

## Acute Dialysis Quality Initiative

### 2<sup>nd</sup> International Consensus Conference

#### REVIEWS

*ADQI workgroup reports were sent to leading experts who served as external reviewers.*

*Reviewers were asked to provide reviews and editorial comment on the workgroup reports.*

*G. Daniel Martich*

#### Workgroup 6: Information Technology in Acute Renal Failure Research

Generally, this workgroup has put together a thoughtful concise yet far-reaching evaluation of information technology as it relates to renal replacement therapy. They have considered many of the opportunities, benefits and risks of pursuing information technology as a means of enhancing patient care in dialysis patients. My thoughts on the report and the future are below.

Envisioning the future of medical informatics as it relates to individual disciplines as well as health-care as a whole approximates what we do as physicians in medical decision-making. We have lumpers and splitters in health-care and generally speaking, making one coherent story for an individual patient's diagnosis and treatment plan is the optimal solution. The same could be said of information technology in healthcare. We have a multitude of best of breed systems that may work well in an intensive care unit, for an acute dialysis area, operating theater, emergency department or other data & information intensive locales within a hospital. However, there is no one system that ties these acute care settings, as well as the growing ambulatory and home-care areas together. There is a trade off between optimizing the information provided at a very granular level in the critical care areas above versus the generalists' needs of a broad overview in an outpatient or home care setting (1). For instance, while hourly or more frequent, heart rate, blood pressure and temperature may be appropriate for the ICU, ED, OR or dialysis unit, this would be information overload and "noise" for the primary care provider who is seeing the patient months or years after his acute event (2). How do we filter these appropriately? Computer information system companies have yet to solve this conundrum, but are getting closer and closer with bridge technology such as CCOW (clinical context object working group) which allows single user sign on and linking between disparate medical information systems while retaining the working context (i.e. same patient across applications, same time and date with dynamic switching no matter in which system you may be working). An example at the University of Pittsburgh Medical Center is the effort now being piloted with CCOW technology from a vendor called Sentillion that will enable a single sign on to the ICU system (EMTEK/Eclipsys), the hospital transaction system (Cerner, PowerChart), PAC system (Stentor) and the web-based home grown on call, directory, bioterrorism alert, paging and notification system (UPMC Physician Portal).

Perhaps the more difficult task for those of us in all clinical areas in healthcare relates to the need to standardize processes while still enabling innovation and research. Healthcare is commonly benchmarked against the airline industry in terms of the advances that have been gained by airlines worldwide in standardizing checklists prior to take-off and certain routines that the flight crew goes through while landing airplanes (3). Many outside of the healthcare industry say that physicians should have the same checklist as it applies to medical decision-making. So too is healthcare informatics compared to the advanced information systems in banking. Dee Hock, the founder of VISA card international, has assailed medical professionals and healthcare in general by saying that he created a system that allowed anyone in the world with one of his cards to charge anything that they wanted at little or no cost to them or to the provider of the goods and services and capturing that with nearly 100% accuracy for millions of card-holders. At the same time, Mr. Hock has said that hospitals and physicians work in a vacuum of information and data transfer not knowing what one another are doing. For the most part, he is correct. What the would-be analogizers miss is that healthcare, unlike banking and aviation, is not an industry with standards. Healthcare as an industry is much more akin to a mom and pop hardware store than to Home Depot<sup>®</sup>. If healthcare is an industry at all, it is a cottage industry with little similarity from hospital to hospital, laboratory to laboratory and physician to physician. If we are going to try to improve healthcare by automation of certain processes like acute dialysis, we need to first standardize those processes that can be, decrease unnecessary variation in care and culturally change those of us who were weaned on being individuals in medical school by “trust no one, but yourself,” to participating in a team-building experience (4). This will mean accepting definitions for acute renal failure, standardizing on units of measure that can be applied across the world and entrusting that the next care-provider will carry out the plan much as you would have if you go away to a meeting or on vacation. Daunting tasks both, but if the healthcare profession is to survive, these are essential changes in our *modus operandi*.

## References

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## Workgroup 6: Information Technology in Acute Renal Failure Research

The paper is divided into five issues. I would like to deal with each of these issues individually:

### **Improving Patient Safety by error reduction**

This section discusses how IT can reduce medical error. ‘Process-Mapping’ of the act of acute dialysis is described and the point is made that with the machines being intrinsically safe errors will therefore more likely be caused at the user/machine interface. In order to set the scene, reference could have been made to the IOM report written in 2000 (1). In this report the magnitude of medical error is stated and a figure of 98000 deaths per annum in the USA due to medical error is given, many of these deaths being preventable. The contribution to this number of medical errors made during the dialysis of patients with acute renal failure is unknown. The recommendation from the IOM report is that clinicians should practice evidence based medicine (EBM) and that IT in the form of Decision Support and Computerised Physician Order Entry is the way forward to reduce medical error. The goal of decision support is to supply the best recommendation under all circumstances (2). In its latest report (3) the IOM defines a clinical decision support system (CDSS) as “software that integrates information on the characteristics of individual patients with a computerized knowledge base for the purpose of generating patient-specific assessments or recommendations designed to aid clinicians and/or patients in making clinical decisions”. Systems that generate electronic reminders and electronic physician order entry systems have proven to both improve quality and cost effectiveness of care (4). Protocols that are built on complex rule bases and use extensive patient data can also significantly reduce clinical error rates. These highly detailed, explicit, computerized protocols may actually achieve a consistency of clinical decision making (5).

### **Monitoring of current practice of dialysis**

This section states that there is no central register for acute dialysis. There is obviously a need to track disease in acute renal failure and corresponding therapies and to collect the data firstly as a pilot scheme and eventually onto a national or largescale database, similar to ICNARC (Intensive Care National Audit and Research Centre) Casemix program in the UK.

### **How does IT reduce practice variation?**

This section makes an important point that unless practice is standardized, new research findings may lack cross-applicability and reproducibility. For instance, on the issue of pathology laboratory results, there is a wide variation in practices, normal ranges, protocols and diagnostic equipment. Unintentional variation in practice can be reduced by adequate training and the introduction of formal certification or competency-based training modules. IT can be of help here in producing simulated examples for training and assessing staff.

### **How will IT improve patient assessment and decision making?**

As stated, real-time analysis can improve assessment and therapy. It is often the case that the more complex the clinical situation the less reliable the data that is captured when manual charting is used (reliability paradox). The use of CISs which automatically chart patients' vital signs and other characteristics by interfacing with the laboratory, X-ray and monitors will ensure all the data is captured, however the clinicians still need to decide what data to capture and how often if it is going to be of use in a clinical situation.

### **How should IT be applied to the dialysis equipment to improve the quality of the dialysis delivered in the acute situation?**

Clearly the huge heterogeneity in current machine design and software specification will impact heavily on any data collection. The authors may need to devise a product inventory and then produce a timetable of how they can expect to introduce IT immediately and decide where machines need to be replaced first before IT can have an impact. The importance of this initiative cannot be overemphasized; consortia of large employers such as the Leapfrog Group (6) which includes GE, IBM, GM, and Boeing, have focused on the issue of medical errors from the payer's perspective. This group has defined issues that will influence their choice of healthcare organizations for the respective companies' health plans. One of their three core recommendations is the hospital-wide implementation of Computerised Physician Order Entry systems with online clinical decision support. Computerized protocols represent the most advanced form of on-line clinical decision support, but they require the computational framework of point-of-care information systems and should be integrated with electronic order entry systems.

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