

Measuring PEFR

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Peak expiratory flow rate (PEFR) is the highest rate at which gas can be expelled from the lungs via an open mouth (Dougherty and Lister, 2004).

The measurement of peak expiratory flow rate is a simple procedure in which an individual takes a full inspiration and blows out as forcibly as possible into an instrument called a peak flow meter (Fig 1), which measures the maximal gas flow during exhalation in litres per minute (Hinchcliffe et al, 1996).

The measurement of PEFR is one index of airway obstruction and may be an economical means of measuring the lung function/obstructive disease process both in the community and acute setting.

It is also recommended by the British Thoracic Society (2004) as a useful tool in the diagnosis and management of asthma.

Factors influencing PEFR

Many factors will influence PEFR including a patient's age, gender and height. Pulmonary problems such as asthma and chronic obstructive pulmonary disease will result in a reduction in flow. Muscle mass will also play a key role in determining PEFR.

There may be significant variability in PEFR in many disease processes. As a tool, individual PEFR readings must therefore be viewed as a trend and in collaboration with other data rather than a single measurement. Measurements must be compared against a recognised chart of normal values, but perhaps more importantly as a comparison against the individual's normal range.

For patients with asthma the British Thoracic Society (2004) suggests that home monitoring is important during exacerbations, changes in treatment and as part of an asthma action plan, but there is little evidence of value as a long-term monitoring tool.

Measuring PEFR 30 minutes after inhaled medication acts as a useful guide to pharmacological management. If a patient is acutely breathless then measurement of PEFR may be of little use as the procedure requires physical effort.

Changes in measurement scales

Historically PEFR has been measured in Wright units. However, due to calibration errors and comparison problems between different instruments a new scale was introduced in 2004.

This scale has now become standard and will apply to all peak flow meters sold within the European

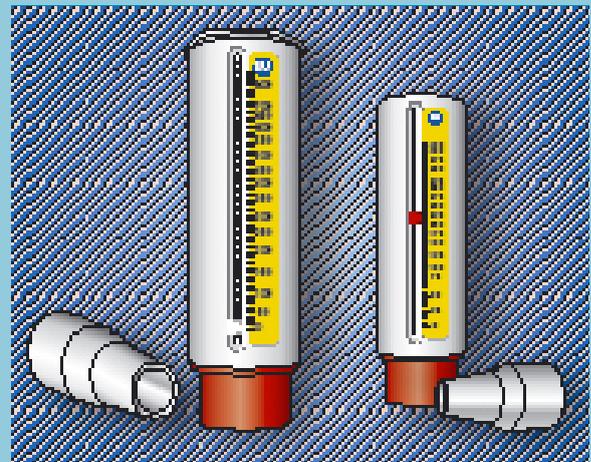


Fig 1. Adult and paediatric peak flow meters



Fig 2. The EU PEFR scale

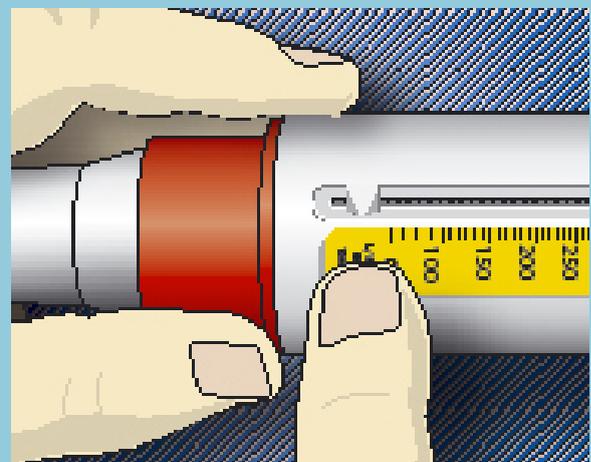


Fig 3. Set the arrow to the zero mark

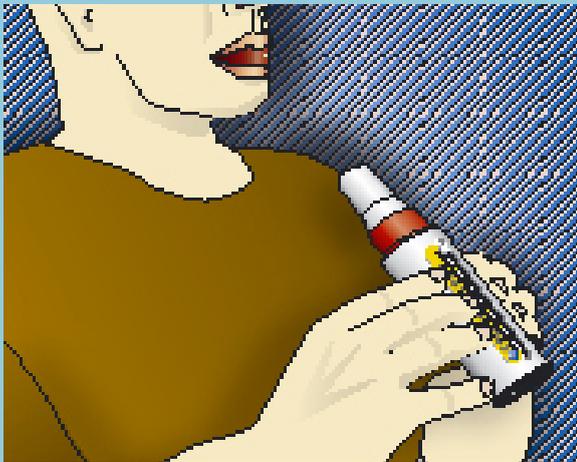


Fig 4. Ask the patient to take a maximal inspiration



Fig 5. Advise the patient to close her or his lips around the mouthpiece and exhale as forcibly as possible

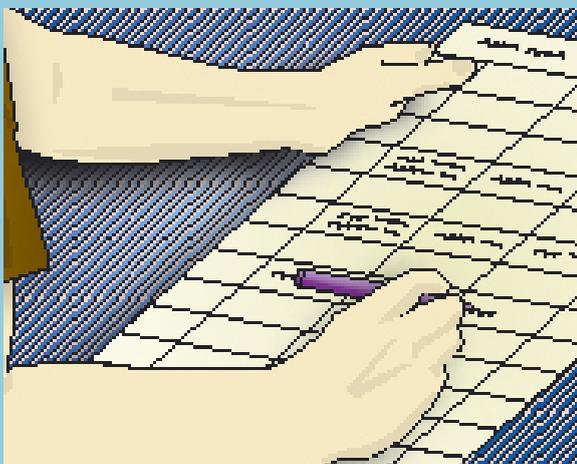


Fig 6. Make a note of the highest value reached, documenting specific time/previous medication, and so on. Compare measured values against predicted values/trends

Union that are available under the drug tariff. It is of great importance that those measuring PEFr are aware of this change in practice and are familiar with the new EU PEFr scale (Fig 2).

Equipment required

- EU scale peak expiratory flow meter.
- Clean apron.
- Clean mouthpiece (if required).
- Documentation.

Patient preparation

Patients new to the procedure or those being taught how to measure their own PEFr will require a full explanation of what PEFr is, what it measures, and how they should interpret their results.

Informed consent must be obtained and the patients must be reassured.

Support and advice must also be given to those who perform the procedure independently to reinforce good technique. Patients monitoring their own peak flow rate should be aware of how to act on the results.

The procedure

- Prepare the patient as outlined above.
- Wash hands and don a clean apron.
- Assemble equipment in accordance with manufacturer's instructions.
- Attach a clean or disposable mouthpiece.
- Set the arrow to the zero mark (Fig 3).
- Position the patient. This should be the position in which the patient normally undertakes the procedure. However, sitting upright/standing up is considered the most appropriate).
- Ask the patient to take a maximal inspiration (Fig 4).
- Advise the patient to close her or his lips around the mouthpiece and to exhale as forcibly as possible (Fig 5).
- Note the measurement.
- Repeat the process a further two times (if tolerated by the patient) ensuring that the arrow is reset to the zero mark for each measurement.
- Dispose of the mouthpiece (if appropriate), and ensure that the equipment is clean. Wash hands.
- Make a note of the highest value reached, documenting specific time/previous medication.
- Compare measured values against predicted values/trends (Fig 6).
- Report any deviance/abnormality to medical/specialist staff.

Professional responsibilities

All nurses who measure PEFr must have received approved training and undertaken supervised practice. The onus is also on the individual to ensure knowledge and skills are maintained both from a theoretical and a practical perspective. Nurses should also undertake this role in accordance with an organisation's protocols, policies and guidelines. ■

REFERENCES

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