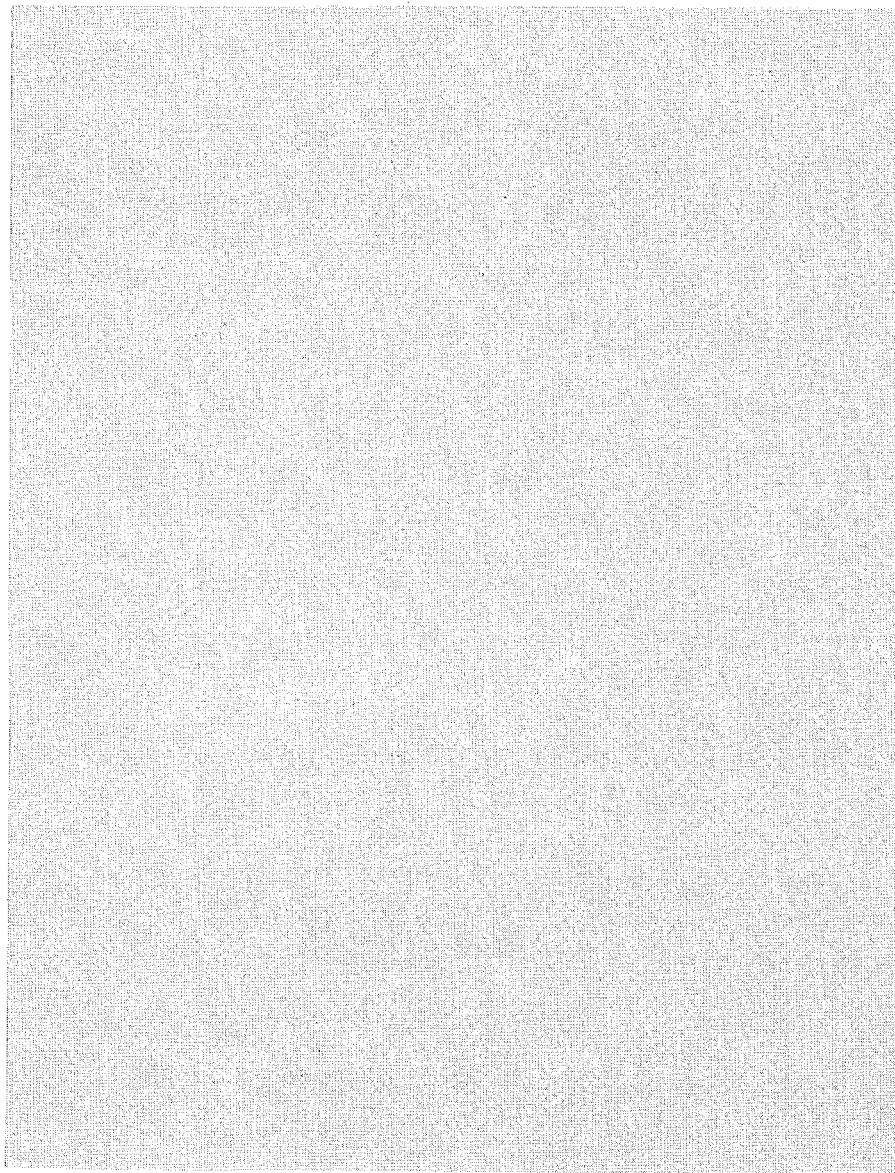


# Danish Medical Bulletin

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The empirical coverage was 60.8% as determined by in-vitro susceptibilities, but many antibiotics are highly concentrated in the urine, and it is probable that these provide some beneficial effect despite finding of resistance by in-vitro testing. Of note, we did not have information concerning the patients' clinical condition at the time when the empirical treatment was commenced. Therefore, we were not able to distinguish between patients with different severity of sepsis. It is likely that occasionally the urinary tract was an unsuspected site, and hence antibiotic treatment aimed at other sites e.g., respiratory tract may have contributed to the low empirical coverage.

The DSS' most frequent suggestion was mecillinam, which was covering in 85% of the cases. In our region mecillinam is highly active against most enteric rods, which makes it acceptable as monotherapy (20). The coverage was 91% in the 11 cases where the DSS suggested fluoroquinolones, which is an alternative to beta-lactam antibiotics in the treatment of urinary tract infections.

The therapeutic benefit was based upon on the assumption that the reduction in 30-day mortality can be ascribed only to whether covering therapy was given or not. Obviously, this is a simplification and the DSS has to be extended in this respect.

The performance of the DSS was affected by the assumptions of costs assigned to each antibiotic. When including only direct costs, the DSS suggested a combination of vancomycin and gentamicin for all cases. Restrictive use of vancomycin is recommended and applies especially to patients with bacteraemic urinary tract infection as only a limited number of bacteraemias are caused by Gram-positive bacteria. This underlines that ecological costs must be taken into account in order to achieve a balanced choice of antibiotic treatment.

The consumption of antibiotics is a major determinant for the level of resistant microorganisms but this relation is not fully understood (5). A quantitative model of this problem is needed, and should include other elements which affect the development of resistance; e.g., resistance factors genetically coupled to virulence factor, hygienic measures affecting transmission of pathogens and use of antibiotics for veterinary purposes.

As ecological cost must be included in the DSS and there are no firm quantitative models at the present time, we have resorted to subjective estimates of the ecological cost associated with the use of different antibiotics. The current frequent empirical use of ampicillin is not supported by the DSS, which preferred mecillinam in order to achieve a larger coverage. This implies either that the current pattern of use of ampicillin must be reconsidered or that the relative ecological costs of ampicillin and mecillinam must be revised.

In conclusion, the DSS significantly improved the coverage rate without increasing costs. We find that through a decision theoretic approach different assumptions about costs and benefits of antibiotic therapy can be elucidated and thereby a rational antibiotic policy may be substantiated.

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# The Danish registers of causes of death

Cand.stat. *Knud Juel & Karin Helweg-Larsen*

## ABSTRACT

Juel K, Helweg-Larsen K. The Danish register of cause of death. *Dan Med Bull* 1999; 46: 354-7.

In 1875 registration of causes of death in Denmark was established by the National Board of Health, and annual statistics of death have since been published. Until 1970 the national statistics were based upon punched cards with data collected from the death certificates. Since then the register has been fully computerized and includes individual based data of all deaths occurring among all residents in Denmark dying in Denmark. Furthermore, a microfilm of all death certificates from 1943 and onward is kept in the National Board of Health. The Danish Institute for Clinical Epidemiology (DICE) has established a computerized register of individual records of deaths in Denmark from 1943 and onwards. No other country covers computerized individual based data of death registration for such a long period, now 54 years. This paper describes the history of the registers, the data sources and access to data, and the research based upon the registers, presenting some examples of research activities.

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## INTRODUCTION

Mortality statistics have for many years been a useful indicator of the national state of health, and long tradition of registration of causes of death exists in Denmark. By 1875 the National Board of Health published the causes of death in the kingdom of Denmark, and the board has since published annual statistics of causes of death based upon the death certificates. In Denmark the statistics of cause of death comprise all deaths among residents in Denmark dying in Denmark. However, files with information about death abroad of residents in Denmark are also kept in the National Board of Health.

## REGISTRATION OF CAUSE OF DEATH, THE DEATH CERTIFICATE

Since 1871 it has been mandatory by law to complete a death certificate in any case of death occurring in Denmark. At present only a physician can complete the death certificate, however, until 1976 a lay person could complete the death certificate.

At present the death certificate in use consists of two parts. One contains all civic information of the deceased, including the unique personal identification number, which identifies all residents in Denmark. Part two of the death certificate contains the medical information: underlying and contributory causes of death, manner of death, and data from any post-mortem examination including information about autopsy, toxicological or other examinations. This information is in general filled in by the family doctor or a hospital doctor. About 10% of all deaths in Denmark are currently submitted to a medico-legal inquest, and the death certificate is in these cases completed by the coroner (forensic expert).

## CLASSIFICATION OF CAUSE OF DEATH

Corresponding to WHO's rules any death certificate shall state the underlying cause of death, or if it cannot be given then state that the cause of death is unknown. In many deaths contributory causes of death are also identified and must be stated in the death certificate. However, only the underlying cause of death is included in the annual mortality statistics. Up to two additional notified causes of death might be coded, and included in the register. These additional causes of death are used in research projects.

As long as a national register of death has existed at the National Board of Health specific classification systems of causes of death have been in use. From the 1870's until 1931 a Danish classification

system of 113 different disease specific causes of death or injuries was used. In the period 1931-1940 the Scandinavian disease classification, and from 1941 to 1950 an international classification, the Bertillon nomenclature, adopted in Paris in 1938, were used in Denmark.

Since 1948 WHO has maintained the international classification of diseases. Manual of the International Classification of Diseases (ICD), 6th Revision was applied in Denmark from 1951 to 1957. In the period 1958-1968 the Seventh revision was applied, and from 1969 to 1993 the Eighth Revision. ICD 9 was never applied in Denmark. From 1994 causes of death have in Denmark been classified according to WHO's tenth revision of diseases, ICD 10.

Due to major modifications in the classification cause specific mortality statistics are not fully comparable over the years. Therefore, in the annual cause specific mortality statistics a Danish list of 49 different categories of diseases and external causes of death is published, which make it possible to follow trends in the major causes of deaths, independently of the changes in the classification of diseases. However, difficulties exist regarding some categories of causes of death requiring more specialised evaluation to follow trends in mortality.

## VALIDITY OF CLASSIFICATION OF CAUSE OF DEATH

Several factors influence the correctness of the statement of cause of death on the death certificate. The physician may have poor knowledge about the deceased or no access to information about clinical symptoms or results of clinical examinations. There may be errors in the sequence of the diagnoses stated, details missing about the duration of the disease, and lack of knowledge of the results of a possible post-mortem examination (1). Among old people with several serious diseases and competing causes of death it may be difficult to establish the underlying disease (2). In general, deaths due to cancer are stated relatively reliably on the death certificate (2-4). Heart diseases present far more problems. Cardiovascular diseases are stated as the cause of death in many cases without any reliable clinical information or post-mortem examination to confirm the diagnosis (2, 5, 6).

The Danish death certificate was changed in 1997 in order to increase the reliability of the classification of cause of death. Now, the statement of the underlying and additional causes of death, on page two, may await the availability of clinical information and the results of any post-mortem examination. Until 1997 the death certificate was completed at the inspection of the dead body, and the statements about cause of death were often filled in by a physician with only little knowledge of the deceased. At present, the physician with the best knowledge about any preceding illness or injury of the deceased is the one to complete the death certificate. Furthermore, the results of any post-mortem examination shall be included in the statement of the cause of death.

However, since the 1970's the autopsy rate has been declining from about 45% of all deaths and 75% of deaths in hospital to 30% and 50%, respectively, in 1985. In the present Danish legislation of post-mortem examination, adopted in 1990, it is stated that an autopsy can be performed only with the informed consent of the relatives of the deceased. In 1996 the overall autopsy rate was only 12.5%, and 22% among deaths in hospital. Further, the autopsy rate in the capital is higher than in the provinces, about 17% and 10%, respectively.

Without any autopsy the cause of death is often incorrectly stated (2-6).

The percentage of deaths classified as unknown cause of death (ICD 8 780-796, ICD 10 R00-R99) has been increasing over the years (6). In 1996 about 11% of all deaths were classified as such. The increase in the number of deaths of unknown cause is about parallel to a decrease in the mortality from circulatory diseases, and presents severe problems when studying the trends in mortality from heart diseases (7). Fig. 1 demonstrates the important decline in registered mortality from circulatory diseases by showing the distribu-

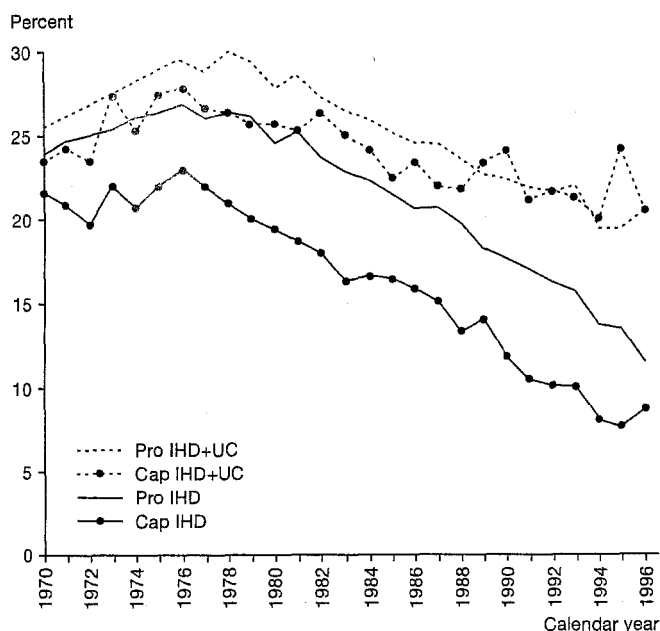


Fig. 1. Proportion of deaths classified as ischemic heart diseases (IHD) and unknown cause (UC) in the Capital (Cap) and in the Provinces (Pro), Denmark, 1970-1996, age group 35-69 years. By calendar year.

tion of death classified as due to circulatory diseases among all deaths of 35-69 year-olds in the period 1970 to 1996. In the beginning of the 1970's, about 20% of all deaths in the capital area were classified as due to ischaemic heart disease, in 1996 only 10%. In the other parts of Denmark the percentage was 25% in 1970 and 15% in 1996. By pooling deaths from ischaemic heart diseases and from unknown cause of death together the trend is very different, and there is much less difference in the distribution between the capital and the non-capital areas. In recent years, in cases of sudden death physicians are more reluctant to state the cause of death as given, without any clinical information or results from post-mortem examinations. The traditions were different two decades ago, where those deaths often would have been notified as due to circulatory diseases.

#### CODING OF THE DEATH CERTIFICATE

Since the start of Danish mortality statistics all data have been coded centrally in the National Board of Health. The coding is performed by a limited number of specially trained coders under the supervision of the medical staff of the Board of Health. Evaluation of the interpersonal reproducibility in coding has shown an acceptable level of agreement (2), and repeated internal quality controls confirm this observation. However, the interpretation of the notified causes of death, for example in cases with competing causes of death, may differ among the coders.

The coding of the underlying cause of death and the possible contributory causes of death follows the international principles laid down by WHO. According to WHO's rules of classification the underlying cause of death is determined by the direct cause of death and by additional, contributory, causes of death by an analysis of clinical sequence and causality. The incompleteness of basic information in the death certificates is one source of incorrect coding of the underlying cause of death, and produces considerable differences in national coding practices. Analysis of Nordic coding practice was performed in 1985 (8). It was found that the coders in a higher percentage of cases requested supplementary information in Denmark and in Norway compared to Finland and Sweden and that a higher proportion of cases were coded as due to heart diseases in Denmark and Norway compared to Sweden.

#### COMPUTERIZATION

In the period 1943-1973 the statistics were made from punched cards based upon the information in the death certificates. From 1974 un-

til 1996 Statistics Denmark, who were responsible for the transferring of the coded data on the death certificates, generated the statistics. The coders in the National Board of Health coded the data directly on the death certificates, which were used in Statistics Denmark, and then returned to the National Board of Health. Since 1996 all computerization is done in the National Board of Health. Since 1997 the coded information from the death certificates are being scanned into a computer.

Demographic information used in the annual updating of the register of causes of death have since 1968 been verified by the linkage to the Central Population Register (CPR), and only a minimum of errors may be expected concerning name, sex, date of birth and of death, and present residence. However, information about place of death cannot be checked, and may be incorrect in some cases.

#### THE REGISTERS OF CAUSES OF DEATH – COMPUTERIZED DATA SOURCES

There are three main sources to obtain data about mortality statistics in Denmark; all are based solely upon the death certificates.

##### 1. THE REGISTER OF CAUSES OF DEATH IN THE NATIONAL BOARD OF HEALTH

Since 1970 all data are computerized in the register which contains the following data: the unique personal identification number, sex, marital status, place of residence, date of death, place of death, type of post-mortem examination (medico-legal or not medico-legal), manner of death, underlying cause of death and up to two contributory causes of death, information about autopsy and type of autopsy (medico-legal or hospital) and other post-mortem examinations.

Access to data in the register is regulated by special rules, which are in accordance with the national legislation of registers, and which safeguards against misuse of the personal files of individuals.

The data in the register is the source of the detailed annual mortality statistics published by the National Board of Health. The statistics include analyses of trends in overall mortality and cause specific mortality by sex and age, and detailed tables of the number of deaths by ICD code, sex and age groups.

The research based upon the registry data is described in connection with an overview of more recent research activities based upon DICE's national register of causes of death.

A copy of this register is located in the Danish Cancer Society.

##### 2. THE CENTRAL FILE OF DEATH CERTIFICATES IN THE NATIONAL BOARD OF HEALTH

Since 1943 a complete archive or file of all Danish death certificates has been kept in the National Board of Health. Copies of the original death certificates are available from microfilms. For the period up to and including 1969, the file is based on punched cards, and the key to a given death certificate is the deceased's name, date of death and place of residence or name and date of birth. Since 1970 the file has been based upon the unique personal identification number and the key to the file is this number and the year of death. A copy of single certificates can be retrieved for use in defined research projects.

Release of details that can identify individual persons may be permitted in accordance with the legislation on public registers as per the regulations of the Danish Ministry of Health.

##### 3. DICE'S NATIONAL REGISTER OF CAUSES OF DEATH

This register contains computerized individual records of all deaths registered in the National Board of Health since 1943. The register thus includes more than 50 years of data, which can be linked to other registers.

For the annual cause of death statistics information from the death certificates were transferred in the National Board of Health to punched cards, which were stored after use. In the early 1960s cards covering the period 1943-1960 were handed over/trusted to DICE, and by 1973 cards from the period 1961-1970 were also transferred to the institute, in all 1.2 million punched cards. Since 1971 DICE

has received computerized data from the National Board of Health every year.

At the computerization of the data from the punched cards, many cards were more than 30 years old. It was difficult to read some of the cards even though the cards were well preserved. In building up the computerized register a lack of continuity in available information and insufficient documentation of the data in some years also presented severe problems.

Continuous control of the quality of the transfer from the punched cards showed only minor errors concerning the period 1943 to 1969, although complete agreement was not obtained. Since 1970 DICE's register is a copy of that at the National Board of Health.

As DICE's register includes information about a total of 2.65 million deaths in the period 1943-1996 a number of problems exist related to the large time period covered by the register. Information about important variables is not available for each year, and some variables have different values in different years. Place of residence has e.g. been classified differently over the years, and the use of five different classifications of diseases over the time period has created problems in trend analyses of cause specific mortality.

The computerization of the data was initiated by the former head of DICE, Ole Horwitz, who foresaw the tremendous importance of having easy access to mortality data in epidemiological studies. No other country covers computerized individual based data of death registration for such a long period, now 54 years.

Release of details that can identify individual persons may be permitted in accordance with the legislation on public registers as per the regulations of the Danish Ministry of Health.

#### RESEARCH BASED UPON REGISTER DATA

The register is a most valuable source of data for epidemiological research and much mortality research in Denmark has already been based on this register. The research may be divided into main groups, such as 1) analysis of mortality trends over the last 50 years, in total and in population sub-groups, 2) analysis of mortality trends due to selected causes of death, 3) analysis of geographical variations in mortality and causes of death, 4) analysis of mortality and causes of death in population groups exposed to the effect of potentially health damaging or health promoting effects, 5) prognosis for patients with selected diseases

Since 1990 much mortality research in Denmark has concentrated on the problematic trend in the mortality of the Danes. Possible causes for the development and suggestions for future research have been discussed (9). The initial analyses were based on the Cause of Death Registers and on WHO and OECD data.

Mortality research has contributed significantly within the areas of environmental medicine and occupational medicine. For instance a great number of analyses of geographical variations in mortality in connection with local cases of pollution or other potentially health-damaging influences of the environment have been made. In Denmark we find several cases where local clusters of certain diseases or deaths have been observed - most often cancers - within a limited geographical area very often close to a production plant. Such observations are often commented on in detail in the media putting the health authorities under pressure to react quickly. The registers have been used in several of such cases: could the pollution from the Cheminova plant have influenced the mortality in the municipality of Thyborøn-Harboør? (10). Or was air pollution from the Superfos plant responsible for an increased prevalence of lung cancer in Fredericia? (11).

As regards occupational medicine the mortality has been followed in many different groups of individuals and this has revealed new knowledge of materials or effects which are harmful to the health. Examples could be: if occupational fluoride exposure is a carcinogenic risk factor (12), if the crash of a B-52 bomber in Greenland caused an increased mortality among workers employed during the clean up (13). Statistic Denmark has studied the influence of socio-economic position on mortality (14).

Also the register is most valuable in clinical studies comprising a great number of analyses based on the cause of death register to assess the prognosis for patient groups with certain diseases: for instance does an excess mortality exist among patients with giant cell arteritis? (15), does neuroleptic medication for schizophrenic patients result in increased mortality? (16), does preconceptional irradiation of males and females from internally deposited radionuclides affect mortality in their offspring? (17).

The fact that DICE's cause of death register covers more than 50 years facilitates such analyses of cause specific mortality in defined population groups or cohorts as compared to various risk factors. But the data are often very old which complicates the tracing of individuals. By comparing date of birth and name from old personnel files for instance with the same data from the cause of death register it is possible to get a list of all persons in the cause of death register with the same date of birth and name and then investigate the likelihood of this person dying before 1968. If necessary a copy of the death certificate can be procured from the Board of Health. When the follow-up has been finalised it is possible, on the basis of the cause of death register, to estimate the expected number of deaths in the study group, had the mortality been the same as in the general Danish population. It is very important those time periods, ages and geography fit. Although there have been no severe fluctuations in the total mortality in Denmark over the past 40-50 years (9), and although the total mortality in a cohort is at the same level as in the entire Danish population, dramatic changes from one group of cause of death to the other may take place within a comparatively short period of time. The registers have been used for a number of studies of variations as to region and time such as the distribution of avoidable deaths in the EU (18) and the mortality in Denmark as compared to other European (9). The register data on contributing causes have been used in projects where it is decisive to know all incident cases of a disease, e.g. diabetes (19).

A very important part of the epidemiological analyses is to minimise the number of dropouts and make the registers and data material as complete as possible. Examples of this are the update of the twin register (20) and the examinations of the Thule workers (13).

For a great number of such studies the long time series of the cause of death register is of invaluable significance.

The cause of death registers are available for research as negotiated with those responsible for the register. Researchers wishing to use data from the register must prepare a protocol in which ethical as well as legal requirements are met. Also they must follow the guidelines for research and co-operation defined by the register. Such guidelines specify the rights and demands of researchers as well as the register. The researchers must to the greatest extent possible cover the cost of using the register.

#### CONCLUDING REMARKS

The registration of causes of death is based upon information in the death certificates. The National Board of Health maintains the updating of the register. The register in the National Board contains computerized data since 1970 and DICE's National Register of Death data since 1943. The quality of the data on causes of death relies mainly upon the quality of physicians' notification of causes of death, and the classification and coding in the National Board of Health of the cause of death. Declining autopsy rates, now about 12% of all deaths, may well present a threat to the quality of the data. The registers are essential for much research. Data from the registers make surveillance of cause specific mortality feasible, and remains one of the most important sources in epidemiological studies.

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## The Danish in vitro fertilisation (IVF) register

Anders Nyboe Andersen, Hanne Brix Westergaard & Jørn Olsen

### ABSTRACT

Andersen AN, Westergaard HB & Olsen J. The Danish in vitro fertilisation (IVF) register.

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The Danish IVF Register was established in 1994 and covers all treatments with in vitro fertilisation (IVF), intracytoplasmic sperm injection (ICSI), frozen embryo replacements (FER) and egg donations (ED). Since data are recorded with personal identification numbers, they provide the starting point for cohort studies of treated women and offspring. It is obligatory for each clinic to report each treatment cycle to the register, by means of special treatment report forms that contain clinical as well as laboratory data. The pregnancy outcome is reported on special forms no later than two months after birth. The personal identification number (CPR) allows cross-linkage of the data from the register, with several other national Danish registers, such as the National Hospital Register, the Abortion Register, the Danish Register of Causes of Death, the Cytogenetic Central Register and the Cancer Register.

In 1998 a total of 7131 IVF and ICSI cycles were performed in Denmark. This corresponds to around 6500 cycles per 1 million women in the reproductive age, which is among the highest number per capita in the world. The coverage of the register is believed to be very close to 100% for the treatment reports, but less for the pregnancy outcome forms, at least during the first two years after the register was established. The main importance of the register is quality control aspects of assisted reproductive techniques and research in relation to follow-up on maternal and infant health.

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The Danish IVF Register was established January 1st 1994, based upon a number of legislative initiatives during this period. The political decision to establish the register was directly provoked by the debate following use of foetal reduction in high order multiple pregnancies – a procedure that was a direct consequence of the new techniques. Secondly, the proposal that use of gonadotropins for ovarian stimulation could increase the risk of ovarian cancer caused concern at that time, and underlined the importance of monitoring the persons treated with IVF. A register could be an important research resource in relation to such possible long term side effects. Thirdly, there was a need for detailed information on several aspects of these treatments, such as the number of treatments, their efficacy in relation to birth rates, their safety in relation to infant health and the complications of treatment.

The register exclusively records those treatments that involve handling of oocytes or embryos. This includes standard in vitro fertilisation (IVF), intracytoplasmic sperm injection (ICSI), frozen embryo replacement (FER) and egg donation (ED). The register is based on a compulsory reporting system, where all initiated cycles are recorded. The register does not record infertility treatment in general, such as induction of ovulation, intrauterine inseminations, use of donor sperm or fertility enhancing surgery.

A number of countries including The United States and Canada (1) France (2), Finland (3), Sweden (4), Germany (5), United Kingdom (6) and Australia and New Zealand (7) have national registers on assisted reproduction techniques (ART), but the registers are organized differently. This makes it difficult to summarise the results from various national data collection programmes (8).

The Danish Register allows identification of each woman in each treatment cycle and linkage to other population and health registers, by means of the personal identification numbers. The first publications from the register have just been published (9, 10).

Table 1. *Summary of data included in the treatment forms for IVF and ICSI\**.

<i>Indications</i>	
Ovulatory defects	
Tubal factor	
Cervical/uterine factors	
Male factor	
Other factors	
Unexplained infertility	
<i>Oocyte collection</i>	
Aspiration cancelled/performed	
Number of oocytes	
<i>Donor gametes and research</i>	
Fertilization using donor sperm	
Oocytes donated to other couple	
Oocytes donated for research	
<i>Drugs</i>	
All drugs used for treatment	
<i>Fertilisation methods</i>	
IVF	
ICSI	
<i>Preimplantation genetic diagnosis (PGD)</i>	
Performed or not	
<i>Transfer</i>	
Cancelled/performed	
Number of embryos transferred	
Number of embryos cryopreserved	
Number of embryos donated to research	
<i>Pregnancy</i>	
Positive or negative pregnancy test	
Clinical pregnancy	
<i>Complications</i>	
Admission to hospital for hyperstimulation	
Admission to hospital for infection	

\*) Data on frozen embryo replacements (FER) and egg donation (ED) are not included here.

## METHODS OF DATA COLLECTION

### TREATMENT CYCLE REPORT

Each of the 16 Danish fertility clinics that perform any type of in vitro fertilisation has to report each initiated cycle on special report forms on clinical and laboratory variables. After completion of each cycle the corresponding record sheet is sent to the National Board of Health. The treatment report form includes a number of variables as shown in Table 1.

### PREGNANCY REPORT

A pregnancy outcome form is filled in by the clinic, not later than two months after completion of each pregnancy.

The pregnancy outcome report includes data on: Abortion, ectopic pregnancy, foetal reduction, delivery and malformations.

### LINKAGE TO OTHER DANISH NATIONAL REGISTERS

Based on the Danish CPR number system the data from the IVF Register can be, and has been, linked to other national registers (11), such as:

1. The Danish National Hospital Register, which registers all hospital diagnoses (ICD-10), including women's morbidity during pregnancy and childbirth, interventions and surgery, children's morbidity and malformations detected at birth or later (12).
2. The Danish Medical Birth Register, which registers pregnancy and childbirth including weight and length, gestational age, Apgar scores and malformations. Until 1996 through application forms and after that through electronic application using ICD-10 (13).
3. The Danish Register of Causes of Death which registers all deaths in Denmark, including stillbirths.
4. The Danish Cytogenetic Central Register which registers all prenatal genetic tests (amniocentesis and chorionic villus biopsies).

5. The Danish Abortion Register, which registers all types of induced abortions.

## COVERAGE

All Danish clinics report every treatment cycle with IVF, ICSI, thawed embryos and egg donation to the register. All Danish clinics (16 in 1995) have their own databases, that include all treatment cycles. As these are very well defined we believe that the coverage is close to 100% for the treatment reports, although reporting errors may of course occur. The coverage is known to be less for the pregnancy outcome forms. Even though it is obligatory to submit the pregnancy outcome form, the first two years (1994 and 1995) showed, that this was not being done in a substantial number of cases. It should be considered however, that the register was established in 1994, and some clinics needed some time to implement their follow-up system.

Even when birth records are not provided by the clinics, it is still possible to get information from the hospital discharge register on birth outcomes, and this procedure will be implemented also in the future as a quality check (9). The National Board of Health will always cross-link the registers to secure data validity, especially regarding births and perinatal data.

## THE SIZE OF THE DATA SOURCE

The number of reported treatment cycles using either IVF or ICSI for the five year period from 1994 to 1998 is given in Table 2.

In 1998 the overall number of treatment cycles was 7131 for the entire population of 5.5 million inhabitants, which corresponds to almost 1300 treatment cycles per million. In relation to the number of women in fertile life (15 to 44 years old), the number of cycles were 6488 per million.

## DATA ACCESSIBILITY, AVAILABILITY AND COST

Data from the Danish IVF-Register have been published for 1994 and 1995 (10). In the coming years data will be published every second year by Munksgaard, Copenhagen. There is a one to two years delay in publishing, due to the cross-linkage to the Danish Register of Causes of Death, the treatments in one year with delivery in the same or the following year, will thus have a follow-up on mortality for at least two years.

The register will be available for research in form of individual or aggregated data, by permission from the National Board of Health. The application must include a study protocol. All data from Registers within the National Board of Health has to be paid for. All scientist will get a quotation on the price, before the agreement is accepted.

## MAIN FINDINGS FROM THE REGISTER

So far data from the register has only been analysed from the two first years. These data included 2245 infants and data on infant health, birth weight, gestational weight, infant mortality and malformations. The offspring of IVF treated women were compared with a control group selected from the Medical Birth Register (13). The control group was matched both regarding age, multiplicity and parity.

The study showed a similar number of congenital malformations in both groups. In the infants born after ART malformations occurred in 4.8% of all infants, whereas 4.6% of the infants in the control group had malformations. This difference is not significant, but both groups had higher prevalences than in the background population (2.8%). Nothing indicated, that the treatment itself, accounted for the apparent high prevalence of malformations.

Similarly, the birthweight among the 2245 children only differed 4 grams between the children born after ART compared with the control group. Other findings were that the birthweight of IVF twins was significantly higher than that of non-IVF twins, and that in relation to infant mortality and death within the first year, the IVF twins performed well (9-10).