

TOWARDS SYSTEMS ANALYSES OF HEALTH SERVICES  
IN THE FEDERAL REPUBLIC OF GERMANY

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1. INTRODUCTION

Systematic analyses of health services in the Federal Republic of Germany are still in their beginnings. Three different approaches dominate the current discussion:

1. General proclamations in favour of interdisciplinary systems analyses of a "complex dynamic social system" as the health services are labeled.<sup>1</sup>
2. Broad scepticism as to the presumed untheoretical nature of systems analyses due to confounding simple graphs with systems analyses.<sup>2</sup>
3. Naive imitation of studies carried out in countries with considerable tradition in health services research.<sup>3</sup>

Proclamations favouring systematic health services research general scepticism for it and naive imitation of foreign analyses of health systems are symptoms of infancy of the interdisciplinary and systems oriented health services research in the FRG. A sudden development towards maturity is not in sight.

For this reason, we can only mention some ongoing research projects, which might serve as starting points towards a systems oriented health services research. In order to understand these projects, it will be necessary to outline their scientific and

political background and some of their preliminary results. Last but not least, we would like to point out some methodological problems which must be solved, if that area of research and action is not to be mere empirics but rather methodologically and theoretically sound as well. Especially elusory is the hope for a sudden growth of health services research through naive imitation of foreign studies. Systematic health services research, as we understand it, must stem from concrete realities. We cannot detail all the special features of structure and process of our health system here: self administration, sectoral division of labour among drug delivery, outpatient, inpatient and public health care, fee-for-service-system, and the impact of the tradition of an almost general social insurance. All this must be considered, if one does not want to efface history, society and reality in systems research.

## 2. POLITICAL AND INSTITUTIONAL BACKGROUND

Part of this reality is that health services research in the FRG has got strong impulses from health care organizations outside the universities. We shall mention only some research groups dealing predominantly with outpatient care.

The Federal Association of Sickness Fund Affiliated Physicians and their regional organizations founded a "Central Institute" in 1973, in order to do "research...in the field of outpatient care by physicians".<sup>4</sup> One of the most important legal counterparts of this physicians association is the Federal Association of Local Sickness Funds which in 1976 founded the "Scientific Insititute of Local Sickness Funds" to carry out "research and training in the area of obligatory health insurance" with the obligation that the research should have practical significance.<sup>5</sup> A private "Institute for Health Systems Research" was founded in Kiel in the same year.<sup>6</sup> At the same time, the non-university "Science Center" at Berlin set up an "International Institute for Comparative Social Research"; the main topic of studies there is health systems research.<sup>7</sup> In 1978, the Hartmann-Union, which is more or less a union-like interest group of physicians in the FRG, founded

the "Scientific Institute of German Physicians". In 1979, the "Institute for Medical Data Processing" of the "Society for Radiation and Environmental Research", which is totally financed by the Federal Ministry for Research and Technology and by the Free State of Bavaria, was transformed into an "Institute for Medical Informatics and Health Services Research" (MEDIS). The "Health Care Research Group Berlin" is the only larger university affiliated institute in health services research.<sup>8</sup>

The background of these research institutions indicates that the "level of politics"<sup>9</sup> is the core of beginning health services research in the FRG. Most of the research projects of the mentioned institutes underline this. In no way, however, do we want to imply that their scientific work is biased by this political origin. A non-political research--and this is not in the sense of party disputes--does not seem possible at all, and has no meaning. We want to discuss this later on under methodological points of views.

The increase in expenditure for health systems research seems to be proportional to the cost explosion in health services. Are these expenditures nonproductive? Do we build pyramids a la Keynes, in order to give jobs to otherwise unemployed epidemiologists, social scientists, mathematicians, statisticians and biomedical specialists? The claim of the existing health services research institutes and the hope of their financing bodies is different. The institutes above are heavily involved in applied research which should help to discuss and to fulfill legislative innovations in the General Insurance Laws (RVO). A lot of research activities were, and still are, related to the "Law for the Further Development of Sickness Funds" (KWG) from 1976, which aims at changing the spacial distribution of physicians in certain regions. Other research activities tried to fulfill the "Sickness Funds Cost Containment Law" (KVKG) from 1977, a law for cost containment which has structural implications. The "Federal Government's Program for Promotion of Research and Development of Health, 1978-1981" supports with a considerable amount of DM 450 million, especially such research which leads to the "utilization of existing knowledge of health

assurance and health care" so that "discussions on health policy will be more rational by means of objective scientific results".<sup>10</sup>

From the beginning most approaches towards systems research in the FRG have been imbedded in the "level of politics", which means in our political and historical constellation: the level of interests and conflicts and the level of bargaining over priorities and resources between different groups and organizations. This feature of the FRG's health system has been institutionalized through the "Sickness Funds Cost Containment Law" since 1977 as a "Concerted Action in Health Care"; all relevant interest groups in the health care delivery system (legal sickness funds, physicians, odontologists, associations of hospitals, pharmacists, pharmaceutical industry, trade unions, employers associations, representatives from the Laender and the communities) are obliged to meet twice a year with the Federal Minister of Labour and Social Affairs "to discuss and to develop

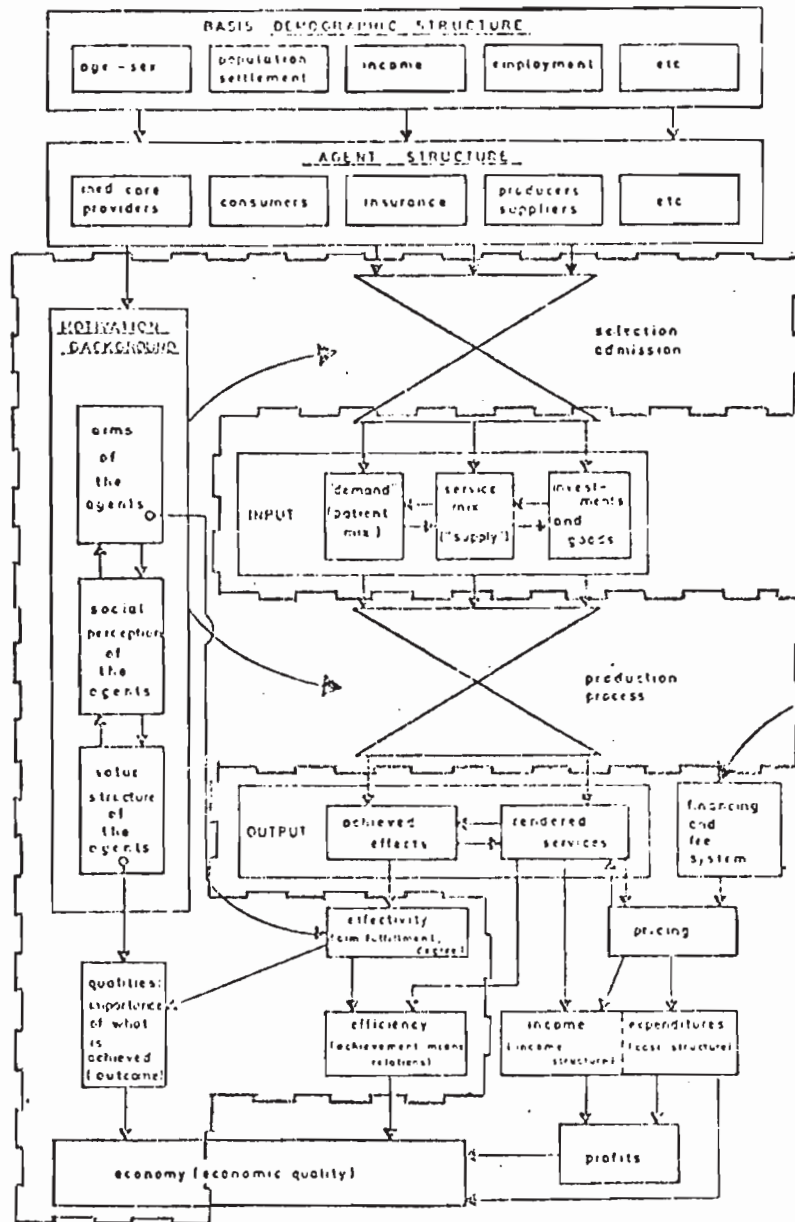
1. medical and economical data or orientation, and
2. to suggest proposals for rationalization, increasing effectivity and efficiency in the health services",

"with the common goal of a health care system according to need, based on the state of art, of medical sciences and according to a balanced distribution of costs".<sup>11</sup>

Without mentioning this political background of health services research in the FRG, it is not possible to understand the current systematic and interdisciplinary studies about aspects of the health care delivery system in our country.

### 3. SOME ASPECTS AND FALLACIES

The federal program for reseach promotion in the health field stresses the following assessment criteria: equity, performance, need orientation, efficiency, capability of financing.<sup>12</sup> Similar notions are known from the discussion about criteria for evaluation in the health field.<sup>13</sup> In order to make such judgements, reliable and valid information about the most important areas of health services are needed. Figure 1 outlines some aspects of structure and process of health care.



— = up till now insufficiently analyzed research regions

Figure 1. Aspects of systems analysis

These aspects are presented in their assumed connection: demographic structure, structure of providers, interest structure, economic structure and input-output structure. The figure also shows that some areas are still too little explored, especially the connection between input and output, i.e. the processes of selection and production, the problem of the interest structure and, last but not least, the question of output and outcome of health

services. Without research in these fields, the health services cannot be judged to the above mentioned "political criteria".

Health services are not material objects of natural scientific research, but rather a part of society and social life. Therefore, merely statistical descriptions of the systems elements are no suitable basis of systems research. Since we are dealing with a dynamic, social and interacting system, we have to avoid at least three fallacies:

1. The fallacy of aggregation: it is understandable that health care systems research tends to start with the existing body of information. In the FRG we do have an immense body of routine data on physicians services. This data is based on our fee-for-service system and aggregated into national statistics. When one looks closely at the quality of information by means of going into details of data generation in the individual practice, then one often is confronted with very grim processing problems and quality distortions. The only solution then seems to be to undertake case studies on a more or less microscopic level, in order to get reliable and valid data. This solution indicates a difficult dilemma for systematic health services research which tries to be precise and methodically sound, without losing actuality and political significance at the same time. Actual political decisions, if based on data at all, are based on routine data, but these data often may not be reliable and valid.
2. The fallacy of neutrality: as in every realm of social life, there are also interest conflicts in the health services, i.e. conflicts between providers and consumers among various groups which offer competing services, between physician and administration. Social and economic interests intervene in the process of data generation and coagulation, especially when it comes to data which is to be used for control, steering and payment of services. Data and information are mirror images of a social man-made, not natural reality. This reality contains conflicts among goals, needs and interests. Data is therefore one instrument for the realization of interests and for carrying out interest conflicts. Hence routine data on health services cannot be seen as neutral mirror images of health care reality. In our view, the concept of need in most cases is only a fake substitute for the concept of demand.
3. The fallacy of tradition: Historical development has given every health system its special form with respect to boundaries and interaction of the various system parts. In the FRG, the division of labour between outpatient and inpatient care with only a small amount of inpatient care by non-hospital physicians and a small amount of

outpatient care by teaching hospitals has led to the situation that relatively little is known about the connection between these two system parts. The same is true for the connection between institutionalized health insurance and health care in the lay system. The functional relativity of such historically grown boundaries between various system classes manifests itself most clearly through the comparison of health systems in different countries. An applied health care systems research which, for example, does not know about alternatives to primary health care practised in other societies not only falls into the trap of tradition but cannot fulfill the demands of a scientific--and science is always international--assessment of health care.

These three fallacies or traps in which the systematic and analytic research of health services can fall into are especially important to overcome if such system analysis is to contribute to evaluating the health services system under the aspects of need-relatedness, equity, performance, efficiency, capability of financing, and last but not least, under the aspect of relevancy of a provider oriented health care system.

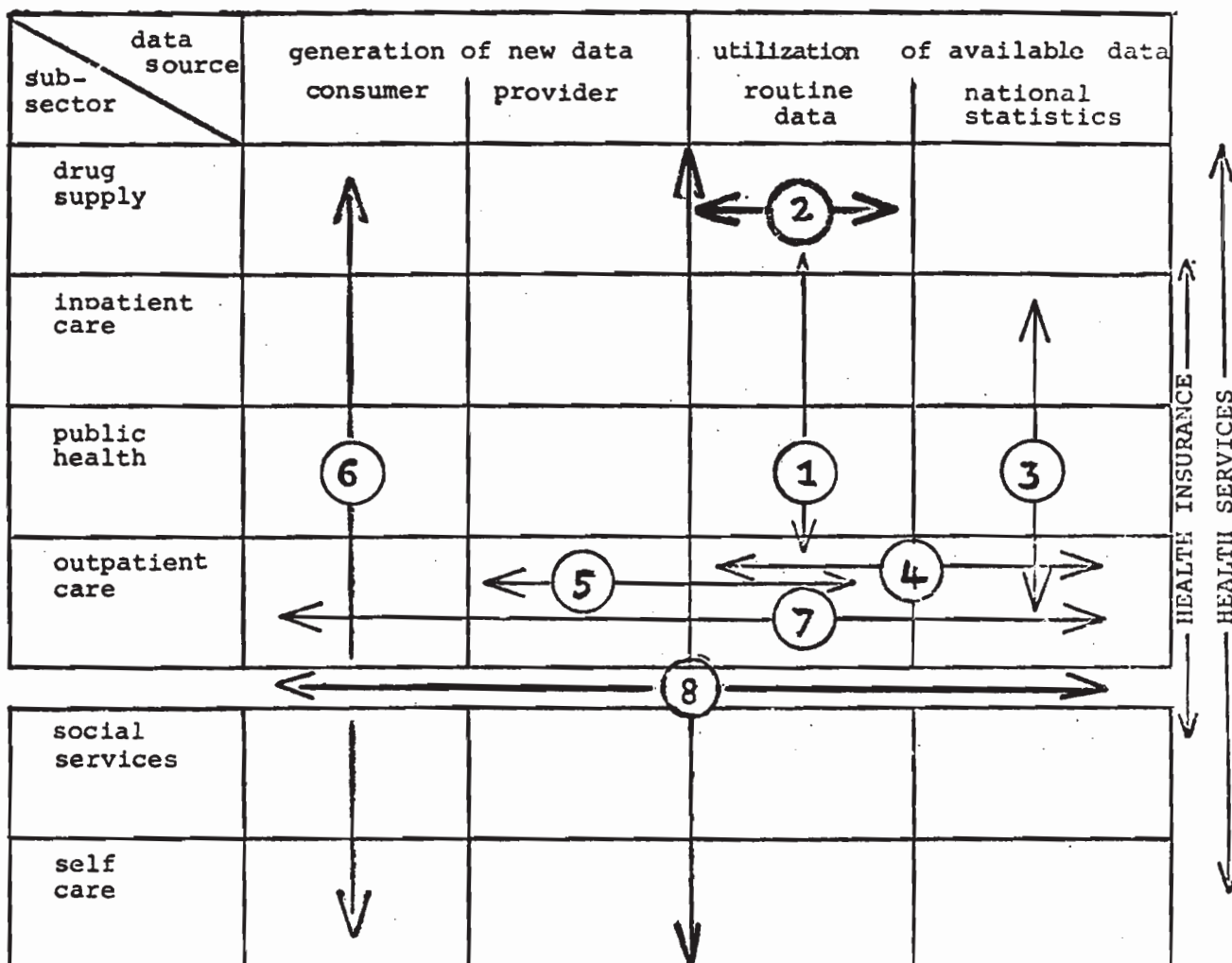
#### 4. EMPIRICAL ENDEAVOURS

Considering the infancy of health services research in the FRG, the logical tendency is to begin with the available data. This data relates above all to aspects within the traditional subsectors of health services: inpatient care, outpatient care, public health services and drug supply. In order to get rid of the three above mentioned fallacies--aggregation, neutrality and tradition--it seems reasonable to examine some of the current research projects as to:

- whether they work entirely with aggregated data,
- or with data stemming from the routine process of sectoral health care,
- or also with procedures trying to explain the background and origin of data.

The greatly simplified Figure 2 attempts to reduce the multi-dimensional topic to only two dimensions. This figure shows some complex research programs which are presently being worked on in the FRG.

FIGURE 2: SOME APPROACHES TOWARDS SYSTEMS ANALYSIS OF HEALTH SERVICES IN THE FRG



Example of Ongoing Projects

1. Social class, illness and use of health services (Jahn)
2. Evaluation of drug prescription (Greiser)
3. Prognoses of physicians supply (ZI, WIDO, IGSF)
4. Spatial allocation of physicians (ZI, WIDO, IGSF)
5. Verden-Study (Moehr)
6. Medical-sociological research (Badura)
7. Analysis of outpatient care (ZI)
8. Intervention studies



This illustration indicates that the evaluation of routine data is considered most important. This class of projects deals essentially with collection, storage and analysis of information which is contained in the accounting forms, used primarily for paying out the physician for his services rendered. The basis for this data is therefore the highly differentiated fee-for-services-system in the FRG. One of the most ambitious projects of this type<sup>14</sup> tried to collect all treatment forms from a sample of insured persons in a local sickness fund during several years. All different kinds of treatment forms were collected, giving information about inpatient care, physicians visits, dental care, drug prescriptions for instance. This data on services rendered is combined with data about diagnosis and social characteristics of the insured persons. The goal of the project is to find differences both in the course of illness and in the pattern of utilization of health services due to differences in social class.

Another class of research projects bases itself on data and information as it is available on the national level. Similar projects of the various above mentioned institutes<sup>15</sup> try to get prognoses about the future supply of physicians, using for this projection highly aggregated national statistics about students, universities, migration for example. The aim of these projects is to clarify unforeseen and unintended consequences of a non-existing regulation of physicians supply.

Only a few studies relate to what actually occurs in the physicians' practices from the point of view of the providers<sup>16</sup>, checking simultaneously the descriptive values of routine data obtained from the practice. If compared with the preliminary results of studies based on aggregated routine data, the results of such studies arise serious doubts about the descriptive and analytical value of routine data. It can be seen, for example, that routine data cannot possibly include all the background information which is necessary for interpretation, e.g the demands of patients, the communication between physicians and the involvement of paramedical personnel. The goal of examining

practices is to give light to the real activities of the physician as opposed to what appears on accounting forms to be physicians' activities. A fourth class of research projects concentrates on specific aspects of health services as seen and experienced by consumers. This medical-sociological research deals mainly with patient behaviour and patient careers as well as with aspects of the lay system. We can only mention that a variety of such research projects is carried out in the FRG at the moment.<sup>17</sup>

Very rarely the attempt is made to join the different levels mentioned above with one another, trying to avoid the fallacies mentioned at the beginning. One of these projects<sup>18</sup> attempts to check the descriptive value of routine data on a regional level by means of comparing them with more or less qualitative data on the history of data generation in the provider-consumer interaction. This comparison tries to enlighten the basic constellations of interest in the process of data production and to check by means of that, reliability and validity of routine data. Concurrently plausibility checks of routine data are attempted, comparing it with macrostatistics from other sources, i.e., with highly aggregated socio-economic data about demographic industrial and other characteristics of regions. By means of comparison the third fallacy may also be avoided: We step over the border of health related subsectors with the help of macrostatistics in calculating, for instance, the regression coefficients on the substitution of inpatient care by outpatient care on a regional level. We also try to step over the border of the system in the more microscopic way of looking at the physician-patient relationship. But nevertheless, there remain uncertainties in relationships among the traditional subsectors in the health services and between professional and lay services, being based on the fact that this project concentrates on outpatient care and not on the more interesting research area between outpatient and other care. There is a double goal to this project: to call attention to data quality and at the same time to produce first results on differences in the use and delivery of outpatient health services.

Especially the third fallacy--that of tradition--is to be overcome in a currently starting project on the cost-effectiveness of different community oriented interventions with the objective to reduce the risk of cardio-vascular diseases and malign neoplasms by primary prevention. This project<sup>19</sup> will be financed by the Federal Ministries. The fallacy can here be met by two approaches: once, by studying the relevance of intervention particularly with respect to unintentional side effects and secular trends, and then, by exceeding the traditional sub-sectors of health services, including social services and self care. In this project a shift takes place from an insurance oriented systems analysis to a health oriented systems research.

#### 5. PRELIMINARY RESULTS OF HEALTH SERVICES RESEARCH

The above mentioned studies are not finished yet. Up till now, only preliminary results are available. They may be outdated very soon. Let us give you a short overview from the methodological point of view.

##### 5.1 Data Coverage

The majority of routine data comes from isolated treatment forms. All running projects try to bring together the different treatment forms of every individual insured user of health services. Additionally, in one study the attempt is made to identify by means of internal plausibility checks all family members of the insured.<sup>20</sup> Here, unplausibilities in attributing individuals to families can only be eliminated if they are extremely obvious, e.g., insured users with many wives, or, clergymen with hundreds of children. Mistakes on the more microscopic level and the distortion caused by them remain entirely unnoticed. They could only be controlled if sample surveys of the relevant families were made parallel to the routine data evaluation.

Because of differing composition and number of clientele from different care units and insurance companies such data bodies usually have a limited coverage. Using data files from insurance companies brings the advantage of covering all different

areas pertaining to the sickness insurance system: prescriptions, inpatient services, outpatient services. This advantage is effaced by the fact that the socio-economic and demographic characteristics of the different insurance populations are altogether different. Therefore, it is impossible to project the results to a larger population. The opposite is true for evaluating routine data, when they are in the hands of physicians associations. Here, all the routine data on outpatient care for individuals belonging to different insurance companies are taken together. Nevertheless, the sectoral coverage of data remains limited to outpatient care.

This dilemma reflects the social and political reality of health services in the FRG. Here, health services are made up of many different and sometimes competing groups of providers, intermediaries and consumers. At the first sight this dilemma may only be solved by means of population surveys. The fascinating advantages of population surveys - representing the point of view of scientists and consumers - are wiped out, when the access to routine data - representing the point of view of the providers - is not granted. Hence, the functional, sectoral and population coverage of routine data can only be increased by the "political bargaining power" of "uninterested" scientists - a naive fiction. The data coverage therefore is practically always diminished.

- Either the data covers the whole population, in which case the access to all routine data is problematic,
- or the data covers all health services financed by one insurance company, in which case the access to routine data of other insurance agencies is problematic,
- or the data covers all outpatients, in which case the access to routine data on the use of other health subsectors - e.g. inpatient care - is problematic.

For this reason a monolithic collection of data covering all insured users, all physicians and the entire population - what may very well appear theoretically significant for systems analysis - is hardly possible in the health care services system in the FRG. That is one of the scientific-political implications of a non-centralized health care service.

## 5.2 Data Quality

Only a few studies pertain to any extent to the question of data quality. Because most studies concentrate on a single data body, they can only conduct internal quality checks. In one of the few projects in which this was possible, the experience from various studies on reliability and descriptive value of routine data in other countries was fully verified.<sup>21</sup> Let us clarify this problem taking as an example the outpatient "diagnosis" written on treatment forms.<sup>22</sup>

1. In the every day activity of a physician, the analytical separation between diagnosis and therapy is very often arbitrary or even irrelevant. Ex-iuvantibus diagnoses are more frequent than 10%.
2. Style and quality of diagnosis documentation vary with the individual practice. Sometimes diagnoses are not documented by the physician himself but by paramedical personnel. Once documented on the accounting forms, the diagnoses are not always updated corresponding to the physicians decision-making process which sometimes leads to falsification of first diagnostical hypotheses.
3. A validation of diagnoses is not always convenient in the outpatient service, partly for economic reasons and partly to assure the effectiveness of treatment, especially when a treatment is very urgent.
4. Diagnoses on treatment forms occasionally dramatize the health condition, because of the intrinsic connection between documentation, justification of services rendered, and fee-for-service-payment.
5. The coding of outpatient diagnosis is only partly possible. Over 23% of the diagnoses could on the first attempt not be coded by a 7-digit ICD code based on 27000 different diagnoses in the code books.
6. Coding errors were frequently made even with physicians as coders. In our study the error rate was over 23%. Only by analysing the external sources of the mistakes very harshly and afterwards altering the method of coding did we reduce this rate to a tolerable 5%.

These results clearly illuminate the lacking quality of routine data collections. At the same time they point to a further problem that we are going to discuss next.

### 5.3 Data and Interests

At the beginning we mentioned the possible fallacy of neutrality in very general terms. The example of diagnoses taken from routine reports shows quite clearly the interference between data quality and interests. Even when the collection and coding of data is highly controlled, interests still influence data, e.g., the interest of the physician to defend and justify his services before the social bureaucracy. By dramatizing diagnoses, the physician acts conform to the interest of his client. Sometimes the physician hides the "real" diagnosis from bureaucracy in the interest of the patient. These are only very few examples of the interference of data quality and interests.

This interest interference affects data on services or therapies, too. In our highly differentiated fee-for-service system the accountability of different services is subject to many bureaucratic restrictions such that the physician tends to report what he usually can account for rather than what he is really doing. Another problem complicates as a rule this situation: Usually the Federal Board of Physicians and Health Insurance defines and prices services without the support of precise descriptions of what actually happens in practices. Diagnoses and services are only two examples of data areas, where socio-economic interests distort data quality.

Also, on macrostatistical levels this interference of data and interests could easily be demonstrated, e.g., indicating the professional and political interests behind infant mortality rates which are much too often used as real data for systems comparisons, or, indicating the fact that in small enterprises sickness leaves go up when business goes down, in order to transfer financial risks to other enterprises using insurance companies as intermediaries.

The stemming of data from needs and interests of the data producers points to three aspects which must be considered before interpreting data on health services:

1. Data about health services have a relative and no absolute meaning; that means, they are only comparable, if the interest constellations and need constellations of the data producers can be assumed to be similar.
2. Data about health services have a connotative meaning; that is, one has to account for emotional, attitudinal, historical and needs-and interest-related aspects of data production and consumption.
3. Data about health services have at the same time also pragmatic meaning; that is, they cannot be isolated from actions and social roles.

Obviously, data on health services must also be interpreted under less critical aspects, stressing, for instance, their aggregational function, i.e. their function to give access to "large-scale-realities" and their economic function.

#### 5.4. Resumé

The preliminary results of the empirical endeavours towards systems analyses in the FRG demonstrate that the confrontation of a microscopic and a macroscopic approach, using and interpreting carefully the immense body of routine data simultaneously, will be an essential step towards sound systems research. Confronting the different data bodies means confronting interests of clients, intermediaries and providers at the same time. Therefore, it is especially important to study the interest constellations of the different health care partners to be capable of interpreting the data correctly. In this sense, the starting point of systems research cannot be merely to describe crude aspects of health services and to think that statistical evaluations of available data could contribute to an applied health systems research.

#### 5. ASPECTS OF THE FUTURE

Future research on health services in the FRG must avoid the fallacies of aggregation, neutrality and tradition. The time of naive data collection and data processing is over.

The Institute for Medical Informatics and Health Services Research (MEDIS) is trying to reorient its research philosophy

and its research activities in this direction. The research and development program for 1979-80 reads as follows: "Better preparation, collection and availability of information are decisive contributions to qualitative and quantitative improvements in health care. In addition to practical medicine, medical and health service research is more and more concerned with methodologically based information processing, and is therefore dependent on efficient methods of data processing.

To meet these overall objectives, the Institute ... is developing, testing and making available suitable tools, especially in the following fields:

1. Effective and efficient strategies of prevention and early detection of diseases for large scale application (e.g. cancer and coronary artery diseases).
2. Utilization of computers as a supporting and integrated technological tool for large scale medical application (e.g. automatic analysis of ECG and EFG, radiographs, scintigrams and sonographic pictures).
3. Design and implementation of valid, and useful information systems and software for statistical evaluation.
4. Methods to assess performance in the health sector (e.g. health indicators of indices).
5. Development of methods for health system analysis (e.g. models for planning health care facilities)."



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