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REGIONAL STRUCTURE AND MAJOR SPATIAL PROCESSES OF PUBLIC HEALTH CARE IN HUNGARY

The first part of the paper deals with the regional structure of public health care in Hungary in comparison to the prevailing tendencies of regional structure of health care in the developed countries and to basic principles and theoretical models of regionalization of health systems. The second part of the paper analyzes major processes underlying regional inequalities in public health care, giving priority to the mismatch existing between the state of health and the supply of health services; as well as to contradictions between meeting new social needs and the formation of regional differences.

Introduction

Since the early 1960s, a new discipline called the 'geography of health care systems' has been developing intensively in addition to the traditional branch of medical geography, the 'geography of diseases' /Mayer 1982; Howe - Phillips 1983; Pyle 1976, 1979, 1983/. This new branch of medical geography aims primarily at investigating the regional distribution of health manpower, facilities, and financial resources; socio-spatial features and inequalities of accessibility to health care; and at exploring contradictions between the spatial processes of health systems and the needs of the population.

Orosz, Éva: Regional structure and major spatial processes of public health care in Hungary. In: Spatial Organization and Regional Development.
Pécs: Centre for Regional Studies, 1988. 180–206. p. Discussion Papers, Spatial Organization and Regional Development

181

My research belongs to this new branch of medical geography /Orosz 1985/. In my paper, I shall first describe the spatial structure of public health care in Hungary, emphasizing the definite contradiction that exists in the separation of the <u>regional structure of public health functions</u> from the <u>regional structure of planning and financing</u> of public health care. In the second part of the paper, I shall discuss the most important spatial processes of public health care in Hungary that occurred between 1960 and 1985. My approach differs from that of health policy and of more traditional statistical investigations that have dealt with regional differences.

1. <u>Regional Structure of Public Health</u>

<u>Regional systems – efforts made to achieve a compromise between concentration and accessibility</u>

During the last two or three decades, rapid development of health technology had huge impacts on the operation, professional, and regional structure of the health care system. Health technology used by hospitals is becoming more and more comlex and expensive, which has led to a concentration in hospital care. Some of this new technology is worth placing only in central hospitals having vast catchment areas /partly because of the relatively small number of patients requiring special cure/. On the other hand, an important concept of the philosophy of health care systems is the accessibility of public health care to everyone. In meeting the contradictory requirements of efficiency and accessibility, the regionalization of health care systems has evolved as a compromise

Orosz, Éva: Regional structure and major spatial processes of public health care in Hungary. In: Spatial Organization and Regional Development.
Pécs: Centre for Regional Studies, 1988. 180–206. p. Discussion Papers, Spatial Organization and Regional Development

182

/Roemer, 1977, 1979/.

In a broader sence, by regionalization is meant a comprehensive management-organizational-operational strategy encompassing the entire health system, which includes primary health care. In both the narrow and practical sense, regionalization in most countries exists only within the system of hospitals. Consequently, further on I shall discuss regionalization in the narrow sense.

In an ideal model, the institutions /hospitals of various functions/ in a health /hospital/ region provide 1 or 2 million inhabitants. Within a region, the hierarchy of hospitals is of three interdependent levels:

a/ regional hospitals treating special diseases of low frequency and requiring highly expensive technology and high-level professional knowledge; regional hospitals are expected to fulfil the task of education and research as well /in a theoretical model these hospitals have 500-1,000 hospital beds/;

b/ county /province/ hospitals concentrating medical professions of medium level /in a theoretical model these hospitals have 100-300 hospital beds/;

c/ local, general hospitals of 50-100 hospital beds with relatively small catchment areas /10,000-50,000 inhabitants/; they are expected to cure the most general and frequent aliments. The catchment area of a regional hospital is comprised of catchment areas of several county hospitals, and, similarly, the catchment area of a county hospital covers that of several local level hospitals. Among hospitals on these three levels,

Orosz, Éva: Regional structure and major spatial processes of public health care in Hungary. In: Spatial Organization and Regional Development.
Pécs: Centre for Regional Studies, 1988. 180–206. p. Discussion Papers, Spatial Organization and Regional Development

183

appropriately organized linkages should function in the interests of patients to get proper health care.

To sum up, by regionalization is meant a strategy of organization and functioning of a health system /primarily of hospital care/ involving a larger hierarchy and coordination of health services within an extended region. The strategy of regionalization involves double-direction flows of patients between the periphery /local level hospitals/ and regional centre, as well as diffusion of professional knowledge from the centre towards the periphery. Certain indications of the regionalization principles mentioned above can be noticed in the present hospital structure of all developed countries. Deviations, however, are at least as important, being expressed partly in hospital structure and in the connections among hospitals assuring more or less 'flows' of patients; moreover in financing mechanisms and infrastructural facilities that strongly influence these peculiarities.

Centralized and incomplete spatial structure of the hospital network in Hungary

The reasons for establishing a regional structure of hospital care and the basic principles of the system are similar to the model described earlier. The administrative organization and financing of public health are two factors influencing practical execution; the unfavourable situation of these elements, however, has a rather restricting, deforming effect on the implementation of objectives of the regional system.

Orosz, Éva: Regional structure and major spatial processes of public health care in Hungary. In: Spatial Organization and Regional Development.
Pécs: Centre for Regional Studies, 1988. 180–206. p. Discussion Papers, Spatial Organization and Regional Development

184

Before detailed description, first let's examine the main characteristics of the spatial structure of hospitals.

In Hungary, health regions were established in 1980, delegating tasks to 4 medical universities and 3 county hospitals thereby allowing the delimitation of catchment areas /Ajkai   et al. 1981/. There are manifold differences among regions as regards number of population and size of territory /Fig. 1/. For example, the territory of the Szeged-centered region in the Southern Great Plain is higher by 3.8 times and its population number is larger by 2.5 times than the Győr-centered region in Northern Transdanubia. These differences are the consequences of circumscribing regions--which represent professional-hospitalization regions-- along county borders even though medical considerations would have required totally different regionalization /e.g., in case of accessibility to emergency care/.

Another characteristic feature of hospital structure is centralization, manifest in the predominance of large hospitals with the deformation of low level hospital structure. Of all the hospitals, 45 percent /including maternity homes with 20-30 beds/ have more than 500 hospital beds; 23 percent have as many as 800 beds, and only 17 percent have fewer than 200 beds. As regards general hospitals, the average capacity at the regional level amounts to 1,690 beds, in county hospitals 1,095 beds, while in local hospitals 407 beds in 1984. Evidently, the capacity of hospitals of both medium and local level is much higher than predicted by the theoretical model. Nevertheless, it exceeds by several times the size of general hos-
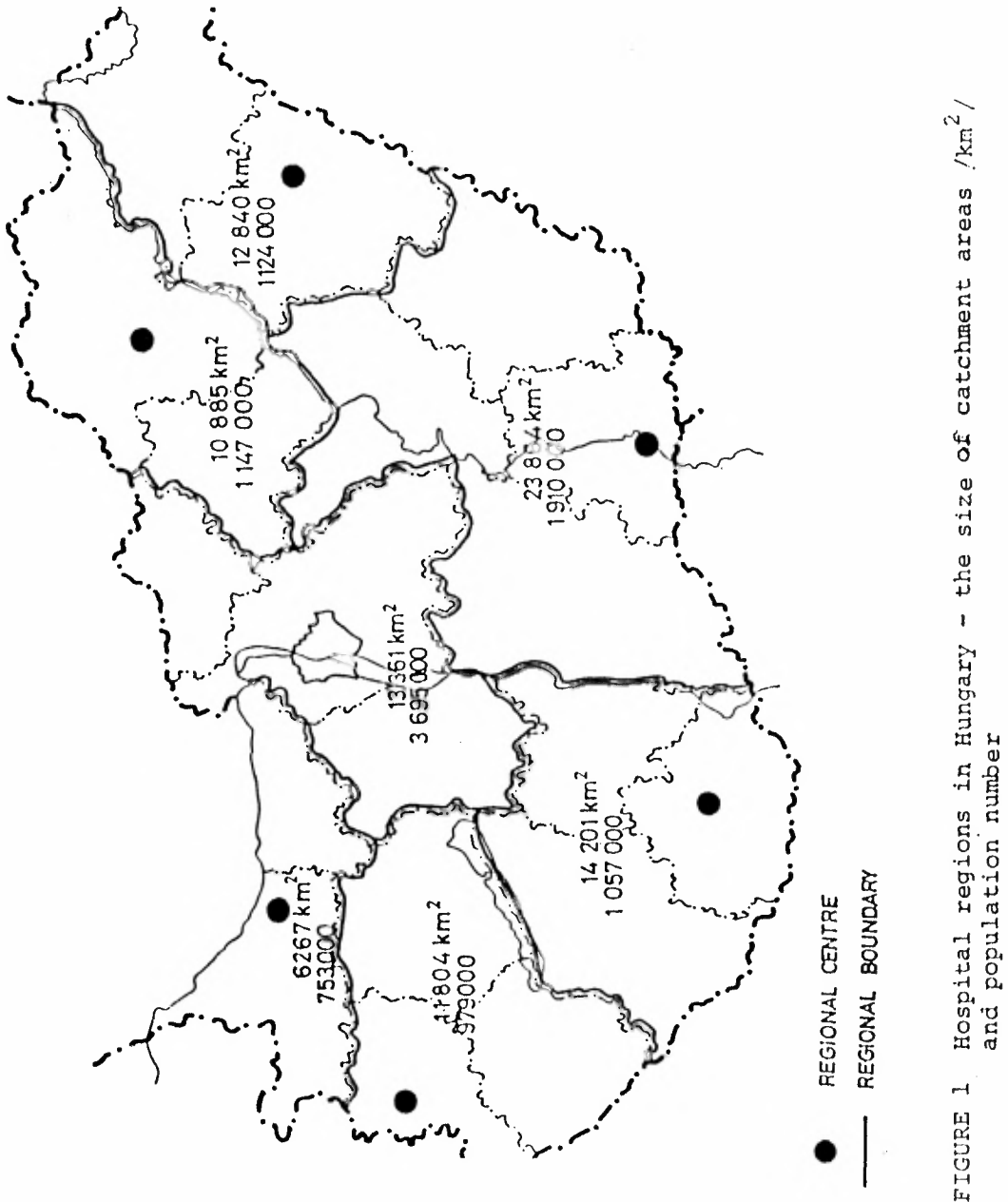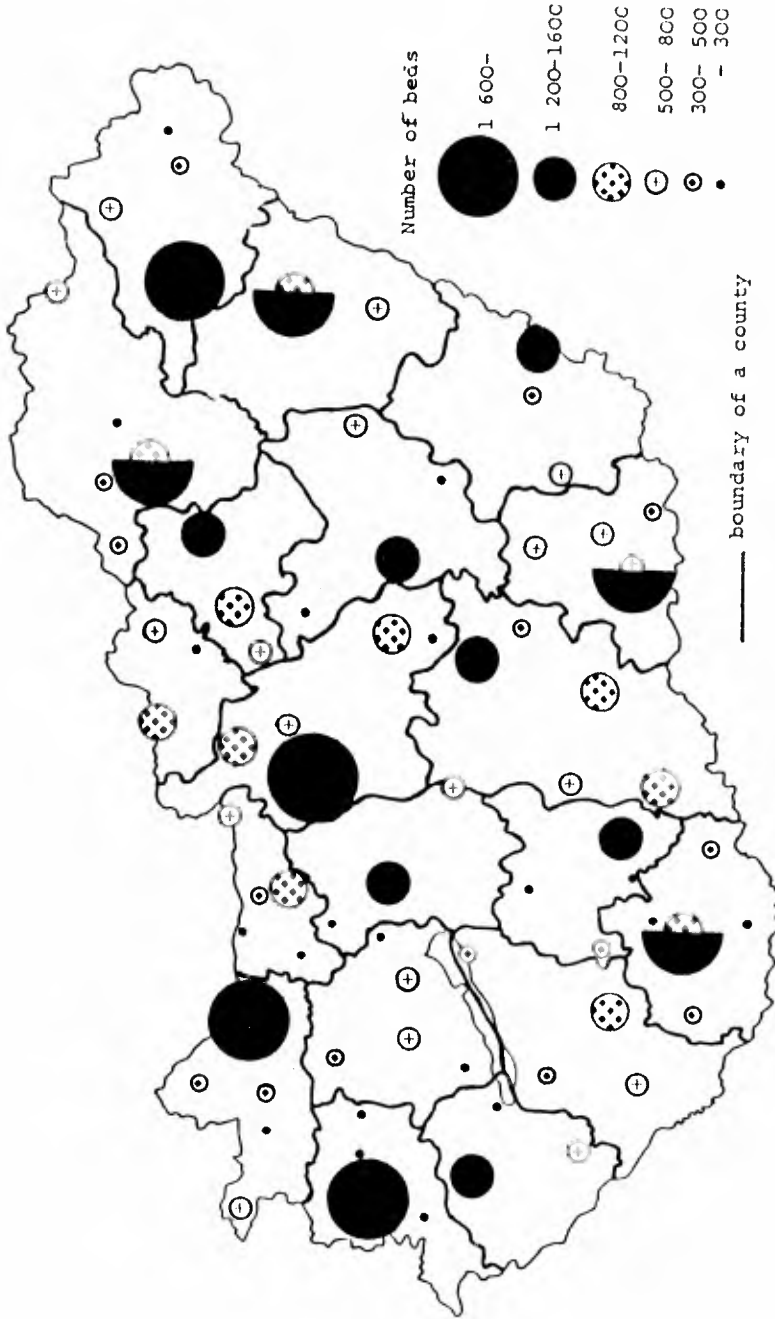
Orosz, Éva: Regional structure and major spatial processes of public health care in Hungary. In: Spatial Organization and Regional Development.
Pécs: Centre for Regional Studies, 1988. 180–206. p. Discussion Papers, Spatial Organization and Regional Development

185

FIGURE 1   Hospital regions in Hungary – the size of catchment areas /km²/ and population number

12 840 km²
1124 000

10 885 km²
1 147 000

23 814 km²
1 910 000

13 361 km²
3 695 000

14 201 km²
1 057 000

6267 km²
753 000

11 804 km²
979 000

REGIONAL CENTRE

REGIONAL BOUNDARY

Orosz, Éva: Regional structure and major spatial processes of public health care in Hungary. In: Spatial Organization and Regional Development.
Pécs: Centre for Regional Studies, 1988. 180–206. p. Discussion Papers, Spatial Organization and Regional Development

186

pitals of developed countries. For example, in the early 1980s, in Belgium the average hospital bed number in general hospitals[x] was 187; in Finland: 136; in the Netherlands: 225; in Denmark: 289; while in Hungary: 562. Table 1 illustrates in detail the differences among hospital structures in Hungary and Finland, highlighting the low level hospital structure in Hungary.

In Finland, local level small hospitals play a very important role in health care, especially for the aged. Not only are they situated near to the residence and family of old patients, they are rather efficient hospitals because the supply of patients requiring simple health care costs much less than the maintenance of expensive hospital beds for acute diseases.

Deformation /lack/ of low level hospital structure in Hungary shows significant regional differences /Fig. 2/. In Northern Transdanubia, besides large hospitals a relatively dense network of medium-sized and small hospitals has been established. For example, on the territory of 9,600 km² of Komárom, Győr-Sopron, and Vas Counties, 14 settlements have hospitals. An absolutely diverse hospital structure is characteristic of the Great Plain, where small hospitals are extremely rare. Despite the territory of 11,800 km² of Békés and Hajdu-Bihar Counties, there are only 5 settlements that have hospitals. In such a way, the extent of

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[x] Besides general hospitals, there are special hospitals as well, e.g., mental hospitals and T. B. sanatoriums. These hospitals and mental beds of general hospitals were not considered in calculations to allow comparison.

Orosz, Éva: Regional structure and major spatial processes of public health care in Hungary. In: Spatial Organization and Regional Development.
Pécs: Centre for Regional Studies, 1988. 180–206. p. Discussion Papers, Spatial Organization and Regional Development

187

FIGURE 2   Spatial location and capacity of general hospitals and clinics

In the case of Budapest, only the medical university is marked /Beside it, 29 hospitals are located in Budapest/.

Orosz, Éva: Regional structure and major spatial processes of public health care in Hungary. In: Spatial Organization and Regional Development.
Pécs: Centre for Regional Studies, 1988. 180–206. p. Discussion Papers, Spatial Organization and Regional Development

188

the catchment areas of a number of hospitals in the Great Plain is larger by 2-3 times both in size and in population number than that of minor hospitals in Transdanubia.

These differences, following largely from inadequate transport and communication facilities, influence significantly accessibility to primary health care. These differences have deep historical roots, reflecting the characteristics of regional distribution of public hospitals in pre-war Hungary. Indeed, between the two world wars even larger settlements could not establish hospitals as a consequence of their undeveloped economy and the backward approach of municipalities. Since peasants were excluded from health insurance, there was a lower level of demand than in the other, more industrialized regions. Besides the public hospital network, private hospitals also functioned to 'compensate' somewhat for these regional differences /for the rich only/ as private hospitals have functioned in a significantly greater number in the Great Plain than in Transdanubia. This part of the hospital structure was abolished after World War II.

Low level autonomy of health care administration

In most countries, regional management of public health is closely connected to regional organization of state administration. This dependence, however, exhibits great variety. The point is that there should exist a relative separation /autonomy/ of health care administration:

1. in connection to public administrative

189

bodies;

2. in planning-financing mechanisms;

3. in the relationship of board of councils that represent residents.

At present, health administration is strongly subject to council administration; the separation and local social control can be realized to such a minor extent that it is almost impossible for public health to make plans for coordinated development of a region considering both comprehensive professional aspects and the connections between settlements. The subordination of public health administration is well-featured in the disintegration between regional systems of health planning and financing and regional systems of public health functioning. The regional units of the latter are formed by the catchment areas of town hospitals /i.e., a given town plus rural settlements designated on a hospital referral order/. These catchment areas do not appear in health planning- financing or informational-statistical systems of public health as regional units. Health administration, and consequently planning and financing, follow the council hierarchy, which in turn is linked to the regional distribution of state administration.

The separation of these two regional systems can be better illustrated through examples. Plans and expenditure of public health in rural settlements are coordinated and supervised by the council of a designated centre in state administration. It frequently happens /e.g., in a lack of a hospital in a town/ that the professional management of primary health care in a village is performed by

Orosz, Éva: Regional structure and major spatial processes of public health care in Hungary. In: Spatial Organization and Regional Development.
Pécs: Centre for Regional Studies, 1988. 180–206. p. Discussion Papers, Spatial Organization and Regional Development

190

the hospital of another town. Evidently, neither the town hospital nor the town council can undertake the task of becoming 'host' in public health care of a catchment area. Another contradiction is that general practitioners in villages are employed by local councils, while at the same time they are professionally supervised by a chief medical officer of a hospital respectively. A town hospital is expected to provide patients of the catchment area, too; but in reality it is just the 'hospital of the town' because rural settlements do not contribute to the maintenance and development of town hospitals; nor are their interests represented in decision making for town hospitals.

Data from County Statistical Yearbooks prove explicitly the consequences of disregarding actual regional units because when determining the index of 'hospital beds per 10,000 inhabitants', the number of hospital beds is divided by population number of the town only. If we calculate the entire population of a catchment area of a hospital /including the inhabitants of villages/, the indices and sequences for health care would be entirely different. As an example: in Kalocsa /1980/ the number of hospital beds per 10,000 inhabitants amounted to 206; while is Kiskunhalas: 234 /Data of Statistical Yearbooks of Counties/. If making calculations by the real catchment area, the numbers would be 88 in Kalocsa and 56 in Kiskunhalas.

The realization of the purpose of regionalization is limited by financing, which appears in two ways. On the one hand, in the distribution mechanisms of regional development resources, public health does not have the separation required

either on the county or local level, which is a consequence of the above mentioned administration dependence. This partly explains why public health is unable to represent the interests of either the whole public health or of particular fields, like primary health care, hospital care, and prevention. On the other hand, scarcity of financial means necessitates that in many cases diseases are cured on the regional level instead of the county /medium/ level and, similarly, county level provides tasks that could be solved in local hospitals. It would naturally require appropriate health technology in the local hospitals, too.

Self-government of health administration could possibly be realized by establishing an organization system of independent local /and county/ health offices that would belong to councils of settlements /and county councils/ only while having coordinated relations with council administration.

2. Major processes of regional inequalities in public health care

The main components of multidimensional re-gional inequalities of public health are as follows:

1. Regional differences in the state of health, rate of mortality of the population;

2. Regional inequalities of health facility supply /supply of doctors, hospitals, etc./;

3. Regional differences of utilization of, and accessibility to, health care.

Orosz, Éva: Regional structure and major spatial processes of public health care in Hungary. In: Spatial Organization and Regional Development.
Pécs: Centre for Regional Studies, 1988. 180–206. p. Discussion Papers, Spatial Organization and Regional Development

192

State of health and health supply

Traditionally, health planning and statistical analyzes examine regional differences in the supply of doctors and hospitals by comparing data of the individual counties with the national average. This approach seems less and less suitable to reveal basic tensions in regional differences. A cardinal aspect of evaluating the regional distribution of doctors, hospitals, and health services should be the regional structure of needs. The state of health of the population is not yet widely known. An approximative, "rough" index of this could be the rate of standardized mortality, which is much debated but used widely in the international literature /Haynes 1985/.

When comparing the state of health and regional differences[x] of supply of health services, certain parts of counties show a better state of health and better supply of doctors and hospitals than the national average; these advantages can strengthen each other. In other counties--e.g., in Bács-Kiskun, Szabolcs-Szatmár, Pest--the state of health is below the national mean value, accompanied by unfavourable supply resulting in accumulating disadvantages.

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[x] Fig. 3 demonstrates the state of health by using rate of standardized mortality, supply of health institutions, and indices of number of doctors and hospital beds per 10,000 inhabitants. The order of counties is based on rate of standardized mortality. As the lowest value for rate of mortality is the most favourable, reciprocals of actual values were applied in the representation. Thus, for all three indices, values over 100 percent are favourable. These data show relative values against the national mean.
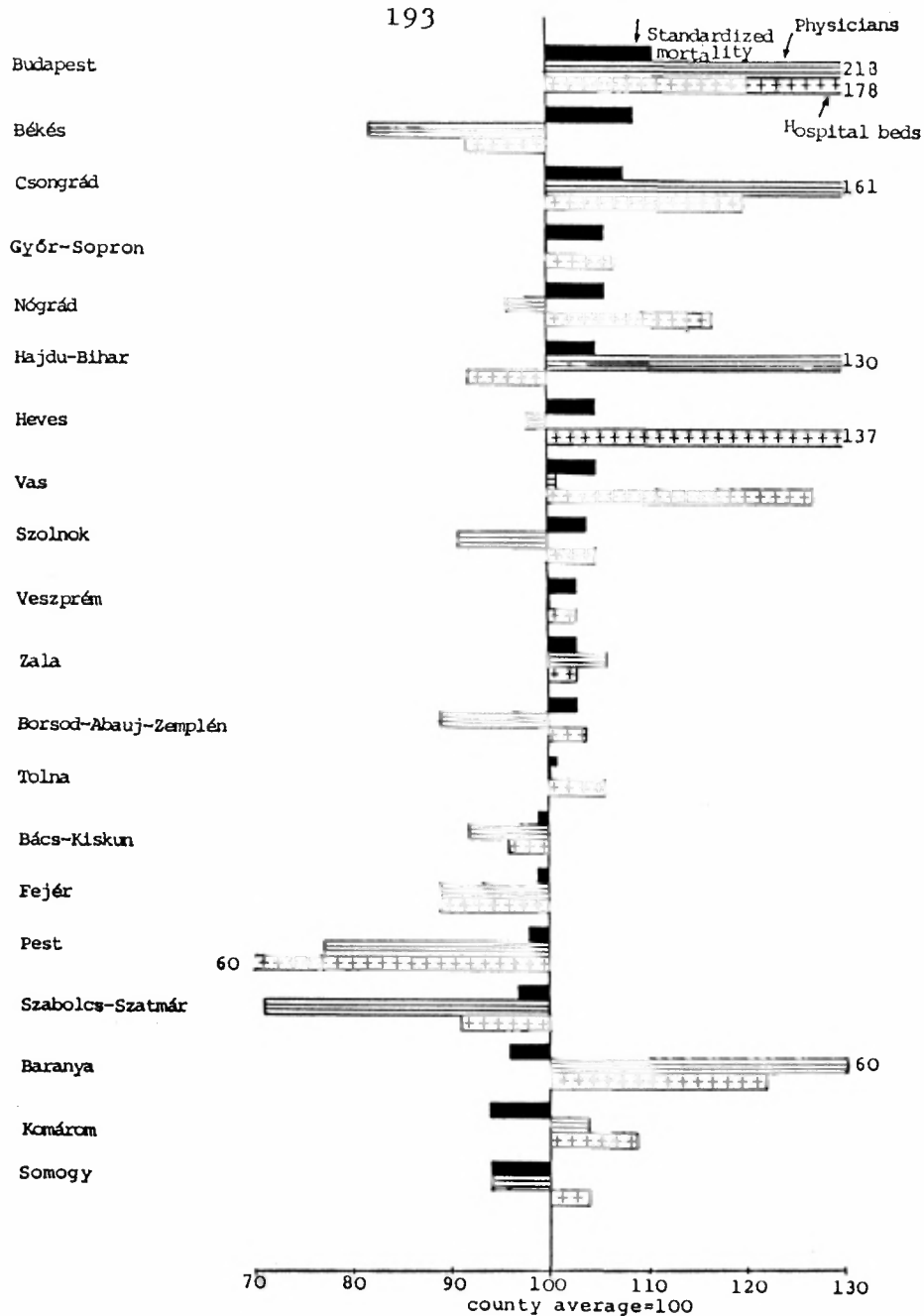
193

FIGURE 3   State of health and health supply (Relative
value of standardized mortality rates
(1982-84), number of doctors, and hospital
beds per 10,000 inhabitants /1984/

Orosz, Éva: Regional structure and major spatial processes of public health care in Hungary. In: Spatial Organization and Regional Development.
Pécs: Centre for Regional Studies, 1988. 180–206. p. Discussion Papers, Spatial Organization and Regional Development

194

For proper interpretation of Figure 3, it should be stressed that inadequate health supply constitutes only one, even a secondary, reason for the unfavourable state of the health of the population, priority being given to socio-economic circumstances. Undoubtedly, regions having an unfavourable state of health of the population should be afforded a larger proportion of resources during distribution of financial resources of public health. By such a strategy of health policy, the effects of other, non-health factors could at least partly be compensated for. Figure 3 calls attention mainly to the fact that inadequate financial means and inefficient mechanisms of health policy in effect over the last decades could be an obstacle to realizing the desired distribution.

In the health-sociological literature, by 'inverse care law' is meant a phenomenon whereby lower social strata having unfavourable states of health use health care to a much lesser extent than upper social strata having better states of health /Hart 1975; Stacey 1977/. My calculations presented earlier can prove that the 'inverse care law' is also valid for regional processes in Hungary.

Diversified development of backward regions

In 1960, considering the supply of doctors, hospital beds, as well as health expenditure per capita of counties, two backward regions could be distinguished in Hungary: one of them was situated in the south-western part of Hungary including three counties /Zala, Somogy, Tolna/; the other was in the middle and eastern part of the country involving five counties /Bács-Kiskun, Békés, Pest,

Orosz, Éva: Regional structure and major spatial processes of public health care in Hungary. In: Spatial Organization and Regional Development.
Pécs: Centre for Regional Studies, 1988. 180–206. p. Discussion Papers, Spatial Organization and Regional Development

195

Szabolcs-Szatmár, Szolnok/ /Fig. 4/. By 1980, only
the counties of the south-western region could
achieve the national average; while the eastern
region was able to improve its relative position
only to a small extent and retains its worst status.
This backwardness was maintained in spite of a cer-
tain leveling of differences between 1960–1980 con-
cerning on the one hand the national average and,
on the other, values of counties having the best
supply /especially in the case of hospital beds
per 10,000 inhabitants/.

Meeting new demands and regional differences

My investigations of the health supply of
counties under most unfavourable circumstances aimed
first of all at whether this leveling process--
which can be characterized by complex indices of
supply--served to meet new demands. The structure
of social needs for health supply was undergoing
significant transformation during the last decades.
/E.g., there is a radical change in the structure
of diseases, an increase in the rate of cardiovas-
cular, mental, and those diseases occurring in old
age./

Data in Table 2[x] illustrate that the struc-
ture of health care infrastructure of counties of
most unfavourable characteristics was less able to

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[x] In Table 2, this 'leveling' process is charac-
terized by complex indices such as the number of
working hours of polyclinics per 10,000 inhabi-
tants plus the number of hospital beds per 10,000
inhabitants. In these terms, the values of rela-
tive indices of backward counties are much higher
than in the case of meeting new demands.

Orosz, Éva: Regional structure and major spatial processes of public health care in Hungary. In: Spatial Organization and Regional Development.
Pécs: Centre for Regional Studies, 1988. 180–206. p. Discussion Papers, Spatial Organization and Regional Development

196

Counties:

Transdanubia:

1: Baranya
2: Fejér
3: Győr-Sopron
4: Komárom
5: Somogy
6: Tolna
7: Vas
8: Veszprém
9: Zala

Great Plain (Alföld)

10: Bács-Kiskun
11: Békés
12: Csongrád
13: Hajdú-Bihar
14: Pest
15: Szabolcs-
    Szatmár
16: Szolnok

North counties:

17: Borsod-Abaúj-
    Zemplén
18: Nógrád
19: Heves
20: Budapest

counties with
poor health
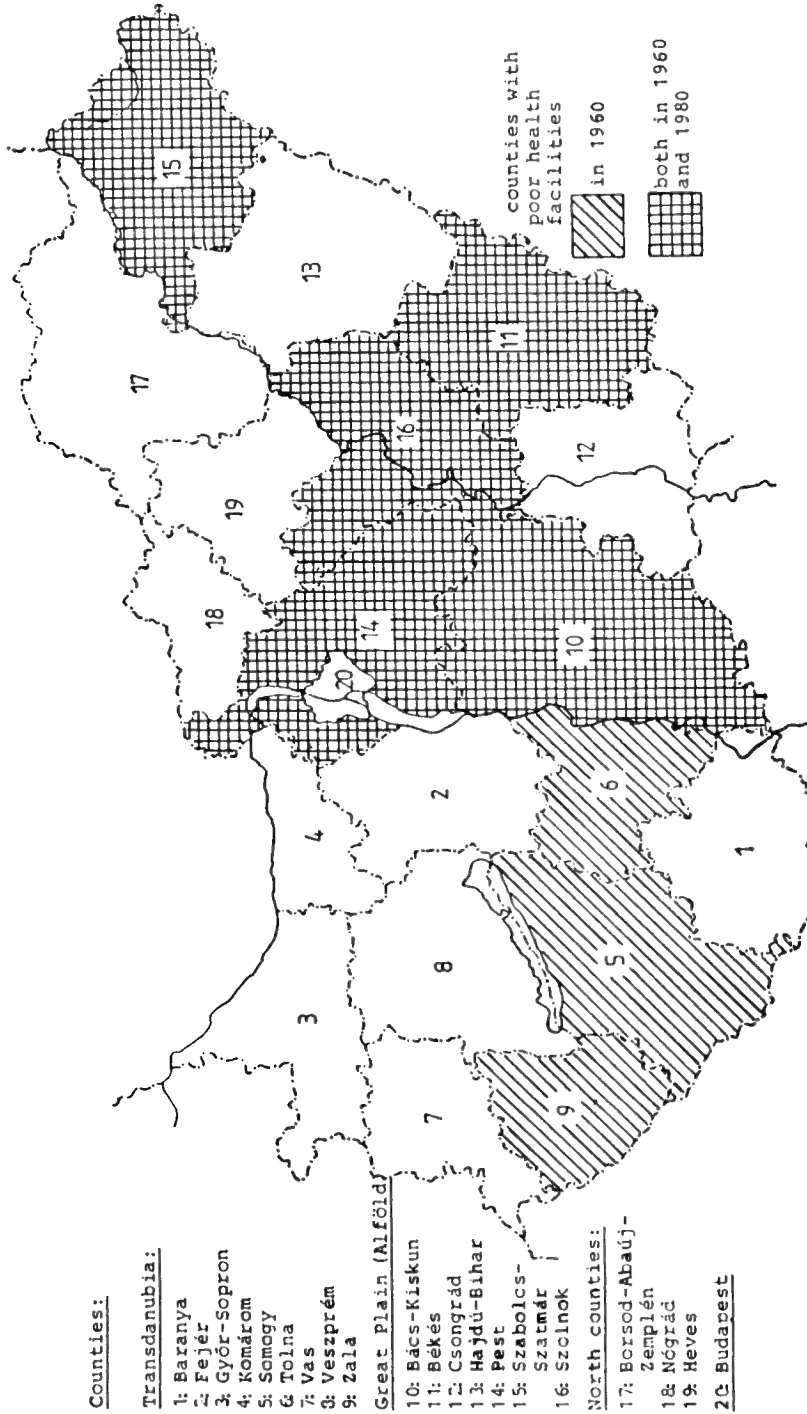facilities

in 1960

both in 1960
and 1980

FIGURE 4   Counties with poor health facilities in 1960 and 1980
/Based on the number of physicians and hospital beds
as well as health expenditures related to the number
of population/

Orosz, Éva: Regional structure and major spatial processes of public health care in Hungary. In: Spatial Organization and Regional Development.
Pécs: Centre for Regional Studies, 1988. 180–206. p. Discussion Papers, Spatial Organization and Regional Development

197

meet changing needs than that of counties having
a more favourable supply though still below na-
tional mean values. To put it in another way:
during the last decades, the leveling processes
that acted to diminish the extent of backwardness
existing in previous periods were unable to meet
new demands to the extent necessary. It means that
meeting new demands is accompanied by significant
regional inequalities at the expense of counties
having more unfavourable supply.

Uneven decrease of regional differences in the supply of doctors and hospitals

During the last few decades, the number of
doctors increased to a much greater extent than
that of hospital beds. /Between 1960 and 1982, the
number of doctors increased by 72 %, while that of
hospital beds grew just by 28 % per 10,000 inhabi-
tants./ Despite the enormous increase in the number
of doctors, regional differences in the supply of
doctors diminished to a lesser extent than was
possible and necessary. Even a contrary tendency
can be noticed in the formation of regional dif-
ferences: there was a much smaller decrease in re-
gional differences in the supply of doctors than
hospital beds /Table 3/. One reason can be seen in
the deficiency of the means of central health
management.After development resources were cen-
tralized, constructing hospitals in undeveloped
regions of low level health services was a relati-
vely easier task; however, central health authori-
ties did not have effective incentives to influ-
ence the decision making of doctors in selecting
settlements in the long run.

Orosz, Éva: Regional structure and major spatial processes of public health care in Hungary. In: Spatial Organization and Regional Development.
Pécs: Centre for Regional Studies, 1988. 180–206. p. Discussion Papers, Spatial Organization and Regional Development

198

The data presented in Table 3 show that the most critical point of regional differences are the inequalities in the supply of specialists. If the special fields of medicine are examined, there are manifold differences in the supply of doctors and hospital beds alike. E.g., in 1984 in Heves County, which can be regarded as the best supplied vith emergency treatment, the number of beds was 5.2 times higher per 10,000 inhabitants than in Békés and Szabolcs-Szatmár Counties, which have relatively the least emergency treatment beds.

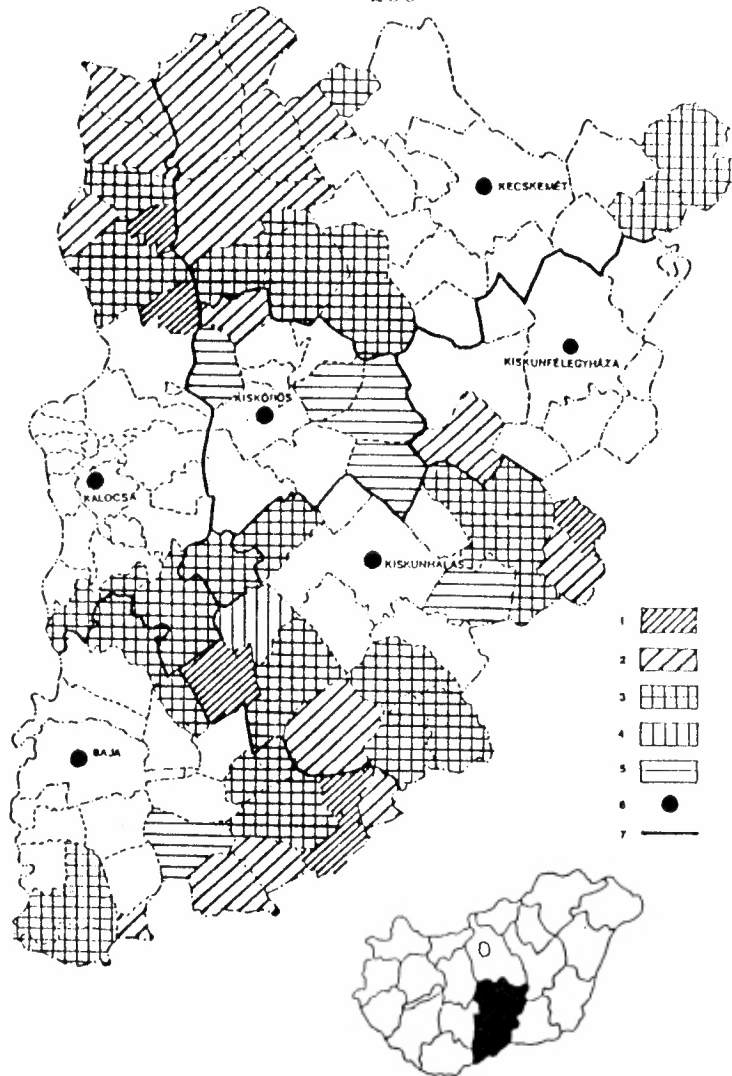## Accessibility to health services in Bács-Kiskun County serving as an example

Among the main components of health inequalities, the third one is meant by regional differences of utilization of and accessibility to health services. Accessibility is a complex phenomenon comprised of distances between settlements, costs of services and travel, information services, connections of doctors and patients, tradition of doctor use, etc. To evaluate regional inequalities of accessibility requires empirical examinations to be made at the settlement level by different health services. There is no comprehensive information on regional differences in accessibility to health care for the whole country. Information-statistical systems of public health do not provide the required data to carry out such investigations; on the other hand, health policy and planning does not demand examinations of such a nature.

In the investigations in health care of rural settlements of Bács-Kiskun County, the transport and settlement characteristics of accessibi-

Orosz, Éva: Regional structure and major spatial processes of public health care in Hungary. In: Spatial Organization and Regional Development.
Pécs: Centre for Regional Studies, 1988. 180–206. p. Discussion Papers, Spatial Organization and Regional Development

199

lity to out-patient clinics were examined /Fig. 5/.
As a result of examinations for distances between
rural settlements and seats of polyclinics, it can
be stated that out of 105 villages 49 were situat-
ed within a distance of 20 kms to a polyclinic.
These settlements contain 53 % of the rural popu-
lation of the county. In numerous instances, even
longer distances, up to 60 kms, must be overcome.
Population in 23 rural settlements /17.4 % of the
rural population/ have difficulties in accessing
polyclinics not only because of long distances
but also because of the low-frequency of transport.

In my paper, efforts were made to present
briefly the characteristics of the regional struc-
ture of public health in Hungary, as well as in
delineating four main processes of changing region-
al differences concerning the following:

    - state of health and contrasted regional
distribution of health manpower and facilities;

    - diversified development of backward coun-
ties in the leveling process;

    - contradictions between meeting new social
needs and the formation of regional differences;

    - finally, the uneven decrease of regional
differences in the supply of doctors and hospitals.

Orosz, Éva: Regional structure and major spatial processes of public health care in Hungary. In: Spatial Organization and Regional Development.
Pécs: Centre for Regional Studies, 1988. 180–206. p. Discussion Papers, Spatial Organization and Regional Development

200

1. rural settlements without easy access and having indirect means of transport;
2. rural settlements laying in long distances and having lowfrequency of transport;
3. rural settlements without easy access;
4. rural settlements having indirect means of transport;
5. rural settlements having low frequency of transport;
6. out-patient clinics;
7. boundary of catchment areas of out-patient clinics

FIGURE 5   Rural settlements having unfavourable transport facilities in terms of accessibility to out-patient clinics in Bács-Kiskun County, 1983

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202

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203

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Table 1

General hospitals^x in Finland and Hungary, by the different levels of a regionalized hospital system

	number of hospitals		average hospital bed number		distribution of hospital beds /%/	
	Finland	Hungary	Finland	Hungary	Finland	Hungary
specialized national institutes		11		523		23.5
regional hospitals	5	7	1,335	1,690	17.4	
medium-level hospitals	16	15	418	1,095	17.4	22.0
local-level hospitals	262	100	95	407	65.2	54.4
	283	132	136	562	100.0	100.0

x For comparison, not the total hospital bed number in Hungary was taken into consideration, only the number of hospital beds reduced by T. B. and mental beds; moreover, local level hospitals include maternity homes and children's hospitals.

Besides general hospitals in the calculations, there are also mental hospitals, T. B. sanatoria, and health institutions belonging to social welfare.

Orosz, Éva: Regional structure and major spatial processes of public health care in Hungary. In: Spatial Organization and Regional Development. Pécs: Centre for Regional Studies, 1988. 180–206. p. Discussion Papers, Spatial Organization and Regional Development

205

Table 2

Indicators of counties with lowest level of supply, 1982
/the county with best condition = 100/

	County				
	BÁCS	BÉKÉS	PEST	SZABOLCS	SZOLNOK
Specialist care /work-hours/10,000 inhabitants/	67	67	56	58	61
Psychiatric care /work-hours/10,000 inhabitants/	45	57	48	23	35
Number of hospital beds x	71	66	43	67	77
Number of chronic care beds x	48	62	45	54	51
Number of casualty surgery beds x	53	18	15	19	58
Number of intensive therapeutic beds x	31	31	19	13	38

x Per 10,000 inhabitants

Source: calculations on the basis of data issued by the Ministry of Health and Central Statistical Office

Table 3

Relative values of major indicators of regional differences in public health infrastructure /the value of the county with the best position equals 100/

	Number of Physicians			Number of Specialists			Number of Hospital Beds[x]		
	Per 10,000 Inhabitants								
	1960	1970	1982	1960	1970	1982	1961	1971	1982
County in the best position	100	100	100	100	100	100	100	100	100
Average of the counties	56	58	61	49	52	56	49	68	72
County in the worst position	35	37	43	22	26	31	34	59	61
Standard deviation /per cent/	24.8	22.5	20.8	37.9	34.0	30.5	35.1	23.7	17.1

x without beds in central sanatoria

Source: see Table 2