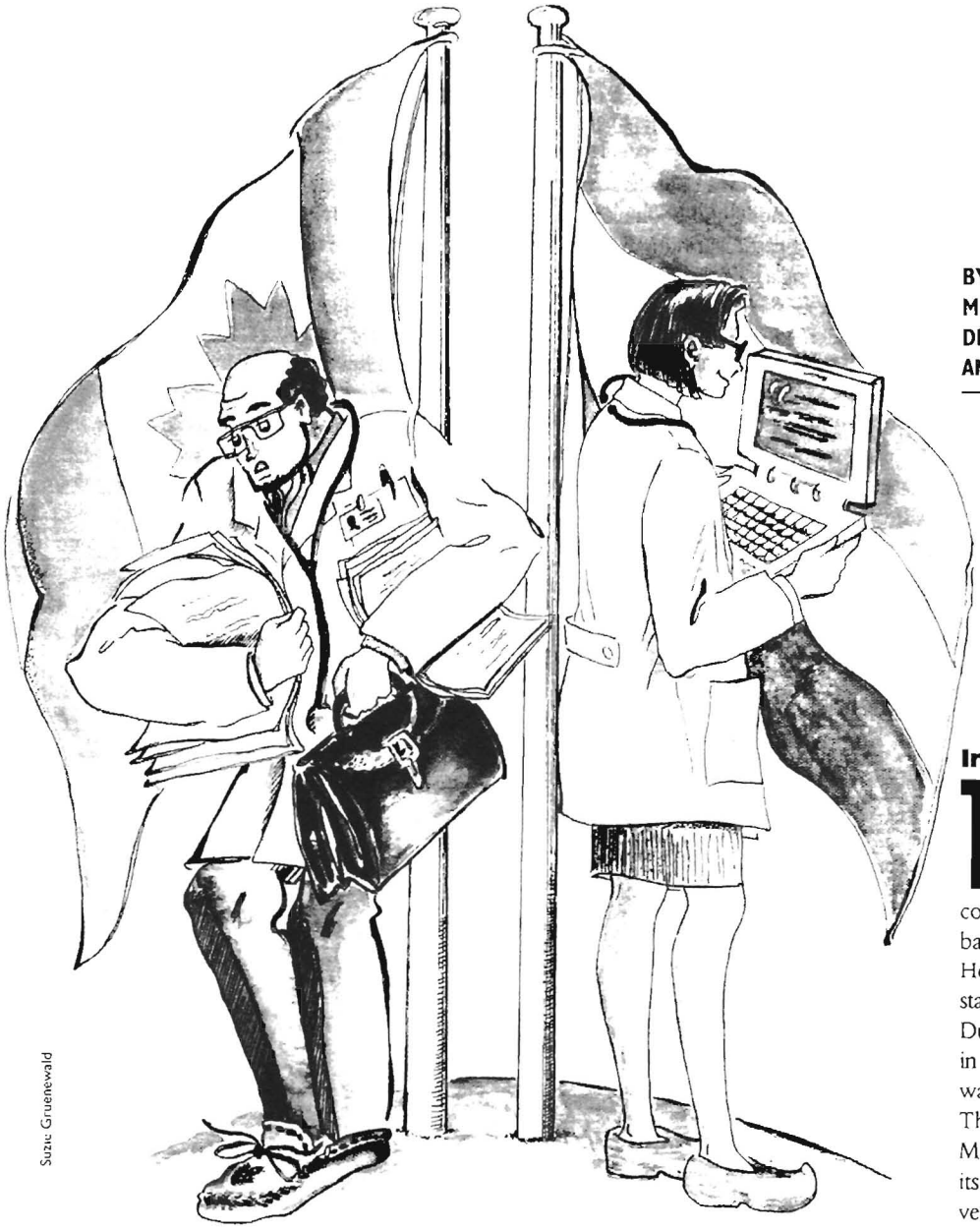
DUTCH REFERENCE MODEL LARGELY USED

70% of Dutch Practices are Successfully Computerized



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PEER REVIEWED

Introduction

This article focuses on the state of clinical computerization outside of North America and in the Netherlands, in particular. The Netherlands has a national standard for computer patient records and this article is based on a meeting and conversation with Dr Henk Westerhof, the person in charge of the standard. Dr Westerhof is a staff member of the Dutch College of General Practitioners, based in Utrecht, Netherlands. The computer standard was written by the College for its members. This standard, called the Dutch Reference Model and first published in 1985, is already in its second revision since1990, with the next version due out in 1995 and every five years after that.

70% Computerization Achieved

Dutch GPs have been enormously successful in getting their practices computerized. Out of approximately 6,500 GPs in the country, 70% are computerized; half of these (ie 35% of the total) use their computers for recording clinical data. However, not all of these have put their patient charts away, thus only about 25% of all GPs have paperless practices.

The fact that 93% (according to a recent survey) of the computer system installations conform to the Dutch Reference Model attests to the important role that this standard plays in promulgating such widespread computerization. However, it would not have happened had there not been excellent cooperation between the government's health insurance plan and the College. Since 1991, the plan reimburses doctors for 60% of the cost of their computer system, up to NLG 6000 (approximately $4,800 Canadian) per year, for systems approved by the College. The College itself, of course, advises its members to buy only tested systems, which has not stopped a small number (30 or 40) of physicians from developing their own. But this seems to have had little impact on the successful marketing efforts by vendors of the eight systems which have received College approval.

Medical Systems Used

Within the eight systems, the physician has a wide range of choice. There is one for Windows, another for Macintosh, two for Unix, and the rest run under DOS on PCs. The Macintosh system, reputedly very fast, has been programmed in a high-level database language called Omnis 7. One of the DOS systems is written in MUMPS, a flexible language developed at the Massachusetts General Hospital specifically for medical applications.

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Many Dutch GPs continue to do house calls, on average 6 or 7 per day. It seems that the Macintosh system is the most advanced in providing features for recording clinical notes while away for the office.

The current version of the standard has two modules, the so-called *Basic Module* and the *Medical Module*. The basic module deals with clinico-administrative aspects, and addresses functions such as registering patient, appointments and billing. It details what data a system should be capable of processing, what functions should be available to the user, and a minimum hardware configuration that the system should be able to run on. To ensure that computerized data can easily follow a patient when he or she goes to a different doctor, exact specifications for files for data interchange are provided.

The medical module deals with clinical computerization, and has two levels, the Standard Medical Module for the basic functions and an Extended Medical Module. Functionalities addressed include the medical history, problem list, diagnostic coding using the ICPC (International Classification for Primary Care), prescription writing, file of standard prescriptions, medication monitoring, risk profile, and risk markers. The standard calls for the capability to enter data using both POR (Problem-Oriented Record) and SOAP (Subjective, Objective, Assessment, Plan) systems. For potentially time-consuming operations, the standard specifies minimum performance levels.

Vendor Certification

At present, vendors can apply for certification of either the basic module or the medical module, or both. In future, the College will only pass systems which meet both parts of the specification.

How does a vendor get his product certified? He provides a system already loaded with actual clinical and administrative data for 2,500 patients (with all patient identifying information modified (anonymized) so as to render it illegible, in order to protect patient confidentiality) to the College, who attempt to use the system for two days, using primarily the vendor's documentation as their guide, but with a vendor's representative available if they run into snags. The GPs write a report which also goes to the vendor. Next, the system is thoroughly evaluated in the lab by an independent computer company, which also examines the source code and documentation to verify the correctness of programs. A copy of their report also goes to the vendor. The final report is edited by Doctor Westerhof. The whole process takes three to five months and costs the vendor NLG 14,500 (about $11,500 Canadian).

The standard does not address issues such as authentification (signing) of medical records or prescriptions. Apparently, in the Netherlands, there is no legal requirement that a clinical note bear a physical signature. For medication prescriptions, current practice is for the drug order to be electronically transmitted to the pharmacy so it can be dispensed; at the end of the day, the accumulated prescriptions are printed out, signed, and delivered in hard-copy form to the pharmacist.

Detection of drug interactions is facilitated by the existence of an official "Royal Dutch" formulary database which includes codes for interactions and also for contra-indications.

What About the Future?

According to Dr Westerhof, the 1995 version of the Reference Model will likely include a standard for treatment protocols, as well as a module to support post-marketing surveillance studies of medications. Performance goals will be more stringent, as will requirements for back-up of data and system reliability. Systems will need to add some administrative functions such as electronic billing. Continuing medical education will be supported by a requirement for computerized knowledge look-up of, for example, abstracts of journal articles. As there are several research groups looking at computer-assisted medical decision making, it is hoped that future systems will provide a framework so that such modules can be added. Dr Westerhof is particularly excited by the support for treatment protocols, as the College has a section which is hard at work developing such treatment guidelines based on the medical literature. Each such guideline is thoroughly tested by 50 GPs before it is circulated.

How does the Dutch experience compare? Dr Westerhof expressed admiration for the British, who he feels are more advanced than the Dutch in using standards and giving intelligent support for treatment protocols (eg hypertension follow up). However, they do not have the type of consensus on treatment guidelines that the Dutch have generated with their carefully researched and widely distributed *Standards of Care*. The British market seems more fragmented also, with between 70 and 140 different vendors, although only five or six are market leaders. Dutch physicians do not like the Read Classification which is an English standard, as they feel it has become too complex. There are also important differences in practice styles which influence the degree to which GPs are computerized; for example, English GPs have on average 1.3 support staff each, while Dutch GPs make do with only 0.7.

Important Messages

The Dutch experience holds several important messages for us in Canada: cooperation between government and physician associations can be beneficial to both; standards and vendor certification can serve as a catalyst to increase clinical computerization, but do not inhibit innovation or stifle healthy competition. Our challenge now is to create a framework which supports the development of medical informatics within the Canadian context.