspiration or expiration secondary to pain, and severe obstructive lung disease. The severity of reductions in the FVC and/or the FEV1 can be characterized by the following scheme:


1. > Mild – 70-79% of predicted
2. > Moderate – 60-69% of predicted
3. > Moderately severe – 50-59%
4. > Severe – 35-49% of predicted
5. > Very severe – Less than 35% ofm predicted

PROCEDURE:

1. Check the physician's order.
2. Review the patient chart for the following:
 - 2.1. Diagnosis
 - 2.2. Patient history
 - 2.3. ABG, X-ray and ECG result.
 - 2.4. Age, weight and height.

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3. Introduce self to the patient.
4. Impress upon the patient the necessity of exerting his best effort while performing the test.
5. Demonstrate to the patient how to perform the test, explaining step by step what to do.
6. Make the patient familiar with the device by explaining to him/her the different parts such as the sensor, disposable mouthpiece with filter and the display monitor to make him /her more comfortable with the procedure.
7. A nose clip will be put on patient's nose so that he/she will breathe through his/her mouth during the test. If air escapes through the nose, incorrect measurements may occur.
8. Instruct the patient to form his lips around the mouthpiece securely and then inhale deeply and fill the lungs with air maximally from tidal respiration to total lung capacity (TLC) and rapidly exhale as forcefully as he can, ideally for six seconds to the fullest extent until no further volume is exhaled at residual volume(RV). When all the air was expelled out, the air should be inhaled again in a rapid way and maximally enough to fill the lungs with air again in its full capacity then remove the sensor out from the mouth. The maneuver may be performed in a forceful manner to generate a forced vital capacity (FVC) or in a more relaxed manner to generate a slow vital capacity (SVC). In normal individuals, the inspiratory SVC, and expiratory SVC is generally higher than the FVC.
9. The breathing exercises may make the patient tired or short of breath and due to the exertion, dizziness is common. Patients are given rest periods during the test if needed.
10. Do the test three times taking the best results for comparison.
11. A post bronchodilator test is performed if the result of the pre-broncho test is not normal. A medicine to inhale may be given as prescribed by the Physician. This is a good way of evaluating the amount of bronchoconstriction present and how responsive the patient was to the bronchodilator medication. This assesses the degree of reversibility of the airway obstruction. Have the patient rest for 30


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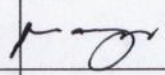

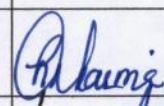
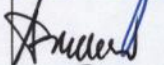
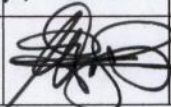
- minutes, to allow the drug to take effect then the PFT is repeated in same procedure as done in the pre-bronchodilator test.
12. Charges are computed after the test is completed.

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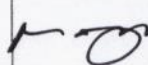

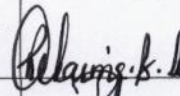

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KEY TASKS	PERSON RESPONSIBLE
1. Checks order or request from the physician.	RTS Staff
2. Reviews the patient chart.	
3. Gives instructions to the patient about the procedure.	
4. Conducts the procedure.	
5. Documents the procedure in the patient's chart.	

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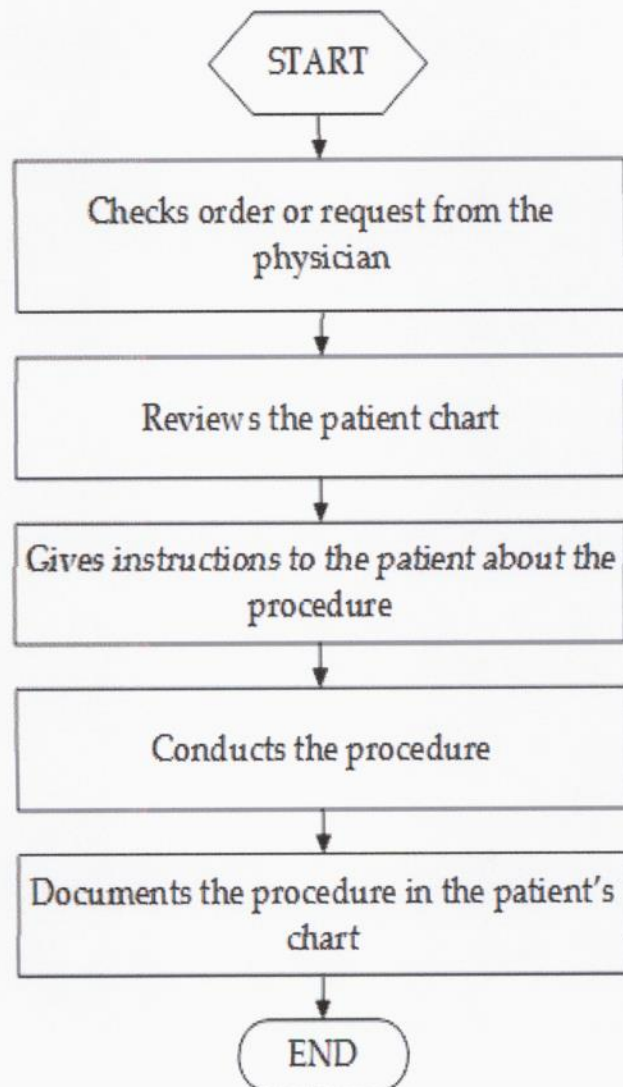



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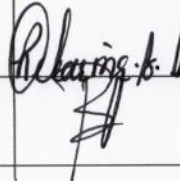
FLOWCHART



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