

### Patients in Danish psychiatric hospitals: Results of a census in 1957

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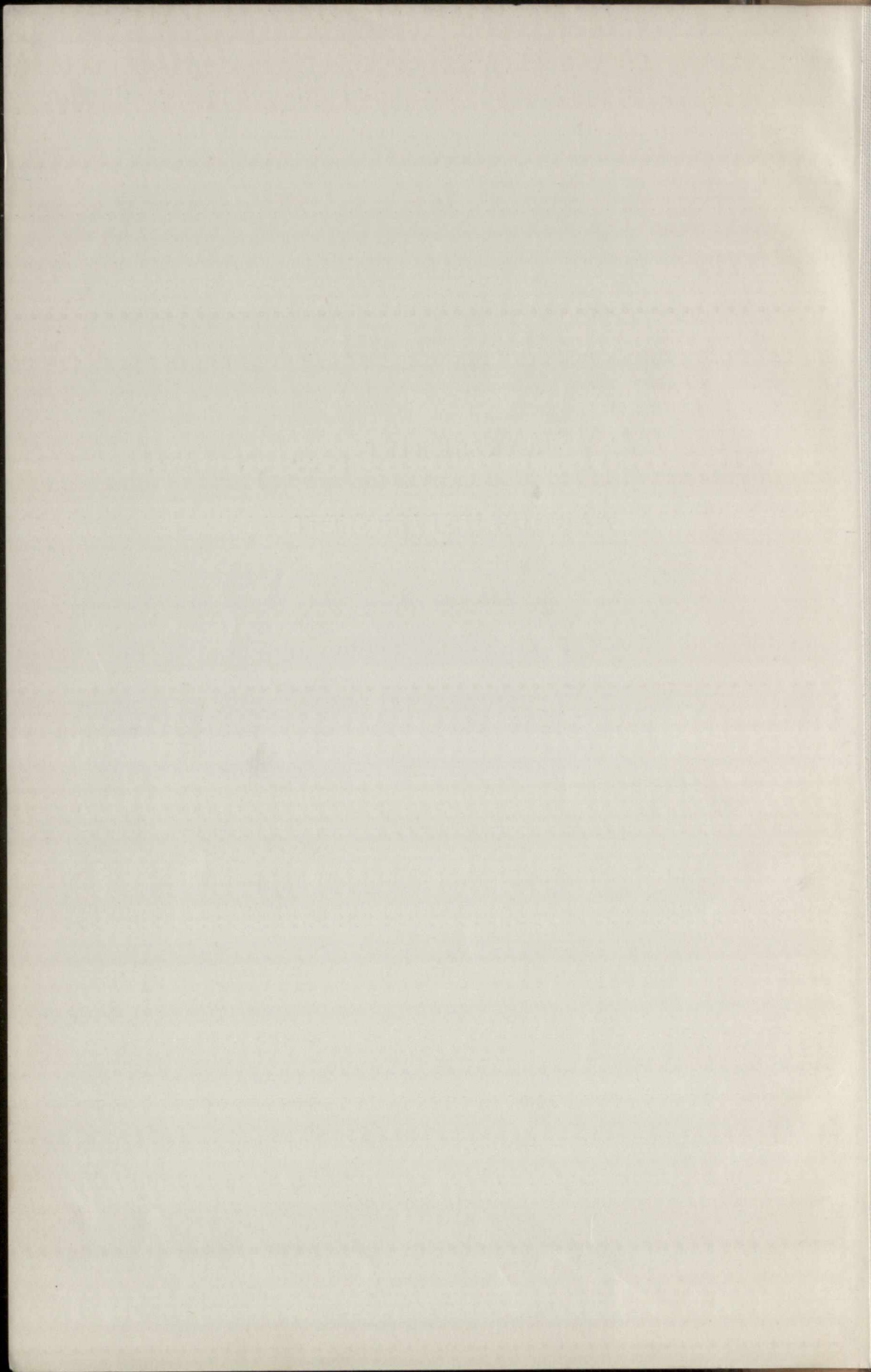
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*Publications of the University of Aarhus*

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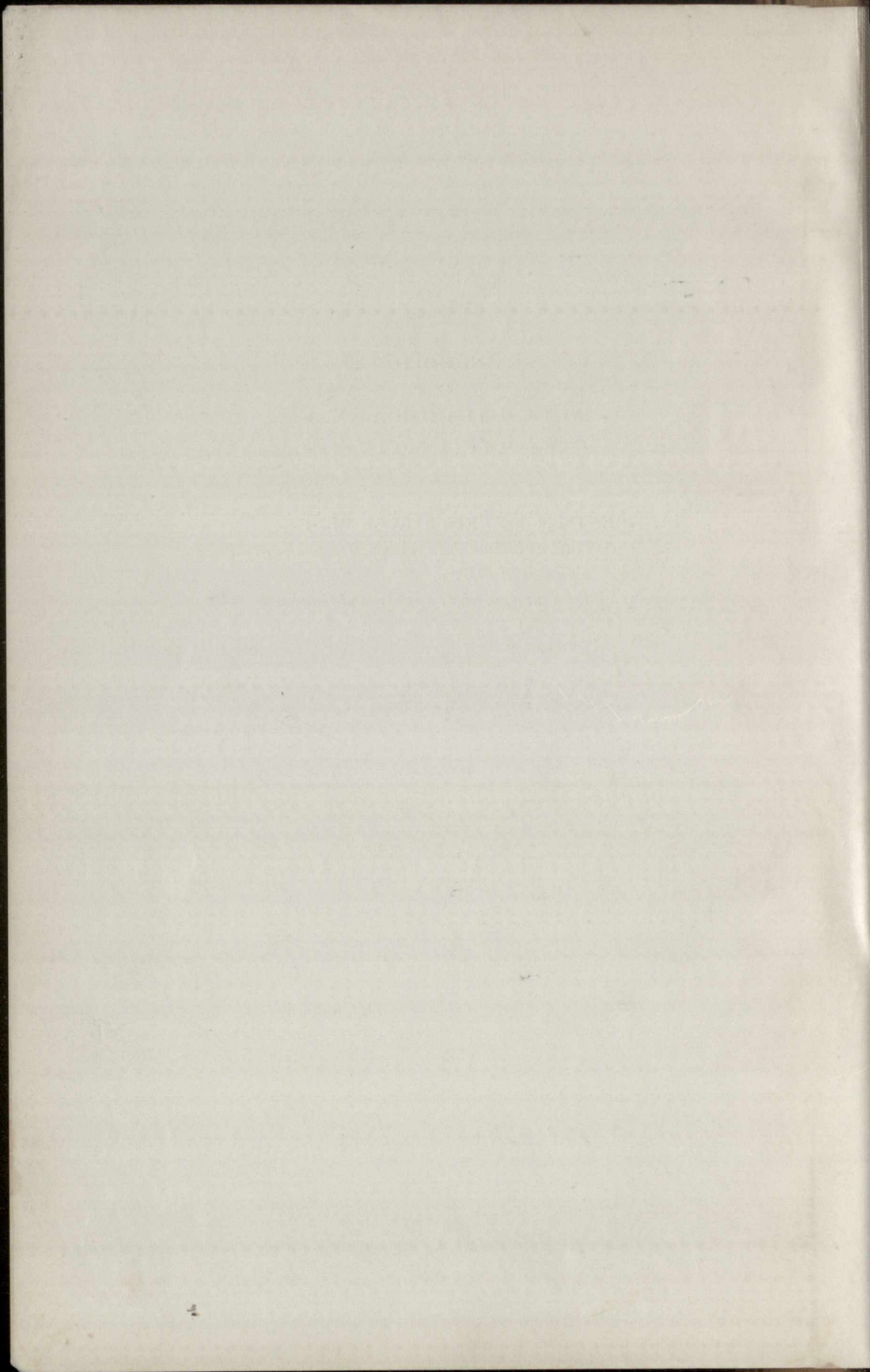
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KAJ ARENTSEN and ERIK STRÖMGREN:

*Patients in Danish Psychiatric Hospitals. Results of  
a Census in 1957.*

*With an Appendix of Tables and Graphs.*

Med. A44.



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MEDICINSK SERIE 9

*(Medical Series)*

PATIENTS IN  
DANISH PSYCHIATRIC HOSPITALS

*Results of a Census in 1957*

WITH AN APPENDIX OF TABLES AND GRAPHS

By

✱  
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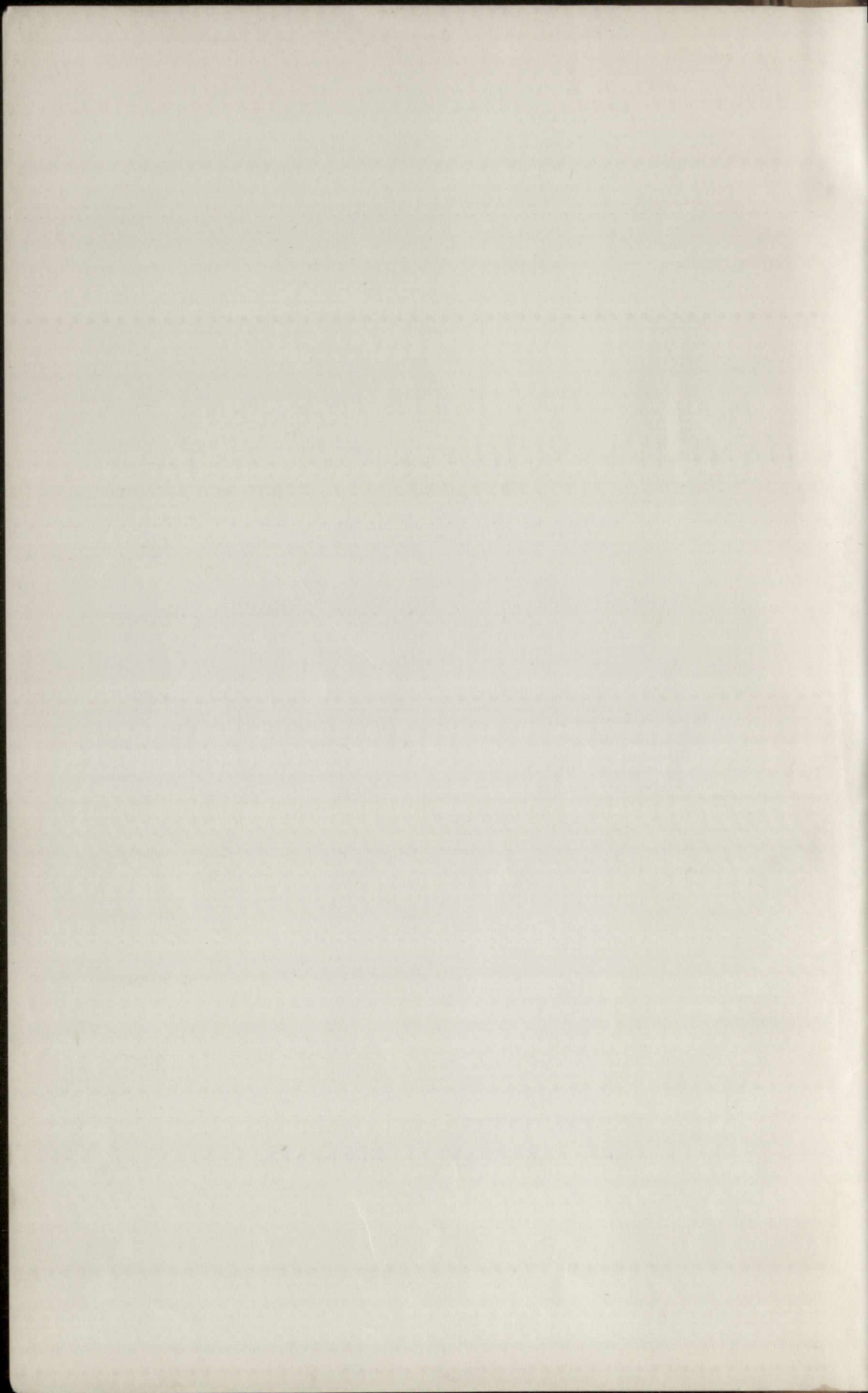
(Med. A61)

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1959





## PREFACE

This investigation was started on the initiative of the medical superintendents of the psychiatric State Hospitals in Denmark. It was evident from the beginning that the investigation should preferably include all Danish psychiatric hospitals; consequently the superintendents of St. Hans hospital, belonging to the municipality of Copenhagen, and the private hospital "Kolonien Filadelfia" were approached, and they at once agreed to cooperate.

The Director of the State Mental Hospitals, *L. le Maire*, LL.D., showed great interest in the investigation from its inception and authorised the hospitals' administrators to give the investigation their necessary support. The staff of the Directorate also gave valuable help in many phases of the work.

The statistics office (head: *mr. Knud Stenshøj*) and the punch card office (head: *mr. Carl Jørgensen*) of the city of Aarhus assisted us most effectively with the statistical treatment of the material collected. *Mr. S. Unmack Larsen*, then Mayor of the city, and the Director of Finances, *mr. E. Tjørnehøj* were instrumental in bringing about this help.

*Mr. Martin Ulv*, secretary in the Department of Statistics of the Ministry of Finance, assisted us extensively in procuring the necessary information concerning population statistics. In many cases the data were not directly available, so that many compilations and computations had to be performed, especially concerning the age distribution within different population groups.

The statistical treatment of the material was time-consuming and costly and was possible only by virtue of the fact that many of the data procured by this investigation were of special importance for a research project, supported by the *Ford Foundation*, which is at present in operation at Aarhus University, Department of Psychiatry (Psychiatric Hospital, Risskov). It was, therefore, to a considerable extent possible to coordinate the two projects.

The material obtained can be evaluated in many different ways, and certainly in ways other than those presented in this publication. The authors have regarded it as their main task to report the numerical material in such detail that the reader will be able to use the material in other ways than ours. The presentation of the material has to a certain degree been hampered by the fact that two completely different goals have been aimed at simultaneously: the main goal of a nation-wide cross-section investigation is, of course, to clarify some of the more general facts which can only emanate from a

large-scale study; on the other hand, the individual hospitals cooperating in the investigation should, of course, receive information of a more special character concerning their own particular material. It is, however, obvious that such more special information may sometimes be of restricted interest to other readers, especially to readers in other countries, and we must crave their indulgence.

It should be remembered that the description of the structure and functions of the hospitals relates to the situation in September, 1957, when not expressly stated otherwise.

The investigation is a *cross-section* study. With regard to *longitudinal* studies the reader is referred to *B. Borup Svendsen's* monograph "Psychiatric Morbidity among Civilians in Wartime", which constitutes in many respects a most valuable supplement to our text, not least in respect of a detailed description of the Danish psychiatric hospital system. Information on this topic can also be obtained in a publication by the undersigned: "Mental Health Service Planning in Denmark".—

The authors divided the work between them as follows: the preliminary planning could be taken from the undersigned's study "Status på et psykiatrisk hospital", and he also undertook the initial practical organisation of the investigation; the bulk, however, of the collection and preparation of the material was undertaken by *Arentsen*, not least with regard to establishing and maintaining collaboration with the statistical experts. *Arentsen* also formulated the problems which arose concerning comparisons of rates in different population groups, and organized the arrangement of the tables and graphs. On the whole, *Arentsen* is responsible for by far the greater part of the work involved. The authors are equally responsible for the formulation of the text and for the conclusions.

We are greatly indebted to dr. *Peter Aungle* and dr. *Poul Færgeman* for their most valuable help in preparing the English version of this paper.

Risskov, July 1959.

*Erik Strömngren.*

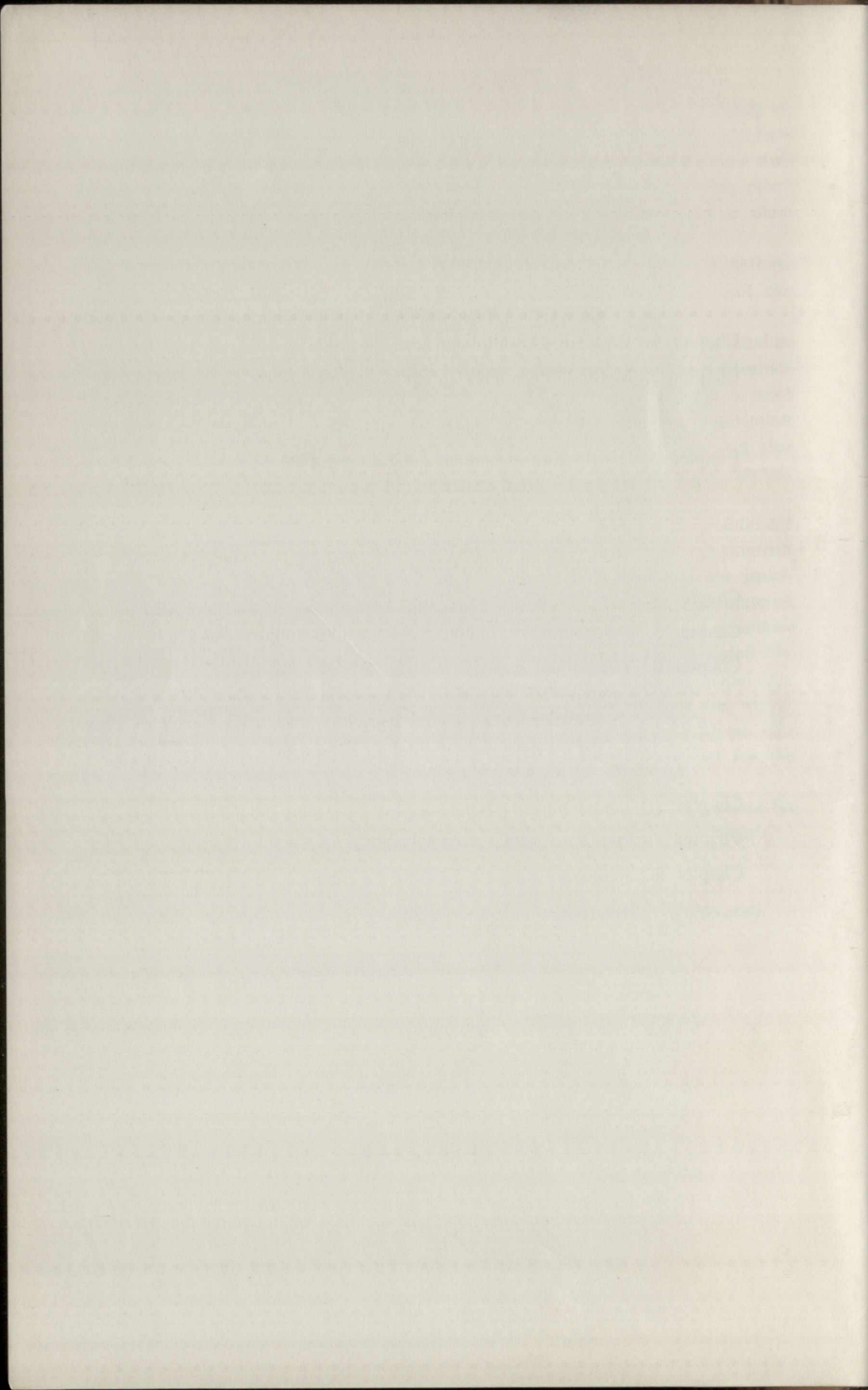
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# INTRODUCTION

## *Chapter 1.*

### Problems. Definitions.

On 26th September 1957 every Danish mental hospital drew up a register of all patients who, on that day, were in the hospital, in one of its nursing-homes, or were in family-care. Various data were recorded for each patient, of which the most important were sex, age, home address, and diagnosis. The procedure used in this "cross-section" investigation,—the first to embrace all Danish psychiatric hospitals—and the results obtained will now be reported.

First, however, it is necessary to explain why such a time-consuming, and also quite costly, investigation was thought desirable, and, further, to define the demographic concepts used.

Psychiatric statistics can serve many different purposes, and the methods used by workers in this field vary accordingly. It is particularly important to distinguish between three different kinds of frequency, viz. prevalence, morbidity (or "incidence"), and disease expectancy.

1) By *prevalence* is understood the fraction of the total population in a particular area which consists, at *one particular time*, of sick or abnormal persons. Ascertainments of prevalence are of special significance for chronic diseases, and have little meaning in relation to diseases of short duration. Measurements of prevalence may have various purposes: a) investigation of what proportion of the population needs treatment for a particular disease; b) to establish the need for hospital beds, also for other treatment facilities, of patients suffering from a particular disease; c) the importance of the disease from the point of view of welfare measures. The prevalence of a disease depends, moreover, on its morbidity, and especially on its duration and mortality—the latter insofar as it differs from the average mortality for the age group concerned.

It should be noted that "prevalence" is sometimes used in a sense differing somewhat from that just described, in such a way that the term includes not only those suffering from a particular disease at a certain *point* in time, but also those who develop the disease within a certain *space* of time (usually relatively short, e. g. one month or one year). The use of "prevalence" in this sense may have certain practical advantages in that, for example, one avoids the difficulties inherent in establishing that the instances of the disease concerned existed on one particular day. It is clear, however, that the boundaries

of the concept become quite blurred, especially in drawing a distinction from "morbidity" or "incidence". Only the narrower definition will be used in this monograph.

2) Investigations of *morbidity* establish the proportion of the population stricken by a particular disease during a certain, usually short, *period of time*, or during a succession of such periods. Cases of recurrence of a disease may be included, as well as first attacks. In many instances it is possible to throw light on problems of morbidity only by investigating hospital admissions.

3) By *disease expectancy* is understood the probability of an individual developing the disease concerned, at one time or another during his life, on the assumption that he will live through the whole "danger zone", i. e. the age range during which there is any possibility at all of the disease starting. "Disease expectancy" is also termed "life-time expectancy" or "morbid risk", and in German "Krankheitserwartung" or "Erkrankungswahrscheinlichkeit". Determinations of disease expectancy have been of special interest in genetic research. In an investigation of the expectancy for a particular disease among the relatives of sick probands, the significance of expectancies actually found can only be evaluated by a comparison with the expectancy found in the general population. It is for this reason that geneticists have been intensely interested in determining the average expectancy for a great many diseases and abnormalities.

In certain instances, "morbidity" and "disease expectancy" approximate to one another, as in a chronic disease in which the time of onset is reasonably definite, such as senile dementia, Huntington's Chorea, or diabetes mellitus. By and large, schizophrenia also falls into this category; it seems reasonable to "count" this disease at the time when the first symptoms appear, regardless of whether there may be subsequent remissions and relapses—presuming, in other words, that the disease has had a definite time of onset and has been continuously present since. Diseases such as manic-depressive psychosis and disseminated sclerosis *can* be regarded in the same way, even though in these instances there may be intervals of complete freedom from symptoms; the essential point here is that one wants to record just when the decisive etiological factor first manifests itself as illness. However, the recording of the individual attacks may, of course, be of interest for other purposes; it is nevertheless important always to distinguish between the disease's true onset and recurrences, or between first admissions to hospital and readmissions.

With regard to the methods which can be used for work relating to the three categories of aim, the following should be mentioned:

1) *Prevalence figures* are obtained with greatest certainty by a *census*, based on medical examination of *all* members of a defined population. A census of this kind will be practicable, even with a relatively large population, provided the diseases or abnormalities, on which the investigation is focussed, are very readily diagnosed. If, on the other hand, it is a matter of attempting to recognize

all only moderately pronounced mental abnormalities, as has most often been the case in psychiatric census investigations, it is obvious that heavy demands will be made on the investigation's technique and duration. These demands are greatly increased if the population concerned is to be large enough to permit statistical treatment of the results. An excellent example of such a comprehensive investigation is the census, directed and recently published by *Essen-Möller* (1956), covering two parishes in Skåne (South Sweden) with a total of ca. 2,500 inhabitants. This investigation succeeded in establishing contact with nearly all the inhabitants to such an extent that a fair assessment of their mental health could be reached. It is clear, however, that the frequency figures obtained for some of the abnormalities are too small to be statistically important.

When carrying out a census of a delimited population, one is always faced with the question of whether the population is representative of the total population of that country or province. It would be an advantage, therefore, to combine such an intensive investigation with an extensive one, the latter comprising the registration from a larger population of those abnormalities which are so pronounced, or obvious in other ways, that they can be quickly diagnosed; this would usually mean the psychoses or at least the hospitalised fraction of the psychoses. The comparison of the prevalence of such cases in the sample and in the total population, respectively, will give an impression of whether the sample is representative of the total population. If this turns out to be the case, there will be some justification in generalizing from the sample also with regard to those abnormalities which are not so easily ascertained and which can therefore only be registered completely in the sample and not in the total population. And in any case it will be interesting to determine the numerical relation between gross and subtle abnormalities and between hospitalised and non-hospitalised cases. The findings in this respect in the sample may at least give some hints as to the corresponding relations also in the total population.

In evaluating the results of a census it is always of crucial importance to know the population's age distribution. It is true not least of psychiatric conditions that their distribution among the different age groups is very uneven, and it must always be remembered that comparisons between prevalences in different populations do not permit one to draw any conclusions whatever regarding morbidity or disease prevalence in these populations. Special consideration must be given to the excess mortality among the mentally abnormal, who are consequently under-represented—though to a widely varying extent, depending on the level of hygiene in the population concerned. This excess mortality among the mentally sick, not only varies markedly from one population to another, but has also undergone radical changes during the last few decades.

In investigating prevalence, the figures obtained by counting hospitalised



cases are of only very limited value. The tendency to admit to hospital is very different in different countries, and has shown considerable swings with the passage of time. Any hospital census should, therefore, be supplemented by an intensive investigation of a defined area, in which the relation between hospitalised and non-hospitalised cases of the disease concerned can be ascertained (cf. the study by Lemkau (1958) and his collaborators in Baltimore, Strömgen's investigations (1938) on the island of Bornholm, and the recently published Swedish study from Halland (in "Betänkande III av Mentalsjukvårdsdelegationen").

2) In investigating *morbidity* one can either confine oneself to data from those institutions or persons who may be supposed to know most of the cases concerned, or one can undertake field studies oneself. In the former instance one can very seldom be content with the figures obtainable from annual reports or from other routine reports. These figures are usually very inexact, diagnostic criteria vary, and cases in which the principal diagnosis is some other condition will often pass unnoticed. There are numerous sources of error even when the investigator himself goes through the case note material and classifies the cases in accordance with his own consistent and critical judgement, because the figures for hospital admissions do not reflect the morbidity in the population at all reliably. Far too many "nosocomial factors", "threshold factors", play a part. In addition there are various sources of error which derive from the technique of registration: for example it is a common practice in many annual reports to give only the diagnosis on discharge, and generally to give statistics relating only to *discharged cases*. In reality, such statistics for terminated treatment of disease tell one nothing directly about morbidity; statistics for admissions would be more relevant. This source of error is of no great moment for admissions of shorter duration, but in psychiatry, where one has a mixture of both short term and long term hospitalisation, it is of decisive importance; in psychiatry one can only use admission statistics. The distribution of diagnoses on discharge tells us nothing about the morbidity in the population. If one considers, for example, a mental hospital with many chronic schizophrenics, an epidemic of influenza or some other comparable illness will result in several deaths among the older schizophrenics. The discharge statistics will then show an unexpected rise for schizophrenia—quite unjustifiably, in that the individual instances of the disease began at very different times, so that a summation of them gives no indication of the morbidity at any time. This source of error has attracted more and more attention, and in most places it is now usual for psychiatric annual reports to state only the diagnoses for admissions.

In the case of routine reports from general practitioners, it is presumably generally known that these only have any statistical validity in relation to certain individual diseases, and under no circumstances can they be used for registering psychiatric conditions—but that is after all not their purpose. In

order to arrive at a reasonably reliable view of how many cases of psychiatric conditions there are in a given area, it is necessary to contact the general practitioners and to review their case notes together with them; one must also devote attention to those cases who have at no time consulted their doctor.

In recent years, a number of morbidity investigations have been conducted by questioning selected, and as far as possible representative, sections of the population. Such investigations have been attempted in several countries, especially the U. S. A. In Denmark an investigation of this kind has been carried out through the agency of the "National Health Service" (Public Health Board); interviewers questioned a large number of people about their health within the immediately preceding month, and a wealth of valuable material was collected in this way. This material, however, did not include particular attention to psychiatric problems and can hardly be used for such a purpose.

In stable populations of limited size, in which one can obtain reliable information about practically all the inhabitants, it is sometimes possible to record the bulk of the more severe mental illnesses which have occurred during a *long* period of time, possibly during several decades. With the aid of various statistical methods, one can then arrive at more accurate values for morbidity (cf. particularly *Tage Larsson & Torsten Sjögren's* already classical work (1954) on these methods).

3) Ascertainment of the biologically very important *disease expectancy* is beset with considerable difficulties. From the theoretical point of view, the so-called "*biographical method*" is by far the best. It was first used by *Klemperer* (1933) and with great success by *Fremming* (1947, 1951). With this method, the proband material is composed of a group of persons, a "cohort", who, as far as possible, are followed from their births to their deaths. *Klemperer's* material consisted of persons selected from the birth register in Munich; *Fremming* chose all persons born on the island of Bornholm in the period 1883-87. If such material is to be of any value in determining the disease expectancy for most of the most important mental disorders, the probands' dates of birth must of necessity be relatively far back in time for the majority to have reached a reasonable age. Fulfillment of this requirement, on the other hand, involves major difficulties in obtaining dependable information about the probands' younger years, and there is likewise a considerable risk of probands being untraceable. The biographical method can thus be used with advantage only under quite special external circumstances, such as those, for example, which existed on Bornholm, where *Fremming* was able to trace 92.5 % of the probands. Since, in the case of most of the diseases, one can disregard—with some justification—excess premorbid mortality, the figures obtained will directly give the desired disease expectancies, once they have been suitably corrected for age.

The figures for prevalence obtained by a *census* are of only very limited value in determining disease expectancy. Only in the case of a stable and

particularly well known population is there any hope of calculating approximate values for disease expectancy. The most important source of error here is the excess mortality among afflicted persons, resulting in their being under-represented in the census material. Only if one can trace all those, in a delimited population, who have suffered from mental abnormalities within the last generation, is it possible to arrive at a reasonably reliable figure for disease expectancy, provided one corrects for excess mortality (cf. for example *Strömberg* 1938).

Much the most commonly used method for determining disease expectancy is the *proband method*. It is principally a question of selecting a proband material "as much by chance as possible". The probands themselves, however, will practically always be non-representative, insofar as they constitute a group of persons who are either alive or have at least lived for a fairly considerable time, and in this way they may constitute a selection of the specially healthy. If one counts the cases of disease among such probands, one may very possibly obtain too low figures. Conversely, some proband selection procedures involve a danger of obtaining too high figures. These various sources of error are "diluted" very appreciably if one avoids using the probands themselves for determining disease expectancy concentrating instead on their near relatives and especially their siblings. These relatives do not constitute a selection based on survival, and information is, of course, obtained about dead as well as living siblings. The reason for devoting particular attention to the relatives of "average probands" is that such material provides an ideal basis for the comparison of disease expectancies found in the families of *afflicted* probands. Ascertainments of ill-health in the general population were originally undertaken principally with a view to comparisons with ill-health in the families of abnormal probands. It was later apparent that knowledge of disease expectancy in the general population was useful from other points of view, and the sphere of application of these well-tried methods was consequently extended.

Even though sources of error can be attenuated by concentrating one's attention on the probands' relatives, it is clear that one should take every precaution to ensure that the probands themselves constitute as neutral a selection from the population as possible.

*To summarize*, it can be said that morbidity and disease expectancy are values with more biological implications, and not least of importance for questions of etiology, whereas the figures for prevalence are of greater significance from therapeutic and social aspect.—

To illustrate the problems which may indicate undertaking a hospital census, it is intended to outline here the "cross-section investigation" which was conducted in Aarhus Psychiatric Hospital in 1953 (*Strömberg* 1955) at the request of the "Commission of 29th March concerning the State Mental Hospitals". The immediate occasion for this investigation was as follows: the Commission was to draw up plans for the development and modernisation of the Danish Mental Hospital Service, covering a period of 20 years. Of crucial importance for the

goal to be aimed at was knowledge of the need for hospital beds which could be estimated to exist at the end of the period for which plans were to be made, i. e. ca. 1970–1975. The need for beds had hitherto grown steadily, but it was, of course, by no means a foregone conclusion that the need would continue to increase. It seemed certain enough that the population as a whole would increase in size. On the other hand, there was at least a possibility that the morbidity might change, and it was not at all improbable that an improvement of therapeutic methods and facilities would lead to such a shortening of the courses run by various illnesses that a decrease in the need for beds would follow. All considered, it was evident that various factors would tend to increase the need for beds, while others would have the opposite effect.

As long as all mental disorders were regarded as one group, the situation was rather confused, and it seemed impossible to make any definite predictions. It was wellknown that certain disorders were highly responsive to modern treatments, whereas others were more resistant. It was thus of great importance to determine the relative dimensions of these groups, but reliable figures concerning this question did not, however, exist at that time.

This situation was the basis for the decision to make a "cross section study". The immediate purpose was to register all patients who were resident in the Aarhus Hospital on a certain day, and then group the patients according to sex, age, and diagnosis. Certain additional factors, which could probably influence the responsiveness of the patients to treatment, had to be taken into special consideration. After the material had been subdivided in this way into small and reasonably homogeneous groups, it was to some extent possible to make a prognosis for each of the subgroups with regard to morbidity and amenability to treatment. At the same time the expected changes in the size and the age distribution of the population were taken into consideration.

The cross section study at the Aarhus Hospital gave information which helped to guide the Commission in its planning. It seemed justifiable to regard the district served by the hospital as reasonably representative of the Danish population (with the exception of the Capital). Nevertheless it would, of course, be more satisfactory for various reasons if similar cross sectional studies were undertaken in other mental hospitals. The results of such a similar study at Nykøbing Hospital were published by *H. Olsen* in 1957. At the same time the superintendents of all the State Hospitals met and discussed the possibility of carrying through a cross section study comprising all the hospitals. It was known that the central administration of the State Hospitals (Direktoratet for Statens Sindssygehospitaller) had made some cross section studies for the years 1937, 1942, 1947, and 1952, but these studies only comprised grouping of patients with regard to sex and age. Although this information was, of course, very important, it was obvious that the absence of diagnoses for these patients constituted a serious gap.

Which results could be expected from a cross section study covering the

whole country? Firstly it would, of course, be of advantage to answer, on a broader basis, the questions which were raised and partly answered by the cross section study of 1953, i. e. questions relating to predictions of the prevalence of the different diagnostic subgroups. In addition, it would be possible to determine whether the number of hospitalised psychiatric cases was evenly distributed over the whole country, between the different parts of the country, between urban and rural districts, between different districts characterised by different degrees of urbanization (city, suburb, provincial town, rural district, etc.). By comparison with the results of the Directorate's earlier cross section study of the distribution of patients according to age and sex, it would be possible, furthermore, to predict future trends with regard to these criteria. It would be especially instructive to repeat the cross section studies at not too long intervals (e. g. every 3rd year), and then compare the extrapolated predictions with the empirically found figures. Major differences between expectation and fact would probably help to disclose new factors of importance for the whole development in this field.

## Chapter 2.

### Method: Principles and practical procedure.

The material investigated was procured by registration of all patients in Danish psychiatric hospitals on a certain date.

Before the procedure is described in detail it is necessary briefly to orientate the reader with regard to the *structure of the Danish mental hospital system* (cf., for instance, *Borup Svendsen* (1952) or *Strömngren* (1958)).

The majority of the *psychiatric hospitals* are state hospitals, only the City of Copenhagen having its own hospital service, comprising St. Hans Mental Hospital, and there is only one private psychiatric hospital which is part of the so-called Filadelfia Colony. The historical development has been as follows:

St. Hans Hospital was built in 1816. In 1852 the Aarhus Hospital was opened, and in 1858 the Vordingborg Hospital. In 1877 a hospital was established in Viborg, in 1888 a new hospital was built in Middelfart, and in 1915 one in Nykøbing on Zealand. In 1921 the hospital in Vedsted was opened, and the Castle of Augustenborg was converted into a hospital in 1932. It is true of all these hospitals that their numbers of beds have increased considerably in the course of time, partly through the building of additional wards, and partly simply in the form of overcrowding.

In addition to the institutions mentioned above, there are *psychiatric wards in the general hospitals* of Copenhagen, but these wards have not been included in the present investigation, mainly because a considerable proportion of the beds in them is occupied by types of patients which are uncommon in the psychiatric hospitals outside Copenhagen. The exclusion of the psychiatric wards in the capital should therefore contribute to the homogeneity of the cross sectional material; it would, on the other hand, not have been of great importance, if they had been included, because of their very limited size. The *neurosis sanatoria* (Dianalund and Montebello) were not included, nor was the new psychiatric hospital in Brønderslev, which was opened in October, 1957.

To most of the hospitals are linked *psychiatric nursing homes* which are especially intended for patients with milder chronic disorders. All hospitals have also a number of patients in supervised *family care*. Both these groups of patients are included in the cross section study.

The Danish Mental Health Service is in principle organized regionally, each hospital (including nursing homes and accommodation for patients in family care) serving a particular district. As new hospitals have been established the boundaries of these areas have, of course, changed, and on opening a new hospital patients have been transferred to it from other hospitals, including many patients whose homes were not in the new hospital's area. In all hospitals there is, therefore, a certain number of patients who do not belong to the hospital's area. Until now, the extent of these irregularities has not been known with any certainty, and it has therefore not been possible to determine whether the number of beds available for the inhabitants of a certain district really corresponded to the number of patients admitted from this same district.

Whenever possible, a hospital's area corresponds to a number of counties, but practical considerations have very often necessitated a break with this principle. At the time of this the cross section study, the hospital areas were as shown in table A, which also indicates the number of prescribed beds in each hospital and nursing home, and the number of patients actually in family care.

The regional division is also illustrated in *figure 1*, which shows a map of Denmark with the boundaries between the different hospital districts. The hospital (and its affiliated nursing homes) for each district are indicated. As is evident from *figure 2*, the regional allocation of beds is especially complicated in the Copenhagen area. In the City of Copenhagen patients are admitted to the psychiatric admission wards of the municipal general hospitals (Kommunehospitalet and Bispebjerg Hospital), and in addition the City has access to some beds in the psychiatric wards of the University Hospital (Rigshospitalet) and Frederiksberg Hospital, the latter being the general hospital of the borough of Frederiksberg. In cases requiring hospitalisation of longer duration, the patients are transferred to St. Hans Hospital (the municipal mental hospital). Inhabitants of the borough of Frederiksberg are usually admitted initially to the psychiatric department of the Frederiksberg Hospital, patients requiring longer term treatment being transferred to the State Hospital in Vordingborg. The borough of Frederiksberg is a part of the County of Copenhagen; patients from the rest of this county can be admitted to the University Hospital, and will be transferred from there to the State Hospital in Nykøbing; many patients are, however, admitted directly to this hospital from the County of Copenhagen.

Outside the Copenhagen area there is only one general hospital which contains a psychiatric ward, namely the hospital in Slagelse (County of Sorø). In all other parts of the country admission to a psychiatric hospital will always be to the regional State Hospital.

As shown in table A, most of the State Hospitals have a *capacity* of about 1,000 beds, plus a varying number of patients in nursing homes and family care, whereas the hospitals in Augustenborg and Vedsted are smaller. With regard to the functioning of the hospitals, it can be mentioned that the *number*

Table A.

Hospital Units	Districts	Divisions of hospital units	Prescribed Number of Beds			
			Hospital Proper	Nursing Homes	Family Care	Total
<b>Nykøbing</b>	County of Holbæk less Samsø » » Frederiksborg » » Copenhagen less Municipality of Frederiksborg Faroe Islands	Hospital Proper Ballerup Holbæk Security Ward Observat. Ward Family Care	831	250 298 50	94	1,523
<b>Vordingborg</b>	County of Sorø » » Præstø » » Maribo » » Bornholm Municipality of Frederiksborg	Hospital Proper Sorø Stege Sakskøbing Family Care	798	128 150 166	91	1,333
<b>Middelfart</b>	County of Odense » » Svendborg » » Vejle less borough of Kolding less district of Nr. Tyrstrup District of Slaugs	Hospital Proper Hvedholm Family Care	1,045	124	95	1,264
<b>Aarhus</b>	County of Randers » » Aalborg » » Aarhus » » Skanderborg Samsø	Hospital Proper Dalstrup Raamosegaard Randers Family Care	728	130 124 108	275	1,365
<b>Viborg</b>	County of Viborg » » Hjørring » » Thisted » » Ringkøbing	Hospital Proper Visborggaard Søndermarken Family Care	786	124 250	68	1,228
<b>Vedsted</b>	District of Hviding County of Ribe less districts of Anst and Slaugs » Municipality of Vejen	Hospital Proper Family Care	262		62	324
<b>Augustenborg</b>	Counties of Haderslev, Aabenraa, Sønderborg, Tønder, less district of Hviding; borough of Kolding; distr. of Nr. Tyrstrup and Anst; Vejen.	Hospital Proper Family Care	480		35	515
<b>TOTAL, STATE HOSPITALS</b>			4,930	1,902	720	7,552
<b>St. Hans Hospital</b>	Municipality of Copenhagen	Hospital Proper Stubberupgaard Holme Skjoldborg Gurrelund Stenslettegaard Family Care	1,872	73 41 28 88 57	230	2,389
<b>TOTAL</b>			1,872	287	230	2,389
<b>Filadelfia</b>			149		67	216
<b>TOTAL, ALL HOSPITALS</b>			6,951	2,189	1,017	10,157



of admissions per year to each hospital is of roughly the same order as the total number of beds in the hospital (including its affiliated nursing homes and family care), thus corresponding to an average stay in hospital of one year. It should, however, be added that 75–80 per cent of the patients are discharged within 3 months of admission, and more than 90 per cent within 1 year. (As mentioned in the preface, *Dr. B. Borup Svendsen* has published, in 1952, a very penetrating statistical description and analysis of psychiatric admissions in Denmark. The book contains a number of fundamental considerations concerning admission statistics in general.)

The Augustenborg and Vedsted Hospitals have one medical superintendent each, the rest of the State Hospitals have two each, while St. Hans Hospital, by far the largest of the Danish mental hospitals, has five superintendents. Taken together, the psychiatric hospitals have on an average one doctor per 50 or 60 patients. The medical services for patients in nursing homes and family care are organized in various ways, but all these patients are under regular psychiatric supervision.

The *practical procedure* during the investigation was as follows:

On the 26th of September, 1957, all nurses in charge of a ward (or of a group of patients in family care) filled in a folder (called A) in which they recorded the sex, name, case history number and birthday of every patient who was in the ward on that day at 7 o'clock in the morning. The folders were then handed over to the administration office, which checked the information given by the nurses and then transferred the information to a second folder (B), adding information concerning birthplace and domicile (municipality and county). The folders were next passed to the medical superintendent concerned, who for each patient added the main diagnosis and its code number, corresponding to the diagnosis list approved by the Danish Psychiatric Association in 1952 and used since then by all Danish psychiatric hospitals and wards.

All folders were then sent to the Aarhus Psychiatric Hospital where the following criteria were coded: 1) the patient's placement within the hospital unit (the hospital proper, a nursing home, or family care), 2) age, 3) hospital area in which the patient was domiciled, 4) the degree of urbanization of the community in which the patient lived; 7 different "main areas" were distinguished, namely: a) City of Copenhagen, b) boroughs of Frederiksberg and Gentofte, c) suburbs of the capital (namely the following municipalities: Brøndbyerne, Gladsaxe, Glostrup, Herlev, Hvidovre, Lyngby-Tårnby, Rødovre, Søllerød and Tårnby), d) provincial towns, e) suburbs of provincial towns according to the criteria used by the Department of Statistics, f) communities with built-up areas having a population of 1,000 or more, so-called "rural districts with urban areas" (cf. Statistical Yearbook, e.g. 1957, page 12, table 10, footnote 3); g) purely rural areas, viz. the remaining communities.

With regard to the coding of diagnoses it should be mentioned that origin-

ally all the diagnoses in the list of the Danish Psychiatric Association were coded by means of a system of 3 digits. This procedure led, however, as might be expected, to a partition of the material into such small groups that no meaningful statistical evaluation was possible. The diagnoses were then reduced to 15 groups, and it is these groups which are used in the majority of the tables in this study. For certain purposes we found it practical to reduce the number of groups to the following five: A) schizophrenia, B) manic-depressive psychosis, C) organic disorders, D) "reactive conditions", E) other conditions. The connection between the two forms of grouping conditions emerges from the following list:

A. Schizophrenia . . . . .	1
B. Manic-depressive Psychosis . . . . .	2
C. Organic Disorders	
Presenile and Senile Psychoses . . . . .	3
Cerebrovascular Disease . . . . .	4
Neurosyphilis . . . . .	5
Epilepsy . . . . .	6
Other Organic Disorders . . . . .	7
D. Reactive Conditions	
Psychogenic Psychoses . . . . .	8
Neuroses . . . . .	9
Psychopathy . . . . .	10
Mental Deficiency . . . . .	11
Alcoholism . . . . .	12
Drug Addiction . . . . .	13
E. Other Conditions	
Not Classifiable Psychoses . . . . .	14
Other Diagnoses . . . . .	15

It should be stressed that in Denmark the concept of schizophrenia is used in a considerably narrower sense, and the concept of manic-depressive psychosis in a wider sense, than in most other countries. "Psychogenic psychosis" is a diagnosis which is widely used in Denmark; it comprises psychoses which arise in immediate connection with a mental stress, and their symptomatology and course is in most cases clearly influenced by the mental trauma. In Anglosaxon psychiatry, a number of these cases are usually labelled schizophrenia, others as neuroses.

The grouping together of a number of morbid states under the label "reactive conditions" may seem at first sight confusing. For some of the subgroups it is evident that they represent markedly static conditions. When it has been regarded as nevertheless practical to include them in the "reactive" group, the reason is that these subgroups consist partly of cases which represent clearly

situational reactions (psychogenic psychoses and neuroses), partly of relatively static conditions, which are not per se the immediate cause of admission, and only lead to admission under certain external circumstances to which these vulnerable patients "react". *V. Dahl*, in her paper on psychiatric morbidity among civilians in wartime (1948), has clearly demonstrated the relevance of delimiting such a "reactive group".—

After coding the material was transferred to IBM-cards at the punchcard-office of the City of Aarhus, where the computations and construction of the basic tables were also carried out.

# MATERIAL

## Chapter 3.

### Distribution of patients according to diagnosis.

On the day of the census the Danish psychiatric hospitals had 10,390 resident patients (4,784 males and 5,606 females). The distribution among the different hospitals (including nursing homes and family care) is shown in table B which also gives the prescribed number of beds ("statutory accommodation") in each category.

The overcrowding was about 2 per cent. This figure may not seem very disturbing: in many countries the percentage of overcrowding is apparently much higher. To evaluate this figure correctly, however, it is necessary to take different factors into consideration. Firstly, it must be remembered that about 1,000 of the available beds belong to the category of family care, and in this category no "overcrowding" is, of course, possible, as there cannot be any "prescribed" number of beds; the excess of 233 patients should therefore be related only to the prescribed numbers in hospitals and nursing homes. Secondly, it must be stressed that the "prescription" of beds in Danish hospitals has been set at a very high figure, and one which does not correspond at all to the requirements which in latter years have become accepted practice in constructing new wards within the psychiatric hospital system; in the new hos-

**Table B.**  
Number of resident patients on census day.

	a	b	c	d	e
	Males	Females	M + F	Prescribed number of beds	c - d
Nykøbing .....	733	792	1,525	1,523	2
Vordingborg .....	592	715	1,307	1,333	- 26
Middelfart .....	579	710	1,289	1,264	25
Aarhus .....	755	727	1,482	1,365	117
Viborg .....	563	682	1,245	1,228	17
Vedsted .....	139	160	299	324	- 25
Augustenborg .....	252	276	528	515	13
St. Hans Hospital .....	1,171	1,330	2,501	2,389	112
Filadelfia .....	0	214	214	216	- 2
Total ..	4,784	5,606	10,390	10,157	233

pitals and nursing homes the requirement of space for each patient is 30–33 sq.m. (net, i. e. area within the limits of the ward), whereas in the majority of the existing hospitals the corresponding figure is usually less than 20 sq.m. per patient, in many institutions even as low as 11 or 12 sq.m..

*Table 1 a* shows the distribution of patients according to diagnosis and sex. The figures are given for the whole material as well as for the State Hospitals only. This distinction has been made, because the conditions governing admission differ between the hospitals; the State Hospitals usually receive their patients directly and are supposed to keep them until they are ready for discharge, whereas St. Hans Hospital receives most patients through the admission wards in Copenhagen, and the private hospital Filadelfia is, on the other hand, in the position that it can discharge patients as soon as the disease tends towards a chronic course.

As might be expected, schizophrenia is by far the dominating group, comprising 59.5 per cent of the patients. Following in order of diminishing size are manic-depressive psychosis (8.2 per cent), presenile and senile psychoses (7.4 per cent), and psychogenic psychoses (4.2 per cent).

With regard to the distribution of diagnoses, the differences between the sexes are not very conspicuous. The most pronounced differences are with regard to manic-depressive psychosis and presenile and senile psychoses; these groups are more frequent in women, whereas the opposite is true concerning schizophrenia, cerebrovascular disease, neurosyphilis, epilepsy, "other organic disorders", and alcoholism.

The sex distribution among the psychogenic psychoses and neuroses deserves special comment. In these groups there is considerable female dominance, which in the case of the psychogenic psychoses is almost exclusively due to the material from the Filadelfia Colony, whereas the difference in the neuroses is found also in the rest of the material.

As a curiosity it may be mentioned that "not-classifiable psychoses" are considerably more frequent among women than among men.

The psychopathies seem to be more frequent among females, but this may be an artefact, since a number of male psychopaths are classified with a main diagnosis of alcoholism.

The following tables (1 b, 1 c, and 1 d) give the *distribution of diagnoses for each of the 9 hospitals*, separately for each sex. These tables have been awaited with considerable interest. Confidence in psychiatric diagnosis is not overwhelming in all circles, and there is especially a tendency to stress its subjectivity. It might, therefore, be expected that the distribution of diagnoses would vary very much among the different hospitals. From several countries, especially the United States, some very discouraging comparisons have been published concerning the diagnostic distributions in different hospitals; the differences have been so large that they can only be presumed to be due principally to the use of different diagnostic criteria. In Denmark also, reports

have been published showing that diagnosis has at least varied a great deal during the course of time; it has been especially striking how in certain periods and in certain places schizophrenia has blossomed forth whereas in other times and places manic-depressive psychosis or psychogenic psychoses have thrived better. The daily, more or less stereotyped, disputes around the conference tables in psychiatric hospitals would seem to indicate that view points concerning psychiatric diagnoses vary greatly.

On the other hand, it might well be assumed that, in a small country like Denmark, different factors would tend to straighten out the differences in view points. The number of psychiatrists is limited, and they have good opportunities for contact with each other; they have all had the same medical education, and their psychiatric training has also been fairly homogeneous. Of special importance is, in addition, the fact that since 1938 all Danish psychiatric departments have used the same diagnostic system authorized by the Danish Psychiatric Association. The diagnostic list has been discussed in a number of meetings of the association, and as a result of these discussions a revised edition of the list appeared in 1952, representing a compromise which was accepted by the great majority of psychiatrists. On the other hand, it is of course not sufficient that certain diagnostic labels or, at best, concepts are accepted; the practical application of the labels is nevertheless always, to a certain degree, a question of subjectivity. In addition, there is the possibility that those psychiatrists who are not wholly satisfied with the official diagnostic system may be inclined to label a particularly large number of cases as "not classifiable". If this grouping is used extensively in some hospitals and very little in others, it is obvious that comparison of the distribution of diagnoses between one hospital and another will be that much less valid. For this reason it was necessary for the instructions to the medical superintendents concerning the cross section study to include a recommendation that the "not-classifiable" group should be kept as small as possible; even if there might be a slight doubt as to the diagnosis in individual cases, they should nevertheless be placed in the groups to which, in all probability, they really belonged. The not classifiable group was to be used mainly for cases which nosologically did not belong to any of the existing groups.

In the tables "diagnosis" always means "*main diagnosis*". This means the diagnosis of the condition which is the main reason for the patient's presence in the hospital. For recently admitted patients this will usually mean the condition which led to admission, whereas for chronic patients it refers to the conditions which is responsible for the patient having still to remain in hospital, regardless of whether this condition was the original cause of admission.

Possible *subsidiary diagnoses* are not suitable for statistical evaluation. Most patients suffer from more than one pathological condition, and it is usually somewhat arbitrary how many conditions are given the status of a subsidiary diagnosis. On the other hand, the necessity of making a main diagnosis forces

a decision as to which of the different possible diagnoses is most relevant with regard to hospital statistics.—

When the diagnostic distributions in the hospitals are compared, it is found that, on the whole, differences between the hospitals are astonishingly small. It should, however, be stressed that the Filadelfia Colony shows features which differ very much from those of the other hospitals, and that in certain respects St. Hans Hospital also differs from the State Hospitals, though not strikingly so.

It must, of course, be admitted at once that such a relative accordance certainly is by no means proof of a complete conformity of diagnostic viewpoints among the different psychiatrists. On the other hand, it must be conceded that the accordance cannot possibly be a result of chance factors alone. Even if it is assumed that the diagnostic principles have been reasonably homogeneous in the different hospitals, it cannot be concluded that the prevalence of the different disorders is the same in all parts of the country. Information concerning this question can only be provided when the figures found are related to the population figures, i. e. when true rates have been computed.

It must also be stressed that even if considerable differences with regard to diagnostic distribution had been found between hospitals, this would not have constituted proof of heterogeneity with regard to diagnostic principles; the differences could well be due to differences in prevalence. On the other hand, it is probably fair to say that the relatively good accordance would be difficult to reconcile with any theory concerning radical differences in diagnostic viewpoints. In conclusion it might be said then that psychiatrists readily reach agreement about the great majority of psychiatric cases, without requiring much discussion. The more doubtful cases are, on the other hand, debated most intensively, giving an impression of considerable differences in viewpoints among psychiatrists.—The reason for mentioning these problems at some length is that one very often hears, even from most competent colleagues, that most kinds of psychiatric statistics are meaningless, because diagnoses are far too uncertain. There is, therefore, good reason to stress that the results of our cross section study which relate to this point, do not tend to support such pessimistic views.

Before analyzing the material in detail it is worth remembering the following facts: the basis of diagnostic disagreement is very often a difference of opinion as to where to draw the borderline between two disease entities, for example the borders between schizophrenia and manic-depressive insanity, between senile dementia and arteriosclerotic dementia, between psychogenic psychosis and neurosis, or between neurosis and psychopathy. If, then, one of these diagnoses is strongly represented in a certain material, it may be useful to ascertain whether the "adjacent" diagnosis is correspondingly underrepresented. If, for example, a hospital has reported unusually many manic-depressives, and if it then turns out that the schizophrenics are underrepresented, this may indicate that these deviations may be due to a particular viewpoint

concerning the right place of the borderline between these two disorders. If, on the other hand, the excess of manic-depressives is not compensated by a corresponding deficit of schizophrenics, or should there even be an excess in the latter disease too, it is more probable that true deviations of prevalence are responsible. For these reasons it may be useful to pay attention not only to the frequencies of single diagnostic groups, but also to the sums of pairs of groups in instances where definition of the borderline between members of the pair is especially difficult. Some male psychiatrists are sometimes inclined to diagnose a condition as psychopathy, if it exists in a male patient, whereas practically the same syndrome in a female patient would be called a neurosis. Female psychiatrists may, on the other hand, have reverse inclinations. Consequently, it may be useful for some purposes to add these two diagnostic groups.—The concept “psychogenic psychosis” is a widely embracing one in Scandinavia, and especially in Denmark, and in making comparisons with non-Scandinavian materials it may therefore be useful to combine the groups “psychogenic psychosis” and “neurosis”, and the groups “psychogenic psychosis” and “schizophrenia”.

If the results of a cross section study were to indicate differences between different parts of the country with regard to the prevalences of certain disorders, it would, of course, be essential to know whether these differences were artefacts, due to differences in diagnostic viewpoints. This aspect can be checked to a certain extent by the fortunate circumstance that most of the hospitals have two (or more) superintendents, each of which is responsible for the diagnoses within his own section of the hospital. The superintendents of one hospital receive patients from the same district, and even though the superintendents usually take care of the male and female departments respectively, it should nevertheless be possible, by comparing the relevant figures to get an impression as to whether the diagnoses were distributed in an analogous way in the two sections. Should this be the case, and should the distribution of diagnoses in both sections deviate in the same direction, this might indicate that the prevalence is really abnormal in the corresponding hospital area. Comparisons should, of course, also be made between hospitals which serve adjacent areas.

On further scrutiny of tables 1 b, 1 c, and 1 d (males, females, males + females), it appears that for some departments there are practically no deviations from the average; in other instances, one section of a hospital may deviate whereas the other section does not, or even deviates in the opposite direction; finally, there are some instances in which the deviations in both sections are in the same direction.

(In using the expression “deviation from the average” in the following, we have endeavoured to take not only the true statistical significance into consideration, but also other factors, such as whether the “average” has been influenced to an abnormal degree by a single markedly deviant value. For



instance, there are certain figures which must be regarded as deviating from the total average, but not from the average which emerges when St. Hans Hospital or, more especially Filadelfia, are excluded.)

The most "deviant" departments will be discussed first, namely Filadelfia and St. Hans. The material from *Filadelfia* shows a strong preponderance of manic-depressive insanity, psychogenic psychosis and neurosis, whereas schizophrenia, presenile, senile, and cerebrovascular psychoses and neurosyphilis are underrepresented. As the hospital has only female patients, this abnormal distribution does not influence table 1 b. In *St. Hans Hospital* schizophrenia, manic-depressive insanity, and psychogenic psychosis are underrepresented, whereas there is a preponderance of presenile and senile psychoses, of neurosyphilis, and alcoholism; these deviations are found for both sexes, some of them being especially marked when the figures for the two sexes are combined.

We shall next consider the State Hospitals. *Nykøbing* shows a substantial accumulation of presenile and senile disorders in both sexes, and also high figures for cerebrovascular disorder in males; the rest of the material does not deviate significantly from the average.

*Vordingborg* deviates only slightly, especially in the form of a deficit of presenile and senile psychoses and epilepsy in males, and an excess of intelligence defect in males and of psychopathy in females; the sum of psychopathy and neurosis does not, however, deviate significantly from the average.

In *Middelfart* there is an excess of psychogenic psychoses among the males, whereas the females show an excess of schizophrenia and low figures for presenile and senile disorders.

*Aarhus* has exceptionally high figures for manic-depressive psychosis among both sexes. By contrast, the schizophrenia figures are low, especially among females. Among these the figures for presenile and senile psychoses are low, and the figures for cerebrovascular disease high. The figures for "not classifiable psychoses" are especially high in women.

There is little doubt that the high figures for the manic-depressive group are partly due to the special diagnostic viewpoints of the superintendent of the female department. The figures for manic-depressives among males is also relatively high. This may be due to the fact that the two superintendents have worked together for a number of years, and have thus reached a large measure of agreement regarding diagnosis. There is, of course, also the possibility that the disease has in fact a greater prevalence in the area. Those members of the staff who have worked in other parts of the country have, on the other hand, not made observations which would tend to support this theoretical possibility. —With regard to the great number of "not classifiable psychoses" in women it may be assumed that in other hospitals the majority of these cases would have been grouped among the schizophrenics.

In *Viborg* the figures for schizophrenia are high, whereas the prevalences

for senile psychoses, neurosyphilis, psychogenic psychoses, psychopathy, and alcoholism are low. These findings would seem to fit in with the fact that the hospital serves an area in which there are no large cities; in addition, it should be mentioned that the area is unusually large. There may, of course, be a tendency for the population in the most peripheral parts of the area only to send those patients to hospital who are in most urgent need of hospitalization. The relatively high figures for schizophrenia could, of course, be the consequence of an elevated morbidity; the fact that the neighbouring districts have relatively low figures for schizophrenia tends to contradict this. On the whole, it seems not improbable that the diagnosis of schizophrenia is relatively widely used in this hospital, perhaps at the expense of the diagnosis of psychogenic psychosis.

*Vedsted* has low values for presenile, senile, cerebrovascular, and neurosyphilitic disorders. According to information from the superintendent this is mainly due to a special and very active policy concerning senile and arteriosclerotic patients: when a patient of this type is referred for admission, the general practitioner and the relatives are approached, and whenever possible the patient is brought to some nursing institution for aged people instead of being admitted to the psychiatric hospital.

*Augustenborg* has relatively many psychogenic psychoses. According to the superintendent this is no doubt mainly due to the fact that he is inclined to use the diagnosis of psychogenic psychosis in a relatively broad sense. He does not believe that the incidence of these disorders is especially high in the area.

*Tables 2 a-h* and *tables 3 a-i* give, for males and females respectively, for each hospital the *distribution of patients according to diagnosis and placement within the hospital unit* (the hospital proper, nursing homes, family care). Only absolute figures are given as most of the figures are too small for computation of frequencies; the tables are published principally for the use of the hospitals with whom they are directly concerned. Nevertheless, some features of more general interest do emerge from these tables. It is, for example, obvious that the *nursing homes* are used in different ways in different areas; in most places the nursing homes are inhabited predominantly by schizophrenic patients, and only in "Gurrelund" (connected with St. Hans Hospital) do patients with senile dementia make up the majority of patients. In the newly established nursing home in Ballerup, which was explicitly intended for senile patients from the suburbs of Copenhagen, this group does in fact make up a considerable proportion of patients, but not as large as the schizophrenia fraction; nevertheless, about 50 per cent of the senile and arteriosclerotic patients belonging to the corresponding hospital (Nykøbing) are placed in nursing homes. In the other areas there is a greater tendency to keep these patients in the hospital proper. On the whole, it seems then that the nursing homes are suitable for housing old patients, but not especially for the treatment of physically

disabled patients; this has no doubt some connection with the fact that nursing homes have been traditionally regarded as "cheap" institutions, in which patients could largely take care of themselves, and where, consequently, the staff could be relatively small. Such a small staff will not, on the other hand, be sufficient if the nursing homes are to be changed into institutions for more disabled patients. It may be natural and even necessary gradually to establish such a change, but the authorities must then be prepared for the costs of running such an institution being considerably higher than the present costs of running nursing homes of the traditional type.

With *family care*, too, there are variations. In some areas practically all patients in family care are schizophrenics, whereas in other areas quite a number of patients from the "reactive" group are placed in private homes.

With further regard to Nykøbing Hospital the *security ward* and the ward for *forensic examination* have been classified together with the nursing homes, despite the very special functions these wards have. The security ward is in fact used for patients from the whole country; it is intended for dangerous patients who cannot be treated in ordinary psychiatric hospitals without great risk. Patients cannot be admitted to the security ward without special legal procedures, i.e. the permission of the Ministry of Justice. The number of patients in the security ward has decreased considerably in recent years as a consequence of the greater efficacy of modern methods of treatment: psychosurgery and drug treatment have been of great importance in this respect. The decrease in the number of patients has made it possible to convert one half of the ward into a special ward for forensic examinations; in this ward it has been possible to place patients who were regarded as especially dangerous or liable to escape. On the whole, however, the ward has functioned predominantly as an observation clinic for forensic psychiatry for the Eastern parts of the country (with the exception of Copenhagen and its suburbs).

As usual the composition of the patient material of the Filadelfia Hospital differs considerably from the rest. It may, for example, be used as an illustration of the fact that it is possible to place a great many patients of the reactive group in family care.

*Tables 4 a, b, and c* recapitulate tables 2 and 3 in such a way that the hospitals are combined into 3 groups, namely the State Hospitals, St. Hans Hospital, and Filadelfia. Table 4 c shows that of all patients, 69 per cent were in hospital proper, 21 per cent in a nursing home, and 10 per cent in family care. With regard to the division among these 3 categories there are considerable differences between the State Hospitals and St. Hans Hospital, the figures being 66, 25, and 9 per cent as against 80, 11, and 9 per cent respectively. These differences can hardly be due to differences affecting the patient material; this is already evident from the fact that, with regard to the grouping among the 3 categories, there are significant differences between the male and the female patients at St. Hans Hospital: among the male patients 7.5 per

cent are in nursing home and 15.8 per cent in family care, whereas the corresponding figures for the females are 14.4 and 3.5 per cent respectively. The real cause is probably to be found in more casual administrative circumstances; on the whole, patients in a nursing home and patients in family care are not so very different from each other, and the placing of patients in one or other way may therefore depend to a high degree on the practical possibilities for procuring beds within the two categories.

Among the patients belonging to the State Hospitals there is no difference between the sexes with regard to the placing of patients in the 3 categories.

With regard to the diagnostic distribution it is noticeable that, as expected, the reactive group is relatively numerous in the hospitals, whereas the organic group is relatively more frequent in the nursing homes, especially so among the male patients from St. Hans.

#### Chapter 4.

### Age and diagnosis.

*Tables 5 a-j* show the distribution of the total material according to age and diagnosis. It is evident that the age distribution differs strikingly for the two sexes, and this is clearly brought out by comparison of the columns which indicate, for each sex, what percentage of the patients are in each 5-year group. There is a clearcut change at the age of 60; before this age the percentages among the males are higher than for females, whereas after this age the opposite is true. As the number of females in the material is larger than the number of males, the numerical difference is not significant in the younger age-groups, whereas it is highly significant among the older patients.

These differences between sexes are also conspicuous on scrutiny of the different diagnostic groups. Until the age of 50 there are many more men than women among the schizophrenics, whereas the women dominate in the older age-groups.

Among the manic-depressives there is a predominance of women which increases gradually through the years. The same applies to the presenile and senile group, while the males predominate in all age-groups with regard to vascular brain disease and neurosyphilis.

Psychogenic psychoses, neuroses, and psychopathies are more frequent among females than among males in all age-groups; for both sexes they have their maximum in the age-group 25-60.

So much for the diagnostic distribution with regard to absolute figures. *Table 6 a and 6 b* and *figure 3* show how the *percentage distributions of diagnoses* are *within each age-group*. The trend of the distribution among the age-groups is obviously the same for both sexes. There are, however, some significant differences. The maximum for schizophrenia comes considerably later in females than in males, and in the older age-groups the organic group predominates by far more among the males than among the females. The "reactive" band is of the same structure in both sexes, only somewhat more narrow for the males.

If the age distribution in the different hospitals is compared, it is apparent that, by and large, there are no significant differences between them. Only on a few points are there considerable deviations from the average. Middelfart has a relatively large proportion of its patients in the age-group 25-45. Viborg and Augustenborg have relatively few old patients; while in the total material

43 per cent of the patients are 60 years and over, the corresponding figure for Viborg is 35, and for Augustenborg 27. As might be expected, St. Hans Hospital has a high proportion of old patients, 51 per cent of its patients being 60 years and over.

Tables 7 a, b, c, and d show in principle the same as figures 4 and 5. Table 7 a shows the distribution of the male patients among the 5 main diagnostic groups. With regard to age distribution the groups are continually summed from above; this means that in the horizontal line which corresponds to age 20 we can find the number of cases in the corresponding diagnostic group which are 20 years old and under; thus, for example, there are 27 schizophrenics belonging to this group, 1,274 schizophrenics are 50 years and under, and so on. In the "total"-column it can be seen that 1,910 of the patients, i.e. 39.9 per cent, of the material are 50 years and under. In a quite analogous way table 7 b shows how many of the male patients are *over* a certain age; here the figures are summed from below. The two tables are therefore to a certain degree complementary. If, for example, we look at the percentage figure for schizophrenia for the age 55, it is found in table 7 a to be 34.6, and in table 7 b to be 27.6; the sum of these two figures is 62.2 per cent, corresponding to the percentage of schizophrenics in the *whole* material. This complementarity appears especially clearly in the graph, as illustrated with respect to the males in figure 4. This graph is used in the following way: a ruler is placed horizontally across the figure—for instance at the 55 year-line. In examining the schizophrenia area to the left it is found that the point of intersection between the ruler and the curve, which delimits this area to the right, has the abscissa 34.6 which means that 34.6 per cent of the whole material consists of schizophrenic patients of the age of 55 years or under. If we follow the ruler to the right and find the point of intersection with the curve which delimits the right hand schizophrenia area, we find that this point has the abscissa 27.6 (as measured on the top scale); this indicates that 27.6 per cent of the material consists of schizophrenics who are over 55 years old. In the same way analogous percentages can be found for the other diagnostic groups. In addition it is possible to read the absolute numbers of patients for each age and diagnosis. Figure 5 gives the corresponding values for the female patients.

## Chapter 5.

### Distribution of patients according to hospital districts.

The State Hospitals and St. Hans Hospital are regional institutions which are intended to serve certain geographical areas. However, all of these hospitals have always had some patients who did not belong to the corresponding district. There are several reasons for this fact. Firstly the delimitation of the districts has changed several times, partly in connection with establishment of new hospitals or extensions of old hospitals, partly because the need for beds has developed with different speed in different parts of the country with the effect that now and then it has been necessary to relieve especially overcrowded hospitals by reducing their districts. In connection with such changes of district some patients have been transferred to a new hospital to the district of which their original domicile now belonged; but other patients who now actually belonged to the district of the new hospital were permitted to remain where they were if this was considered as practical or as serving the patients' needs best. In other cases some of the hospitals have had special functions, the Middelfart Hospital, for example, as treatment center for tuberculous patients, and Aarhus and Nykøbing with respect to malaria treatment of patients with general paralysis. These hospitals must naturally receive patients also from other districts. In addition it may be mentioned that for a long period the Aarhus Hospital specialized in family care with the consequence that many patients were transferred from other hospitals to Aarhus for the purpose of placing them in family care. The security ward in Nykøbing has, of course, been obliged to receive patients from any district of the country. Finally there have always been possibilities for transferring a patient to another hospital for example in case the relatives of the patient lived in the neighbourhood of this hospital.

It has not been known exactly how many of the patients have been "displaced" in this way. The question is not without interest. For the planning with respect to the location of new hospitals it is, of course, essential to know in which parts of the country the need for new beds is most urgent. If a hospital houses a great number of patients who do not belong to the district of the hospital, the overcrowding of the hospital will not per se indicate that this is the district where new wards should be established. *Table 8* presents a survey of the pertinent facts. The patients have been grouped according to the hos-

pital to which they were admitted as well as to the district to which their domicile belongs. The diagonal column in heavy print indicates the number of patients who are resident in their own regional hospital. It turns out that of the 10,176 patients who are resident in a regional hospital, 1,026 are staying in a hospital not their own.

When the situation in the different hospitals and districts is analysed, it is usually not difficult to find the causes for these irregularities. Nykøbing is the hospital which has the greatest number of patients from other districts. The percentage of such patients is close to 20, and by far the majority of these belong to the district of the Vordingborg Hospital. The explanation for this fact and for the fact that Vordingborg also has a great number of Nykøbing patients is simply that there have been particularly many changes of boundary between the districts of these two neighbouring hospitals.

In St. Hans Hospital there were only 4 patients who in fact belonged to one of the State Hospitals, whereas these hospitals have no less than 72 patients who came from the district of St. Hans Hospital.

*Table 9* illustrates the "balance" of the different hospitals. The first column (n 1) shows how many "alien" patients are staying in the hospital in question, and the second column (n 2) shows how many patients, who belong to the district of this hospital, are in fact placed in other hospitals. The difference  $n 1 - n 2$  indicates the balance; if it is positive, it means that the hospital has been obliged to take care of more patients than does in fact correspond to the need of the district; if it is negative, the hospital has been favoured in this respect. To the first group belong the hospitals in Viborg, Middelfart, and especially Nykøbing, and to the second group particularly St. Hans Hospital and Vordingborg. It appears that the sum of these differences is not 0, as might be expected, but -142. The reason is, firstly, that a number of patients have been placed in the non-regional hospital, Filadelfia; secondly, that a number of patients do not belong to any specific district. If this last number (72) is subtracted from the number of Filadelfia patients (214), we arrive at the number 142.

When more beds for psychiatric patients become available, and when new hospitals and wards are built, it will be reasonable to take these figures into consideration. On the other hand they should not be taken too seriously, because in many cases the "displacing" of patients has had very good practical reasons. Thus, a systematic or even compulsory transfer of patients from one regional hospital to the hospital which is legitimately the regional hospital of the patient is certainly not indicated.



## Chapter 6.

### The patient material as seen in relation to the population from which it has emerged.

The prevalences for each hospital can be calculated in two different ways. The number of patients resident in the hospital can be related to the population of the corresponding hospital district whether or not these patients are really residents of the district; or the patients can be grouped, not according to the hospital in which they are staying, but according to the *hospital district* in which they have their home, and then the figures can be related to the population figures in the corresponding district. This latter method of calculating the prevalence is obviously the more satisfactory.

In *tables 10 a, b, and c*, both methods have been applied. For some of the hospitals there are considerable differences between the results obtained by the two methods. In the following only the figures obtained by means of the last named method will be discussed.

The population figures are identical with the numbers of persons aged 15 years and over.

The most conspicuous feature of table 10 c, which includes both sexes, is the exceptionally high prevalence in the city of Copenhagen as compared with the rest of the country. The city has 443 per 100,000 against an average of 311 for the whole country. Among the State hospitals Nykøbing has a very low figure (242), and Vordingborg a high figure (349), whereas the remaining hospitals are practically all on an equal level. It is rather striking that the extreme values come from two neighbouring districts. The explanation is probably to be found mainly in the fact that the district of Nykøbing comprises the suburbs of Copenhagen. This part of the country has a very rapidly growing population; a selection of relatively healthy and relatively young people immigrate to this area and in this way cause a rapid growth of the "background figure", the figure to which the number of patients must be related; the patient figure, however, concerns to a high degree persons who have been admitted several years ago, and it is, therefore, not adequate to relate it to the present-time population which has a size and structure that differs essentially from the population from which the patients emerged. Unfortunately, there is probably no practicable way of compensating for this source of error.—Reversely it can be said that the district of the Vordingborg Hospital has by far a more stationary population which to a certain degree has the character of a "resid-

ual population", a population from which a relatively healthy part has emigrated to the suburbs of Copenhagen, leaving behind a less healthy part with a higher morbidity.

The population of the city of Copenhagen also has obviously to a certain degree the character of a residual population. For the size of the admission and residence figures in the psychiatric hospitals it is of further importance that the central parts of the metropolis are not adequate for housing mentally sick persons in private homes.

The differences between the prevalences of the two sexes appear from tables 10 a and b. In Copenhagen the prevalence is a little higher among males, but in all other districts the prevalence figures are higher for the females; for the Aarhus district, however, not to any significant degree.—

Obviously, prevalences can also be determined for other population groups than for those which correspond to the district of a hospital. *Table 11* shows the prevalences for the different *counties* and for the city of Copenhagen. As usual the last named municipality has the highest figure by far, but otherwise the picture is very confusing and difficult to analyze. There is no evident explanation for the differences found. It would have been of great interest if it had been possible to relate the figures to the age-distribution in the different counties. Unfortunately no tables with regard to this distribution exist. It must, however, be admitted that the counties are no natural "geographical" unities. It would, of course, be quite realistic to test the hypothesis that there could be differences in prevalence and morbidity among the different geographical parts of the country—perhaps due to anthropological variations; but in this case the counties would not be reliable representatives for the different parts of the country. Some of the counties comprise, by chance, relatively urbanized parts, whereas the neighbouring counties may be of a much more rural nature. Such differences would probably be of much greater importance for the prevalence than any anthropological differences within the relatively homogeneous population of Denmark. Furthermore it is known that the migrations between the counties is of great importance; and the prevalences must, naturally, be relatively high in residual populations and relatively low in districts with a rapidly growing population. Unfortunately very little exact knowledge exists concerning these internal migrations in Denmark, and certainly not enough for the purpose of taking these factors into exact numerical consideration.

Very often the different factors mentioned will counteract each other. At first glance, for example, it might seem remarkable that counties like Odense, Aarhus and Aalborg, which comprise relatively large cities, do not have especially high prevalences. This is probably best explained by the fact that there is considerable immigration to these counties. Reversely the high figures in the counties of Holbæk and Maribo which are relatively rural can most probably be explained by the "residual" character of the population of these counties.

The last column of table 11 shows the increase of the total population of each county during the period 1935–1955. These figures illustrate, to a certain degree, the populational developments and structures of the different counties. In the Eastern part of Denmark the differences between counties are conspicuous, the increase percentages varying from 1.3 to 66.8 and there is a definite negative correlation between these percentages and the corresponding hospitalization rates. In the Western parts of the country the variations are much smaller, and no correlations between the two series of figures can be found.

One thing, however, seems to appear quite clearly: the prevalence figures obtained by means of our material do not lend any support to conclusions as to existing anthropological differences between the different parts of Denmark.—

In the preceding we have been concerned with population groups which were *geographically* delimited (hospital districts, counties), and which, therefore, in principle might be different from each other in anthropological respect. On the other hand it was, with the one exception of the City of Copenhagen, impossible to characterize these groups sensibly by means of *sociological criteria*. It would be of great interest to group the material in a way which made it possible to distinguish between the groups by means of sociological criteria. If such groupings should be correlated to existing data in Danish population statistics it would first of all be advisable to group patients according to the *degree of urbanization* of the community in which they have their domicile. A grouping according to *profession* would also be of great interest, but for our purposes it would not carry us very far, because it would not be possible to correlate it to age. In the Danish population statistics no subdivision of the professional groups according to age exists.

The material was then divided into the seven population-groups mentioned on page 18: Copenhagen, Frederiksberg + Gentofte, suburbs of the capital, provincial towns, suburbs of provincial towns, rural districts with urban areas, rural districts. Each of these groups was then again divided according to sex, age and diagnosis (the usual five main diagnostic groups). The results are shown in *tables 12 a–i* and *figures 6, 7, and 8*.

The figures consist of two main sections: in the first and smaller section three areas are represented, namely Denmark proper (i. e., Denmark less Faroe Islands and Greenland), Copenhagen, Denmark proper — Copenhagen, respectively. Within each area are six columns corresponding to each group, and each column consists of layers (with different colours) which represent the different diagnoses. The second and larger main section, gives a subdivision of "Denmark proper — Copenhagen". It is the part of Denmark which is served by the State hospitals. This section comprises seven groups of columns of the same structure as those described for the first-named section.

Frequencies are in all cases given as "rate per 100,000" of the corresponding age-group in the population of the sub-area. It is, therefore, possible to

compare the prevalences of the single sub-areas, one with another, and each of them with the total population.—

For the purpose of *statistical evaluation* of differences between frequencies in the total area and frequencies in the sub-areas the following formula has been applied:

$$\delta = \sqrt{\frac{\text{rate}_t \times 10^5}{\text{population}_p}}$$

in which  $\text{rate}_t$  is rate per 100,000 in the total area, and  $\text{population}_p$  is the size of the population in the corresponding sub-area.

Graphically this is illustrated by means of the solid double-arrow which is placed to the left of each column. The length of the arrow corresponds to  $4\delta$ , and it is placed in such a way that the mid-point of the arrow is on the same level as  $\text{rate}_t$ .

If the top of the column is on a higher, respectively lower, level than the points of the arrow, the rate of the sub-area deviates significantly from the rate which might be expected from the total area ( $P < 5$  per cent).

For the evaluation of differences between frequencies in sub-areas the following formula was applied:

$$\delta' = \sqrt{\frac{\text{rate}_p \times 10^5}{\text{population}_p}}$$

where  $\text{rate}_p$  is rate per 100,000 in the sub-area, and  $\text{population}_p$  is the size of the population in the same area.

Graphically this is illustrated by means of the broken double-arrow. The mid-point of this arrow is placed at the top of each column, and the arrow has an extension of  $4\delta'$ .

If the broken arrows of two sub-areas do not overlap each other the frequencies of the two areas differ significantly from each other ( $P < 5$  per cent).—

It is evident from the figures that there are great differences so far as prevalences in the different sub-areas are concerned. The deviations, especially with respect to diagnosis, are so numerous that a description of them all is not advisable. In the following only some of the main results will be stressed.

Figure 6 (males) indicates the striking difference between Copenhagen and the rest of the country. For Copenhagen the deviations from the average are significant in all age-groups; for the rest of the country, in the groups 45 years and over only. The two areas deviate from each other significantly in all age-groups over 25 years. The difference is especially due to the organic group.

For the females (figure 7) the difference is only significant in the oldest age-group (65 years and over). But here it is, on the other hand, quite conspicuous. Again, the main reason is to be found in the organic group.

The comparison of areas outside Copenhagen (figure 6, males) gives as the most striking result that there is a very low prevalence in the suburbs

of the capital (25—64 years), which is explained by the low figures for schizophrenia and by a high prevalence in the suburbs of the provincial towns (65 years and over) and in urbanized areas of smaller communities (25—44 years, 65 years and over). For the females the trends are on the whole the same (figure 7).

Summarizing it may be said that among the factors which have hitherto been studied the age of the patients is the one which has shown the highest correlation to prevalence for mental disorder. Next follows the degree of urbanization of the home community of the patient. In most cases this correlation can easily be explained as the consequence of migration phenomena. It should, however, be stressed that this does not exclude the possibility that the morbidity may be different in the different areas; but the prevalence figures do not yield any evidence which could support hypotheses in this direction.

A more detailed investigation along the same principal lines was performed with the purpose of comparing the boroughs of *Frederiksberg* and *Gentofte* (table 13 and figure 9; the population figures are those found on the 1st of January 1957; these figures have been taken from "Statistisk Årbog for København, Frederiksberg og Gentofte samt Omegnskommunerne 1957", table 19, page 23).

Frederiksberg was originally a typical suburb of Copenhagen. Already in the 19th century, however, the more central part of Frederiksberg became completely urbanized and although some districts with one-family houses have remained Frederiksberg, which is now completely surrounded by the city of Copenhagen, must be said to have a populational structure which rapidly approaches the structure of the Copenhagen population. Until a few decades ago Gentofte was a typical, rapidly growing suburb; but the area is now practically filled, and other communities further out in the periphery of the metropolitan area are now gradually taking over the roles as suburbs. In socio-economical respect Gentofte is on a high level.

It turns out that there is a significant difference between the prevalences of the two communities. The Frederiksberg figures are about 50 per cent higher than the Gentofte figures, a difference which is found to be practically constant in all larger groups both with respect to sex, age and diagnosis. For both communities the prevalences are definitely lower than those found in the city of Copenhagen. In Gentofte the prevalences are even lower than the average for Denmark proper — Copenhagen but not as low as in the other suburbs of Copenhagen.

Tables 14 a, b, and c present the material grouped according to the same districts as in table 12 or figures 6 and 7 but without diagnostic subdivision. On the other hand, the material has been grouped according to age, in 5-year-groups. Here, also, the fundamental differences between the main areas come out very clearly. The highest figures are found in the city of Copenhagen, the lowest in the suburbs of the capital.



## *Chapter 7.*

### Course and predictions.

It was regarded as one of the main goals of cross-section investigations to repeat the investigations with regular, not too long intervals, making it possible to obtain a picture of the development with respect to numbers and distribution as to age, sex and diagnosis of hospitalized patients. On the basis of the results of a series of such cross-sectional studies it should be possible to extrapolate with regard to the probable future development with a somewhat higher degree of certainty than hitherto possible.

Predictions concerning the future need for psychiatric hospital beds have been made on several occasions. Obviously the development depends on a large number of factors which are only partly known and which, in addition, must be assumed to vary very much according to time and place. It is, of course, possible to concentrate on some of these factors which are relatively well-known and then try to prophecy regarding the future on this basis. But usually it is impossible to state with any degree of certainty whether the actions of these factors will be inhibited or enhanced by other factors and, if so, to what degree. Some studies have tried to include quite a number of important factors but nevertheless the results are so uncertain that it is most tempting to give up any speculations in this direction.

In order not to sink too deeply into pessimism it may be advisable to remember the old joke concerning the meteorologists about whom it is said that when they are using all their skill and their finest observations and have made the necessary computations, and on the basis of this make predictions concerning the weather for to-morrow there is a 50 per cent chance that they will be right. This seems to be quite a respectable result. But if, on the other hand, all kinds of scientific observation and reasoning are skipped, and instead a prediction is made to the effect that the weather to-morrow will be like the weather to-day, the chances are 80 per cent that one will be right. It may not be fair to measure the value of meteorology by means of the difference between these two percentages, but it may, on the other hand, be comforting to be reminded that predictions based on purely empirical statistical data may be of some value. In relation to the problem focussed upon in this chapter it might, therefore, be quite sensible just to extrapolate from a series of consecutive observations from the last decades.

The report which was published in 1956 by the "Commission of 29th March 1952 concerning the State Mental Hospitals" contains some tables which to a certain degree may serve as a basis for such extrapolations. The tables which had been computed by the Statistical Department of the Ministry of Finance showed the probable development of the Danish population until the year 1970, especially with respect to the distribution between rural and urban populations and between the age-groups over and under 15 years, respectively. Through these figures it was possible to receive hints as to the speed with which the need for psychiatric hospital beds would probably grow and as to the localisation of areas in which the need would probably become particularly high. Furthermore, the report contained some tables which showed the age distribution of patients in State Mental Hospitals in the years 1937, 1942, 1947 and 1952, respectively. These figures showed definite trends. As was to be expected as a consequence of the changing age distribution of the total population there was a relative growth of the older age-groups. But in addition to this it turned out that the prevalence among the older age-groups was increasing whereas it was decreasing in certain younger age-groups.

It seemed to be of interest to make a new census concerning the age-distribution and this was one of the natural goals of our cross-section study. If any extrapolations into the future should be reasonably justified it was necessary to base them on quite a series of such cross-sections and for this purpose the above mentioned tables could be used, even if they were not without certain defects, mainly because the background with regard to population-statistics was not quite accurate. In addition, the Holbæk nursing home was not included because its administrative position differed to some extent from that of the other nursing homes. *Tables 15 a, b, and c* give a survey of the four last cross-sections. The population figures, the number of patients and the prevalences are given for each sex separately and combined. The results appear clearly from *figure 10* in which it is seen that the total prevalence has been practically unchanged whereas the prevalence has developed in quite different ways in the different age-groups: in the group 15-24 years there has been little change only, in the group 25-34 years the prevalence has been slightly decreasing, and in the group 35-54 years rapidly decreasing; in the 55-64 year group increasing and in the oldest groups rapidly increasing.

If now the pure empirical extrapolating method is to be applied the first step must be to compute—from population-statistical data—the future size and age distribution of the total population. Next the number of persons in each age-group in certain future years (*viz.* 1960, 1965 and 1970) must be multiplied by the prevalences found by means of extrapolation on the basis of existing cross-section values. *Figure 10* indicates that the material is reasonably fit for extrapolation which can be performed on a linear principle without appreciable error.

The result is frightening. It appears from *table 16* and *figure 10* (in the

table computed frequencies are in brackets). It is of course not especially remarkable that the need for hospital beds—if satisfied to the same degree as it is now—will increase from 7,381 in 1957 to 8,559 in 1970. It seems much more striking that, whereas in 1957 only 29 per cent of the patients were 65 years and over, in 1970 the corresponding figure will have increased to 42 per cent. This simply means that the hospitals will develop rapidly into institutions which first and foremost have to take care of the nursing of old people. Such a development can probably only be avoided if measures are taken not only to a preservation of the capacity of the hospitals but to a considerable expansion of it. If not, it will be impossible to give adequate treatment to patients of the younger age-groups. These younger patients will have to wait until the death of the corresponding old patients before they can be admitted for treatment. It appears from the tables that if the tendency which has dominated recently continues, the number of patients in the age-group 45–54 years will, during the period 1957–1970, decrease from 14.3 to 6.4 per cent and the number of patients in the group 45–54 will decrease from 21.3 to 12.9 per cent.

As the earlier cross section studies performed by the Directorate of the State Mental Hospitals did not include the diagnoses, it is not yet possible to make any empirically founded predictions concerning the future distribution of diagnoses within the psychiatric hospitals. Such predictions should preferably be made on the basis of the results of successive cross section studies comprising the population of all mental hospitals in the country. It is not advisable to rely too much on studies concerning individual hospitals; in these years so many new institutions have been opened, or are going to be opened, and so many patients are transferred from one institution to another that it strongly influences the composition of the patient material in most of the hospitals.

Only in two hospitals (Aarhus and Nykøbing) had cross section studies been performed previously. The results of these studies can, of course, be compared with the figures concerning the same hospitals derived from the 1957 cross section. The Nykøbing study was, however, performed as late as in January, 1956. No big changes could be expected to take place in the period until September, 1957. In addition, any changes that might take place for biological or social reasons must be very small as compared to the change caused by the fact that in the spring of 1957 about 200 patients were transferred from Nykøbing to the newly established Ballerup nursing home. The comparison of the two cross sections performed in Nykøbing would therefore not have much sense.

In Aarhus the first census was made in January, 1953. A comparison with the 1957 results must take into consideration that in 1955 90 patients were transferred from Aarhus to Randers nursing home. If this is done, it turns out that only in a few points have there been significant changes in the patient



material: there has been a considerable rise in the number of the neurotics and patients with senile and arteriosclerotic dementia. The percentage of neuroses has increased from 1.9 to 5.5 and that of the senile and arteriosclerotic group from 6.9 to 10.3 (cf. *Jacobsen, Lunn & Strömngren, 1958*). The increase in these two groups has only been made possible by a decrease in the schizophrenia group caused by the transfer of many schizophrenics to the Randers nursing home, and it seems to demonstrate from which sources the afflux to the hospitals will come as soon as more beds in the hospitals become available.

*Addendum:* In 1957 *Fremming* published a short analysis of the St. Hans Hospital material containing, *inter alia*, a brief description of a cross section investigation accomplished in March, 1956. Due to a regrettable oversight we have not discussed this paper in the preceding. A comparison of the two cross sections, performed with 18 months' interval, gives interesting results, which, it is to be hoped, will be published on a later occasion.

Chapter 8.

Final discussion and conclusions.

It is of obvious interest to compare prevalences of hospitalized psychiatric patients in different countries. The following figures may be mentioned:

	Rate per 100,000
U. S. A. (1957) . . . . .	368
Norway (1953) . . . . .	240
Sweden (1956) . . . . .	430
England and Wales (1953) . . . . .	342
Switzerland (1948) . . . . .	380
Denmark (1957) . . . . .	228

The figures for Norway require a comment. *Lohne Knudsen* (1956) has presented detailed information on conditions in Norway. Only about 50 per cent of certified psychiatric patients were actually in a hospital, the remaining patients being taken care of in other ways, mostly in some form of family care without connection with the psychiatric hospitals. It is estimated that 3 per thousand of the general population need care in a hospital, and 1 per thousand in a psychiatric nursing home.

With the exception of Norway all other countries mentioned have much higher figures for hospitalized patients than Denmark. When trying to establish the causes for these differences it is natural first to compare the Scandinavian countries with each other. Many studies of incidence of mental disorder have been performed in these countries, and the results have demonstrated that there is no reason to believe that they differ significantly with respect to psychiatric morbidity. Neither are there any big differences with regard to age distribution, degree of urbanization, or migration phenomena. The differences are probably mainly due to "nosocomial" factors; Sweden has been able to provide more hospital beds than have Norway and Denmark. The differences between these two countries are probably to a significant degree due to geographical circumstances: in Denmark, where distances are small, there are relatively good conditions for a rapid turn-over and for out patient treatment, whereas the very difficult transportation conditions in Norway have led to a more passive handling of some of the psychiatric patients, a great number of them being in private care without active treatment.

If, on the other hand, we compare Denmark with Great Britain and U. S. A., which have communication facilities comparable to those of Denmark, the higher prevalences in these two countries must be explained differently. First, they have a higher degree of urbanization, and, second, Denmark has without a doubt been lucky in being able to provide relatively ample staffs in the psychiatric hospitals, enabling them to carry through relatively active treatment. It seems quite probable that for American psychiatry *William C. Menninger's* slogan "brains before bricks" may be adequate. In Denmark, however, nobody who has had personal contact with the psychiatric hospitals can doubt that a substantial number of bricks is needed. The Directorate of State Mental Hospitals is aiming at a figure of 250 hospital beds per 100,000 population (outside Copenhagen). It is felt that this figure is too low, but financial considerations have prevented the setting of higher goals. Nevertheless, it is of interest to find out what the figure ought in fact to be, and in this respect valuable information has come recently from Sweden where a governmental commission has published the results of two very careful census investigations. Two counties, that of Stockholm and that of Halland, have been examined. In both investigations it was attempted to ascertain all patients in need of treatment in a psychiatric institution. In the Stockholm county it was found that 560 per 100,000 needed treatment. The prevalences differed very much among the different communities within the county, namely from about 300 to about 1,000 in 100,000. These differences seemed mainly to be due to migration phenomena, communities which are suburbs of the City of Stockholm having very low figures, whereas communities in the periphery with much emigration to the suburbs have high figures. In the Halland investigation, which was even more thorough, the prevalence was found to be 700 per 100,000. Approximately 500 of these were considered as being in need of treatment in a psychiatric institution, whereas the remaining 200 would be able to stay in private homes. These figures are in good accordance with the prevalences found in 1938 in the Danish County of Bornholm, where 310 per 100,000 were in psychiatric hospitals, nursing homes or family care, whereas 400 per 100,000 were psychotic, but not under psychiatric care at that time.

The differences between nations with respect to the prevalence of hospitalized patients may at first glance appear rather impressive. They can, however, be analysed in such a way that at least they cannot be said to point with any degree of certainty in the direction of differences concerning morbidity. And paradoxically enough the differences with respect to prevalence between different countries are not nearly as big as those found between the different parts of one country. In a country like U. S. A. this may not be so very remarkable; the very big differences between the states with respect to these prevalences might easily be analysed in terms of differences in the traditions for hospitalization and in the possibilities for providing the necessary

numbers of beds in hospitals. In addition the United States are no doubt in anthropological respect relatively heterogeneous. But what about the Scandinavian countries? They are usually regarded as anthropologically homogeneous, the governments of the hospital systems are to a high degree centralized, and nevertheless intranational differences with regard to prevalence are enormous. The findings in the Stockholm County in Sweden is a good illustration of this, as are the differences found in Denmark between, for instance, the City of Copenhagen and the suburbs of the Capital. It should be stressed that no doubt these differences are mainly due to the effect of internal migration, with the severely mentally ill being a relatively stable part of the population; for obvious reasons the chronic schizophrenics will maintain the same address for decades. The prevalences found in different parts of the country will therefore not be influenced primarily by the numbers of hospitalized patients, but much more by the changing "background population".

It is certainly possible, and even probable, that many different factors contribute, at least to some degree, to the production of prevalence differences between, for example, suburbs and certain residual populations. Those who emigrate to the suburbs may be qualitatively different from those who remain in the residual district; they may be predisposed to a lower morbidity. It is also quite possible that living conditions in the suburbs are more healthy, and that this may reduce the morbidity. It must, however, be stressed that no such factors are necessary to explain the differences in prevalence. Pure quantitative effects of the rapid growth of the population concerned are quite sufficient as an explanation. It seems that all prevalence differences found in our study between the different geographically delimited population groups can be explained simply by this factor.

In addition to the differences in total rates of hospitalized psychiatric patients we have found some other variations. With respect to diagnoses the differences have been remarkably small. The distributions of diagnoses in the different hospital districts are really not very conspicuous. This may to a certain degree be characteristic of cross section materials. They include a great number of patients who have been under observation for a relatively long time with the effect that the long-term course has decided the diagnosis even in cases which were originally of a doubtful nature. Admission statistics, on the other hand, comprise a relatively great number of cases who have only been under observation for a short time and therefore not diagnosed with certainty.

The majority of beds in all psychiatric hospitals are occupied by chronic patients; the number of beds occupied by patients only staying for a short time varies a great deal according to geographical circumstances. If there happens to be a large city close to the hospital, relatively many acute patients will be admitted and stay for a short time only. If, on the other hand, the hospital is located in a rural district, admissions of this "urban" character will not be very frequent. The differences between the counties of Aarhus and Aalborg, respectively, may

illustrate this phenomenon. They both belong to the district of the Aarhus hospital. The Aarhus county surrounds the hospital, while the Aalborg county is in the outskirts of the district. The two counties are of the same size, Aarhus being slightly more urbanized. The prevalences of hospitalized psychiatric patients do not differ very much, the rate per 100,000 being 285 for Aarhus and 238 for Aalborg; concerning schizophrenia the rates are even less different, namely 100 for Aarhus and 112 for Aalborg. Thus, the hospitalization rate for chronic diseases is not higher in the county which is located a long distance from the hospital than it is in the county surrounding the hospital. With regard to admission rates, however, there are big differences; for generations the rate has been 50–80 per cent higher for Aarhus than for Aalborg. This can only mean that there are a great number of short-lasting admissions from the neighbourhood of the hospital. This category of patients are obviously not sent to Aarhus from the Aalborg district; they are either not admitted or they are sent to the medical ward of a local general hospital.

The rates vary considerably with *age*. This is only what might be expected. The most remarkable feature with respect to age distribution becomes obvious when the *changes* in the age distribution during the last decades are analysed. In the period 1942–1957 not only the numbers, but also the rates of patients within the age groups over 60 have increased to a very marked degree, and the rates between 15 and 55 have decreased. This fact might be explained in the following way: the number of available hospital beds has practically not increased during the period; the mortality of patients who have been admitted has decreased to an appreciable degree, and the chronic patients therefore occupy their beds for a much longer time than they used to. This then prevents the admission of other patients or at least it necessitates that their stay in the hospital be of only short duration, a development which has certainly been facilitated by the increasing efficiency of therapy.

In the United States the number of available hospital beds has increased considerably during the last decades. Nevertheless the change in the age distribution has been practically identical with that observed in Denmark. *Kramer* (1959) has analysed the development in age distribution during the period 1939–1955. He found an increase in the age groups under 15 and over 65, a decrease from 15 to 45 and a stagnation from 45 to 65. This seems to show that even in countries where the pressure of admissions has led to the provision of more hospital beds, relatively fewer beds are now occupied by young and middle-aged patients. As there is no reason to believe that the morbidity has decreased in these age groups this is probably primarily due to a greater efficiency of treatment.

## Chapter 9.

### Summary.

*Chapter 1:* The reasons for the advisability of census studies in mental hospitals are stated. Definitions of statistical concepts and terms used in this and similar studies are advanced.

*Chapter 2:* The practical procedure used in the study is described. The census, which embraced all patients in Danish mental hospitals, was performed on the 26th of September, 1957.

*Chapter 3:* An analysis is carried out of the distribution of patients according to diagnosis, in the total material, in the different hospital units, and in the different parts of these units (hospitals proper, nursing homes, and family care).

*Chapter 4:* The diagnostic distribution within the different age groups is analysed, separately for each sex. Manic-depressive psychosis, presenile, and senile disorders, psychogenic psychoses, neuroses, and psychopathy are relatively more frequent in females, whereas schizophrenia, cerebrovascular disorder, other organic brain disorders, and alcoholism are more frequent in males. The diagnostic distribution within the age groups shows considerable differences between the two sexes.

*Chapter 5:* The hospitals are, in principle, regional hospitals, but many of the patients are placed in a hospital which is different from that to which they formally belong. The extent of these incongruencies is described.

*Chapter 6:* The patient material is analysed on the background of the population from which it has emerged. The prevalences are determined for 1) hospital districts, 2) counties, 3) certain "main areas" which are characterized by different degrees of urbanization. Whereas the strictly "geographically" delimited populations do not differ remarkably much with regard to prevalences, the opposite is true concerning the main areas. The causes for these differences are analysed, and it is stated that the most probable explanation is that they are mainly due to migration phenomena.

*Chapter 7:* The changes in age distribution during the last decades are described. On the basis of this development an attempt is made to predict the development until 1970. The main result is that the percentage of old patients will rise rapidly, especially if the rate of available hospital beds is not increased considerably.

*Chapter 8:* The main results of the investigation are discussed, and comparisons are made with figures from other countries. The hospitalization rate is remarkably low in Denmark as compared with most other countries which have a similar cultural level. Attempts are made to explain this fact.

## REFERENCES

- Dahl, V.*: Studies, based on statistical data, on the causes of the fluctuations in the admissions to Danish psychiatric institutions during the period 1939-45. Unpublished paper, 1948. (Abstracted in *Strömghren* 1950.)
- Essen-Möller, E.*: Individual traits and morbidity in a Swedish rural population. Copenhagen 1956. (*Acta psychiat. scand.*, suppl. 100.)
- Fremming, K. H.*: Sygdomsrisikoen for sindslidelser og andre sjælelige abnormtilstande i den danske gennemsnitsbefolkning. Copenhagen 1947.
- Fremming, K. H.*: The expectation of mental infirmity in a sample of the Danish population. London 1951.
- Fremming, K. H.*: Patientskiftet på Sct. Hans Hospital. *Nordisk Medicin* **58**, 1454-1455 (1957).
- Jacobsen, O., V. Lunn & E. Strömghren*: Er behovet for psykiatriske hospitalspladser aftagende? *Ugeskr. Læg.* **120**, 1562-1566 (1958).
- Klemperer, J.*: Zur Belastungsstatistik der Durchschnittsbevölkerung: Psychosenhäufigkeit unter 1000 stichprobenmässig aus den Geburtsregistern der Stadt München (Jahrgang 1881-1890) ausgelesenen Probanden. *Z. ges. Neurol. Psychiat.* **146**, 277-316 (1933).
- Knudsen, C. Lohne*: The care of the mentally ill outside the hospital. In "Report on the eleventh congress of Scandinavian psychiatrists in Oslo, Norway 1955", pp. 122-146. Copenhagen 1956. (*Acta psychiat. scand.*, suppl. 106.)
- Kramer, M.*: Personal communication (1959).
- Larsson, T., & T. Sjöghren*: A methodological psychiatric and statistical study of a large Swedish rural population. Copenhagen 1954. (*Acta psychiat. scand.*, suppl. 89.)
- Lemkau, P. V., & G. M. Crocetti*: Vital statistics of schizophrenia. In *L. Bellak* (ed.): Schizophrenia: a review of the syndrome, pp. 64-81. New York 1958.
- Olsen, H.*: Status på et psykiatrisk hospital. Resultater af en tværnsnitsundersøgelse på Sindsygehospitalet i Nykøbing Sj. *Ugeskr. Læg.* **119**, 1497-1499 (1957).
- Strömghren, E.*: Beiträge zur psychiatrischen Erblehre auf Grund von Untersuchungen an einer Inselbevölkerung. Copenhagen 1938. (*Acta psychiat. (Kbh.)*, suppl. 19.)
- Strömghren, E.*: Statistical and genetical population studies within psychiatry. Methods and principal results. Congrès international de psychiatrie Paris 1950 **6**, 155-192 (1950).
- Strömghren, E.*: Status på et psykiatrisk hospital. Resultater af en »tværnsnitsundersøgelse« på Sindsygehospitalet ved Århus. *Ugeskr. Læg.* **117**, 221-225 (1955). (Abstracted in *Strömghren* 1958.)
- Strömghren, E.*: Mental health service planning in Denmark. *Dan. med. Bull.* **5**, 1-17 (1958).
- Svendsen, B. Borup*: Psychiatric morbidity among civilians in wartime. On trends studies in general and a trends study of Danish psychiatric hospital admissions, 1939-1948. Copenhagen 1952. (*Acta jutlandica* vol. 24, suppl. A, med. ser. 8.)
- Ødegård, Ø.*: The distribution of mental diseases in Norway. *Acta psychiat. (Kbh.)* **20**, 247-284 (1945).
- Beretning til indenrigsministeren om Statens sindsygehospitaler i finansåret 1957-58. Copenhagen 1958. (Annual report on the State Mental Hospitals.)
- Betænkning afgivet af kommissionen af 29. marts 1952 vedrørende Statens sindsygevæsen. Betænkning nr. 165. Copenhagen 1956. (Abstracted in *Strömghren* 1958.)
- Danish national morbidity survey of 1950. Communication no. 7. Scope and methods. *Dan. med. Bull.* **2**, 148-152 (1955).
- Diagnoseliste med kommentarer. Edited by "Dansk Psykiatrisk Selskabs Diagnoseudvalg 1952". *Nord. psykiat. Medlemsbl.* **6**, 277-295 (1952).

- Medical report for the Kingdom of Denmark. II. Hospitals and other institutions for treatment of the sick. Published by the National Health Service of Denmark. Copenhagen 1958.
- Mentalsjukvården. Planering och organisation. Betänkande III av mentalsjukvårdsdelegationen. Stockholm 1958. (Statens offentliga utredningar 1958: 38.)
- Patient and administrative data for public mental hospitals and veterans' administration hospitals, 1957. Fact sheet number 5 of Joint information service of Amer. psychiat. Ass. & Nat. Ass. ment. Hlth, March 1958.
- Report on mental hospitals in Denmark in 1956. Published by the National Health Service of Denmark. Copenhagen 1958.
- Statistical yearbook, vol. 62. Published by the Danish Statistical Department. Copenhagen 1957.
- Statistisk årbog for København, Frederiksberg og Gentofte samt omegnskommunerne, vol. 33. Published by the Copenhagen Statistical Office. Copenhagen 1957.