How to Use Health Informatics to Manage the Information Overflow Created by Itself?

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Since its beginnings, medical or health informatics has some problem with its self definition. In the early years using a computer for any problem in any health care setting was sufficient to regard the work as medical informatics. But since the use of computers became quite ubiquitous, this cannot be a “necessary and sufficient” attribute of our discipline.

The following three papers present results of works that first have been presented at Medical Informatics Europe (MIE) 2011 in Oslo. By tradition, European Federation of Medical Informatics (EFMI) selects papers at each MIE conferences that are considered to be worth to publish as original journal article. The Publication Officer of EFMI has the honour and obligation to write an editorial introduction to these articles. Year by year, this work appears to be more difficult due to the thematic diversity of the papers that are selected by their value, not by some topical focus. This is in parallel with the mentioned problem of the self definition of medical informatics. It is not just by chance that the topic of the 50th anniversary conference of Methods of Information in Medicine in 2011, Heidelberg was the same problem: what makes medical informatics a self-standing discipline [1].

Looking at the current three articles, they apparently show the usual thematic diversity: user acceptance, patient safety [2], image processing, differential diagnostics in Parkinson disease [3], translational research in inherited cardiomyopathy [4] – is there anything common in these topics? More precisely: is there any exclusively common feature in these papers?

I still do believe, what I stated in my presentation in the mentioned conference in Heidelberg, that essence of all medical informatics research is the formalisation of problems in health care [1]. But when I went through these three studies, a new aspect appeared to me that is not in contradiction but gives an additional flavour. This new common feature is that all the three paper are facing with the problem of finding the relevant information in a large amount of data.

As computing becomes ubiquitous, as medical and information technology develops rapidly, we trivially run into a problem that never was so serious as today: the information overflow. Finding the volumes of interest in an MR image [3], providing the relevant information from a drug interaction database to the physician [2], combining relevant genomic data and literature and translating them to the use in clinical practice [4] – these are all tools to navigate in an incredibly large knowledge space.

The problem of information overflow is nearly a common-place today. The wonder is that we strive to use the same technology to overcome the problem by which it was created. Thanks to information technology we have drug interaction database – but we...
need an alerting system to warn to prevent the physician from inappropriate ordering. We have MR images but we need an image processing system to find the relevant parts of the images. We have genomic and literature databases but how can we use them at the bedside?

From this point of view, the paper of Jung at al. [2] appears to be the most exciting. Look at the following sentence:

“Around half of the respondents see possible alert overload as a major problem”

This is amazing. We collect a drug interaction database. There is a huge amount of information in it, much more than what we could memorise, or could effectively browse on demand. For that reason we create an alerting system to manage the information overflow that warns the physician if an inappropriate order happened. This selects only the relevant part of the interaction database for us. And then, we are facing with the problem of alert overflow. Maybe we will need another system that selects only the most relevant alerts for us.

Some people may believe that many data together is information, a huge amount of information makes knowledge, and a lot of knowledge is wisdom. But think of this in reverse order: we need wisdom to decide what is useful to know. We need knowledge, how to find the relevant information etc.

It is clear from these papers that an unstructured mass of data helps hardly more than nothing. As the commentary to the paper of Jung et al. [5] highlights: we have to prioritise our data: certain drug interactions are extremely important, and the corresponding alerts should not be over-ridden, others are less important that should not interrupt the clinical workflow. In other words: we have to structure the data. What we really need, is not merely the huge amount but a system of information.

Forming a structured system from an unstructured mass may be called formalisation. So we are again in the heart of health informatics. If we succeed to structure a health problem in a computationally tractable way, we gain a huge amount of information and then we have to structure it.

This recursive nature of information overflow may cause a certain sort of disenchantment. No question: we are far from the end of the story. But many interim results – as those that are presented in the following papers – serve the wealth of the patients. When John Bryden asked: Have over 35 years of health informatics made Europe healthier? [6] – he gave a definitely positive answer. As John, who was a distinguished colleague and friend of EFMI passed away last year, it is worthy to dedicate this editorial to his unforgettable memory.

References