Notes from the Chair
by Carl Mottram, RRT, RPFT

Pulmonary function testing is recognized as the predominant component of pulmonary diagnostic testing. With this in mind, the quintessential component of pulmonary function testing is an excellent quality assurance program. It is common when thinking about quality assurance (QA) to only consider equipment quality control, but the QA model for diagnostics includes all aspects of the path of workflow, including pretest, test, and post-test assessments.

Pre-test QA involves a review of the subject’s history, which should include a questionnaire specific enough to assist in test selection, obtaining accurate demographic and anthropometric information, medication usage, assuring subject compliance with pre-test instructions, and assessing if the appropriate test is ordered. The testing component includes equipment calibration, patient instruction and testing (e.g., understanding, effort, and cooperation), technologist driven protocols, technologist performance/competency, and the reference equations selected. The post-test QA process encompasses maneuver selection, interpretation, and final report review.

In “PFTs Need To Be Correlated With Patient Comments” in this issue of the Bulletin, Bob Bageant discusses how the pre-test component of the quality assurance model can affect patient outcomes. I know that you will find his article insightful.

In another issue related to quality, the National Committee on Clinical Laboratory Standards (NCCLS) is currently developing a document addressing the quality model in health care. This document, titled “A Quality Systems Model for Healthcare,” uses the ISO 9000 paradigm and applies it to the health care environment. Susan Blonshtein (past chair of our section) has been influential in the development of this document by serving as the AARC’s representative to the NCCLS. When completed, the pulmonary diagnostic QA model will be represented in this timely publication.

I have recently received several inquiries about ordering the American Thoracic Society’s (ATS) publication titled “Pulmonary Function Policy and Procedure Manual.” It is now available via the ATS website at www.ats.org. This document, authored by several members of our section, can also be a useful tool when establishing your laboratory’s QA program. If you have questions regarding laboratory QA, please do not hesitate to call any of the section leaders listed on page two of this Bulletin.

I hope you enjoy this issue, and I encourage you to send us your recommendations for future topics for the Bulletin. Our goal is to meet or exceed our membership’s educational needs.

PFTs Need to Be Correlated with Patient Comments
by Bob Bageant, RRT, manager respiratory care services, Bluefield Regional Medical Center, Bluefield, WV

As respiratory technologists and therapists, we need to gain as much information about why a physician orders a test procedure as possible. Many times we can gain valuable information from the patient’s comments and then alter procedures to find out much more information to help the physician in his or her diagnoses. The following case studies illustrate this point.

“Patient Comments” continued on page 2
In April of 1995, a 37-year-old, 5’5” tall, Caucasian female returned from a trip to the beach where she acquired a respiratory infection. After the infection cleared she maintained a wheeze. Since this woman is a nurse working in our operating room, she had the anesthesia staff listen to her chest. The wheeze seemed more audible on the right. The wheezing occasionally caused her to gasp for breath so she went to her primary care physician with complaints of wheezing, coughing, and being short of breath. The primary care physician felt she either had asthma or a pulmonary embolus (she was using birth control pills). He ordered a chest x-ray and lung scan. The x-ray report was read as normal but questioned emphysematous bullae. The scan was negative for an embolus. She was referred to a pulmonologist to take care of the asthma.

The pulmonologist evaluated the woman and had spirometry tests performed before and after bronchodilator.

<table>
<thead>
<tr>
<th>Pre bronchodilator</th>
<th>Post bronchodilator</th>
<th>Change</th>
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<tbody>
<tr>
<td>FVC 86% of pred</td>
<td>84% of pred</td>
<td>-3%</td>
</tr>
<tr>
<td>FEV.5 82% of pred</td>
<td>87% of pred</td>
<td>6%</td>
</tr>
<tr>
<td>FEV1 83% of pred</td>
<td>85% of pred</td>
<td>3%</td>
</tr>
<tr>
<td>FEV1/FVC 95% of pred</td>
<td>101% of pred</td>
<td>6%</td>
</tr>
<tr>
<td>FEV3 83% of pred</td>
<td>84% of pred</td>
<td>1%</td>
</tr>
<tr>
<td>PEFR 102% of pred</td>
<td>110% of pred</td>
<td>7%</td>
</tr>
<tr>
<td>FEF.2-1.2 5.1 (meas)</td>
<td>5.57 (meas)</td>
<td>9%</td>
</tr>
<tr>
<td>FEF25-75 71% of pred</td>
<td>87% of pred</td>
<td>23%</td>
</tr>
</tbody>
</table>

Exp time 7.19 sec 4.90 sec -32%

The studies were evaluated by the pulmonologist, who thought there was “insignificant response to bronchodilator and minimal limitation to airflow.” However, she was started on bronchodilator therapy for asthma.

During the winter of ’95-’96, wheezing occurred daily, and the asthma became progressively worse. In addition to the asthma medications, antibiotics and steroids were added along with prescriptions for migraines. By late winter, after several medication adjustments, she had three pillow orthopnea, she remained short of breath, and she was unable to exercise.

In early 1996, during a 15” snowstorm, her husband brought her to the ED with severe asthma and she was treated by an ED physician. She was admitted to her pulmonologist, who felt she must be having sinusitis problems that were prompting the asthma attacks. She received a 2D echocardiogram, CT of the sinuses, chest x-ray, and a barium swallow (negative) because she complained she could not breathe when laying on her right side. Allergy and ENT consults were not helpful, though a course of antibiotics was prescribed and taken, and the ENT physician was ready to schedule surgery (which she refused). After being discharged she returned to work but had to take nebulizer treatments between OR cases.

On steroids and unable to exercise, circulation decreased and she gained weight. She was seen by a surgeon for varicose veins, and he suggested she have a bronchoscopy if her breathing did not improve. On her own (outside her HMO) she saw another ENT physician who did a thorough H&P and more extensive allergy tests. He, too, suggested bronchoscopy if improvement did not occur.

In April 1996, while at work, she developed atrial fibrillation. The ED physicians felt the heart situation was probably related to the combination of asthma medications but also questioned her about trouble with upper body flushing and diarrhea that she had been experi-
encing. They ran 24 hour urine tests for hormones secreted by carcinoid tumors, which came back negative. A cardiologist was able to control the atrial fibrillation short of cardioversion but was concerned about the non-responding asthma and consulted another pulmonologist. Between them, they thought gastric reflux was likely but later ordered use of 24 hour Holter monitoring, and the pulmonologist again adjusted asthma medications. Review of an alarming lung scan (little air flow to the right lung), repeated with the same results, and the following PFTs caused the pulmonologist to suspect a mucus plug, which did not respond to KI drops.

1996 FV LOOP

These findings correlated with the signs and symptoms, and the reading was “further decline in VC and certainly in expiratory flow thus minimal restrictive abnormality, due to obstruction with moderate to significant airflow limitation.”

The woman was admitted for bronchoscopy, and the RT staff noted during chest PT that when she lay on her right side the O2 saturation dropped to 84%. On bronchoscopy, the anticipated mucus plug turned out to be a very vascular carcinoid tumor. She was transferred for thoracic surgery, where it was feared she might lose her right lung. At surgery she lost her right upper lobe, and even with an endotracheal tube in place, as she reacted from her anesthesia she reported she was breathing easier than she had in a long time. She had developed severe physical limitations (exhausted climbing to the top step in her home), and she had become very depressed thinking her asthma may never get better. Her family and her financial situation were both severely stressed during the period of time she was out of work.

After she returned to work in 1997 she had the following PFTs:

1997 FV LOOP

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Originally seen</td>
<td>Reevaluation</td>
<td>Post Surgery</td>
</tr>
<tr>
<td>FVC 86</td>
<td>82</td>
<td>86% of Pred</td>
</tr>
<tr>
<td>FEV1 83</td>
<td>69</td>
<td>83% of Pred</td>
</tr>
<tr>
<td>FEV1/FVC 95</td>
<td>84</td>
<td>95% of Pred</td>
</tr>
<tr>
<td>PEFR 102</td>
<td>89</td>
<td>117% of Pred</td>
</tr>
<tr>
<td>FEF25-75 71</td>
<td>40</td>
<td>68% of Pred</td>
</tr>
</tbody>
</table>
After another year (without asthma) we tested her for our own interest, and we were pleased to find that she is continuing to do well:

### Patient 2: You wanted what?

As PFT techs/therapists, it is also our responsibility to provide the physician with a study that helps to validate the problem actually being experienced by the patient. In one example this year, we did not succeed the first time out, causing the family to return with an adolescent child because we did not perform the study desired by the referring physician.

Typically, a referring physician as his secretary schedule PFTs at our hospital-based PFT lab, and our secretary makes the appointments. We have a list of choices, such as "spirometry," "lung volumes," "diffusion," etc., but in this case the procedure was scheduled as an exercised-induced bronchospasm study, and we performed the study by our protocol. We confirmed the diagnosis only to find out that the referring physician knew the diagnosis but wanted to know something else.

The adolescent was enrolled in a scuba diving course, and the instructor would not let her continue unless the physician said it was okay. The physician, in turn, wanted us to administer her prescribed bronchodilator then exercise her and confirm that the bronchodilator prevented her from becoming symptomatic for a period long enough to cover her dive. We studied the adolescent again (causing a parent to miss work again) and provided the desired results.

Thus, when there is some question as to what the physician is looking for, we should discuss the situation with the patient (family) and/or referring physician prior to performing the study. Repeat studies are costly and aggravating to patients, their families, and physicians, as well as to the testing facility.

### Patient 3: I hear you

In a recent situation where we did communicate with the patient, we provided the needed information and saved a repeat study. The patient was scheduled for "spirometry," but when we questioned him about his symptoms he said he was only short of breath when he was lying down. Thus, we performed spirometry in the upright position, then had him lie on a stretcher for repeat spirometry. He became significantly obstructed. He soon had corrective surgery for a movable obstruction – but had we performed only "spirometry," the definitive therapy would have been delayed.

At our hospital, we have developed a protocol that helps direct some of our testing based on patient comments or initial test results. But it does not cover every possibility, so we must listen to what the patient is telling us.

### Review of CPGs

The AARC Clinical Practice Guidelines Steering Committee would like your help in revising the Clinical Practice Guidelines (CPGs). We need the respiratory community to identify specific areas of the CPGs for revision. Note that the CPGs are evidence based; therefore, please identify areas for revision, provide suggestions for revision, and cite peer-reviewed literature to support those suggestions.

Please e-mail your specific comments to the chair of the Steering Committee, Dean Hess, PhD, RRT, FAARC, at dhess@partners.org or fax them to 617/724-4495.

You will find copies of all the CPGs published by the AARC at: [http://www.rcjournal.com/online_resources/cpgs/cpg_index.html](http://www.rcjournal.com/online_resources/cpgs/cpg_index.html)
FYI . . .

AARC's CPGs included in AHCPR's National Guideline Clearinghouse™

The AARC has been the largest association contributor to the National Guideline Clearinghouse (NGC), an Internet-based tool of the Agency for Health Care Policy and Research (AHCPR). This valuable tool, which was officially introduced by the AHCPR in January, is now up and running at http://www.guideline.gov. To date, the NGC contains more than 300 evidence-based CPGs submitted by over 60 health care organizations and other entities, with the AARC contributing 44 guidelines, by far the largest number contributed by any association. All submissions are abstracted into a standardized format that enables users to compare CPG recommendations more quickly than ever before. (The AARC approved the standardized format for each of the association guidelines appearing in the NGC website.)

The NGC is a comprehensive database of evidence-based CPGs and related documents produced by AHCPR in partnership with the American Medical Association (AMA) and the American Association of Health Plans (AAHP). The NGC mission is to provide all health professionals, health care providers, health plans, integrated delivery systems, purchasers, and others an accessible mechanism for obtaining objective, detailed information on CPGs and to further their dissemination, implementation, and use. The AARC will continue to work with NGC as new and/or revised guidelines are available from the Association, and we will keep you informed of any other NGC developments of interest.

Allergies may predict chronic fatigue syndrome

Allergies to foods, plants, or animals could cause chronic fatigue syndrome (CFS) in some people, say researchers from the National Jewish Medical and Research Center who received a grant from the National Institutes of Health to study the connection. Their research will look at four groups of people -- one with CFS, one with allergies, one with depression, and a control group -- in an attempt to determine what factors play a role in the condition, which is defined as six months of fatigue that interferes with daily functioning and is related to no known disease.

So far, investigators have looked at a number of chemical changes in the body that may signal CFS and have found that allergy is the only consistent finding. Seventy-five percent of people with CFS have allergies, compared to 10 to 20 percent of the general population. (Journal of Allergy and Clinical Immunology)

Dutch population suffering from lung function decline

Dutch investigators who studied 1,155 people age 25 to 70 in 10 practice districts, found that more than 52 percent (604 persons) showed symptoms of previous undiagnosed COPD or asthma during the screening. Of those with symptoms, 384 agreed to participate in a two-year follow-up monitoring project. In this group, more than 20 percent showed either persistently reduced or a rapid decline in lung function. More than 19 percent of the remaining participants showed objective, mild signs of COPD or asthma.

According to the investigators the “two-stage detection program revealed that a large proportion of the general undiagnosed population showed symptoms and objective signs of COPD and asthma.” I support their initial screening criteria, a random sample of 200 additional persons who tested negative was followed for 3.6 years. None of those individuals were diagnose with either COPD or asthma during that time period. (American Journal of Respiratory and Critical Care Medicine, 12/98)