

IT'S ALL ABOUT THE CHILDREN: THE VIRTUAL PICU

by Lisa Rapple M.Ed RRT

Clinical medicine has made great progress in recent decades, greatly improving the quality of clinical practice. But in the area of pediatric critical care there continues to be a wide variability in practice standards. This is due, in large part, to two characteristics of the practice itself. First of all, an individual pediatric intensivist will not see a large number of patients with a particular condition or illness to establish a "best practice" standard. And secondly, if they do develop an effective treatment, they do it in isolation. Their work goes unshared with other intensivists.

In 1998 a diverse group of pediatric intensivists and professionals from across the United States decided to meet and discuss this common concern. What prompted this meeting was their continued discussion of these concerns in other meetings with no real resolution. They focused on advancing their subspecialty, their clinical practice, education and communication. Their key question for this informal beginning was "how to treat critically ill

children in this country more than one at a time".

From the 1998 meeting arose a mission statement, problem identification, goals and approaches for addressing their mutual concerns. These are described at their website "The Laura P. and Leland K. Whittier Virtual Pediatric Intensive Care Unit" at www.vpicu.org.

To address the issue of data collection and promote professional networking among pediatric intensivists and practitioners the VPICU Performance System (VPS) was created. VPS addresses the first goal of VPICU "To develop the technology and expertise now within cost effective reach to allow inter-institutional data sharing for the creation of extended, multi center (distributed) knowledge bases."

The VPS software and comparative data collection program are a collaboration among three organizations: the VPICU at Children's Hospital Los Angeles, National Outcome Center at Children's Hospital of Wisconsin and NACHRI. As they describe it: "The VPS system is a clinical database dedicated to standardized data sharing and benchmarking among pediatric ICUs. All participants collect information on patient and hospital measures, diagnoses, interventions, discharge, organ donation, and pediatric severity of mortality scores. Users can choose to collect data for multi-site research studies and additional internal research needs through customizable interfaces."

In the fall of 2005 VPICU had achieved the goal of developing and distributing software to assist PICUs in better understanding their practice; both locally and, importantly, on a national aggregate level, through the development and operation of the VPICU Performance System (VPS). The database had grown to over 70,000 patients and they were able to provide detailed reports about performance for the participating ICUs. Multiple research projects, both retrospective and prospective were under way. In addition, many ICUs were using the software and its unique features for their own internal projects that range from line sepsis to structuring resident programs to tracking delayed discharges. Growth and success necessitated a change. VPICU decided to create an independent entity to continue this work. This new entity was named Virtual PICU Systems or VPS, LLC. It is accessed via its own website entitled "myVPS Online" at <https://myvps.org>. There is a link on the VPICU website as well "VPICU Software" on the top bar of the home page.

A second goal of VPICU is "To develop critical care telemedicine to enhance critical care." In September of 2005 doctors at Children's Hospital of Los Angeles were able to guide physicians in Japan to initiate diaphragmatic pacing on a pediatric patient



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via VPICU telemedicine. The Japanese patient had diaphragm pacers surgically implanted in LA using the innovative thoracoscopic technique originally developed there. Because pacing is not actually started until 2-months after surgery, the option of VPICU telemedicine was used.

To support the goal of enhanced education VPICU has an education section, accessible from the top bar, where education material is presented in a practical format. Case studies, clinical examples, lecture material and interactive discussions are used. VPICU is hoping to develop an electronic tracking system that practitioners can use to track self-education. A "Question of the Month" is presented, with archives of past questions. Case studies are enhanced with clinical materials such as x-rays and lab values. The answer is also given at the bottom of the presentation.

The PICUList is an email mailing list for discussion of Pediatric Critical Care issues. To subscribe, send an e-mail to PICUList@vpicu.org with the word "subscribe," typed in the SUBJECT. All practitioners interested in pediatric intensive care medicine are welcome. At the main website click on "PICUList" and you will find Etiquette instructions and user instructions.

The "PICU Directory" can be used to search for a Pediatric Intensive Care Unit by state and/or by country. The hospital name and address is given and stats on admissions and staff are given. There is also contact information. If you are a registered facility you can update that information right from the website, or can initiate registering your facility.

If you click on "VPICU Directors" from the home page you will be taken to a list of the Directors. They are listed with their professional background information and personal contact information including websites. You can also read their Medical Practice Philosophy, their Professional Biosketch, and the Computer/Telemedicine/ Informatics Projects they've worked on.

The website itself is very easy to navigate. You will quickly find all the information that I have described and can link over to "myVPSOnline". Anyone with an interest in pediatric intensive medicine will find something of interest here. This would be a great place to initiate networking in the field. And if you are a PICU, certainly you will want to investigate participating in some or all of what this organization has to offer.

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"Nine to five might be a problem - I like to sleep in."

So there you have it. As Kent Savage said, we don't need to be challenged with organizing the clinical, financial and quality data needed to manage a sleep program. We don't need to cope with stacks of paper audits, calculations and manual reports. Some of the questions you may want to answer to determine your readiness for a database are: What data do you currently track and how do you report this data? What are my current financial and human resources available to coordinate this process? What obstacles do you anticipate in implementation of a database? Where do you want to be in the future with data management and reporting?

A database comprised of patient demographics, sleep related clinical measures, encounter history, quality audits and basic financial data can become the backbone of a sleep program management system. Combined with the expertise of a program's clinical and non-clinical human resources, the database becomes the tool for both clinical and fiscal operations leading to successful patient outcomes, clinical quality, clinical safety, accreditation and higher pay-for-performance.

Simply put, a database is a documentation tool. A database is designed to enter data at the time of collection, which results in reduction of stacks of paper and saving personnel time to collect data retrospectively, making the process extremely efficient and cost beneficial.

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requires that flow rates into the bag be adjusted to keep the bag sufficiently expanded, but not *too* expanded. In some designs, there is also a requirement to adjust the flow out of the bag via use of a variable flow resistor where the gas egresses the bag. And in some designs the egress of the gas from the bag is controlled by partially occluding a hole in the bag with your thumb. In the hands of experienced clinicians, these design flaws can be overcome, but "experienced" clinicians are not always using the bags. I have personal knowledge of a number of adverse events related to clinicians misapplying flow-inflating resuscitation bags.

I have concluded that overall patient safety is enhanced by eliminating the use flow-inflating bags. And we have almost completely converted our hospital to self-inflating bags. Anesthesia remains a hold out and they have circled the wagons on this issue. They argue that they need flow-inflating bags to do inductions and intubations. They argue that they can attach the flow-inflating bag to the endotracheal tube and allow the patient to spontaneously breath, without imposing too much work of breathing on the patient. They claim that the valves in a self-inflating bag impose too much inspiratory work of breathing on patients, especially small children and infants. As indelicate as it may sound, I just don't believe this. If there is sufficient flow into a self-inflating bag with a duck bill grommet designed valve, the valve actually stays slightly open all the time. Our next stop on the issue is the bench. We intend to measure the imposed inspiratory work of breathing through endotracheal tubes of various neonatal and pediatric sized, while attached to different styles of manual ventilation bags. Obvious man may strike again.

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