NURSING AND COMPUTERS

THIRD INTERNATIONAL SYMPOSIUM ON NURSING USE OF COMPUTERS AND INFORMATION SCIENCE

HOSTED BY THE IRISH NURSING BOARD IN TRINITY COLLEGE, DUBLIN, IRELAND

20TH-23RD JUNE 1988

Proceedings

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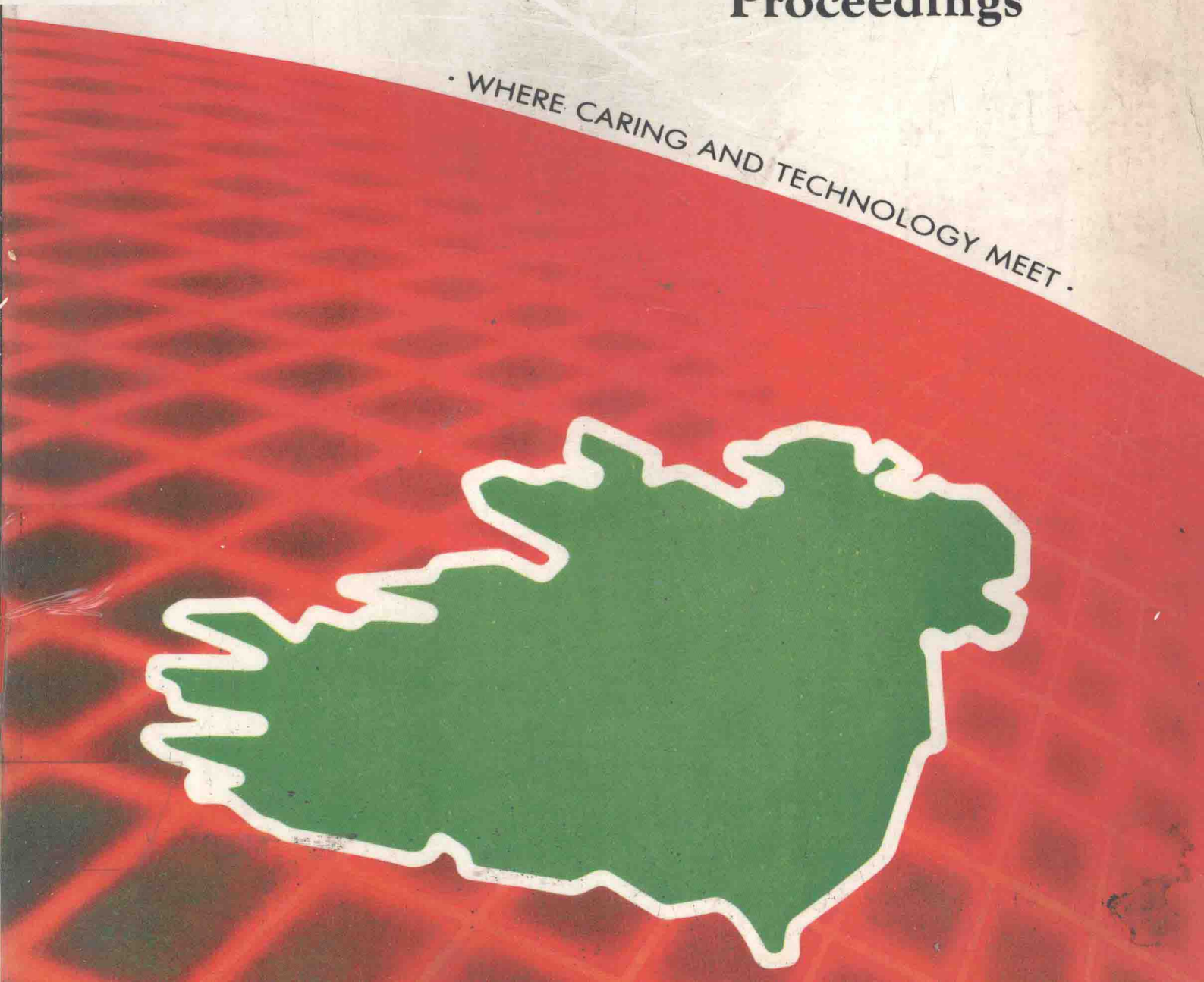

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Hosted by the Irish Nursing Board
Trinity College, Dublin, Ireland

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Irish Nursing Board
Dublin, Ireland

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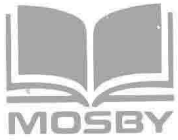

A TRADITION OF PUBLISHING EXCELLENCE

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PREFACE

This volume is the third in the series of proceedings published following international symposia held under the auspices of the International Medical Informatics Association (IMIA). The first gathering of nurses within IMIA occurred as an evening seminar held in Tokyo during Medinfo '80 (the triennial international conference of IMIA). The overflow crowd in the room that evening persuaded nurses in the United Kingdom that an international conference of nurses interested in the use of computers in nursing was timely. Subsequently, the international Symposium on the Impact of Computers on Nursing was convened in London, England in the fall of 1982, followed immediately by an IMIA sponsored working conference.

One outcome of the working conference was our first book, which documented the developments related to nursing uses of computers from their beginning to 1982. The second outcome of that first working conference was the consensus of those assembled that nurses needed a structure within an international organization to promote future regular international exchange of ideas related to the use of computers in nursing and in health care. Consequently, in the spring of 1983, a proposal was submitted to the General Assembly of the International Medical Informatics Association for the establishment of a permanent working group within IMIA. This proposal was approved and Working Group 8 of IMIA was established.

Our first meeting was held in Amsterdam in conjunction with Medinfo '83. At that time the Working Group set itself the ambitious task of organizing international symposia at 3 year intervals between Medinfo meetings. To date meetings have been held in Calgary, Canada in 1985 and Dublin, Ireland in 1988. In keeping with the practice established at the first meeting in 1982, each symposium produced a volume of proceedings in order to provide the widest possible distribution and dissemination of the information presented at the meeting. Working Group 8 has also undertaken to host working conferences, usually following each symposium, at which the leaders in a particular aspect of nursing informatics are assembled for the purpose of providing direction and leadership with regard to research and development in this rapidly evolving field. Working conferences have been held in Calgary, 1985; Stockholm, 1987; and Dublin, 1988.

This present volume marks yet another milestone in our history. For the first time the size of the symposium necessitates separating the text of the proceedings of the public forum from the text of the associated working conference. The proceedings of the working conference are available as a companion volume. Another first is the fact that speakers at the Dublin, 1988 meeting were selected from among the responses to a worldwide "call for papers." The programme at all previous symposia has been presented by invited presenters--the number of people working in the field was small and the major purpose of the symposia and their proceedings was to teach and make nurses aware of the existence of the field. The contents of this volume and of the symposium were submitted to a panel of referees, who reviewed all submissions and selected those which represented new and innovative contributions to the field. The focus has shifted from the need to persuade nurses of the existence and need for awareness of nursing informatics to the need to disseminate new developments in the field and share ideas. The seemingly minor change reflects the enormous growth in the field of nursing informatics in terms of both activity and participants.

Those of us who have been involved in nursing uses of computers and information science from the beginning are delighted to see the marked increase in the number of people now working in nursing informatics. Our early belief--that this aspect of nursing would become increasingly important to the delivery of patient care--has been justified. In addition we all benefit from increased volume of work in the field because it increases the speed with which we move toward our common goal of providing the highest possible quality of nursing care to all of our patients. We began by considering "The Impact of Computers on Nursing," we moved to "Building Bridges to the Future," and with this volume we acknowledge that nursing informatics is "Where Caring and Technology Meet."

June, 1988

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PLENARY SPEAKERS

DATA PROTECTION

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Preface

As the computer interferes more and more with primary health care in a hospital, attention will have to be paid to the protection of the personal lifestyle and to data security as a whole; this next to questions about efficient use of the means.

This is also claimed by the different health care workers. As an example we could quote the point of view of the physicians. Their statement however can easly be transferred to the nursing staff and might as well be formalised by national and international professional or occupational associations of nurses. In the new European Code of Medical Ethics (Paris, 6 January 1987) physicians state: "The physician has to respect the personal lifestyle of the patient and he has to take all necessary precautions so as to guarantee secrecy...(article 8). Physicians cannot cooperate in the extension of electronic medical data systems which could threaten or violate the patient's right of privacy, certainty and security of his or her personal lifestyle. Every computerized medical data system should be in the ethical responsibility of a specially appointed physician. Medical data systems cannot in any way be connected to other data systems." (article 9)

The following statement however, immediately indicates the weakest link in the realisation of this claim. "By far, the greatest security hazard for a system is the set of people who use it. If the people who use a machine are naive about security issues, the machine will be vulnerable regardless of what is done by management. This applies particularly to the system's administrators, but ordinary users should also take heed." (Butzen & Furler, 1986, p.215)

In the first part some concepts as privacy, personal lifestyle, confidentiality and professional secrecy are briefly elucidated. The juridical context of data protection is made clear by means of the different international principles of law.

The answers to three fundamental questions: why?, what?, and how? will explain the problems of data secutity in general.

Finally light will be thrown upon some selected precautions: access control, encryption or cryptography and recovery.

Some Concepts Dealing With Data Security

Privacy, Personal Lifestyle, Confidentiality and Professional Secrecy

There is a clear relationship of cause and effect between on the one hand, items as privacy, confidentiality and professional secrecy and on the other hand, data security.

Privacy is experienced as personal freedom; the possibility to remain somewhere, alone and unrestrained, in one's own circle or with a partner, the possibility to seclude oneself, to keep away from hindering influences from the outside world. Privacy is often felt to be the same as personal lifestyle (See a.o. DeBecker, 1985; Guldix, 1987) Personal lifestyle however, is a larger concept. It not only includes the personal values (private life or privacy), but also the very personal attributes and expressions, which determine the individual, whether this is wanted or not, in his social relationships, i.e. his outward and inner appearance, his health, his voice, his name, his intellectual creations, etc. (Guldix, 1987,p. 203) In the European Convention for the Protection of Human Rights (Rome, 4 November 1950) privacy is defined likewise: "Each person has the right of respect of his private life, his family life, his house, and his correspondence (article 8, first part)". This right of protection of the personal lifestyle however, is restrained by the right of the others, the community. "No interference from any public authority is allowed as to the execution of this (privacy) right, except by what is provided by the law and is necessary in a democratic community for the sake of a country's security and the public security, or the economic welfare of a country, or the protection of the public order and the prevention of crimes, or the protection of health or decency, or for the protection of the rights and freedom of other individuals (European Convention, article 8, second part)."

Personal lifestyle is reflected in two privacy rights (See a.o. Griesser; Romano, 1987; Young Barhyte, 1987; EDP-Analyser Report, 1980): the right of the individual(patient) to determine personally how much information about himself he wants to disclose to others, and the right of the indivdual of protection of this disclosed information against all possible forms of abuse.

This last right of privacy finds a first form of protection in the confidentiality, Romano (1987, p. 100) states: "Confidentiality concerns redisclosure of information by the person to whom one confides or relinquishes privacy". Confidentiality means the respect for professional secrecy and is as such a mission for all persons (physicians, nurses, secretaries, laboratory-analysts, accountancy staff, computer operators, etc.) who come into contact with the data or the information about the health status of a patient/client. (See a.o. Prims, 1986; Romano, 1987; Griesser; Carels, 1987)

Some Juridical Basic Principles

The protection of the personal lifestyle regularly comes forth when using informatics especially within the fields of health care; this is often justifiable, but it is equally often misplaced.

Regulations concerning data protection are an exercise of equilibrium. The right of an individual of the protection of his privacy on the one hand and the right of the community of the free flow of information on the other hand should be kept in balance. Laws concerning data protection have already been issued in several countries: Sweden (1973), USA (1974, Privacy Act), German Federal Republic (1977, Bundesdatenschutzgesetz), Denmark (1978), France (1978, Loi n 78-17 du 6 janvier 1978 relative a 1'informalique, aux fichiers et aux libertes), United Kingdom (1984, Data Protection Act), the Netherlands (1987, Wet Persoonsregistratie). (Barber, 1987; Borking, 1986) All these laws have a number of basic principles in common. These basic principles have been made by a number of international organizations (OESO, UNO, the European Council, the European Community) as a guideline for legislative work. (See also Gerlo, 1985; Westin, 1980; Romano, 1987; Decoster, 1987; EDP-Analyser Report, 1980)

Collection limitation principle: Data can only be acquired in a lawful and honest way, and certain data, which are very sensitive, cannot be collected at all. This also means that only those data can be collected which are necessary for the realization of the organization's objectives.

Purpose specification principle: Whenever data are collected of a certain person, then this person has to be informed about the objective for which the data will be used. This implies that the data have to be destroyed when they don't serve the purpose any longer.

Openness principle: It has to be possible for anyone to be informed about the existence of any data system.

Individual participation principle: Any individual has the right of insight into data, collected about him, he must be allowed to check them and to demand the correction of these data.

Accoutability principle: The person in charge of the data has to be made responsible for the execution of the precautions which excite these principles.

Data quality principle: Data have to be relevant to their purpose, they have to be exact, complete and up-to-date.

Use limitation principle: Data can only be used for the objective for which they have been collected. One can make an exception to this rule only with the permission of the person involved or in accordance with the law.

Security safeguards principle: Data should not be accessible for unauthorized persons, these should not be able to read the data or to alter them.

Data Security: Why?, What?, How?

Why is Data Security So Important?

Data security is not only linked to the use of an computerized information system. Data security existed even before the computer, also in the health information was (is) sealed in diverse lawful documents. The use of the computer has only enlarged the necessity of accurate data security. Data security and the protection of the

personal lifestyle obviously have a relationship as we explained before. This statement however mustn't lead to the conclusion that data security is necessary only to protect the privacy. The protection of privacy is only one aspect of the objective, though not the least important one within the whole of medical attendance.

Data security is needed especially because (Vandenbulcke, 1980):

the organization which automatizes, becomes more and more dependent upon the reliability of the computer system; (e.g. electricity supply cut).

the data themselves are in important help for themanagement and the well-functioning of the organization; (e.g. suppliers' and debtors' data).

a lot of money and energy is invested in the collection and the storage of data; (e.g. lists of patients, medical history of diseases).

unreliable data diminish the operational accuracy of the system and they have an influence on the system's credibility; (e.g. financial records of wages and salaries).

the potential power to collect information in a fast selective way and to use or misuse this information increases under influence of the computer; (e.g. staff records).

What Is Data Security?

The second question concerns the object, the items of interest and the place of action of the data security. Data security concerns at least the whole of precautions in order to comply with the last three juridical principles: data quality, use limitation and security safeguards principle.

In the literature data protection is often defined by means of the following concepts: data safety, data security, data integrity, usage integrity. These concepts are used by turns to a degree that one gets the impression that they are synonyms or homonyms.

Data security or computer data security are not the broadest concepts. Romano (1987, p. 101) uses the concept rather in the narrow sense when she writes: "Computer data security is defined as involving the protection of data...". Van Zutphen (1980, p. 134) gives a broader definition: "Data security can be defined as the whole of means and precautions used to obtain and keep the needed degree of reliability of an computerized information system".

Data security does not only means protection of the data, but also the protection of the infrastructure involved: buildings, hardware,...; the "purely physical" (Fenna, 1987, p. 69).

Data protection as an aspect of data security involves two objectives: the reliability and the confidential nature of the data. In the literature reliability mostly occurs under the name 'data safety' or 'data integrity'. Both concepts are used one for another, although data integrity is a subpart of data safety. (See a.o. Griesser, 1977). Data integrity however is used more and more in the wide sense. (See a.o. Kouwenberg & Bakker, 1980; Griesser; Romano, 1987; vanSwigchem, 1980).

Data integrity or the reliability of the data is reached when the following needs are satisfied or when the data have the following characteristics: they are complete, correct, accurate, available,

reliable, valid and logical or consistent.

Usage integrity stands for confidentiality although some authors prefer the term data security (in the narrow sense). (See a.o. Greiller & Uberla, 1980, p. 293; Griesser, 1977, p. 723) Usage integrity aims at the guarantee of privacy and thus the protection of the data against unauthorized use and/or abuse.

Data security can be defined as the whole of precautions and means used to guarantee the usage and data integrity of the information as well as to realize the continuity of the system availability.

How To Protect The Data And The System Availability?

The starting point in the protection of an automatized information system is not to endeavour a 100% security, but an optimal security. Why not 100% ? An information system cannot be fully secured because:

the costs are higher than the profits and the system has to remain easy to work with (economic balance);

data security is only as strong as its weakest link (balanced measures);

the least secure systems are often those which are not secured and those of which one knows that they are over secured (sociological balance) (Vandenbulcke, 1980, p. 224).

Aiming at these three balances is a process of risk control. (See o.a. Koning, 1980; Kocks, 1986; Kocks & Urbanus, 1980) By risk control is meant the conscious, integral and dynamic knowledge of all risks resulting from automatization (also for other organizational aspects) and the aiming at a permanent balanced set of precautions to reduces the risks to a (costs) level which is acceptable for the management. (Kocks, 1986, p. 154) The process of risk control is an iterative happening in four fases (See Koning, 1980, p. 146). The analogy with the systematic nursing process is obvious.

Risk-analysis: which dangers? how much chance is there to prevent? Which are the effects (qualitative and quantitative)?

Taking and selecting precautions: the precautions belong in principle to one of the following groups: avoiding the risk, reducing the risk, transfering the risk or taking the potential consequences.

The introduction of selected precautions.

The back coupling.

There are a great many techniques and precautions in the field of data security: from the closure of a simple door, over the testing of applications and the ciphering of data to the act of taking security copies. As it is important to come to some kind of taxonomy in this matter and in the mean time to give a short summary of how to secure data and the information system, a classification system is presented. This system has been adopted by the Dutch Governmental Department State Computer Centre (RCC): the three axes of data security. (see a.o. Brouwer, e.a., 1984 Bautz & Jongenelen, 1984)

Data security is generally meant to cure three kinds of abuses:

violations of the integrity: which make it possible for unauthorized persons to have access to and to use the data;

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