

## VOLUME 3(3) September 1983

Below are short overviews of the articles that appeared in this issue of VOLUME:

### **The Evaluation of a Computerised Spirometry System (Judith A. Roget and Catherine M. Owen)**

This comprehensive and well written article describes the evaluation of a fully computerised expiratory spirometry system (VPAC) developed at the Alfred Hospital, Melbourne. The system was based around the S-model Vitalograph (wedge bellows) spirometer. An electrical signal (volts) proportional to volume was obtained using a linear potentiometer fitted to one side of the bellows and flow from a mechanical differentiator (galvanometer) fitted to the other side. These signals were processed (via a custom built interface board) by a 'rudimentary' PC consisted of an Exidy Sorcerer microprocessor (Z80). The Sorcerer's RAM had been expanded to 47 kilobytes and had an 8 kilobyte interpreter version of Basic stored in ROM! The VPAC software was custom developed and written in Sorcerer Basic and subroutines in machine code – the latter being utilised whenever a faster execution speed than provided by Basic was required. The computerised spirometry system allowed flow-volume curves and all spirometric indices to be displayed on a video monitor as the patient exhaled and superimposed successive curves. The best curve could be selected by the scientist and printed on the final report sheet along with predicted values, etc.

The evaluation of the VPAC system was conducted using a calibration syringe to determine volume accuracy, and 15 subjects and an explosive decompression device (EDDE) to assess dynamic performance. The results from VPAC were compared with results obtained from their laboratory standard pneumotachograph system (HP 4051). Although EDDE was invaluable in developing and evaluating the VPAC system, it did not fully demonstrate the true magnitude by which their VPAC system tended to overestimate  $FEF_{25-75\%}$  in subjects, or to adequately check the FVC endpoint algorithm (defined as no change in volume over two seconds was used). However, because EDDE produced highly reproducible expiratory curves it was found to be suited for calibration and for detecting change over time. The VPAC system was used routinely for a number of years.

*Many of our "older" members will remember Judy Roget who retired in 1993. She was a founding member of the Society and served as President in the mid 1980s. She was extremely well respected for her dedication and professionalism, broad knowledge and experience of respiratory technology, mentoring of young scientists and for the exceptional laboratory that she developed and managed at the Alfred Hospital in the 1970s and 80s. I am personally very thankful to Judy for supporting me during my early years in Australia and thoroughly enjoyed the three years we worked together prior to her retirement. When Judy and Catherine (another very talented scientist) developed the VPAC spirometer system fully computerised systems were not readily available .... so .....if you wanted one, you had to build it yourself.*

### **Monitoring of Peak Expiratory Flow Rates in Patients with Obstructive Lung Disease (Barry P. Hickey, FRACP)**

This short article asks the question how should one monitor the progress of patients with obstructive lung disease? It provides an overview of the underlying physics and

physiology of PER and includes three asthma cases to demonstrate the value of serial monitoring of PEF. Dr Barry Hickey (Respiratory Specialist in Queensland) suggested that regular PEF monitoring was a practical and inexpensive way of objectively assessing the efficacy of treatment regimens as the test requires only a brief effort which is easy for patients to perform and allows them to monitor their own lung function and response to therapy. He concluded that PEF is a practical (cheap, portable, simple to perform) index of the severity of airflow obstruction and has considerable value in the management of asthmatics with severe airflow obstruction.

### **Mouth-Piece**

Several References of Interest were listed, notably a seminal article by the late Professor Ludwig Engel (Westmead Hospital, Sydney) describing gas mixing in the acinus of the lung (Journal of Applied Physiology, 1983).

*Bruce Thompson may correct me here, but I believe this to be a landmark article that led to the “trumpet model” and contributed to the development in the 1990’s of the multiple breath nitrogen washout test that is now regarded as the most sensitive non-invasive test of heterogeneity of airway emptying.*

**Please contact me if you are interested in a copy of this or any other issue of VOLUME.**

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