



# Pulmonary Function Testing

## INTRODUCTION

Spirometry, the most frequently performed pulmonary function test (PFT), is the cornerstone of occupational respiratory evaluation programs. In the occupational health setting, spirometry plays a critical role in the primary, secondary, and tertiary prevention of workplace-related lung disease. In many settings, legislation or work activity standards dictate the frequency and rationale for testing; for example, the National Fire Protection Agency, Canadian Standards Association and provincial legislation.<sup>[1, 4]</sup>

## REASON FOR TESTING

It is well documented that employees working in construction, manufacturing/processing, mining, health services, education, public administration and transportation suffer ill effect and die from workplace exposures to silica, asbestos, coal, isocyanates, surgical smoke in operating rooms, and more.<sup>[5]</sup> From 2012 until the end of January 2016, the Workers Compensation Board of Alberta reported 305 fatalities related to occupational disease. Of these, 84.9% were directly related to lung injury and disease.<sup>[6]</sup> The majority of those deaths relate directly to the past exposure to asbestos. In today's workplace, we see an enormous use of silica in the oil and gas industry along with silica dust from hard rock mining. If we were to learn anything from the past, it is to not repeat the same mistake in the future.

Spirometry/PFT can guide the health care professional and employer in the following circumstances:

- Effectiveness of implemented measures to protect employees <sup>[3]</sup>
- Monitoring people exposed to injurious agents (silica, asbestos, isocyanates) <sup>[2]</sup>
- Assess ability of employees to safely use respiratory PPE (SCBA) <sup>[1]</sup>
- Compliance with Federal/Provincial and industry standards (NFPA, CSA)
- To assess health status before beginning strenuous physical activity programs

In Canada, eight provinces and all territories have legislation and regulations in place which demand that employers provide respiratory surveillance programs for employees exposed to air borne hazards. Surveillance allows for early identification of health concerns related to the workplace, and in some cases to issues unrelated to the workplace (i.e. smoking).

## TESTING PROCESS

Prior to testing, employees complete a focused health and work activity questionnaire and consent. This information is in keeping with the legislated requirements for respiratory surveillance. The employee's weight, height and blood pressure are assessed, and if safe to do so the testing is started. Each breathing attempt will take on average 20-25 seconds to complete. The employee will rest between attempts, and the technician will monitor the employee for signs of dizziness, faintness, etc.

Once completed, the test results will be reviewed by a CannAmm physician. The physician will complete a testing report or a fitness certificate, if testing was part of a medical examination. Identified concerns will be communicated to the employee with a copy of the test results. Suggested actions in the form of a health advice letter will be sent to the employees home/email address. If the test results indicate workplace concerns, comments will be included on the testing report/fitness certificate. Medical staff will be available to discuss these results and guide employers on further actions.

## REFERENCES

1. American Thoracic Society - Medical Section of the American Lung Association. "Respiratory Protection Guidelines." American Journal of Respiratory and Critical Care Medicine, 1996: 1153-1165.
2. ATS/ERS Task Force. "Standardization of spirometry." European Respiratory Journal, 2005: 320-335.
3. Centres For Disease Control and Prevention, National Institute For Occupational Safety and Health. "Centres for Disease Control and Prevention." NIOSH Spirometry Training Guide. December 2003. <https://www.cdc.gov/niosh/docs/2004-154c/> (accessed April 2016).
4. Committee, Mary Townsend and the Occupational and Environmental Lung Disorders. "Spirometry in the Occupational Health Setting -- 2011 Update." Journal of Occupational and Environmental Medicine, 2011: 569-584.
5. Sillicker, Amanda. "Up in Surgical Smoke." Canadian Occupational Safety, 2016: 18-19.
6. Workers Compensation Board of Alberta. Occupational Disease Fatalities Accepted by the Workers' Compensation Board. Numerical, descriptive, Not provided: Alberta Government, 2015.