



Editorial

The ICUC[®] app: Can it pave the way for quality control and transparency in medicine?



The common goal for improvement in any Health Care system is to develop the basis for and to provide optimal care to patients in an efficient, safe, cost effective and sustainable manner.

Rising global health care costs [1] and avoidable complications are increasingly debated in medical and non medical publications [2–6]. Criticism of today's Health Care Systems range from scientific misconduct [7–13] and insufficient documentation of clinical activity [14,15] to unnecessary, or inappropriate surgery [3,10,16,17] and inadequate learning tools [18–20].

The causes of the deficits cited above are numerous and changes are correspondingly difficult to achieve. Delivery of health care is complex with many managerial struggles. Doctors used to be the main decision makers, but they have lost their decisional power [21] to many different idle players. Every one of these groups has different focus, knowledge, interests and fears. Not surprisingly therefore many doctors tend to practice defensive medicine [5,6,22–26] and to overlook the importance of management and economic savings in health care [25,27].

Fundamental problems in health care

A lack of transparent and accessible data at the technical level and distorted incentives at the psychological level are common denominators for deficits in different fields of today's health care, including:

1. Health care management and hospital finances
2. Handling of research data (basic and clinical)
3. Documentation of clinical activities
4. Education tools

The responsible use of available resources should minimize concerns and diminish the risk of complications resulting in optimal patient satisfaction. Furthermore, adequate data handling should both protect privacy and allow progress in clinical and basic research. Finally, education has to grant optimal renewal of health care professionals continued personal development. Unfortunately, the key players in the above mentioned four fields are driven by different interests and priorities.

A concept for possible improvements

Maintaining original data unchanged and rendering them transparent and freely accessible theoretically provides improvements in all the four fields mentioned above.

Implementation, however, is difficult to realize because issues to be addressed are very different in the four mentioned fields, these vary from one country to another and involve many different decision makers. Not surprisingly, therefore, changes in management and politics are slow to be executed clinically.

Efforts to guarantee transparent handling of research and clinical data is instead not the task for a single surgeon but for scientific and [28] hospital organizations requiring political and managerial engagement. National and international coordination is needed to improve the above.

“Teaching and learning” are one of the above mentioned fields, where initiatives of smaller groups can be successful, despite the fact that a strong resistance to change has to be expected.

The literature provides evidence for the following facts concerning education:

- tools for the acquisition of knowledge and skills exist [28–31]
- surgical skills can now be measured [32–34]
- the skill level correlates with the complication rate [32]
- complications increase social health care costs [1]
- teaching/learning deficits can cause complications [35]

The connection between education, health care quality and its economic impact explains why an significant amount of money is spent for continuous medical education [29]. Today the Medical Industry provides about half of the funding for Continuous Medical Education (CME) in the United States, through sponsoring educational events put on by educational organizations. Maintaining scientific independence of CME programs and optimizing learning tools is a relevant issue [18–20].

Technically, the rise of information technology allowed modern learning tools to adapt to personal needs, personal learning rhythm and free choice of time and location. According to many educators open access tools and journals are the way to go [36,37]. An open source electronic learning tool for surgical procedures can help to maintain scientific independence, improve quality and increase user comfort (online learning) and advantages (no expensive subscription).

Such a source of learning has been recently developed to contribute to the important facet of education and can be downloaded free of charge (ICUC[®] app for iPad, www.ICUC.net). The tool is based on Continuous and Complete data of the technical performance of surgical procedures. The basic data remain Unchanged and are anonymized. The relevant parts of the recorded data are integrated into the learning tool. The collected procedures

were performed at several respected hospitals. The recordings were produced by independent medical professionals within a predetermined, agreed and audited period of time. The resulting series—however small they might be - are therefore prospective and continuous. The individuals in charge of image recording, are surgeons who ascertain that no essential step is missed.

This guarantees that no shortcomings or errors are missed, thereby realizing a solid mirror of the surgical procedure using modern IT technology. The result is a repeatable, real time experience, as if you were traveling to different surgical centers around the world. The user can scroll through the data according to his individual needs and at an individual pace when and where he wants. Complications are included – after anonymization – as they are also a valuable source of learning. An additional advantage of anonymization has been the basic improvement in expert critiques. Critique of anonymized data is not associated with the potential risk of offending colleagues. Furthermore, it preempts inappropriate legal consequences [22].

The ICUC[®] app offers far more details compared to any other conventional tool and so far the expert comments of the cases that are displayed have increased credibility and created an attractive type of interaction. For the less experienced user animations and basic biomechanical comments have been included to make the presentation more systematic and clearly indicate when there is a deviation from “textbook teaching”. Conventional indoctrinations have been avoided, since it is clear that there are many ways to solve a given clinical problem. Also, a variety of cases has been included as we know that there is a difference between “work as planned” and “work as done”. Sub-optimal cases are a valuable source of learning. The available large number of detailed cases can be used as positive or negative examples by teachers, who will comment on the material and define personal preferences to establish house doctrines, e.g. for grand rounds or during case discussions sessions during courses.

The surgeon’s performance – although not frequently specifically assessed in the literature – is not the only factor influencing the outcome of a surgical procedure/treatment, but one can argue that it can be considered as a core element [32,34,38]. The single Surgeon’s performance cannot be expected to be continuously at the same level [38]. Adverse effects can occur also to experienced surgeons for many reasons. A change of attitude toward adverse effects is required [39]. In this respect surgery could learn from aviation [30]. Secondary (“ex-post”) analysis of the detailed data registered following the Surgicorder[®] concept – resembling those of a flight recorder – might allow reconstruction of the process that led to an adverse effect or a difference between work as planned and work as done [25]. Understanding the mechanisms might allow a change of processes and avoid recurrence of adverse effects. This makes more sense than searching for a culprit. Avoiding shortcomings/complications is a great added value. Less complications are an advantage for patients and improved performance in a given institution. Although single hospitals might profit from treating complications [1] social health care costs decrease with a decrease of complications. However, the time to implement the changes needed will probably take some time [4].

The first experiences with the ICUC[®] app seem to show, that the advantages of transparent data handling, – now applied for the first time to learning – are welcomed by the users and offer value.

Efforts to improve the quality of learning tools appear to be justified, when the consequences for health care costs are considered; Optimized learning tools allow to efficiently acquire knowledge and skills. High skill levels increase the likelihood of avoiding complications which decrease social health care costs.

In a second phase a snowball effect might result, if and when non-medical decision makers/stakeholders in health care realize

the economic implications mentioned above. It would then become evident that the importance of transparent documentation transcends the field of education and might progress to the other areas in health care. Scientific and clinical misconduct could be diminished by transparent handling of data. Ultimately health care management and politics could be positively influenced.

In conclusion, lack of transparent and accessible data is a common denominator for many shortcomings in different sectors of health care. Complete documentation and transparent handling can allow to generate progress in many fields ranging from learning, to clinical and research documentation, innovative therapeutic strategies and to health care management. A concept of complete documentation the ICUC[®] app could serve as a possible solution, using teaching in surgery as example. Its use could enhance progress in surgical education in a similar way the flight recorder did in aviation. Subsequently, the lessons from learning might expand to other health care fields like documentation in research and clinical medicine and health care management.

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