



**Introduction**

Spirometry may be necessary when working with substances which cause asthma. These substances have a generic term and are called respiratory sensitisers identified on hazard data sheets with the risk phrase and number in chemical safety data sheets “may cause sensitisation by inhalation (R42). Many are also identified by the “Sen” notation.

Spirometry is a means of measuring the output from the lungs and comparing the results with ‘normal’ values, taking into account the employees age, gender, height and ethnic origin. The lung measurement test is a scientific method of spotting deterioration early so that protective measures can be put in place if necessary.

The difference between occupational asthma and the most common occurring asthma (such as exercise induced or childhood) is that this is an **occupational** asthma that is **caused by work**.

Spirometry is for the purpose of:

1. Establishing the health of the lungs when starting a position which involves working with respiratory sensitisers, referred to as a ‘baseline’ lung function.
2. Monitoring the health of the lungs over the period of time to look for any deterioration
3. To check that the respiratory sensitiser is being controlled in the workplace.

Some common respiratory sensitisers (the term ‘R42’ may be written on the hazard data sheet or on product labels):

Animal Dander (Furs)	Flour	Drugs
Pollen, grasses	Isocyanates (spray paint)	Nickel
Wood dusts	Dyes	Soldering

It should be noted that some respiratory sensitisers are not manufactured as a substance but be naturally present in the atmosphere eg pollen, grasses. It is important to distinguish whether the health issue is related to work or to the environment generally.

All practitioners undertaking spirometry should have had training on how to do the testing and what to do in the event of poor or unexpected results.

**Issues arising**

As a rough guide, spirometry results should be 80% of the normal –so



look for this magic figure in the results printout. Anything below this would merit more careful inspection – either by consideration of the circumstances (does the individual have an upper respiratory tract infection?) or by referral to either the occupational health doctor or GP.

Single spirometry results have very little significance when considering occupational asthma. Serial measurements using easy to read ‘at a glance’ presentation packages are the most helpful tools for this. Trend analysis of say FEV<sub>1</sub> over a period of testing will be a sure way of determining if there is an emerging health problem.

### **Peak Flow Diary**

The next steps for determining whether there is a case of occupational asthma would involve further testing and the keeping of a peak flow diary. A peak flow diary is a simple way of determining whether poor lung health is associated with work or not. Individuals are given a peak flow meter and asked to record their peak flow readings up to 6 times per day for three weeks. When the diary is completed, the results are analysed to look for trends such as dips during the working day or improvements when on holiday or at weekends, it is a very simple concept and used extensively. It should be noted that true compliance with peak flow diary keeping is low.

Many new starters find the whole experience of undertaking spirometry to be particularly difficult and no matter how they try or the OH professional take them through the procedure; it does not produce a satisfactory result. In these cases, it will depend very much on the OH practitioners experience on how this is managed; a good way round this is to give the individual a peak flow meter to take away to practice with – usually technique improves considerably.

Another debate amongst OH professionals is the issue of whether to stand or sit the employee when testing. For years everybody stood up for the test. Nowadays with the recommendation from the British Thoracic Society – sitting is the recommended way of undertaking the test. However, I believe that if the employee has been tested in the past when standing then this should be maintained for the duration – otherwise there will be a variation in the results. A chair should be placed behind the employee for health and safety reasons.

### **Known Asthmatics**

Individuals with uncontrolled existing asthma at pre-placement or during employment are the most difficult to deal with – at the start of the examination it will have been explained that that the individual needs to reach the magical figure of 80% in order to ‘pass’ the test; when this is not achieved, there is invariably great concern from the prospective employee. The usual course of action is the put the individual ‘on hold’ and refer to the GP for further advice/treatment but as this can hold up the recruitment process, OH professionals can be



quite unpopular. It is important, in these cases, to stress the importance of the individual's safety and how the organisation has a duty of care to protect even if they don't want protecting, this generally helps the situation.

It should also be remembered that asthma could be covered by the provisions of the Equality Act so the employer would have to make reasonable adjustments to the workplace for employment purposes.

**Colds/Flu**

It is important that those who attend with a cold or cough are tested at the time of presentation as symptoms could be the start of occupational asthma.

**Equipment**

- Spirometer\*
- Calibration syringe (if required)
- Extra paper for print out of results
- Mouthpieces
- BP and Sphygmanometer
- Height conversion chart and measuring stick or tape measure
- Respiratory Questionnaires – either initial (baseline) or repeat questionnaire.

\* Manufacturers offer training on the use of their own machines and support. New designs take into account the need to visit worksites and offer hand held or laptop applications of the equipment which makes transporting so much easier.

**Method**

1. Invite individual for spirometry, ensuring that there is no accidental spoiling of the testing eg smoking, eating large meal, excessive exercise, taking of broncho-dilators
2. Enclose questionnaire with invite letter to attend OH (this saves a huge amount of time). The invite letter should set out the reason for screening, pre testing conditions, directions on how to complete the questionnaire, time, date and venue of screening and information about how the results will be dealt with
3. Prior to testing the OH professional will consider the completed questionnaire and discuss any outstanding issues. Contra-indications to testing will be discussed eg recent abdominal surgery etc and blood pressure taken if required
4. Follow best practice guidelines for spirometry and be consistent with all
5. Record readings of FEV<sub>1</sub>, FVC, PEF and FEV<sub>1</sub>% (VC not required in OH setting unless considering work related chronic obstructive pulmonary disease or for health promotion purposes) x 3 as a minimum, readings must be within 5 % of each other. A maximum



- of 8 blows can be undertaken at any one session.
- 6. Print off and explain results to employee, making reference to substance used and SOP's and how to use PPE if required
- 7. Give information sheet on substances used to employee or the HSE breathe easy leaflet
- 8. Discuss next appointment with employee eg one month, 3 months, 1 year

The OH professional should be aware of the substances used by the employees when undertaking the spirometry, indeed, a large part of the OH role should be about informing employees of the correct protective measures they should be using. Therefore it is essential that the OH professional understands the substances being exposed to, the procedures used when dealing with the substance in question and finally and most importantly, the control methods advocated by the risk assessment. In this way, not only can the health surveillance be completed but the opportunity to enforce good work hygiene.

**Results**

Nowadays calculations for normal lung function values are delivered by the spirometer machine itself which print out the results and diagnosis at the end of the testing session. However, it is important that those conducting lung function testing are competent to both guide the client through the process and to determine if the results are as expected.

**Paperwork**

Photocopy spirometry results if on metallic paper.

**Records**

Group results of the testing programme is a requirement of the COSHH legislation

**Occupational Health implications**

The health surveillance programme will be decided by the nature of the work. For example, nurses using latex gloves (latex is a well known respiratory sensitiser) have spirometry on an annual basis, after initial assessment, whereas workers with resins, may be required to have spirometry 4 times in year one of starting work. The programme of surveillance is decided by the risk assessment, undertaken by safety and hygienists in conjunction with the OH professional.

Examples of good practice when working with hazardous substances:

- Following standing operation procedures (SOP's) and safe systems of work
- Wearing personal protective equipment as prescribed:
  - Gloves
  - Overalls
  - Masks
  - Air fed hood
  - Respirators
  - Self contained breathing apparatus
- Not eating or drinking on shopfloor
- Reporting any spillages/accidents
- Washing hands after using substance and before going to



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lavatory

- Reporting any signs of ill health immediately

It should be noted that employees do not understand the term respiratory sensitisers or occupational asthma – many, in the older established industries such as mining and foundries, do not care about protection and take OH advice with a pinch of salt. It is important to try and break down these barriers and explain the reasons for the programme and how occupational asthma can be prevented.

It is also an opportunity to offer health promotion advice for those who smoke but this must be done sympathetically and only if the employee is receptive in the information.

Finally, it must be mentioned here that there is some discussion regarding the value of undertaking serial lung function testing. Dr Paul Cullinan a leading expert in the field of occupational asthma questions its usefulness; it has been found that very few cases of occupational asthma are actually discovered by the health surveillance programmes. Therefore it is unlikely that this method of testing will continue indefinitely.

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#### Follow up

##### Further Information

There are many ways that the employer can protect staff from the effects of respiratory sensitisers and this information is available via the COSHH ACOP or direct from the HSE website, [www.hse.gov.uk](http://www.hse.gov.uk) here there is specific reference to many of the specific substances mentioned above and many more.

The Control of Substances Hazardous to Health Approved Code of Practice<sup>1</sup> contains guidance for health professionals and employers on the control of occupational asthma at work.

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<sup>1</sup> Control of Substances Hazardous to Health (ACOP) ISBN 0 7176 25346