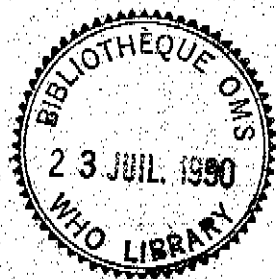


DEVELOPING QUALITY OF CARE
THROUGH INFORMATION SYSTEMS

A report from the programme of
Quality of Care and Technologies



WORLD HEALTH ORGANIZATION
Regional Office for Europe
COPENHAGEN

TARGET 31

Ensuring the quality of services

By 1990, all Member States should have built effective mechanisms for ensuring quality of patient care within their health care systems.

Index:

QUALITY ASSURANCE, HEALTH CARE
INFORMATION SYSTEMS
SURGICAL WOUND INFECTION - prevent/control
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DEVELOPING QUALITY OF CARE THROUGH
INFORMATION SYSTEMS: HOSPITAL INFECTION
SURVEILLANCE AS A MODEL

Report on the Workshop on the DANOP-DATA
Computerized System for the Continuous
Surveillance of Surgical Wound Infections

Copenhagen
26-28 April 1989

Note

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Introduction

A Workshop on the DANOP-DATA Computerized System for the Continuous Surveillance of Surgical Wound Infections was organized jointly by the Danish State Serum Institute and the WHO Regional Office for Europe in Copenhagen on 26-28 April 1989. The 40 participants came from Austria, Belgium, Denmark, Finland, France, Greece, India, Italy, Netherlands, Portugal and Spain. By profession they were physicians, surgeons, clinical microbiologists, epidemiologists, infection-control nurses, public health administrators, health economists and informatics specialists.

The aims of the Workshop were to review the participants' experiences during the WHO/DANOP-DATA pilot study, to identify further requirements and to draw up a plan for future Regional Office activities in the field of hospital infection control.

The DANOP-DATA system is a microcomputer system designed for the local (ward) surveillance of postoperative surgical wound infections (SWIs). The system is served by a user-friendly microcomputer programme capable of tabulating data input in four standard output tables, thus providing sufficient continuous information for surveillance purposes. The system is envisaged as a preliminary to a more systematic surveillance of all types of hospital-acquired infections (HAIs) and is regarded as a tool for facilitating both data recording and feedback.

The DANOP-DATA system was developed at the Central Department of Hospital Hygiene, State Serum Institute, Copenhagen. The prototype software, written in Danish, was first used at a regional Danish hospital in February 1987. The goal of the DANOP-DATA group was to install the DANOP-DATA (or a similar system) in 50% of all Danish hospitals within a five-year period.

Participants in the WHO Workshop on Hospital Infection Control, held in Brussels in 1982 under the sponsorship of the Belgian Government, recommended that hospital infections should be systematically recorded. They presented a common protocol for a prevalence study and recommended that it should be tested in as many countries as possible.

Collaboration between WHO and DANOP-DATA began in May 1987, when both the concept and the prototype software were presented at the TEKMED Congress on Appropriate Technology in Lyon. As a consequence of the interest shown by Member States, both European and non-European, in the autumn of 1987 the State Serum Institute, Copenhagen, and the Regional Office reached an agreement that the software would be translated into English and tested in European centres as a pilot feasibility study.

The WHO/DANOP-DATA pilot study

Primarily, it was hoped that the pilot study would create interest in the problem of HAIs, which have been of concern to the Regional Office since the Quality of Care and Technologies programme (previously Appropriate Technology for Health) started in 1975. One of WHO's earlier activities in this field was the headquarters cooperative prevalence survey of HAIs carried out in 1983-1985 in 55 hospitals, in 14 countries representing four WHO regions (Europe, the Eastern Mediterranean, South-East Asia and the Western Pacific). Examination of the records of more than 30 000 patients showed that the mean prevalence rate of HAIs was 8.7%, although the range was from 3.0% to 20.7%. HAIs were evidently a global problem and there was a need for improvement. The most evenly distributed and most frequently occurring type of HAI in this study turned out to be surgical wound infections (SWI), accounting for 25.1% of the total. The

Quality of Care and Technologies programme therefore made the reduction of the SWI rate one of its major activities and used it as a model for improving the quality of care.

This activity is directly linked to target 31 of the regional strategy for health for all: "By 1990, all Member States should have built effective mechanisms for ensuring quality of patient care within their health care systems".

The pilot study was also seen as a feasibility study for the testing of different methods of data collection. With the rapid development of information/computer technology, it was important to test whether the use of simple software packages in Member States was an appropriate and feasible way of gathering comparable data.

The study was therefore to be an assessment of a medical technology, linked to target 38 of the regional strategy: "Before 1990, all Member States should have established a formal mechanism for the systematic assessment of the use of health technologies and of their effectiveness, efficiency, safety and acceptability while reflecting national health policies and economic restraints".

The study started in the autumn of 1987. The material, a package consisting of a manual and three diskettes (Demo, Programme and Data), was produced in a limited number of copies and distributed to participating centres in December 1987. The participating centres were deliberately limited to either general surgical departments or departments of orthopaedic surgery. Particular specialties such as cardiovascular and neurosurgery were excluded. The centres were to test the system for a minimum of six months.

National experiences

Austria

A large traumatology hospital in Vienna used the DANOP-DATA system in parallel with its own computerized patient-record filing system. Owing to the highly specific type of activity in this centre, the DANOP-DATA system was not considered fully appropriate.

Belgium

Two medium-sized general hospitals were involved in the study. An infection-control nurse and a microbiologist respectively collected the data. No direct use was made of the DANOP-DATA software but a very similar system was installed that more closely met the feedback requirements demanded by the hospitals. The development of a specially designed Belgian system was inspired by participation in this trial.

Denmark

By the time of the Workshop, the DANOP-DATA system had been functioning at a county hospital for more than two years, so that a considerable amount of data and experience had been gathered. A comparison of the overall infection rates during the six months immediately before and after introduction of the DANOP-DATA system showed a drop in infections from 4.7% to 2.0% ($P < 0.01$) (χ^2 test).

Data collection is fully decentralized and surgeons are responsible for their own data. All concerned receive monthly feedback. Moreover, surveillance is extended beyond patient discharge, as outpatient clinics and general practitioners are also involved in the system. This post-discharge follow-up was considered important as about 25% of all SWIs are first diagnosed

after discharge from hospital. In a Danish language version, the DANOP-DATA system has now been installed in 15 Danish hospitals.

France

The study was carried out in two orthopaedic wards, one in a teaching hospital, where the highly motivated staff used the software directly, and the other in a small general hospital, where the inputs were made by a secretary. In both cases the study led to an increased awareness of the need for more information.

Greece

A university hospital and a general hospital participated in the trial. At both sites, data were collected by surgeons who had a special interest in infectious diseases, a microbiologist assisting at one of the hospitals. Data were entered by the infection-control nurse. The surgical teams received feedback at the end of the trial. There is now a prospect that computerized surveillance of infections and of antibiotic use will be introduced. A health economist expressed interest in being actively involved in these developments.

Italy

A university polyclinic, a 1400-bed teaching hospital and an 800-bed general hospital participated in the trial. Data collection and analysis were as far as possible decentralized. Data were collected by surgeons and entered into the computer by surgeons or by an infection-control nurse. A number of conceptual and practical problems were identified, including the need for a more detailed classification of patients.

Netherlands

Two centres participated in the study, of which only one in effect used the DANOP-DATA software. In both centres, the data were registered by a "non-involved" person, i.e. the infection-control practitioner, and surgeon-specific feedback was incorporated into the system. A commercial, integrated database/spreadsheet/graphics package was very much inspired by the DANOP-DATA system.

Portugal

Three centres participated in the study. At one of them, a 1000-bed university hospital, a surgeon was responsible for the study, in which a total of 18 surgeons participated. Feedback was given every three months, although it was noted that there had been no demand for it on the part of the surgeons. There was considerable interest in information systems not only for the registration of SWIs but for health care management and quality assurance. Future prospects include national surveillance of clean-wound infection rates and of the use of antibiotics.

Spain

Two hospitals took part in the study, but results were presented from the first only, a 1000-bed academic hospital (the second hospital's data were not available at the time of the Workshop). A continuous prospective surveillance programme of nosocomial infections had been running for over three years, involving a random sample of about 10% of all patients, with feedback every three months. For the WHO/DANOP-DATA study the data were collected by a Fellow in surgery (who also entered the data in the computer) and an infection-control nurse. As

a result of their participation in the study, it was decided to survey all clean surgical interventions prospectively, and to register a number of additional risk factors.

Evaluation of the DANOP-DATA software

Most of the participating centres suggested improvements and extensions to the preliminary English version of the DANOP-DATA system as tested in the pilot study. These suggestions largely follow similar lines of thought and will be incorporated into future versions of the software. They can be summarized as follows.

The most widespread request was that there should be a feature in the programme for identifying individual surgeons so that surgeon-specific results could be produced.

It was generally felt that SWIs and surgical procedures needed to be more clearly defined.

Several centres wanted to be able to record more detailed information on risk factors and/or patient characteristics, type/duration and dosage of antibiotics, and the use of other resources.

Post-discharge surveillance was felt to be an important factor.

On a more practical level, it was felt that new software should:

- offer good translation facilities;
- include a more elaborate method of validating the data input;

- include manual registration forms that match the computer layout;
- have better output formats;
- have tables which are more explanatory;
- offer good data protection guarantees.

Other software systems

One of the most striking findings of the WHO DANOP-DATA study was that it touched on a very active and rapidly evolving area in European health care. Numerous individuals and companies have developed, or are in the process of developing, their own local solutions, based largely on small microcomputer programmes. Despite this, such programmes are only being introduced sporadically in Europe. Some examples were demonstrated from Austria, Belgium, Denmark and the Netherlands.

At this stage, the Workshop split into two groups, the first addressing the concept of using computer surveillance of SWIs as a model for quality assurance, and the second analysing the results of the study. The findings of both groups are reflected in the conclusions and recommendations.

A more detailed paper on the concept, Improving quality of care through information systems: hospital infection surveillance as a model, is available².

² From WHO Regional Office for Europe, 8 Scherfigsvej, DK-2100 Copenhagen Ø, Denmark.

Conclusions drawn from the pilot study

The pilot study of the DANOP-DATA system in 22 centres in 11 countries showed the following.

1. It was possible to use the DANOP-DATA system (or some modification of it) in all the participating countries. Computerized surveillance is an appropriate method for the registration and analysis of SWIs. Continuous surveillance with feedback and self-assessment is a feasible model for local quality assurance activities. According to a questionnaire answered by Workshop participants, the system played a positive part in reducing HAIs in the majority of centres.

2. Further investigation is needed of the following:

- the overall results of the pilot study;
- a "minimum basic data set" for SWI surveillance;
- the functional requirements for new WHO surveillance software;
- the codes, classifications and definitions to be used in future studies;
- other quality-of-care indicators (including nursing care practices, the use of diagnostic and therapeutic procedures and sick leave);
- antibiotic utilization patterns;
- use of resources;
- follow-up on post-discharge SWIs;

- stimulation of professional accountability (individual, team, hospital, county/province, country);
 - the involvement of national professional societies (of surgeons, nurses and other health care personnel).
3. The DANOP-DATA system inspired the development of local software in several participating centres.
 4. The system stimulated interest in continuous surveillance in general surgical and other hospital wards as well as drawing attention to the problem of HAIs generally.
 5. A preliminary "minimum basic data set" for recording SWIs was drafted at the Workshop. It includes security, patient identification and sex, ward, hospital admission date, operation date, operation code (ICD^a), operation time, wound classification, elective/urgent, antibiotic prophylaxis, surgeon identification, discharge date, post-operative wound infection, superficial/deep, pus.
 6. WHO should give priority to the exchange of information and experience from similar quality assurance studies and the development of outcome indicators.
 7. The direct study results should be published in the form of at least one scientific paper (one subgroup's discussion focused mainly on the content and format of this paper).

^a WHO International Classification of Diseases.

General conclusions and recommendations regarding infection control

The last 150 years of hospital infection history make it obvious that progress in infection control has been rather slow compared with progress in other medical and biological fields. In spite of major advances such as antisepsis and asepsis, hygienic measures, epidemiology, microbiology, the advent of powerful antimicrobials and filtered air, the overall reduction in infection rates has been modest.

Regarding national health policies, it has been shown that without clear objectives and valid indicators to measure any progress, it is not possible to reach the targets proposed. A well defined European health policy in which the objectives, targets and approaches have been identified, has been an historically important step forward.

Some of the preventative and control measures now used in hospital infection must still be tested for effectiveness, as many of them are only used by tradition or habit and cannot otherwise be justified in the light of today's knowledge and experience. Scientifically valid assessments are needed to give more evidence on effectiveness and efficiency, as mentioned in target 38.

Education and training are a major component of all infection-control activities. A global WHO survey has shown that the courses provided by the various Member States vary widely and are often insufficient in both number of hours and content, as is evident from the curricula and teaching materials offered to health care workers (physicians, nurses, midwives). Where education is provided, it is generally only at the postgraduate and in-service stages and is generally tailored to the needs of the national health care system, thereby being inapplicable to other countries.

The Workshop participants recommended that hospital hygiene should be an integral part of undergraduate education for all health care personnel. It should also be complemented by continuous education schemes based on self-assessment and monitoring in relation to good practice and guiding standards, with the aim of improving the quality of care. As the problem of adequate education is a global one, a general framework, adaptable to local situations will have to be devised and later translated and modified as necessary for countries with a common language and culture. Collaboration between IFIC (the International Federation for Infection Control), WHO and other intergovernmental and nongovernmental organizations could be of great value in promoting the development of curricula, the choice of consultants and the organization of national and international workshops and courses.

All the centres involved in the pilot study looked forward to continued participation in the present working group and agreed to take on specific tasks related to the development of valid and reliable indicators which can be monitored, in accordance with target 31. On the basis of present results and future plans for the project, it was unanimously recommended that the Regional Office should continue to catalyse the development of a WHO computerized system for the continuous surveillance of SWIs. This software should be in the public domain and should be designed to allow for possible expansion to include not only other HAIs but also other quality-of-care indicators.

Future plans

To follow up on the results of the Workshop, the Regional Office plans to develop a WHO software package based on the same principles as DANOP-DATA, which could be made available at a basic charge (to cover costs) to institutions in Member States. The intention is that national, regional or local medical/professional

societies should adopt and promote this software package and the concept behind it and include them in national schemes for the prevention of HAIs and for quality assurance in general.

A project proposal giving the time frame, personnel and financial requirements for production of the WHO software was prepared and distributed to participants^a.

^a Copies are available from the Quality of Care and Technologies unit, WHO Regional Office for Europe, 8 Scherfigsvej, DK-2100 Copenhagen Ø, Denmark.

Annex I

BACKGROUND DOCUMENTS^a

Crede, W. et al. Linking hospital epidemiology and quality assurance: seasoned concepts in a new role. Infection control hospital epidemiology, 9(1): 42-44 (1988).

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^a Copies are available from the Quality of Care and Technologies unit, WHO Regional Office for Europe, 8 Scherfigsvej, DK-2100 Copenhagen O.

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