

	RESPIRATORY SERVICES	DATE CREATED: May 2011 DATE REVIEWED/REVISED: September 2015
PROCEDURE	TITLE: <u>Pulmonary Diagnostics: Single Breath Diffusing Capacity (DLCO)</u> NUMBER: B-00-12-12115	RELATED DOCUMENTS:

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SITE APPLICABILITY:

ST. PAUL'S HOSPITAL
MOUNT SAINT JOSEPH HOSPITAL

GENERAL INFORMATION:

Diffusing capacity is a measurement of gas transfer from the alveoli to the blood. The test involves measuring the partial pressure difference between inspired and expired carbon monoxide (CO). It relies on the strong affinity and large absorption capacity of red blood cells for carbon monoxide, which makes the uptake of CO less dependent on cardiac output.

Supplemental oxygen should be removed 10 minutes prior to measurement if possible. Cigarette smoking prior to testing produces COHb, which will decrease the DLCO measurement. DLCO is the third measurement in the *Complete Pulmonary Function* testing sequence.

INDICATIONS:

- Evaluation and follow up of diseases that involve lung parenchyma
- Evaluation and follow up of emphysema
- Differentiating among chronic bronchitis, emphysema, and asthma
- Evaluation of pulmonary involvement in systemic diseases
- Evaluation of cardiovascular disease
- Prediction of arterial desaturations during exercise in some patients with lung disease
- Evaluation and qualification of impairment and disability associated with interstitial lung diseases and emphysema
- Evaluation of the pulmonary effects of chemotherapy agents or other drugs known to induce pulmonary dysfunction
- Evaluation of pulmonary hemorrhage

CONTRAINDICATIONS:

- Mental confusion or poor coordination that does not allow the patient to keep a tight seal with their lips or follow instructions
- Large meals prior to testing
- Vigorous exercise prior to testing

CAUTIONS:

Supplemental O₂ should be removed 10 minutes prior to the measurement. If patient unable to maintain SpO₂ greater than 88% on room air, DLCO should not be performed and a note will be made in the chart.

SPECIAL CONSIDERATIONS:

- In heavy smokers, the time of the last cigarette smoked should be recorded and noted for the interpretation
- Patients with low lung volumes (VC less than 1.5 L) may have difficulty with the test, as the measurement requires a minimum washout volume of 600 mL
- When a DLCO tank has been changed a biologic QC must be completed prior to testing a patient

REQUIRED SUPPLIES & EQUIPMENT:

- Jaeger Masterscreen
- Microgard Filter
- Silicone Mouthpiece
- Nose clips

PATIENT PREPARATION:

1. Patients should not smoke for at least 24 hours prior to testing. Since this often is not possible, the time of the patient's last cigarette should be recorded.
2. Patients should avoid alcohol for 4 hours prior to testing.
3. A large meal should not be consumed within 2 hours prior to testing.
4. Vigorous exercise should not occur within 1 hour of testing.
5. The patient should be seated at least 5 minutes prior to testing.
6. Supplemental oxygen should be off the patient for at least 10 minutes prior to testing.

PROCEDURE:

1. Check to make sure the patient has no contraindications prior to starting testing.
2. The patient should be sitting comfortably, with both feet flat on the floor and the mouthpiece adjusted to a comfortable height.
3. Patient should be allowed to rest for at least 5 minutes prior to completing testing.
4. Explain procedure to patient and demonstrate appropriate technique.
5. Double click on the **Diffusing Capacity** icon on the main screen.
6. Set the patient wash out volume. This volume can only be set between 600 mL to 1000 mL.
7. Press **F1** to start measurement.
8. Ensure the gas analyzers are zeroed as indicated by the notation at the bottom of the screen.
9. Ask the patient to place the mouthpiece in their mouth and attach nose clips.
10. Instruct the patient to breathe normally in and out through their mouth.
11. The maneuver begins with an unforced exhalation to residual volume.
12. As the patient exhales press **F2**.
13. After reaching RV, have the patient inhale rapidly to TLC and hold their breath.
14. A counter on the screen will count down the breath hold (breath hold time should be 9 – 11 seconds).
15. Exhalation after breath hold must meet the minimum volume required for analysis (normally 2/3 of VC as indicated by single dashed line on screen).
16. Allow the gas to be analyzed by equipment – **DO NOT** press F7 to calculate result.
17. A wait time of at least 4 minutes is required between tests.
18. At least two acceptable tests must be performed. DLCO measurements should meet the repeatability requirement of either being within 3 standard units of each other or within 10% of the highest value.
19. No more than 5 tests can be completed in one session.

20. Press **F12** to save results and exit screen.

REFERENCES:

1. American Thoracic Society Series *"ATS/ERS Task Force: Standardization of the single breath determination of carbon monoxide uptake in the lung."*
2. ATS Pulmonary Function Laboratory Management and Procedure Manual (2005).

REVIEWED BY:

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