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REGISTER-BASED VITAL STATISTICS
ISSUES TO CONSIDER SOME DANISH EXPERIENCES

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* The views expressed in this paper are those of the author and do not necessarily reflect those of the Economic and Social Commission for Western Asia.

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all probability will be of interest within the foreseeable future should be considered. On the other hand, data that cannot be used directly or indirectly (for example, for checking) should be avoided. It is expensive to store and to treat data and data that are not regularly used often cause confusion in the system.

Extraction of data

The extracts of data from an administrative register, like the Central Population Register, to a statistical register are mainly of two different types.

Status extract

The first type, the status extract, is an extract of all relevant data for all persons who are registrated as active persons on the register at a specific time. A status extract typically forms the basis for a yearly survey of the total population and its composition.

Change extract

The second type of extract, the change extract, concerns all relevant changes in the population register, such as births, deaths etc. for a period of time.

A change extract typically forms the basis for statistics of population changes - births, deaths, marriages, migrations etc.

These change extracts must be subjected to an initial processing, during which the category of change must be established for each individual case. It must particurlarly be decided whether a change has actually taken place, or whether it is only a case of correcting the wrong data contents.

Delays

Owing to delays in reporting births, deaths and migrations etc., the population register never corresponds as regards contents to the resident population as it is at a specific time in question. The delays can differ widely from event to event. The delays concerning births and deaths are usually not very long, whereas reports concerning emigration are those with the longest delays in Denmark.

Danish experience has shown that within 40 days, more than 99 pct. of the events are reported. When making a status extract these delays have to be taken into account. An extract from the Central Population Register, as it is at a specific date, e.g. 1st January, is adjusted with regard to births, deaths, migrations etc., which have taken place before 1st January, and were reported within 40 days of the new year. By means of this period of collection, it is ensured that all reports, which are not subject to extraordinary delays, are included in the statistics.

As for status extraxts, attention has to be paid to delays in the reports, when processing change extracts. It is also necessary to decide what to do with changes reported to the register too late. One possible solution is to transfer these late reports to the next period (year or quarter of a year). In this way, all changes are registered in the statistics, but some of them in the wrong period. Another solution is to exclude these very late registrations from the statistics of changes and record them as corrections in a new status.

It is possible to create a new status with a status extract as basis and with regular change extracts. However, it is the experience that it is difficult to

keep the quality of the status over the years by using this procedure. Small errors in the first status or in the change extract can over the time develop, in such a way, that after some years there are increasing differences between the calculated status and the real status. Therefore, processing the status extract regularly, e.g. once a year gives a better quality of data.

Check for error

Like all data used for statistics, the status extracts as well as change extracts have to be checked for errors. Checks of computer-based information is a comparatively quick process, which makes it possible to effect a more extensive checking than in the old-fashioned processes. There are mainly two different types of error-checks to consider, validity checks and combination checks or logical checks.

Validity check

A validity check ensures that for every single item only valid codes exist. For example, the item of sex will normally have only two acceptable codes, one for men and one for women, all other codes will be understood as errors

Logical check

The logical checks are based on comparison between two or more pieces of information concerning the same person. If the event, e.g. is a birth, the mother's age is supposed to be in the interval 14-49 years. A marriage should be between a man and a woman, and there can be an age limit for marriages In the Danish data extracts from the CPR today, less than 1 per cent of the items of information are defective. This can, of course, be attributed to a well-developed check for errors in the CPR.

The data extracts can, after check for errors and corrections, provide inputs to statistical registers. Statistical registers are usually organized after the type of statistics that is the final output. There is no one-to-one relationship between extracts from administrative registers and statistical registers. The data extracts from one administrative register often constitute the input to several statistical registers and one statistical register often receives inputs from more than one administrative register, and sometimes the input is a combination of administrative extracts and data collected in other ways

Extracts from CPR to Danmarks Statistik

Once a year Danmarks Statistik receives *a status extract* from the CPR. This extract forms together with 40 day's change extracts the basis of the statistical register, which in turn constitutes the basis of the annual statistics of the population and its composition according to various criteria. The unit in this statistical register is naturally the person, who is unambiguously identified by his/her person number.

By way of illustration, the data contents in the status extract and change extract from the CPR are shown in appendix 2.

Every week Danmarks Statistik receives an *extract* from the CPR *of the changes* which are of interest. The information from the weekly change extracts is compiled, after error-checking, for statistical registers with quarterly information, which at a later stage is compiled for annual registers Like the status register the unit is here the person. The statistical registers of changes are used as basis for the vital statistics.

Appendix 2

Status extract from CPR: (yearly)
Person number
Status (active or not)
Date for change of address (latest)
Code for address (municipality, street, streetnumber, floor, apartment)
Member of church
Marital status
Date for change in marital status
Place of birth
Name
Person number of spouce
Person number of mother
Person number of father
Date for immigration
Citizenship

Change extracts: weekly, accumulated to quarters and year

Person number
Type of change
Date of change
Status (active or not)
Date of registration (of change)
Date for change of address (latest)
Code for address
Date for change in marital status
Marital status
Person number of spouce
Person number of mother
Person number of father
Member of church
Place of birth
Date for immigration
Date for emigration
Citizenship
Country of immigration/emigration

Old status
Code for old address
Old marital status
Old date for change of marital status
Old person number of spouce
Old person number of mother
Old person number of father
Old place of birth
Old date of immigration
Old date of emigration
Old citizenship
Old country of immigration/emigration

summary statistics of the population in parishes are compiled (2 000 parishes).

Delays

The first final results from the annual status statistics, concerning the total population in all Denmark and in each municipality, are published in a news letter before the end of February. Simultaneously with the publication of the first available information, detailed information on the level of municipalities is made available for the users who subscribe to Danmarks Statistik's data banks. The data banks constitute a system of data bases to which the users can obtain on-line access. A fee is charged for access to the data banks.

The more detailed information is published, at a later stage, subject to the delays caused by the editing and technical production of major publications.

Vital statistics

As mentioned, the weekly change extracts are compiled for quarterly vital statistics. For each quarter the number of births and deaths (preliminary figures), number of external and internal migrations, marriages and divorces are published. The statistics are analysed by sex. Once a year, statistics of naturalizations and adoptions are compiled in addition to the statistics already mentioned.

Geography

The quarterly statistics are compiled for all Denmark and for each municipality.

Delays

The quarterly statistics, like the status statistics, are also published with a delay, i.e. within 2 months after the end of the quarter.

The final statistics of births and deaths, i.e. the information which is constructed by linking information from the CPR and information from the certificates, are only compiled annually. They are available with a delay of 6 to 9 months.

4. Vital statistics as part of a register system

The statistics described here constitute today part of a register-based statistical system in Denmark. Through the 1970's a range of administrative EDP registers were established, which by means of various keys can be linked in order to construct statistical information on persons, dwellings and business enterprises.

The information contained in the tax system concerning incomes and economic activity status can be linked to the demographic information in the CPR by means of the person number, which is the identification number in both systems. The registers in the tax system also contain for each person in employment an identification number for the employer. The employer's number is recorded as identification number in the register system for business statistics. This register system contains information on industry, size and ownership of the business enterprise.

The Central Register of Building and Dwellings, which contains a range data concerning quality and size for each dwelling, has the same exact address as identification as the one which is used in the CPR. Consequently. it is possible to link information on the dwelling to individual persons

The register of educational attainment contains information on persons receiving education or persons who have completed an education The identification is here the person number.

Linking information from all these administrative register systems made it possible for Denmark in 1981 to conduct a population and housing census based entirely on extracts from registers and without applying directly to the population.

5. Centralized versus decentralized data processing

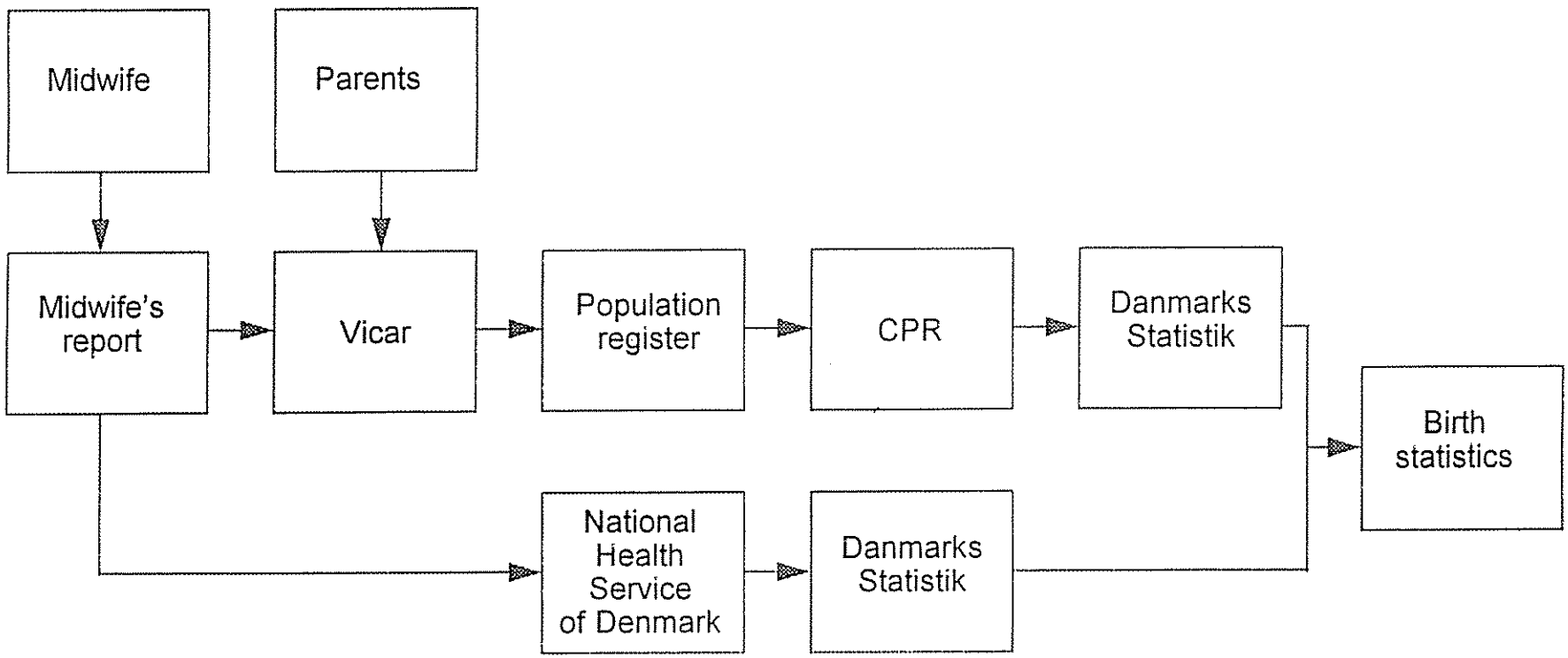
The data input concerning the basic demographic information has been decentralized in Denmark, i.e the local population register in each municipality is responsible for recording an event However, the same event is also recorded on the Central Population Register. This combination consisting of decentralized and centralized registration yields a range of advantages. The local knowledge, which is a great strength of the decentralized data collection, is maintained, while at the same time the centralized registration ensures that, for example, duplicate registration is avoided.

The Danish system enhances the possibilities of a decentralized as well as a centralized production of population statistics. The information on the population stored by the municipalities is similar to the information stored by the central statistical authority Danmarks Statistik. The Danish production of official statistics is, however, greatly centralized. Danmarks Statistik is responsible for producing most of the statistics in the demographic, social and economic fields. Some of the reasons for a centralized production of the statistics appear from chapter 3

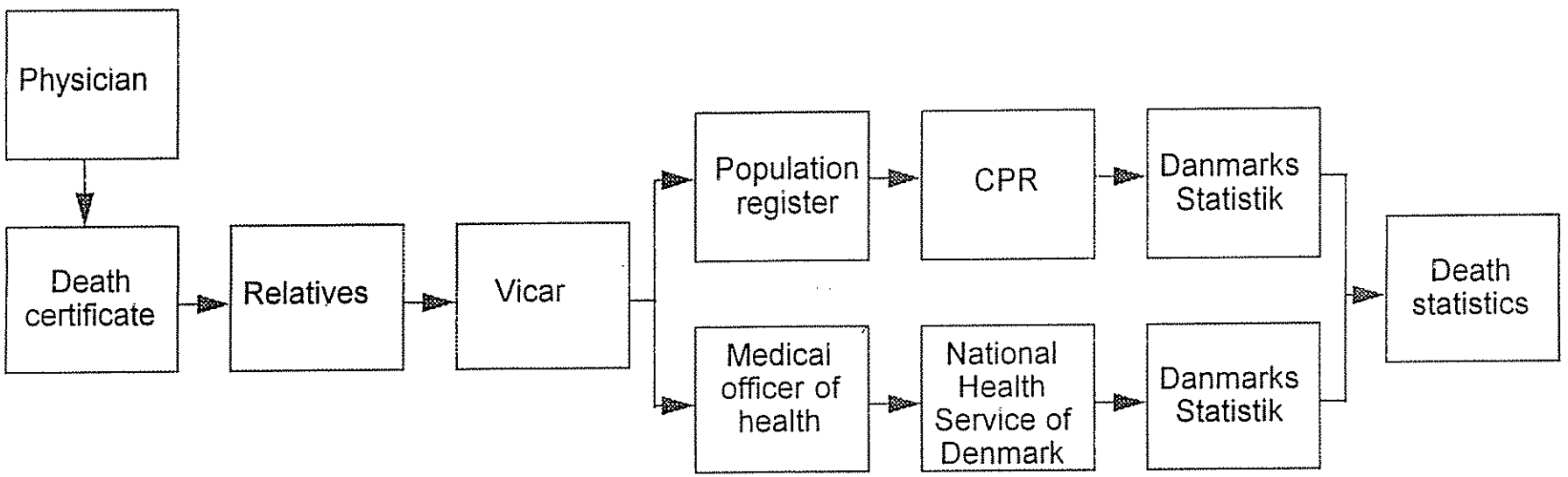
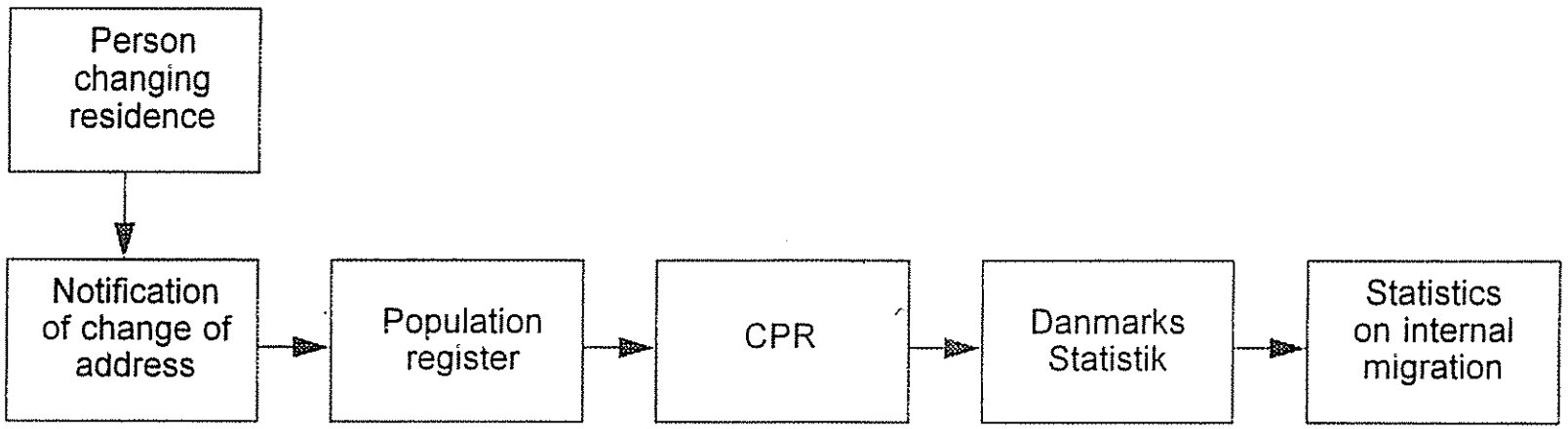
The numerous processes, which are conducted before the final production of the statistics, can be difficult to handle and a homogeneous treatment of the data is very important for the final results.

The centralized statistical production ensures a high degree of consistency, e.g. the population figures for small areas add up to larger areas, which, in turn add up to figures for all Denmark. It is also possible to ensure consistency between the various statistical fields, e.g. by using the same definitions and classifications, when this is desirable. Furthermore, a centralized production also ensures certain advantages of a large-scale operation. This may involve that the data material from one field to another is re-used.

Birth statistics



Death statistics



Change of address