Keynotes

[Keynote 1]
KOALA: An Internet-based learning and knowledge management system

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Research demonstrates that learning is enhanced when learners identify their own needs, select their own strategies and evaluate their own learning outcomes. Over the past decade, the concepts of reflective practice and life-long learning have influenced the organization of both medical education and continuing medical education. In addition the disciplines of distribution of medical informatics and education knowledge management have been catalyzed into the consciousness of medical educators by the speed of information access and distribution from Internet-based technologies.

These concepts incorporated into a learning model based on reflection and self-management of knowledge have not been broadly incorporated into obstetrics and gynecology residency training in Canada. Upon completion of residency, students are evaluated by exam and satisfactory completion of FITER, the Final In-Training Evaluation Report. FITER is based on the roles outlined in the RCPSC's Canadian Medical Education Directions for Specialists 2000 Project report. These new roles, including Medical Expert/Clinical Decision-maker; Communicator; Collaborator; Manager; Health Advocate; Scholar; and Professional, necessitate that residents hone their information literacy and knowledge management skills. Both the Project Panel on the General Professional Education of the Physician and Assessing Change in Medical Education, The Road to Implementation reports highlight that a strong grounding in information management can enhance professional practice.

One of the educational tools that lend itself to the integration of the principles of reflective practice, information literacy, and educational knowledge management is that of a learning portfolio.

Documentation of activities in a portfolio has been used in both undergraduate and continuing education to promote reflection and self-management of learning. To stimulate self-reflection and cultivate information literacy the Computerized Obstetrics and Gynaecology Automated Learning Analysis (KOALA) was developed. KOALA is an educational knowledge management system that offers an easy-to-use, point-and-click interface through which the user can record details about the motivation for a particular learning event, specific questions relevant to the situation, the information found and applied to the event, and the treatment and learning outcome. It also benefits program directors, who are able to review the learning experiences of all residents, enabling the provision of timely feedback for personalized educational planning, and subsequent evaluation.

A stand-alone version of the dynamic relational database was first introduced at a Canadian obstetrics and gynaecology residency-training program in June of 1995. The subsequent development of an Internet version allowed for a multicentre pilot project to measure the impact of the KOALA program on self-directed learning habits and perceptions. 7,049 patient encounters and 1,460 critical incidents of learning were recorded by 41 residents at one KOALA-exposed school and three KOALA-naive schools over five months during 1997. Residents at the KOALA-exposed school were more likely to have a cognitive critical incident (45% vs 6%, $p<0.0001$), had a significantly higher perception of their self-directed

learning abilities (p<0.05), were looking forward to learning for life (p<0.000), tended to learn new things on their own each year (p<0.015), had a strong desire to learn new things (p<0.018), and believed that maintaining a learning portfolio during their residency would contribute to their learning (p<0.011). In 354 cases (30%) residents reported that a change in subsequent practice would occur.

To date, number of school participating are 14, and the total number of cases entered is 61,887 with 10,046 critical incidents with 340 residents. Initial analysis confirms that high volume users demonstrate the characteristics of self-directed learner. In addition, the program has allowed the potential to create a community of learners with effective knowledge building capability.

Reflection on the unique successes that we have experienced are both political and behavioural in nature. Many schools cooperated by contributing to, and sharing their residents' learning portfolios so that the specialty as a whole could benefit. We view this as a unifying process providing a common platform for future collective educational initiatives. The implementation of a learning portfolio has facilitated the shift from an apprenticeship model to a inquiry-based model that is grounded in the structured requirements for certification and maintenance of certification as required by the Royal College of Physicians and Surgeons of Canada.

Future research challenges include the evaluation of learning portfolios in a structured manner which can be replicated in a number of schools; establishing mechanisms to identify deficiencies in training through regular review of learning portfolios; and pairing residents with an electronic mentor to support inquiry-based training on an on-going basis. This capability will be further enhanced by the integration of new multi media technology, hand-held computing and the enrollment of other countries.

Ultimately society will benefit from this enhanced model of residency training that focuses on the development of practitioners that are prepared to engage in life-long learning.

[Keynote 2]
e-Healthcare in The Netherlands

Anton A. Westerlaken

Summmary: Speaker is a member of the Raad voor de Volksgezondheid en Zorg (The Council for Public Health and Health Care) He was instrumental in creating the advisory report ¨E-health in Sight"

In his keynote he will address the challenges in information technology, especially focused on health care. These will compel adaptation by health care providers. But also for consumers and patients these changes will bring new opportunities and maybe dangers. How will they cope? How is the e-health situation in the Netherlands, especially compared to other countries within or outside Europe? What is the main message in the advisory report and which way shall we go?

'E-health in Sight' advisory report

Introduction: The Minister of Health, Welfare and Sport has asked the Council for its advice on current forms of and future developments in e-health, on the relevant threats and opportunities and on the measures to be taken by the government and practitioners in the field in order to exploit opportunities and reduce threats. In this advisory report e-health as defined as the use of new information and communication technologies, especially Internet technology, to support or improve health and health care. This advisory report is a follow-up to the advisory report 'Patient and Internet' published by the Council in March 2000. That report focused on the possibilities for the use of new information and communication technologies, especially Internet technology, in the provision of care.

Facts: E-health offers major opportunities. These include the possibilities for improving the quality, efficiency and accessibility of care. In particular this stems from the capacity of e-health to provide the care-provider at the right time and in the right place with the information he or she needs to perform their task. In addition e-health provides opportunities for improving the doctor/patient relationship. For patients e-health provides opportunities for greater freedom of choice with regard to the available care. E-health may also be a means of meeting the growing demand for care - due in significant measure to ageing - combined with the (growing) scarcity of care professionals in the labour market.

Apart from opportunities there are also threats. E-health applications may not be a sufficient quality. Privacy may be infringed, e.g. due to the lack of adequate data protection measures.

Errors in software and/or hardware can have serious consequences.

Although care-providers use the Internet in order to consult general, non-patient-based medical information and to e-mail their colleagues, they apply e-health to only a limited extent in the direct provision of care to the patient. Where this is done this will generally take the form of a specific project.

Analysis: It is clear that e-health may make a significant contribution towards the realisation of high-quality, accessible and cost effective health care. Potential threats can be eliminated. At the same time it may be noted that the healthcare sector lags behind other sectors when it comes to the input of new information and communication technologies, such as e-health. There remains a big gap between the support that can in principle be provided by e-health and what is happening in practice. This is not to suggest that the present care can be entirely replaced by e-health. In many cases e-health will mean the supplementation of existing care or will involve a different form of the same care.

In practice there turn out to be numerous obstacles towards the application of e-health. These obstacles or problems are concentrated around three topics: market structure, funding and legislation/regulations. One of the most important problems is the fact that it is not always possible to exchange data between care-providers by electronic means. In the first place this is because data are not always recorded in electronic form. Secondly it is due to the non-application or inadequate application of technical standards. By 'technical standards' is understood in this report standards that make it possible for data to be communicated between actors in health care by digital means. This means that this standardisation relates to the way in which data are exchanged (the transport medium and security, etc.), the form in which this takes place (syntax) and the significance of the data to be exchanged (semantics). The fact that data cannot be properly exchanged electronically means that care-providers can remain deprived of information of relevance for the care they provide or that they unnecessarily repeat research that has already been carried out, etc. Care-providers in the health care sector have not been able in recent years to arrive at adequate co-operation when it comes to the facilitation of e-health. Care providers have not succeeded in taking the necessary measures to bring about such co-operation. Care-providers are on the sidelines; in practice they lack the opportunities for the proper exchange of information that is required for the optimal provision of care. Although the government has established that practitioners in the field are not succeeding in sorting things out themselves, it is reluctant to grasp the nettle itself. Nevertheless all these parties will need jointly to ensure that the opportunities offered by the use of e-health are exploited.

Another problem is fear of change, or in other words the existence of a culture within the health care sector that is not sufficiently open to the application of new information and communication technologies.

There are also obstacles in the financial and economic field. Too little is invested in relative terms and the question of reimbursements for the application of e-health is unclear. In addition the effectiveness of new e-health applications is not sufficiently apparent.

Finally there are legal obstacles. Privacy is not sufficiently assured if it is not possible for patient details to be exchanged electronically in a secure manner. It must also be established that those communicating electronically are in fact who they purport to be.

The conclusion to emerge from this analysis is that the application of e-health is a promising instrument for providing accessible, cost-effective care of high-quality but that this instrument is not being used sufficiently. In order to do so a number of preconditions need to be satisfied and various obstacles eliminated. The creation of preconditions, elimination of obstacles and provision of incentives for the application of e-health will be to the benefit of health care.

Advice: As noted above the government and practitioners in the field must together ensure that the opportunities offered by the input of e-health are exploited and the threats reduced or eliminated. The message of this advice may be summarised in a single sentence: make use of the opportunities that e-health offers for the provision of high-quality, accessible and cost effective care. It is the task of the government to create the necessary preconditions.

By the latter the Council understands the compulsory use of technical standards for the electronic exchange of data and the protection of electronic data traffic where this concerns particulars that can be traced back to the patient. It will prove impossible to make use of the opportunities offered by the application of e-health if these preconditions are not satisfied.

To this end the Council advises the Minister of Health, Welfare of Sport to establish an independent, publicly funded authority in order to ensure that data can be exchanged securely between information systems. This authority must have the power to impose the use of open standards on care providers.
This power could be delegated by tightening the Care Institutions (Quality) Act and the Individual Health Care Professions Act.

In addition the authority must encourage the secure electronic exchange of data in the health care sector. The necessary measures in the data protection field can be taken elsewhere. This removes an important obstacle, namely the possible infringement of privacy. Finally this authority must encourage the development of software on the basis of open source principles, meaning inter alia that the source code of developed software is publicly disclosed and freely accessible to all.

The government should promote investment in the development and implementation of e-health by setting up a fund. Care-providers should play a role in this regard by accepting a commitment when funds are awarded that they will ensure the continuity of the necessary funding if positive results are achieved. Clarity needs to be provided with regard to the reimbursement of e-health applications. Apart from the fear of infringements of privacy, the lack of reimbursement for e-health applications is regarded as an important obstacle. If such applications involve a new form of care that needs to be classified as part of the package of primary care, care-providers must not be pre-vented from using such applications because they receive no reimbursement for them.

Practitioners in the field will need to focus in particular on changing the culture. E-health must be integrated into health care. In part this can be promoted by demonstrating that the application of e-health has added value for both the patient and the care-provider. Among other things this should be done by making use of e-health technology assessment in order to evaluate the effectiveness of e-health applications.

This involves not just an evaluation in terms of costs but also obtaining insight into the quality gains and the organisational and social impact of such applications. Furthermore assessment will encourage the introduction of care-based e-health standards and the financial reimbursement of e-health applications. For both care-providers and patients/consumers it is important for patient and consumers to accept greater responsibility for their health. E-health can make a contribution to this end.

It can for example facilitate the more efficient use of the available range of care by relieving professionals of tasks that can be performed by others - in certain cases patients themselves, or those with whom they are in close contact. Among other things this can be promoted by making it easier for new e-health providers offering such resources to patients to enter the healthcare market.

[Keynote 3]
Knowledge management in medicine – Are comprehensive electronic clinical libraries the answer ?

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The need to provide clinicians with up-to-date evidence-based point of care knowledge resources is widely accepted [1-3], and a number of "comprehensive electronic clinical library" projects costing millions of euros already do this (eg. the National electronic Library for Health, NeLH and Knowledge Access 24 in the UK, the Clinical information Access Project in Australia).

However, we also know that doctors rarely use electronic library services [4] and that there are many barriers to knowledge use by clinicians [5]. These barriers include the time taken by clinicians to find answers to their questions and low success rates [6]. For example, of 1200 questions volunteered by US family physicians in Ely's study, the doctors searched for answers to only 444. However, they used electronic resources to answer only 10 (2%) of these 444 questions, and took a median of 3 minutes to search such resources, finding an answer only twice [7]. This suggests that the electronic resources themselves might be a significant barrier to knowledge access.

Clearly no individual resource can answer all clinical questions, so the UK NHS has now recommended 12 specific resources as being suitable to answer clinical questions [8]. All of these are now provided either free on the web or through contracts placed by the NeLH.

However, we suspected that even this large number of resources might not answer many clinical questions and were unsure how long it would take to search them. We therefore studied the ability of expert librarians to search for answers to 96 well formulated clinical questions, half from primary and half from secondary care. We deliberately biased our study in favour of the electronic clinical library model, in the following ways:

- The searchers were volunteer medical librarians familiar with the NHS-commended resources (ie. faster, more expert searchers than doctors),
- We only selected well formed clinical questions (ie. easier to search for answers),
- All questions were volunteered in the last 2 years by clinicians working in UK general practice or hospitals (ie. the questions were thought to be answerable).

Our results were disappointing, with a 60% failure rate and only 16% of questions well answered. This was despite expert librarians spending a median of 54 minutes searching a minimum of 5 comprehensive evidence based resources.

Our results demonstrate that the currently favoured model of a comprehensive electronic clinical library is unlikely to answer many clinical questions at the point of care - even if the doctor uses it once her patients have gone home. Worse, providing clinicians with access to such knowledge resources may introduce searching delays, and could even lead to inappropriate tests or treatment for patients.

Improvements to the electronic library model might include adding ever more comprehensive resources, or providing a better search function to enable doctors and others to find what they need fast, without wasting time on unproductive searches. However, we believe that a broader knowledge management strategy is needed which explore alternatives to the comprehensive electronic clinical library, such as:

- A clinical question help line, analogous to NHSDirect, with 24 X 7 access to librarians searching on demand and a regularly updated store of FAQs available on a web site. This could be a development of, and possibly based on, current informal question answering services in various parts of the UK such as ATTRACT [9],

–   Intelligent personal search agents to which a clinician could email a question and which would return seconds or minutes later with a short answer and web links to further detail. Such information agents are the subject of much current information science research [eg. 10], but do not yet appear ready for clinical field testing.

In conclusion, we believe that our study casts serious doubt on the extent to which comprehensive electronic clinical libraries can answer a sufficient proportion of clinical questions in time to influence clinical decisions and, most importantly, actions. We therefore suggest that new thinking is needed, such as a 24 X 7 librarian-mediated search and FAQ facility to complement direct user searching.

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[Keynote 4]
Access, quality, and patient empowerment - Can we have it all?

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More and more patients are using the Internet not just to seek information from various sources, but also to empower themselves by providing their own online sources of health information, establishing and moderating online support groups, and using e-mail to communicate with their physicians.

However, not all patients in all countries have equal access to health information on the Internet whatever the source. In many nations, including the U.S. and Europe, large portions of the population do not have access to the Internet because of a lack of technical infrastructure or for economic reasons.

To have true patient empowerment, more equity between the "have" and "have-nots" needs to be established. Only through a combination of Access + Quality will we achieve this Equity (i.e., Access+Quality=Equity).

While we may not be able to do much about the Access part of this Equity equation, we should do more about the Quality part. Much attention has been paid to commercial health websites with regard to privacy, ethics, and information quality guidelines and codes of practice (e.g., the Internet Healthcare

Coalition's e-Health Code of Ethics). But, have we given enough thought to developing guidelines for patient-driven online activities?

[Special Lecture]
Legal issues in Internet in medicine

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Introduction: The use of the Internet in medicine provides an exciting new medium for delivery of health care. Unfortunately, Internet use in medicine also poses new legal issues. First of all, providing medical advice across state or national borders is generally illegal, unless the provider is licensed in both regions. Second, there is potential for increased liability exposure for providers and organizations supporting interactive websites. Interactive tools such as web bots, health assessment questionnaires, medical advice and information applications, chat rooms and bulletin boards, and email usage all create new legal challenges.

Types of medical and health websites and "cyberliability" (product liability vs. medical liability):
   Health websites can be broken down generally into three categories: medical information websites, private practice websites, and hybrid medical websites. Information websites generally provide information on particular health topics, which may include interactive tools, e.g. a personal health assessment. Private practice web sites are utilized for existing provider practice populations and offer appointment scheduling, practice and health topic information, and secure private interactions between the provider/staff and patients. Hybrid medical websites include both health information plus direct provider/consumer interaction, and the consumer and provider may never have face-to-face contact.

Medical advice vs. health information: To determine licensure requirements and liability risk one must establish whether the site provides health information or medical advice. Generally, Internet medical articles and even intelligent interactive health assessments are considered health information only and not the practice of medicine. But if specific information or advice is provided on a one-to-one basis to an individual user, courts hold this to fall under the category of the practice of medicine. Therefore, how information and disclaimers of use are written is paramount. U.S. courts currently hold in favor of disclaimers that state that the health information should be construed as information only and that the user should contact a physician if specific advice is requested. The courts rationale is that a user is given sufficient notice if the disclaimer is well displayed.

Web Bots - Is this the practice of medicine? Wet bots are software robots that can be implemented on a web server. Web bots pose interesting new legal questions. Web bots may include intelligent health-risk assessments (e.g. Dr. Global, WebMD), artificial intelligence decision support systems, and actual disease self-management applications. Use of databases e.g. National Institutes of Health, National Library of Medicine, etc, may be utilized to provide responses to various questions. Such programmed responses may give actual diagnoses and recommendations. Is this the practice of medicine? To date, no legal cases have come before U.S. courts. Nevertheless, as web bots become more intelligent and interactive, they will undoubtedly be challenged in court as constituting the practice of medicine. How web bots are programmed and by whom, what databases are utilized, and the utilization of appropriate disclaimers will be important in determining case outcomes.

Use of disclaimers: Well-written, well-displayed disclaimers are the "lifeboat" of a medical website. Applications can be designed so that they "force" the user to read the disclaimer prior to using the

application. This provides virtual "documentation" that the user has read and agrees to the terms of the application or its use. Again, U.S. courts find this a compelling argument.

Handling of emails: How emails are viewed from a legal perspective in part depends on the type of website and the type of email interaction. Is this a general medical information website or a private medical practice website, and does a prior relationship exist between the sender and the receiver? Is the email a technical issue or health related issue? Once a physician responds to a specific health question, a physician/patient relationship may exist. This relationship would create licensure requirements and greater liability exposure. How one fashions a response is critical. If health information is provided one needs to state via a disclaimer or write in the body of the email that the user should also contact his/her own physician.

Several organizations including AMIA (American Medical Informatics Association) and the American Medical Association have created guidelines for use of email in a medical practice. Generally, non-urgent general health related information, and reminders and scheduling are appropriate uses. However, urgent or potentially urgent health related concerns would not be. Additionally, those in the U.S. must now consider the effects of HIPAA (Health Insurance Portability & Accountability Act) regarding encryption and security of email requirements.

Privacy policies/ Use of Cookies: Privacy policies reassure users that the use of any information provided to a web site is handled in a confidential manner. Quality websites prominently display their privacy policies and agencies that review websites scrutinize such policies carefully.

The use of "cookies" on a website does not violate a user's privacy if the user is notified of such use in the privacy policy. U.S. courts have held that sites that violate a user's privacy or violate their own site's privacy policy will be severely dealt with. HIPAA will also require that privacy policies be in place on medical websites in the U.S., as well as encryption technology for certain user interactions.

Bulletin boards and chat room: Bulletin boards and chat rooms create additional legal issues. Should they be monitored? To monitor or not depends on: 1) how a site's disclaimer regarding bulletin boards and chat rooms is written, 2) what type of site it is, and 3) who the user is. If it is stated that the bulletin board(s) and chat room(s) are monitored, then the site must retain documentation that they are in fact monitored.

Which creates more liability exposure, continuous or periodic monitoring? What liability exposures do you have if you do not monitor them at all? How are websites dealing with offensive or self-destructive users or those who may harm others? Currently, little case law is available. One company, AOL (America Online) does monitor some chat rooms 24/7. Their policy is to immediately notify law enforcement of any harmful or self-destructive user. But AOL is unique, in that it has complete user information available, e.g. name and physical address. Thus, courts may examine what user information a site has available when determining if there is a duty to report abuse. Whether a site has a duty to monitor chat rooms and bulletin boards will also be affected by the disclaimers and policies stated by the website.

Conclusion: The Internet is still in its pioneer phase, but it offers great promise and potential for medicine. Health care delivery, provider/patient interchange and consumer involvement in their own health care will all benefit from the Internet. If careful health planning is followed, and legal risk reduction is planned for, the Internet has the possibility of being one of healthcare's greatest tools.