Occupational Medicine and Occupational Surveillance

What is Surveillance?

- Examinations that are carried out to determine whether workers are experiencing any adverse health effects as a result of performing their jobs
- This determination is made by comparing the results of periodic examinations to baseline examinations, ideally performed prior to the first job assignment of a new employee.

What Does Surveillance Entail?

- Pre-placement and periodic examinations
  - History and physical examinations
  - Chest x-rays
  - Pulmonary function testing
  - Testing of target organs
    - e.g., liver function tests prior to, during and after exposure to liver toxins
    - Tests of renal function prior to, during and after exposure to kidney toxins (elemental Hg)
  - Tests for the substances themselves in urine and blood
  - Tests for the effects of the substances in urine and blood
  - Biologic markers

Occupational Medicine

- Is a unique medical specialty linking the clinical care of individual to preventive efforts in the workplace, thereby impacting not only the individual patient but also a larger at risk population.
- The field of occupational medicine is considered a subspecialty in the broader field of preventive medicine and is strongly grounded in the principles of public health, as it should be. We all work. The effort to ensure safety in the workplace is something that will benefit us all.

The Medical Director

- The vast majority of physicians who practice occupational medicine do so with knowledge gained by self-study, attendance at short courses and practice experience.
- You want to be sure that your medical director has made a major commitment to training in occupational medicine

Teaching Occupational Medicine

- 1985 – Only half of medical schools required the teaching of occupational medicine
  - Mean required curriculum time over 4 years was 4 hours!
- Now, almost no change in the percentage of medical schools specifically teaching occupational medicine to medical students, although the number of schools requiring occupational medicine as part of the curriculum increased slightly.
  - The mean number of required hours of teaching has increased by a disappointing 2 hours, from 4 – 6 hours over a 4 year period.
- The average doctor does not have enough training

Training in Occupational Medicine

- Residency in Occupational Medicine
  - Only 30 approved residencies in the United States, down from 40 ten years ago
  - The annual number of graduates from each residency program averages only slightly greater than two. This small number does not answer the requirement for academically trained occupational physicians, nor does it fill the vacancies in public health departments in many areas of the country
- MPH and practice experience
- Four specific courses in an MPH program and practice experience

Board Certification

- ABPM began board certification of specialists in occupational medicine in 1955.
- The ABPM has certified a total of 3518 occupational physicians through 2005.
- Fewer than half of these certified physicians are in practice.

Board Certification Residency

- Occupational Medicine remains one of medicine's smallest specialties.
- The number of residency trained occupational physicians certified by the ABPM is not replacing the losses to retirement or retreats from the field.
- In 2005, 101 residency graduates qualified for board certification and 63 passed the certification exam.

Board Certification Alternate Pathway

- An alternate pathway is available to physicians who graduated from medical school before 1984 – the equivalency of a residency training program
- In 2005, 38 physicians qualified to take the board examination through the alternate pathway and 23 passed the exam.
- The total number of new board certifications in occupational medicine in 2005 was 90 doctors. This small supply is far below that which would be required merely to replace the loss by retirement.

Chest X-rays
The B-reading

- In past years, many radiologists were not familiar with the many types and appearances of occupational related lung diseases (pneumoconioses) and did not always report their findings in the same way.
- In 1970, NIOSH, in concert with the American College of Radiology Task Force on Pneumoconiosis and the International Labour Office, developed a program that set standards for the identification of abnormalities in chest x-rays.
- Physicians who learn this system and pass an examination are know as B-readers.
- The system has been updated several times since its inception and now offers a degree of consistency in radiographic interpretation that was unobtainable prior to its development

Chest X-rays
The B-reading

- Specifically, the system sets forth criteria for:
  - The film quality (e.g., exposure, subject movement)
  - Classification of both small and large opacities in terms of shape and size and their extent and profusion
  - Classification of pleural abnormalities
- Whenever possible, B-readers should be used to interpret chest x-rays, since this helps ensure consistently high-quality, accurate interpretation of the films which is not easily achievable in other ways.

Spirometry

- Based on a maximal, forced expiratory maneuver
- FVC, FEV1 and FEV1/FVC
- The accuracy of its results are effort dependent and thus the test requires a subject’s full understanding, cooperation and effort

Spirometry
What Else Affects Validity?

- Equipment Performance
  - Spirometers are not certified or approved by a government or private agency.
  - However, the ATS recommends minimum performance criteria, validation to determine that specific models meet these performance criteria andd frequent calibration to ensure that spirometers remain accurate during use.
  - ACOEM recommends that calibration records be kept in a log.

Spirometry
What Else Affects Validity?

- Testing technique
  - Testing temperature
  - The technician must demonstrate correct performance as well as describe it orally to the subject being tested. The technician must enthusiastically coach the subject. Specifically, the subject must:
    - Exhale with a hard fast “blast” of air
    - Exhale smoothly with no cough or glottis closure in the first second and no leak, obstruction of the mouthpiece or variable effort and
    - Exhale completely, for at least 6-10 seconds and/or until a 1 second long FVC plateau is reached

Spirometry
What Else Affects Validity?

- Measurement of Results
  - The largest FVC and the largest FEV1 from the acceptable curves are reported, even if they are not derived from the same maneuver.
  - Also, the largest FEV1 may come from a curve that is acceptable, except for its early termination.
  - All expiratory flow rates are drawn from the single acceptable tracing having the largest sum of FEV1 + FVC.

Spirometry
What Else Affects Validity

- Technician training
  - "The key to reliable pulmonary function testing is the technician's way of guiding the employee through a series of respiratory maneuvers. The most important quality of a pulmonary function technician is the motivation to do the very best test on every employee. The technician must also be able to judge the degree of effort and cooperation of the subject. The test results obtained by a technician who lacks these skills are not only useless but also convey false information which could be harmful to the employee."
  - NIOSH approved course every three years.
  - ACOEM, NIOSH, ATS and AAOHN all recommend technician training
  - Quality control reviews to provide feedback on the quality of each technician's testing