Implementing FIRS Pulmonary Function testing program in emerging countries (work in progress)
FIRS Task Force

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Aims of the Task Force

• The high rise of smoking habits, and domestic and outdoor pollution in emerging countries has focused attention on the necessity to detect early signs of pulmonary obstruction in general and COPD in particular in a difficult economic and health context.
• Numerous guidelines had been set that recommend specific screening and monitoring programs.

• They are likely not relevant when cost and trained personnel issues are predominant and health demand is huge.
International guidelines

Current international guidelines recommend the use of post-bronchodilator spirometry to detect obstruction, as defined by:

a low FEV1/VC ratio *and* a low FEV1

[ATS, ERS, BTS, GOLD etc]
Performance standards

• Performance standards for spirometers and spirometry tests are well-established [ATS/ERS 2005] for hospital and university laboratories
• But the real issue is that high-quality resources are not affordable for more than 90% of the population of many countries.
Early detection of COPD

• COPD screening and case-finding should be directed towards people who have a high pre-test probability of COPD
Pre-test Probability

- Simple questions can be used to determine those at higher COPD risk.
• The yield of spirometry testing will be much higher in smokers over age 45 or having smoked more than a given number of years, and people with heavy exposures and dyspnea
First step
A simple check list
A simple check list

The first task of healthcare workers is to document a simple checklist asking:
1) age group,
2) years of smoking,
3) dyspnea,
4) chronic cough,
5) attacks of wheezing,
Second step
An elementary Pulmonary Function Test
wristwatch and stethoscope

- The **forced exhalation time (FET)**, as determined by auscultation at the neck or over the chest, is easily measured using a **wristwatch and stethoscope**.

- A **threshold can be established**, above which referral for spirometry to confirm COPD is indicated.
Inexpensive PFT Devices

• Peak Flow devices
• Pocket spirometers
• Office (field) spirometers
Peak Flow Devices

- Peak flow meters have been used for decades for asthma management
- dozens of models are commercially available.
- Peak flow meters are small and (almost) inexpensive (20 Euros)
Poor substitutes for spirometers

• The PEF is very effort dependent and without a graph or electronics to detect poor efforts, false positive rates are relatively high.
• The predicted values and lower limits of the normal range for PEF are poorly established for adults.
• Variability is high
• PEF is a poor index of early distal disease
Pocket spirometry

- **Inexpensive**, electronic “pocket spirometers” have been available for about five years.
- They cost 20-60 Euros and are **smaller than a cell phone**, thus their cost and size is similar to a mechanical peak flow meter.
- They **do not necessitate a power line**
- They measure FEV1/FEV6, FEV1, FEV6, and PEF
• They use simple maneuver quality checks.
• Some can connect to a personal computer or PDA to create graphs and printed reports.
• Thousands of general practitioners have found them easy-to-use
• In clinical settings, their misclassification rate is higher than on the bench, but this depends on the abnormality thresholds applied.
• Pocket spirometers do not calculate predicted values, lower limits of the normal range, nor percent predicted values, so nomograms or simple look-up tables need to be used.
Office spirometers

- They require a larger investment
- They require a stable source of energy
- They can deliver visual information and graphs
- They can incorporate reference values
Recommendations

• We recommend that when the simple checklist finds a high pre-test probability of COPD, the availability of local resources be considered when applying the next step of testing to confirm COPD.
(1) Ideally…

• When available, the subject should be referred to a PFT laboratory which uses trained and certified technologists and a diagnostic quality spirometer to perform pre and post-bronchodilator spirometry.
(II)

- When this resource is not available, a next-best choice is to send the subject to a primary care physician office or clinic where an office spirometer is available.
(III)

- When office spirometry is not available, the use of a pocket spirometer by a local healthcare provider is indicated.
• When a pocket spirometer is not available trust, but moderately, the Peak Expiratory Flow or as a last resource the Forced Expiratory Time
Simplified calibration

• Periodic testing of a biological control can be used to check the long-term performance of office spirometers
Preventing infection

- Flow-sensing spirometers with inexpensive, disposable flow-sensors which minimize the risk of cross-contamination are preferred.
- But disposable mouthpieces with one-way valves are also acceptable (if available).
Spirometry Training

• The vast majority of physicians in developing countries have an ability to be connected to the Internet (if only for an hour a week), making distance-based, self-paced learning possible.

• Of several media used by various Spirometry Project to educate primary care providers, a dozen patient vignettes were the most popular. These cases could be translated and adapted to many languages and cultures.
You do not need a doctor

• The person who works with patients to perform the spirometry test need not be a physician, a nurse, or a technologist. Any available healthcare worker can be trained.

• The skills needed to coach patients to perform good quality spirometry tests differ considerably from those needed to interpret the results.
The basic education program needs only to address simple issues

- How to perform a good blow
- Simple quality control
- Simple vignette patient cases
- When to refer
- Hygiene
Stop smoking!

• Yes, all smokers should be encouraged and helped to stop smoking

• There is preliminary data that knowledge of abnormal spirometry may improve significantly the success rate of standard smoking cessation interventions