

# Arbeidsnotater

S T A T I S T I S K S E N T R A L B Y R

IO 67/2

Oslo, 13. juli 1967

The Norwegian Population Register System<sup>1)</sup>

by

Helge Skaug

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1) Paper presented for the International Symposium on Automation of Population Register Systems in Jerusalem, 25-28 September 1967.

## 1. Historical summary

Although the International Statistical Institute as early as 1872 at its 8th session in St. Petersburg recommended that general population registers be established in member states, compulsory population registration in Norway was not introduced until after the Second World War. However, in 1905 an act was passed permitting the local authorities, i.e. the municipalities,<sup>1</sup> to establish population registers on a voluntary basis. According to this act, special by-laws - confirmed by the Government - granted the municipalities the right to take annual local censuses and to collect information about migration within the municipality.

Pursuant to the act and regulations of 1905, population registers were established in Oslo as from 1 January 1906, and somewhat later in other comparatively well-populated urban and rural municipalities.

The Act of 1905 was superseded by a new Act of 1915. This act also forced the inhabitants to report to the population registers movements between municipalities, but the main contents of the previous act remained unchanged.

The initiative to establish local population registers was originally taken by the local authorities themselves. The main reasons included the great need for individual information about the inhabitants, simplification and control concerning school attendance, military service, taxation and tax collection, preparation of voting lists, etc.

The population register of Oslo was administered as a separate institution under the local authority. The register was based on a main card register - arranged by place of residence - and a name card register, arranged alphabetically. The technical system adopted in Oslo served as a model for other municipalities. In smaller municipalities the population registers were, for practical purposes, administratively combined with the assessment office. This ensured a high degree of uniformity in the practical register routines in the different municipalities.

In 1922, a draft bill on the introduction of compulsory population registers in all municipalities was prepared. This bill, however, was never promoted for the legislative authorities.

At the outbreak of World War II, there were facultative population registers in 49 of the 64 towns and in 42 of the 680 rural districts, comprising approximately 38 per cent of the total population.

During the war, registration of all persons 15 years and over was

<sup>1</sup> A municipality - or commune - is the smallest administrative division in Norway.

imposed upon the local government by the occupants. The special purpose of the decree was to facilitate the search by the police. However, since no general population census could be taken in 1940, the basis of these registers was rather poor. Furthermore, as might be expected, many citizens did not obey the law, and neglected to report events such as migration etc. These registers were consequently of little value to the compulsory population registers that were established after the war.

## 2. Legal foundation

The authorization for population registration in Norway is the Act on Population Registers of 15 November 1946. This went into effect 3 December the same year, the date of the census of population on which the new registers were based. According to the law, population registers are established in each of the 454 municipalities (as from 1 January 1967).

Administratively, the Act on Population Registers was based on two main principles:

- a. The population registers should be administered by the local authorities, which are also responsible for the administrative costs.
- b. The local population registers are subject to control and direction from a central agency for the population registration.

The Central Bureau of Statistics has been charged with the responsibility for acting as central office for the local registers. One of the reasons for this arrangement is, of course, the close connection between the activities related to population registers and the compilation of vital statistics and migration statistics.

The main duties of the central office are to control the activities of the local registers, to support the necessary instructions concerning the registration, to decide questions of principle character and to solve disagreements that may arise between registers and between a register and the public. Further, the central office is authorized to establish supplementary provisions to the act, and thereby compel any official authority to furnish the population registers with current information that is of importance for the maintenance and updating of the registers etc. Prior to 1965, the central office also had the right to approve the position of Director of the population register. This position is, as a rule, combined with that of Director of the assessment office.

Compulsory population registers were established primarily out of consideration to the local authorities, particularly their need for a reliable

registration of persons liable to taxation within the municipality, and persons resident in the district who are eligible to vote. However, the extension of the General National Insurance Scheme etc. and the need for homogeneous and effective taxation procedures gradually increased the central authorities' interest for adequate population registration and individual identification. As a result of this development, the municipal assessment offices were reorganized and became state offices from 1 January 1965<sup>1</sup>. Simultaneously, the administration of the local population registers were - according to a royal decree - also transferred to the Director for the system of taxation. Special consideration was given to the local authorities so that their access to information from the registers would not in general be diminished. There is to-day a well established co-operation between the central office for the population registration and the tax authorities concerning the arrangement and utilization of the registers.

We may summarize by stating that the Central Bureau of Statistics (CBS) - in its capacity as central office - is the professional authority for the local population register offices, whereas the central tax authorities are responsible for the administration of the local offices and for the administrative costs.

### 3. Structure of the system

#### 3.1 Local and central registers

Population registration in Norway prior to the Act on population registration in 1946 was generally poor, although it might have been well organized and executed in the most populated municipalities. Registration of the local population in connection with rationing during and immediately after the war was, otherwise, of little value to the authorities.

The law on population registration established rules for uniform registration and equal treatment of analogous events. Such rules are of vital importance for avoiding double registration, or non-registration, of individuals, an occurrence which has always been of primary interest to the tax authorities. Furthermore, the law provided for co-operation between the local registration offices, and between these offices and the central office (CBS) on registration matters.

During the 1950's the population registration was gradually improved, and its functions and purposes more generally accepted. This development has continued. However, the vast distances and somewhat difficult communications are at times stumbling-blocks for the desired contact between the CBS and the more remote municipalities.

<sup>1</sup> Due to special circumstances, the population register of Oslo is, at present, still locally administered.

A number of municipalities, chiefly in the most populated districts, had on a voluntary basis established punch card registers before the end of 1964. Punch card service bureaus (co-operative societies) were established, financed by means of contributions from the respective municipalities. It should be mentioned that these centrals were established at different times, and have somewhat different equipment. They maintain businesslike principles, and operate to some degree independently of each other. Consequently, they are not affected by the legal regulations for population registration. They are, however, not permitted to utilize the punch card registers for purposes other than services for the local offices in question, and they are bound by general professional secrecy with regard to information on individuals.

In the beginning of the 1960's, a co-operating committee with members from the trade association and public administration suggested an analysis of the question of permanent identification numbers. The disadvantages of operating with various numbers for the same person in connection with assessment of taxes, health insurance, pension scheme etc. were emphasized.

The Directorate for Organization and Method supported the suggestion, and the Ministry of Finance and Customs requested the Central Bureau of Statistics to conduct the further work with permanent identification numbers based on dates of birth<sup>1</sup>.

During the planning period, it became evident that a system of permanent identification numbers ought to comprise the entire population. Moreover, great advantages could be attained by establishing a central personal register, and keeping it continuously updated by means of current information from the local population registers.

The implementation of the central population register began in 1963. By utilizing the schedules from the 1960 Census of Population, cards were prepared for the entire population by place of residence at 1 November 1960. This material was supplemented with information on births and immigrants after the date of the census. The identification numbers were assigned to cards, sorted alphabetically by municipality, and distributed to the local population registers for the control of date of birth, sex and name. The date for the check-point was fixed at 1 October 1964. Information on postal address, marital status, date of death or emigration had to be added. The numbered cards for persons who had moved to another municipality during the period 1 November 1960 and 1 October 1964 were forwarded to the municipality

<sup>1</sup> This work was supervised by, at that time, chief of the demographic division, Bjørnulf Bendiksen.

where the persons concerned were resident at the end of the period.

The local registers transferred the identification numbers to their main card and name card registers (cf part 3,5 in this paper). Municipalities which had at that time established punch card registers were allowed to reproduce new cards containing the desired information at the service-centrals. From Oslo the "situation" as per 1 October (in principle) was provided on magnetic tapes. Discrepancies in date of birth or sex entailed the issue of new identification numbers from the CBS. Similarly, identification numbers had to be allotted to all persons who had been omitted at the time of the population census, or those registered after the census. If the same person had been counted more than once by the enumerators in 1960, only one of the identification numbers was used.

All numbered cards had to be returned to the CBS. They were matched against a file that was used in generating identification numbers. Missing cards were copied and distributed to the relevant municipalities once more, but this time as a card of inquiry. By now there are very few missing card issued in connection with the establishment of the central population register.

This solution for introducing the permanent identification system gave, at the same time, a very good impression of the completeness and quality of local population registration. Generally, this impression was positive, but it also unveiled the need for adjustments of regulations and reorganization of routines for adopting the new system.

### 3.2 Identification numbers

The idea of permanent identification numbers for the entire population is not new in Norway, but for practical, administrative and economic reasons it was previously impossible to realize. The rapid technical development in the field of electronic data computers, however, made it gradually easier to fulfill this desire.

As already noted, the Ministry of Finance and Customs, when assigning the task to the CBS, specifically stated that the identification number should be based on date of birth. This question had, of course, been discussed by main agencies of possible users at a preparatory stage. The following main points were emphasized:

1. The number should unambiguously identify the individual. Two persons must not have the same identification number.
2. The number must be permanent over time.
3. The identification number should be constructed in such a way that errors in the number could easily be observed.

Date of birth and sex were chosen as the individual non-changeable data in the construction of the permanent identification number. Two significant factors for this decision were the inclusion of date of birth on most schedules, forms etc., and the high degree of accuracy connected with the data.

Since there is a maximum of 250 births on any single date in Norway, each person can be identified by a 3 digit number. Simultaneously, this number is used to distinguish between men and women, and between persons born on the same date in different centuries.

The construction of the identification number can be illustrated as shown below.

Identification number				
Date of birth			Personal number	
Day	Month	Year	Serial- number	Check- digits
21	09	30	458	73

The sequence in date of birth is that most familiar to Norwegians and the one which is generally used in schedules and documents. The alternative, to list year first instead of day, which may be more appropriate for archival purposes, was considered to be of secondary importance. What is precisely new, is the 5 digit personal number.

The serial number 0-499 is chosen for persons born later than 31 December 1899, and 500-749 for persons born before 1 January 1900. (For practical reasons, the assignment of identification number was begun with the highest numbers 499 and 749). The serial numbers 750-999 are reserved for special purposes, possibly for persons who will be born in the next century. The third or last digit of the serial number indicates sex, even numbers for women and odd numbers for men. Thus, the example given above refers to a woman born 21 September 1930.

The first of the two check-digits is calculated by using a selected set of weights and the second one by using the IBM standard weights. The second check digit, which also includes the first, can be calculated and checked by an IBM punching machine, whereas the first digit has to be checked by the computer [1]. Based on estimations from studies on the degree and character of errors relating to transcription etc, it is hoped that not more than approximately one error out of 100,000 registrations will pass undetected through the check-computations.

The choice between one or two control digits was, of course, strongly influenced by the expected future use of the system. Many agencies, however, may be assumed to have few other checking-possibilities in their registration routines, but at the same time have a need for a high degree of accuracy. The inconveniences and extra costs involved in erroneous registration may more than compensate for the costs of using more than one check digit.

All identification numbers are computed by an automatic processing procedure. The same procedure controls which numbers are unallocated and which are occupied for each possible date of birth.

The CBS is alone responsible for, and has a monopoly on, the computation of the permanent identification numbers.

### 3.3 Scope

The central population register comprises all persons who are resident in the country irrespective of their nationality. According to the law, a person is considered as residing in the place where he regularly takes his daily rest. Generally, all persons shall be registered in the local population registers at their respective places of residence. The entire population is thus registered both locally and centrally.

Certain categories of Norwegian citizens living abroad are nevertheless registered as resident in Norway (sailors, students). They are, as a rule, registered in the place considered as their home, but in some cases they have been transferred to a special "register of persons temporarily without place of residence" in the CBS. Other Norwegians living abroad are normally not registered in the country, regardless of whether they pay tax to the Norwegian state.

Each of the municipalities comprises all residents in the respective district. Permanent residents in another municipality may be registered as temporary residents, but the number of such registration is very small.

The following individual information is registered locally: Full name, address, district (within the municipality), date of birth, personal number and marital status. Furthermore, information is noted on date of entrance in the register, previous place of residence, citizenship, religious denominations, date of migration and new place of residence or date of death. For married couples the name and characteristics of the spouse and, if relevant, children are registered. The local registers also note information on individuals' right to vote at various times, and military service. Information



on occupation may be recorded at each official census of population, but this information is not kept up to date during the interim.

The local population Registers' punched cards contain, in addition, special codes for family number, principal person and subordinate persons - used by the tax administration for the preparation of taxation rolls. In principle, similar information might, of course, also be included in the central, population register.

In addition to the resident population, the central population register also includes all individuals who have at one time had an 11-digit identification number, i.e. persons who were counted as resident at the Census of Population 1 November 1960, or registered as such at a later date. This entails that the central register also comprises a considerable number of persons who are either deceased, emigrated or reported as missing. The last mentioned categories are, of course, excluded when the central register is used for administrative and statistical purposes. On the other hand, it has proved to be of great importance to have their names, last place of residence and identification numbers, as far as possible, on nation-wide lists in the CBS. In that way duplicates may more easily be observed, the "old" identification number for persons who return to the country may more quickly be found etc. It is a matter of convenience to what extent persons previously registered as resident should be extracted from the register for controlling purposes, but the system does allow all identification numbers to be included (cf. part 3.4).

The following information concerning each individual is at present available from the situation file:

11	digit	-	identification number	
4	"	-	code for municipality	
26	"	-	name (including spaces)	
30	"	-	address (name of street, road etc. and No.)	
2	"	-	code for postal district (to be used in connection with the code for municipality)	
1	"	-	code for type of registration (resident, deceased, emigrated or missing)	
1	"	-	code for marital status	
6	"	-	date of death	
11	"	-	identification number for mother	Applies only for persons born later than 30 September 1964
<u>11</u>	"	-	" " " " father	
Total 103 digits				

Thus, the central personal register contains relatively little information about the individual, but it may prove inconveniently to incorporate too

much information in the central register. A more rational method is to keep most other information of a non-demographic character on separate magnetic tapes, and link them with the file for the central register when the need for information of this kind exists (cf. parts 4.1-4.2). It would therefore be more appropriate, instead of one central register, to regard it as a system of co-operating registers with common identification numbers. If we consider the **scope of the** register in this broader sense, there are, practically speaking, no limits for its utilization.

#### 3.4 Organization and storage of data

All information collected about the individuals are organized in three files, kept on magnetic tapes: The situation file, the new change file and the old change file.

The situation file refers to a given date and has one logical record for each person showing the most up to date information about all individuals at that given date. All changes dated later than the date of the situation file are kept in the new change file, one logical record for each change showing the date of the change, the new (and sometimes also the old) value of the characteristic and the code-number for the characteristic. All changes dated earlier than the situation file are kept in the old change file. This file has the same structure as the new change file. In the new change file the date refers to the beginning of the period in which the characteristic has the given value while in the old change file the date refers to the end of the period.

The new change file is used together with the situation file to produce another situation file referring to a later date. For this purpose, each item of information is standardized to a fixed format in the situation file. The old change file is used in the same way to produce a situation file referring to an earlier date. The old change file will increase continually with approximately 500,000 changes annually.

The changes are of two types: real changes and corrections. Corrections are either ordinary or conditional, cf. Aurbakken <sup>[1]</sup>, part 6. Corrections are used to correct an error in the change file or in the situation file. When establishing a situation file referring to an earlier date than the existing situation, the corrections in the old change file may upon request be withheld, thus avoiding a characteristic being changed back to a wrong value.

For checking purposes there is a date file containing one record for each item which has been changed in the situation file. The file shows the date for the latest change for each characteristic which has been changed.

The new change file is matched against this date file to detect and avoid all changes out of chronological order. A control of this kind eliminates, for example, the inclusion of information of a later date than the date of death for the same person, and ensures that couples who marry are not registered as married or separated at the date of marriage. In a number of cases further investigations are made and incorrect dates changed, or the desired documents etc. collected.

From the new change file the various types of information during a certain period can be extracted and used for compiling provisional statistics. The situation file can be used for printing lists and extracting addresses for the whole or part of the population. Persons who are deceased, emigrated or missing may be included or excluded in the lists. The old change file, or "history" file, will give corresponding information at earlier dates.

The use of the concept "history" in this respect is to a large extent a matter of convenience. Registration and reporting routines of this size will never function without flaws, simply because they are maintained by human beings. The history file, therefore, will never become 100 per cent conclusive, but after 2 or 3 years changes will probably occur quite infrequently.

The burdens implied by the standardization and date checking routines etc. are heavy. The results, however, are estimated to be of more than sufficient value to compensate for the efforts in the long-run because of the greater flexibility in utilizing the central register. The constant control of dates and subsequent inquiries for supplementary information will in all probability also tend to improve the registration at the local offices.

### 3.5 Updating

Administratively, Norway is divided into 20 counties and (in 1967) 454 municipalities. Furthermore, there are approximately 1,070 parishes (ecclesiastical divisions). Each parish minister is responsible for the civil registration of births, marriages and deaths. In addition, he is obliged, according to the legal regulations on population registration, to provide information concerning all changes of the population residing in the parish to the local population register offices.

In accordance with the present regulations, the parish registers dispatch current information on marriages, whereas information on births, baptismal names of children, and deaths are reported monthly (within 5 days after the end of the month).

The local population registers also receive current information on separations, divorces, adoptions and changes in names from the county governor.

Persons who move within the municipality are required to report change of addresses directly to the population register office. When a person or family intends to move to another municipality, he must apply to the local office where he is resident to obtain a migration certificate, which forms the basis for being registered in the in-movement municipality.

All persons who migrate or move to other countries are responsible for reporting this in advance to the local population register office. Norwegians who return to the country are obliged to do the same. Aliens who immigrate or move to Norway must notify the local police office, which sends current information to the population registers concerned. These rules, however, often seem difficult to practice.

The local population register offices must carefully note all information on individuals which they receive from the various sources. For each person who is, or has once been, registered, there is one main card, comprising information on name, address, marital status, place of birth etc., and if relevant, information on spouse and children. Main cards for resident persons (arranged geographically), and for persons who are emigrated, deceased or reported as missing are arranged in separate sections. Moreover, each office has a name card register (arranged alphabetically) comprising all persons who are, or have once been, registered as resident in the municipality. References are given from the name cards to the main cards.

The local population registers are continually updated manually by means of the mentioned basic material. In addition, the local registers shall check and supplement their card files in accordance with the schedules relating to the general population censuses. Reports on information which is lacking (births, divorces, deaths etc.) must be requested at the primary source. Information on persons who are not resident in the municipality concerned at the date of the event shall be forwarded. However, information on correct place of residence is not always available at that time.

At the end of 1965, it was decided that the imposition of taxes from 1967 should generally be based on the punch card method. The CBS participated in the work for establishing punch card registers in a great number of municipalities.

The local population register offices record the information on special forms, or directly on the punch cards, and forward them to the service bureaus to have the punch card registers updated. The CBS is not responsible for, and exercises no control over these activities.

All the registration material shall be sent once a month to the CBS from each of the local register offices within 14 days after the end of the month. Each of the events shall, as far as possible, be assigned a number (dates of birth should also in advance be checked against the cards in the respective local population register offices). Personal numbers will, in principle, only be lacking for births, adoptions (because of anonymity) and immigrants not resident in the country after 31 October 1960 (the local population registers are obliged to co-operate in procuring identification numbers for persons who have moved). Otherwise, schedules etc. are immediately returned to the respective local registers if identification numbers are lacking or are incomplete, or if the schedules are not dated.

In the CBS all the registration material is, at the same time, revised and punched both for statistical purposes and for updating the central population register. Errors in the identification numbers may be detected by the self-checking-number punching routine. The schedules are then "removed", and returned to the local population registers concerned, and the punch cards with such errors are extracted.

Errors in the identification numbers might also, of course, have been corrected centrally in the CBS. There are two main reasons for not doing this to any great extent. First, it is generally important for the local offices to be aware of the error as soon as possible. It would require more employees than convenient to do all this centrally. Secondly, it has also been the intention to train the staff at the local population register offices to be careful and accurate when using the identification numbers.

New identification numbers are not produced until after the revision and punching have been finished. These procedures entail that the local offices must wait for the new number somewhat longer than desirable. An important goal, therefore, is to speed up the reporting and processing routines. For immediate use in special cases, however, numbered cards on all actual dates, for men and for women, are produced in advance. External users of the identification system, which verify errors in date of birth in the identification number, must apply to the local population register concerned. This office notifies the CBS, so that the identification numbers are always given to other users by the local offices. One exception from this principle may be noted: Norwegian sailors who have neither emigrated, nor are registered as resident in any municipality, may be given identification numbers directly from the CBS to the Directorate for Seamen.

When the identification numbers are computed, provisional statistics in the field can be produced. The system provides, however, that the numbered

cards are to be returned to the CBS before updating the central population register. Missing cards are called for at certain intervals.

Errors in identification numbers etc. that are detected during the computer routines are separated and listed by municipality. Such error-lists are now sent quite regularly to the various local population offices. If personal names are not punched from the basic material (for example for deceased persons), the names must be added manually to the lists by the CBS. The number of discrepancies on the error-lists has shown a smooth, decreasing tendency since the adoption of the identification system.

Of course, there are a number of minor problems that occur because of double-registration and under-reporting, cf. for example Mr. Baron<sup>[2]</sup>. Imperfections in some of the regulations for registration and reporting routines may cause misunderstandings and somewhat different practices locally. Some adjustments in the schedules etc. have already been implemented, and others are under consideration.

### 3.6 Plans for further development

The system of permanent identification numbers was adopted because of the advantages derived in the various administrative processes, whereas the central population register aims first and foremost at providing better statistics. A number of administrative agencies (see below) are clearly waiting for assistance from the CBS to have identification numbers and, for example, information on address and marital status transferred to their personal registers. The CBS, on the other hand, has been reluctant to start such procedures because it first wishes to have the central register more up to date. A problem hitherto has been the lack of personnel etc., and it was deemed undesirable to interrupt the current processing more than absolutely necessary during the initial period.

In the course of one year, the identification numbers will probably be introduced in some registers within the health sector. A special physicians' register to be updated partly by means of current information from the central population register will be established in the CBS in the near future. In addition it has been planned to establish a central register in the Bureau for all government employees, making it possible - among other things - to provide fast and reliable data in connection with wage negotiations. Other institutions which have declared their interest in adopting the system include: The Norwegian Broadcasting Corporation, the National Fire Insurance Office, the Government's Pension Fund, the Police Service, the Railways and the State Telegraph Administration. A general programme for the transmission

of identification numbers to larger personal registers will be prepared.

The most important plan initiated by the CBS is, in the author's opinion, the extension of the central population register to comprise the information that is presently covered by the punched card registers held by the local population registers. In the long run it is scarcely satisfactory to maintain local punched cards or tape registers in all municipalities, because it tends to delay the dispatch of registration material to the CBS etc. A prerequisite for the plan, however, is that the CBS at any time has enough capacity to keep the central register as up to date as is practically possible.

By eliminating the local punch card registers, the basic information needed for local administrative and statistical purposes has to be prepared by the CBS. The printing of the taxation rolls and the voting rolls etc. might still be undertaken by local service bureaus on the basis of, for example, magnetic tapes from the CBS. The main point is that the greater part of the information need not to be transferred manually from the basic material (it may prove convenient to use manual routines for reporting directly from the local register offices to the service bureaus in the periods immediately preceding the deadline for printing the rolls).

When the central population register is kept more permanently up to date, the plan is to render a better service to the local authorities, for example, in the form of relatively detailed population statistics, published periodically.

In connection with the population census in 1970 some tentative plans for utilizing the information already covered by the central register have been discussed. Because of discrepancies introduced at the date of check-point, it seems most appropriate to check some of the information in the central register against the new census material and vice-versa. Data on age, sex and marital status may then easily be extracted from the central population register.

In the Norwegian population censuses the traditional division within the municipality is the enumerator-district, which is geographically different from all other subdivisions. Because of the general increasing demand for current regional statistics, there is a great need for including "district" in the central population register. The question as to whether the present postal districts are satisfactory for this purpose will be investigated.

Another field for developing the population registration refers to the concept of "household". The definition of family in the local punched card registers is not quite the same as that adopted in the population censuses, but it seems possible to arrive at a useable compromise. The establishment of a special household register that may be continuously kept up to date

will be very useful as a basis for sample surveys etc. Among other concrete plans discussed in connection with the 1970 census of population may be mentioned the adoption of information on occupation in the central population register. Current data on occupation for updating the register might be transferred from other administrative agencies.

An important and interesting project, still in the planning stage, is the use of the identification numbers in connection with a register of employers [3]. It depends on the availability of a qualified staff for further planning and co-operation as to when this system can be operative.

Otherwise, one of the most comprehensive plans in the CBS aims at introducing the identification numbers in the school system as early as the elementary school level. Identification numbers will also be transferred to the schedules for all students who have enrolled at the universities or equivalent institutions.

The work with the transmission of identification numbers to the current basic material on social care has already begun. Somewhat later, the system will also be introduced in the fields of child welfare, hospitals, alcohol and criminal statistics.

As mentioned in the preceding part of this paper, the present system of population registration is not yet completely appropriate for the use for permanent identification numbers.

A main goal has therefore been to overcome the transitional problems as quickly and efficiently as possible, and there are now many signs which point to substantial progress in this field. The most important factors that support this optimistic view are: The staff at the local population registers has at this time acquired a better general understanding of how the new system works, with fewer misunderstandings and failures etc. as a result.

A gradual reorganization of administrative routines to satisfy the actual requirements and needs is taking place. A special committee will recommend a number of changes in the Act on population registers and its provisions.

The CBS has gained a great deal of practical experience, and can more easily establish rational internal routines and manage the current problems than in the first phase after the introduction of the system.

Lastly, the installation of a new EDP 360/40 machine in the CBS entails great advantages for the processing and future updating of the central personal register. There is no reason to believe that programmes etc. need be changed to the same extent as has hitherto been the case.



To summarize: There exists a number of more or less definite plans - both outside and inside the CBS - for further use of the system with permanent identification numbers. Partly because of the delay with the establishment of the central population register and partly because of the general lack of qualified personnel, comparatively few of the plans have yet been realized. Some of the plans, and new ones that may be expected to appear, will probably be put into effect in the next few years.

#### 4. Application

##### 4.1 Administrative

The local population registers accommodate primary local administrative needs by, for example, providing information to the assessment authorities, insurance funds, health authorities, the police service etc. More infrequently similar information is given to election officials, schools and military authorities, regional planners etc. After 1967 inclusive the taxation rolls are being prepared on the basis of the punch card registers. Other lists may be set up by manual methods, but larger municipalities ordinarily use the punched cards. Any other local or governmental agency may on request obtain additional data on individuals from the local population registers.

The central population register was first used for addressing purposes. The most important application of the register up to the present time has been the introduction of the permanent identification number system in the tax and social welfare administration in 1966. The identification numbers were transferred to the tax rolls on the basis of the local punch card registers, implemented by the punch card service-centrals. The National Insurance Institution and the Directorate for Seamen, however, ordered printed lists from the CBS for the manual transmission of the identification numbers to their local and central administrative card files. In order to obtain continuous information for the updating of its sub-registers in the different administrative routines, the CBS has later agreed upon a technical co-operation with the former institution.

The National Cancer Register has, by means of lists borrowed from the CBS, in a similar manner employed the new identification number system. In addition, according to a new Act on motor vehicles this year, the identification numbers must be assigned to all new issues of driving licences.

When the central register becomes more up to date, the Ministry of Defence will probably be the next large user of the identification number

system. Instead of preparing lists of military conscripts in each municipality, a magnetic tape, with full name and address for all men of the desired age, will be produced. Direct use of the register for purposes of this kind will save time, avoid duplication of work and reduce the costs considerably as compared with traditional manual methods.

A number of other institutions will adopt the system with permanent identification numbers as soon as the CBS is able to assist with the transmission and/or technical maintenance. The external registers will usually require information on new units (persons born, immigrants), changes in certain characteristics (place of residence, marital status) and departure (deaths, emigrants). This information may be provided by the CBS on punched cards (reproduced), printed lists or on magnetic tapes. The information may, of course, also be transferred directly by matching data against the central population register, but this method will probably be more costly, and will perhaps not be accepted by the CBS because it may hamper the ordinary updating process etc. of the central register.

For more simple administrative purposes, the external users will not require continuous information on individual changes. For the mailing of cards to holders of radio and television licences, for example, only annual information on deaths (for the removal of old names) and most recent address is necessary.

The system of common identification numbers and machine processing is well-suited for promoting co-operation among different administrative registers. None of the co-operating registers is compelled to collect information about individuals from the primary source which is already kept by one of the others. Particularly if the agencies concerned possess, or have access to, the same EDP-equipment, the mutual advantages of linking individual information from different fields are assumed to be considerable. More efficient methods in the register routines will generally be time-saving and allow the staff to be used for more interesting and profitable tasks.

In the CBS itself, the central population register will, in all probability, be used extensively for extracting information on certain categories of citizens for administrative purposes (for example: Name and address for men or women in certain age groups and/or definite geographical regions). Furthermore, the register will provide an excellent basis for investigations based on samples.

## 4.2 Statistical

Detailed population statistics and migration statistics for smaller areas to meet local needs are currently being compiled by the local population register offices. It may at times be difficult to distinguish between information to local authorities for administrative and for statistical applications. These statistics may be compiled manually or, if more comprehensive, on the basis of the local punch card registers. If punched cards are used, the user must pay for the statistics supplied. Oslo has its own statistical bureau and EDP-installation, which produces and publishes population statistics on a regular basis.

Private institutions or persons may order statistical information at the local population offices, provided that the execution of such requests does not hamper the current activities connected with registration matters.

For the central production of official population statistics, the introduction of permanent unit identifiers opens up new possibilities. Only some of the practical adoptions already realized, and projects for the near future, will be mentioned here. The theoretical aspects relating to statistical file systems have been thoroughly discussed by Mr. Nordbotten [3,4,5] and others.

Generally, the system with permanent individual identifiers and the utilization of advanced EDP-equipment permits the combination of information about the same units from different professional fields relating to different points of time or periods. By including more variables in quantitative analysis of demographic developments, theories and social problems may be studied more extensively than has hitherto been possible. Provided there is proper planning and co-ordination, cf. Mr. Ohlsson [6], the statistics may thus be substantially extended and improved without loss of time and at reasonable extra costs. This will provide excellent opportunities for meeting the accelerating need for more and better statistics on social relations etc.

The identification numbers have been linked with the data on individuals from the 1960 Census of Population and converted to magnetic tapes. The data on place of residence, education, occupation etc. in 1960, can now be combined with the information on place of residence and marital status, for the whole population or specific age categories etc. at any point of time later than 30 September 1964.

The permanent identification numbers have also been converted to the Fishery Census in 1960 (approx. 61,000 fishermen). For a new census for fishermen, to be carried out in 1967, very little information was collected.

Because this information will be linked with the 1960 Fishery Census, the desired statistics will, nevertheless, be obtained.

Furthermore, the permanent identification number system has been adopted in a current survey on private consumption. Matching of data from this field with information from other sources, will provide a better basis for research on consumption habits.

The identification number system will be used in connection with the municipal elections in 1967. This will, for the first time in Norway, give a nation-wide survey of all voters by sex, age and marital status, as well as a survey of those who did not vote.

In 1968 data on income for all personal taxpayers (1967), including identification numbers, will be available on magnetic tapes from the tax authorities. Compare the Swedish project in this field <sup>[7]</sup>. This will ensure a permanent extension of income statistics based also on data already prepared for other statistical purposes. In a similar manner specific data on individuals may be obtained from other administrative agencies.

As more institutions adopt the new system, the possibilities for expansion and improvement of the statistics will, in principle, be increased. Furthermore, the burdens of the respondents will be reduced when the information has to be collected only once. The population statistics will expand far beyond its traditional domains to include at the same time data of a demographic, as well as of a social and economic character.

From the situation file (cf. part 3.4 of this paper) statistics on the population by sex, age, marital status and by municipality/postal districts can be produced at any desirable date. Detailed statistics of this kind have previously as a rule been available only in connection with the population censuses each decade.

The organization of a "history" file makes possible statistical studies of the development over time on an individual basis. An example: At the next Storting election it can easily be shown how many persons did not vote compared with this year's election, by age etc. and geographically. Even more interesting and refined statistics will of course be obtained when this information is further combined with individual data from other professional sources. Another example: After some years detailed statistics may easily be produced showing how many "emigrants" return to Norway after certain periods of time. This will also result in more realistic current statistics on external migration.

Since information on family relationship is collected and filed, statistics on fertility rates in marriage will also in time be improved. Internal migration can in the same manner be studied more intensively than hitherto. This information will further provide a better foundation for preparing population forecasts.

#### 4.3 Misuse

The word misuse will here be used to denote the utilization of detailed information about individuals, despite instructions or promise of secrecy, to acquire personal advantages (directly or indirectly) or to harm the individuals concerned.

In many instances so-called "misuse" may not be intentional, and perhaps harmless for the individual's right to privacy. On the other hand, the possibilities in connection with population registration in a modern community are manifold. The contents of the registers are usually extensive, and moreover, usually include detailed individual information. The collection of such information may be of primary importance for the administrative authorities, but it also makes the question of mutual confidence between the inhabitants and the government quite relevant. This confidence is fundamental for an efficient administration, and should not be abandoned because individual information might be utilized for harmful purposes.

Particularly as a result of EDP-systems in population registration, greater attention than previously has been paid to methods for safeguarding human privacy. This can obviously be attributed to the view that modern data archive systems and the use of electronic computers are considered to be dangerous tools in the hands of speculators<sup>[8]</sup>. See also: "Security sets", related to data file<sup>[5]</sup>.

The entire staff, locally and centrally, attached to population registration in Norway is strictly bound by professional secrecy. According to the present regulations, the staff is only permitted to give to private persons and firms etc. the last address of name-mentioned persons. The basic material must be treated in absolute confidence. Statistical information may be given to anyone providing that the data comprise at least 3 units (persons). These provisions aim at reducing the possibilities for injuring individuals, and help to guarantee the good reputation of the central authorities - and particularly the CBS. One does not wish to encumber or impair the collection of data from individuals for statistical purposes etc.

There has been no problem in practicing the regulations so far. It happens only very seldom that the CBS finds it appropriate to enjoin them.

More serious is the opportunity to take copies of cards, lists and documents containing information on name, date of birth, marital status etc. Private enterprises such as insurance companies, advertising bureaus and local business appear to be willing to pay well to obtain particulars of this kind. The staff has many, but not legal, possibilities to comply with such requests. Lists containing information on individuals are frequently transmitted to other public institutions, and copies of documents on separation/divorces, adoptions and deceased persons etc. are regularly forwarded to various categories of government users. The temptation to take extra copies quickly and cheaply seems obvious. The staff dealing with registration matters, however, has been very loyal in this respect. Since the establishment of compulsory local population registers in 1947, no employee has been reported to the CBS for misuse of information in the service.

It might be expected that the danger for misuse would be even greater among the staff at the inter-municipal punch card service bureaus, since there is no public authority to supervise and directly control their activities. They could easily reproduce punched cards or print lists for various purposes each time they possessed the punched cards, without the knowledge of the local population register offices concerned.

It is an interesting fact that these privately organized service bureaus as well have, broadly speaking, demonstrated their loyalty and impartiality in processing the data on individuals. They seem to be well aware of the **regulations** and dare not risk being deprived of the tasks, from which the main part of their income is derived, which they traditionally accomplish for the local registers and assessment offices.

The question that arises is whether the legal system provides adequate security so that items of information may not be improperly used against an individual. The experiences gained in Norway in this respect indicate that the answer is in the negative. Two examples will illustrate the type of problems the CBS has to encounter: Each autumn a duplicate of the taxation rolls in all municipalities are open to the public for a short period. It is, surprisingly enough, not forbidden to take copies of the information, for example names, addresses and dates of birth from these rolls. One may, of course, say that these rolls only comprise wage-earners and are not generally available. Nevertheless, this general admittance to the tax rolls is not in accordance with the strict regulations maintained in connection with population registration.

The legal authorities have proclaimed that all approved political parties in the various districts shall have one complete copy of the voting

roll free of charge. These rolls, however, are often prepared by the punch card service bureaus in a number of copies and sold to the political parties. If not, they claim, the political parties will themselves copy or duplicate the rolls.

The last mentioned example indicates a kind of "legal misuse" of individual information. The CBS has, at present, no guarantee for how the said rolls are utilized, and the citizens cannot be satisfactorily safeguarded against invasion of privacy. An important goal is therefore, to adopt the legal system, particularly for the purpose of excluding the possibilities for "legal misuse", and thus better preserve the individual's civil liberties etc. In Norway, these questions have received much attention recently.

It is the opinion of the author of this paper that any citizen has the right to know what data have been collected about him, which agency is authorized to make use of these data, and also for what purpose. This will again emphasize the importance of mutual confidence between the public and the central authorities.

## 5. Costs

### 5.1 Basic costs

The figures on costs which are given in this chapter relate to the central population register and the direct adoption of the new identification number system in the local population register offices only. The local registers were, as previously mentioned, locally administered and financed up to 1965, and no over-all estimate on their basic costs is available.

Generally, the costs connected with the establishment and maintenance of a population register are closely related to the type of system adopted and, more specifically, the structure of that system. The costs involved are, to a large extent, contingent upon how great an effort is made to obtain reliable registers and effective reporting procedures. Furthermore, costs are normally positively correlated with the amplification of information collected. Furthermore, costs are usually proportional to the amount of information collected and as a rule an extension of the system to cover more data will entail a rise in costs. The available technical equipment may also be of significance in this connection. Last, but not least, attention should be given to the general economic and social standard in the countries concerned. Population registers will naturally have other functions in the more economically advanced countries than in others.

In calculating the costs of the central register, one encounters a number of more or less uncertain factors. The recurring problem of inadequate data for making correct estimates as well as the problem of determining the period to which the expenditure refers are two such uncertainties. Subjective appraisements are therefore inevitable.

These considerations imply that caution should be exercised when comparing estimated costs from period to period, and even more from one country to another.

Neither the general, nor the more specific difficulties in this respect should, however, restrict the attempts to estimate costs of population registration. Such estimations may prove to be very useful to the authorities in connection with proposals on extensions etc. For the agencies concerned it is of importance to compare, as far as possible, the real costs of the various components attached to population registration in order to assess the possibility of cost reductions.

The total basic costs for establishing the central population register in Norway, including the introduction of the identification numbers in the local population register offices, are estimated at 5,554,000 N.Kr. or 776,000 United States dollars, at the present exchange rate. The amount corresponds to 1.50 N.Kr. per inhabitant.

The control of dates of birth etc. and transfer of the identification numbers in the local registers amounted to 34 per cent of the total basic costs. The corresponding figure for the use of EDP computers (mainly I401) was 12 per cent, punching and computer operating 20 per cent, programming 10 per cent, magnetic tapes 7 per cent, punch cards and machine paper 4 per cent and overhead costs (including office staff, inventory etc.) 13 per cent.

For various reasons it is impossible to compute the costs involved in the period covering the establishment of the system in the CBS. The estimated figure for "overhead costs" is consequently uncertain. The other figures are estimated on the basis of fairly complete statistics and prices. It should also be noted that all figures are estimated on the basis of current prices and wages.

## 5.2 Maintenance costs

The maintenance costs include the monthly revision etc. and processing of all schedules and documents, control and collection of supplementary information. Costs related to the preparation of statistics are not included (costs on processing basic material which are used both for statistical purposes and for updating of central register are divided proportionally



between these subjects). Furthermore, the estimated figures include sorting and listing for the entire population from the situation file twice a year - one list arranged by dates of birth, the other arranged alphabetically by municipality or alphabetically for the whole country. Costs on other types of lists for manual control, assignation and distribution of new identification numbers, corrections and all correspondance etc. with the local register offices are also included.

The annual maintenance costs are estimated at 1,351,000 N.Kr., corresponding to 189,000 U.S. dollars. Of this amount the use of EDP (360) accounted for 38 per cent and wages for the office staff 37 per cent. Otherwise, the costs of punching and operating computers were 10 per cent, programming 6 per cent, paper, punch cards and magnetic tapes 4 per cent, transfer of identification numbers with the local offices 3 per cent and inventory, requisitions, telephone, etc. 2 per cent.

The maintenance costs for the local population registers are not available because there are common budgets and accounts for these registers and the respective assessment offices. Very rough estimates indicate that the local maintenance costs for all the local population register offices in 1967 will amount to 18 - 20 million N.Kr., or approx. 2.7 million U.S. dollars.

### 5.3 Statistical service costs

Sorting of data for the whole population amounts to approximately 30,000 N.Kr., and printing costs approx. 40,000 N.Kr. In addition come paper and overhead costs (5,000 - 15,000 N.Kr. depending on the number of copies). Thus, a list with names, addresses, etc. for all inhabitants will cost approx. 10,000 U.S. dollars. If the information can be given on magnetic tapes instead of lists, the amount will be reduced by half.

Less comprehensive service tasks, for example persons in certain age groups or geographical districts, may be comparatively expensive if the processing cannot be combined with the CBS's ordinary procedures. The cost of extracting is, as a rule, quite independent of the number of units which are extracted.

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One may be tempted to question whether the estimated amounts cited above indicate that the central population register is too expensive. Unfortunately, little experience has yet been gained regarding the direct savings involved by adopting the system. As far as can be judged, however, a number of central institutions, etc. (cf. part 4.1), after passing the transition period, will save considerable amounts annually as a result of

fewer persons working with old-fashioned addressing routines etc. In addition there will, as previously noted, be a number of important improvements in the production of statistics. The author of this paper would not hesitate in concluding, therefore, that the total basic and maintenance costs are nevertheless fairly reasonable.

## 6. Critical evaluation of the planning

The planning of the local population registers was strongly influenced by the tradition of local self-government and the historically decentralized system for registration of births, marriages and deaths etc. The organization of one local population register in each municipality has proved to be a fortunate solution for satisfying the local, as well as central administrative agencies' and the public's, need for individual information and service.

The establishment of the central population register occurred during a period of comprehensive structural changes in the society.

If one assumes that the planning of a central population register based upon advanced EDP-equipment could scarcely begin until the beginning of the 1960's, relatively long time might elapse after the Population Census in 1960 until the register could be established. In fact, it proved to be approximately 4 years. Because of migration and changes in population characteristics, it was foreseen that the control and supplementary work would be very extensive. Up to the present time approximately 140,000 identification numbers, corresponding to 3.8 per cent of the population, have been changed because of discrepancies between dates of birth in the registers and in the census material. Some of the local register offices have declared that their registers were not -as prescribed - fully revised in accordance with the schedules from the Population Census because of limited time. These, and other shortcomings, entailed that the supplementary work became even more extensive than expected. On the other hand, the CBS had very limited time at its disposal. According to the plan for a General National Insurance Scheme, a nation-wide system with permanent identification numbers became extremely relevant. Furthermore, the tax authorities had, for practical/administrative reasons, to adopt the same system. These circumstances were to a large extent decisive in determining the date for introducing the new system.

There were two main reasons for choosing the last population census as the basis for the assignment of the new identification numbers, i.e. the desire to establish a system of communication between the central register

and the census, and the need for a control of the local population registers.

There was scarcely time in 1964/65 to carry out a new population census. It would perhaps have been less costly, or time-saving, to call in the main cards for the resident population from the municipalities (except from the larger towns) and punch directly from them. However, statistical connections with the Population Census in 1960 had by then been lost.

It might have been desirable for a period of at least 1-2 years to test the basic material and reorganize the existing reporting routines to make them more suitable for the new system, but time did not allow this to any great extent. There is also the question of whether the staff handling the local population registers could have absorbed further directives on processing procedures etc. at the time. Comprehensive administrative regulations, reducing the number of municipalities from 689 in 1963 to 466 in 1965, also entailed much extra work for the local population registers concerned.

The inclusion of date of birth in the identification number entails advantages as well as drawbacks<sup>[1]</sup>. The great number of corrections in the identification numbers due to errors in dates of birth may support the argument for an identification unit independent of this characteristic. However, date of birth is, as a rule, a necessary item of information and is always given on schedules etc. The system preserves this information, in spite of an identification number of not more than 11 digits. The alternative solution of numbering the individuals progressively would claim at least 8 digits (including one check digit). In addition, one would ordinarily have to process the 6 digits for date of birth. The question concerning the possibilities of decentralized number generating routines has hitherto not been discussed to any great extent in Norway.

Generally, the size of the population, and the quality of the basic material and the available technical equipment must be of primary importance for the choice of a numbering system. For larger populations, however, particularly when the basic material is rather weak and the registration methods etc. less developed, one should be aware of the risks involved in including dates of birth in a system with permanent identification numbers.

The question has been raised whether more than one check digit is superfluous, and therefore perhaps an unnecessary burden to the system. The author disagrees with those who may argue for only one check digit. First: Two control digits ensure very reliable information on dates of birth for various administrative purposes. Secondly, the matching of records from different statistical areas will be facilitated, and thirdly, the data

on age in compiling the statistics will generally be improved. It is also worth noting that one of the control digits may at any time be dropped, but a possible extension from one to two digits after the introduction of the system would have caused nearly insurmountable difficulties.

A problem one may encounter is of a more psychological character, and relates to the well-known fact that changes in tradition and well-established practices inevitably meet opposition and entail transitional difficulties. It takes some time to alter the manner in which one customarily performs a task. This kind of reluctance to change is usually more pronounced in older people who are less convinced about the advantages of a new system.

Unfortunately, many otherwise well-educated employees seem to take a dislike to reading written instructions etc. This entails errors in the registration material which hamper the processing and updating of the central population register. The author believes that well-planned courses for the entire staff as well as systematic inspections of the local register offices are the best means for facilitating the transition to new regulations etc. This is, however, a question of sufficient resources.

There is no reason to camouflage the fact that the central population register in Norway has up to the present time deviated slightly from the original time schedule. This may, to some extent, be attributed to a too optimistic view among the planners, but is for the most part due to special circumstances and a general shortage of qualified personnel. The result is that the central population register could not become fully operative until a later date than originally anticipated.

In the meantime, the general interest concerning the use of the permanent identification system has undoubtedly increased considerably. This necessitates further planning and co-ordination to utilize the system and meet the new requirements.

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