PhD Thesis Abstract

Doctoral School of Earth Sciences

Regional connection of the Medical Diagnostic Laboratories and the quality of life

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1. Introduction

Dealing with health, general state of health and the questions of health care, the examination of regional dimensions of those, the exploration of the spatial differences and inequalities one of the important topics of the human geography research. Young branch of it the geography of health which won its form in the latter decades only, but its traditions dating back to older times. (PÁL, V. – TÓTH, J. 2007)

The new focus on questions of health and health care, the examination of the regional features are justified by numerous factors at present. On the one hand, the life expectancy at birth as one of the results of the socio-economic and scientific-technical development grew in the past decades, at the same time the high birth rate, can be said general early, decreases continuously. As a direct result, an ageing population. This process observable also in Hungary but at least such a serious problem the declining state of health of the population and the critical level of the mortality (JÓZAN, P. 1994, 2002, 2003). All the three symptoms create a major challenge for the health care provision system. According to the values of our times the health care system is such a national economic strategic sector of which fundamental task is the restoration and preservation of the health status of the population, the prolongation the years spent in health and with this improving the quality of life. On the other hand, is justified by the fact that the regional differences became even deeper after the change of political system in 1989, and with Hungary's joining the European Union the question of the regional provision of health care came into the foreground.

Reducing the regional differences is an important task to ensure equal opportunities for access to basic health services. This requires wording of a complex aims in which the infrastructural developments will play a priority role. Since the different in vitro diagnostic disciplines provide important information for the curative and preventive activities, development of these may contribute to the efficacy and efficiency of the health care largely. Both the diagnosis and treatment of diseases and an important and indispensable background of the preventive medical activities is the medical laboratory diagnostics. According to the international statistics 80 per cent of the medical practitioners' decisions based on laboratory and pathology diagnoses (KOVÁCS, L. G. 2005).

Accordingly, due to the transformation of the health care provision system is important creating a laboratory provision system in accordance with new structure in forming.

In this respect is to be noted that the claim was arosed in the early 1990s for the rationalisation of the laboratory services and establishment of a more efficient laboratory system. However, for the realisation of this

examinations should be necessary carried out that provide a comprehensive overview of the situation, the role playing in the health care system, construction, operational characteristics and spatial specificity of this profession, and may serve as a basis for further research in the future. Such a work focusing on the spatial view with regard to this discipline not made yet in Hungary.

2. Theory

The traditional branch of the geography of health is the medical geography in Hungary. Studies examining the spatial characteristics of state of health population's can be found in the geographical literature since the 1960s. The interconnection of the Hungarian medical geography work and the geography science and organizing between scientific frameworks is related to ENDRE RÉTI a doctor historian. Under his direction started the Medical Geography Section within the Hungarian Geographical Society in 1964, and its scientific journal Geographia Medica Hungarica was published first in 1966, and the volumen of 1969-70 as an international journal was printed under the name of Geographia Medica. In 1973 the editor-in-chief tasks was taken by ILLÉS DÉSI chairman of Medical Geography Section of Hungarian Geographical Society. Unfortunately, the journal after printing in 1994 ended or merged into the Journal of Health and Place. (PÁL, V. 1998)

The modern branch of the geography of health is the geography of health care. Writings analysing the health care system from a regional aspect relation to smaller areas (city, county) appeared in the early 1970s (TÓTH, J. – PÉNZES, I. 1970, 1973; PÉNZES, I. – BÉLA, D. – TÓTH, J. 1972). Since the mid-1980s – due to the extensive research work by ÉVA OROSZ mostly – publications dealing with the geography of health care system increased in number (OROSZ, É. 1985, 1989, 1993, 2001). From that time can be said that the geography of health care turned into an independent research tendency beside the classic medical geography within the geography of health. Then significant research were going on in this area (PÁL, V. 1996, 1998, 2000, 2002, 2003, 2005).

In the Doctoral School of Earth Sciences of University of Pécs take place research work at present with a health geography concern in more areas headed by JÓZSEF TÓTH. Without the claim of completeness: the general state of health of the population and the health care of Nógrád county analyses ERZSÉBET KAJTOR, the general state of health of the population and the health care system of "Viharsarok" investigates SZILVIA BEKE. Research were made earlier: The place of the geography of health within human geography in a theoretical and practical approach

was examined by VIKTOR PÁL (2005). GÉZA ANTAL searched the regional differences of patients' rights in Hungary (2006).

Present work examines the characteristics and the differences of distribution of resources of the medical laboratory diagnostics, which is one of the sectors of the health care system, in a regional-geographical aspect they are in the early 21st century.

By reason of the importance and seriousness of the problems more scientific work dealt with the regional inequalities related the operation of the health care system before (OROSZ, É. 1985, 1989, 1993, 2001; PÁL, V. 1996, 1998, 1999, 2000, 2004, 2006). In the latter years, the approach of the health care in a regional view is the subject of different studies more frequently with all of its possible benefits and problems (SZEILER, A. 1999; BONCZ, I. 2002; BORDÁS, I. 2003; MIHÁLYI, P. 2003). A number of scientific studies examine the situation, positive and negative characteristics, benefits and weaknesses of the health care, too (KINCSES, GY. 1994, 1999, 2003, 2005, 2007; BUGOVICS, E. 2005). More concepts and action plans have been done before to ensure the equal opportunities and efficiency, the better use of the capacities, and for the establishment of the rational health provision system appropriate to current needs and requirements. One of the results of this the question of the regional organization of health care based on theory of progressivity become into focus point, and we suppose that the medical laboratory provision system will be affected, too.

That what kind of quality supply can be provided by the health care provision system depends largery on the infrastructural development of the institutional network, human resources, and spatial features of all these.

In recent years, studies analysing the troubles and problems, evaluating situation of the medical diagnostic laboratories are multiplied. These deal primarily with the inability resulting from unfavourable operating conditions (lack of resources, under-financing, absence of amortisation, low wages, etc.) (ENDRŐCZI, E. 1994, 1997, 1999, 2000; KOVÁCS, L. G. 1997, 2001; NÉMETH-CSÓKA, M. 1999; FERENC, A. – HORVÁTH, A. – KOVÁCS, L. G. 2004).

3. Research background

On the basis of these problems and reasonableness the dissertation looks for the answer on the one hand, the medical diagnostic laboratories play how large and what kind of role in regional shaping of the population's quality of life – that's, diagnostic activities in the medical laboratories how contribute to improvement the quality of life or to the maintenance of the state of health, and what kind of role play the

laboratories in the process of health care. On the other hand, what kind of role plays the scientific-technical innovation of this discipline in the regional development of the health infrastructure.

It is presupposed that the medical diagnostic laboratories have increasing significance in the curative and predictive health care thereby that the result of the technical-technological development the new methodological procedures extend increasingly most of which is linked infrastructure development. As a result, provide assistance to establishing the more accurate and faster diagnoses, thereby contributing to the planning and monitoring of targeted therapy. With all this to improve the rational, efficient and effective operation of the health care system.

Outcome of all these the dissertation wishes to comply with the expectations set out on the above basis and veryfication of the hypotheses at the same time. That on the one hand, in a theoretical approach, on the other hand, via empirical research intend to achieve.

By the answers can be given to these questions the aim is to draw the attention to the fact that the activities in the medical diagnostic laboratories are an essential part of the health care, because of this necessary to ensure the financial, material and human resources – to make all this taking into account the different regional needs – to enable them to perform their tasks more efficiently.

Accordingly, the final aim of the research is the presentation characteristics of the medical diagnostic laboratories from a regional aspect, particulary their role played in the health care system and in the population's quality of life.

- Within that one of the principal goals of the research is to show an up-to-date and factual picture on the situation characterising this discipline, and on its current and future tasks.
- The other main goal is to draw up a list of both human resources and material assets furthermore, presentation the spatial distribution and configuration of these factors.

However, since the laboratory diagnostics is an integral part of the health care provision system by our judgement in the course of the research cannot be missed the examination of this complex system. In addition, cannot be ignored that the health care provision system operating in specific circumtances and given space (socio-economic), the characteristics and conditions of which are influenced by the spatial environment. Due to this fact the analysis of the wider environment of health care gets an essential role in the geography approach, too. Our judgement cannot be missed to overview the questions and troubles connected with the health of European Union, knowledge of these can give the opportunity to the better understanding of the domestic problems and expected tendencies.

Accordingly, the paper endeavours to achieve the undermentioned sub-aims beside the main goals:

- To review the health situation of the wider environment the European Union, and the features of the Hungarian health care system.
- To present the socio-economic, social and health environment of the medical diagnostic laboratory provision system. With the characterisation of it we can receive a picture on the troubles and problems on the agenda and the future trends.
- To reveal how solution opportunities there are for maintenance of the functioning ability, for execution qualitative work that may help the organizing of the laboratory supply at regional level, and may serve as a basis for planning a model region.

4. Materials and methods

The research applies more approaches and processing due to the complexity of the topic and objectives. These justify using a method with which as many data and information as possible can be gathered from the national and regional features and processes, and provides the opportunity for the temporal and spatial comparison, and suitable for the verification of the hypotheses.

The principle of the developed method that are founded on each other as primary resources the statistical data of the Hungarian Central Statistical Office combined with indicators created for our specific needs (collected in the National Laboratory Institute, during the interviews and case study, and the personal experience), and the results of our earlier empirical examinations, and the forming of those indicators being fit for the research purposes, which could no be found before. Examination trying to be completed with the works being studied in the subject published by skilled authors and reviewing the relevant parts of research results relating to this topic.

Verification of research hypotheses have been done in more analytical phases being founded on each other. Examination was carried out at two territorial levels – national and regional – with qualitative and quantitative methods. (Figure 1)

1. In chapters dealing with theoretical questions was used on the one hand, literature data on the other hand, information related to the topic for description of the examined factors, features and processes.

- For the examination of the question of quality of life, health, health care, and regionality the literature was considered as a resourche, and their content were classified by topics and thoughts, in a word it was made a qualitative content analysis.

- For presenting of the socio-economic and health environment of the medical diagnostic laboratories the literature involved in the research were used for overviewing of the processes according to our aims. To the exploration of the features of the health and the situation of the health care provision system we summarised the specialists' (often cited) views, opinions and assessments dealing with this topic grouped by subjects but not exhaustive.
- At examination of the medical diagnostic laboratory provision system for verifying the hypotheses the history, tasks, main directions of expected development, present features and situation of the laboratory medicine were analysed supported by specialists' opinions and standpoints of this discipline.

In any case, we not endeavour to give a whole picture, our aim merely the presentation of the similar and different views, and the highlighting of some features, which demonstrate what kind of problems are in this area in our days.

2. In the empirical research we were striving to give a multipurpose, transparent and more detailed picture, bearing in mind the aspects of comparability. In the examinations we applied mathematical-statistical quantitative analytical methods, and we used interview and a case study, too. During the analyses we tried to use the possible widest database and drawn up it on the basis of the questions and methods.

Among the examination methods the main emphasis was laid on the comparison of each indicator of the regions and hereby we concentrated on the exploration of the regional, spatial differences that provided the opportunity establishing the order of the regions in respect of the indicator in question at the same time.

- According to this concept, in the first step the six indicator groups worked up and the indicators forming them were valued independently during descriptive regional analysis and compared the values of each indicator by regions, outlining the spatial configuration and regional inequalities of the most important features of the examined factors (regional-geographical, socio-economic and social, demographic, health conditions and life chances, health care and medical diagnostic laboratory provision system).
- Inside this, at examination of the indicators of the health care and medical diagnostic laboratory provision system for better evaluation and sketching a finer picture we composed four indicator groups as follows: structure, capacity, performance, human resources.

- At examination of indicators of the medical diagnostic laboratory provision system according to the set aims – on the one hand, compilation of a regional supply map, „a list of resources", on the other hand, the exploration of the spatial differences – were applied different analysis methods.

In the first part of the dissertation the aims of the descriptive analyses are that the examined indicators on the one hand, at national level, on the other hand, for each of the seven regions but in the same way and structure will be presented. Relate to this the intention of presentation of the chronological changes (2001-2003), too.

The other part, since intend to detecting regional inequalities primarily contains comparative analyses on the basis of data 2003. Inside this, in the possession of received results we defined the order of the regions, too. It was disposed in a way that four integrated indexes was developed – infrastructure, capacity, performance, human resource – that can be examined the development level of the regions in the same aspects. Based on the results the regions were scored from 1 to 7 and ranked in such a manner that the region received the least total number is the most developed, and the region received the most total number is the most "underdeveloped" in respect of the examined indicator group.

After receiving a picture on the spatial structure of each segment we attempted sketching the picture of the complex area development of the regions. To this end, from the four indicator groups one integrated index was created – complex area development (an aggregated index received of fusion of the results of indicator groups (infrastructure, capacity, performance, human resources) examined) – that the scores in each group were summed in respect of each region, and the order of the regions was set up on this basis. After all this, we made the attempt to draw conclusions about the development of the regions based on the results.

To the exploration of efforts relating to the realisation of optimal and rational operating the information acquired in an interview (Roche Mo. Ltd. Diagnostics Division) and a case study complemented with an interview (ProDia Diagnosztics Inc.) were used.

5. Results

First of all, we would like to mention a problem that arose in regional examinations. In recent years, there is much talk about the regionalism and the regional inequalities connecting to the transformation of the health care (TÓTH J. 2004). Considering the debates and problems in connection with this issue we can come to the conclusion that the demarcation of the regions may never be perfect and according to all viewpoint.

The research deals with both theoretical and practical questions based on the set aims. According to this, the results can be divided into two groups. Within this, the dissertation has produced new results in a methodological, content and development policy respects.

Between the methodological results can be enumerated that in research two databases – a national and a regional – containing territorial-geographical, socio-economic, demographic, status of health and health care data and information, ordered into six indicator groups, consist of 109 indicators was created as follows: Territorial-geographical specialities of the regions: 6; Main economic and social indicators: 10; The main demographic features of the population: 6; State of health, life chances, cause of death structure: 11; Health care provision system: 30; Medical diagnostic laboratory provision system: 46 variables. The statistical database contains basic data of different data sources (KSH, OLI), and indicators were prepared from basic data and constructed from own research results (national 10, regional 28).

From the methodological point of view means a novelty the designation of dimensions (infrastructure, capacity, performance, human resources) being used for the examination of the spatial structure and regional disparities of the main characteristics of the medical diagnostic laboratory provision system, and the part of the indicators being used. Among the available indicators of the regional statistical data of this profession several, to the best of our knowledge early not, or not in this analysis context or not for the whole country and at regional level were used. In each analysis dimensions new indicators and complex index numbers were made from more indicators, integrated indicators, and indicator groups were set up.

Moreover, the possibility of applying of the database has been created the additional result of the research is that it provided a possible model for the complex examination in the geographical-socio-economic space of the health care system and within that the medical diagnostic laboratory provision system, hoping its contribution to further research at the same time.

Main content results - the main findings of the dissertation

In view of the formation and development by the beginning of 2000s of the medical laboratory diagnostics verifiable that in the last half-century compared to the beginnings its importance and role played in healing and research and along with it the totality and quality of the tasks to be completed changed radically.

Summing up the opinion of more specialists tracking the international and domestic trends (ENDRŐCZI, E. 1997; JUHÁSZ, P. – DUX, L. 2000; KOVÁCS, L. G. 2001) can be declared that the laboratory

medicine in the past and our days and also in the future plays an outstandingly important role in supporting the curative and preventive medical science by providing important prognostic and predictive data to therapy. Furthermore, it has a significant place in ensuring the quality of the medical activity, too.

As a result of the scientific-technical-technological development the new methodological procedures getting a bigger role in the medical diagnostic laboratories, and most of them an infrastructural development joins at the same time. Considering the future trends can be stated with certainty that the role of this profession with the strengthening of the molecular diagnostic view, the spreading of the evidence-based treatment, increasing of the needs for more rational use of the material resources will more explicitly in the future. As a result, it is necessary to expect with further increase of the number of laboratory examinations in the next decade.

Based on all these, can be established that the fast development is typical of the laboratory medicine and it is qualified as an indispensable basis profession now. By now, this discipline is an independent and branching in many direction part of the medical science. Resulting from its operational features capables both near the patient and far from the health supply or the place of the examination (with the insurance of professional sample transport) to fulfill its task as well, because of this plays an important role in the reduction of the regional differences.

The examinations have also shown that the constant development of the medical science and the increase of the professional claims request that the laboratory diagnostic service will be continous and high standard, will give express and accurate information and will be able to adapt to the changing claims. Increase of the professional expectations require constant choice extension and qualitative infrastructure development. This contributes to developing of the infrastructure of the health care provision system and its formation at a regional level.

It became obvious that the cause of the present adverse situation in the financing of this profession can be found. By our judgement, the further existence of this jeopardizes the function of the laboratory supply at the appropriate level and might be the source of additional problems. That could cause the inability of the medical diagnostic laboratories. The facts prove it squarely that the currently valid laboratory financing system is considered unsatisfactory and requires a reform. This situation is aggravated by the fact that, the medical laboratories work to an order, that is their performance is determined by that how many examinations the clinicians ask for their patients, in which rather frequent the unreasonable orders, too.

Fig. 1. Steps in the examination of hypothesis

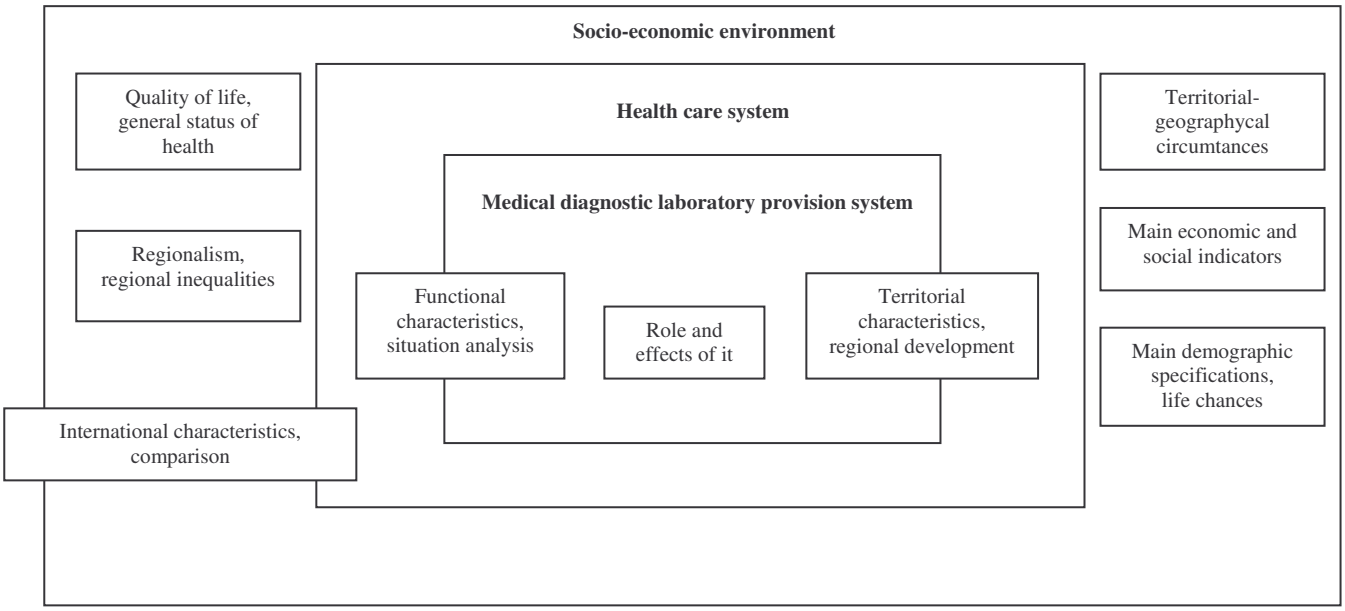
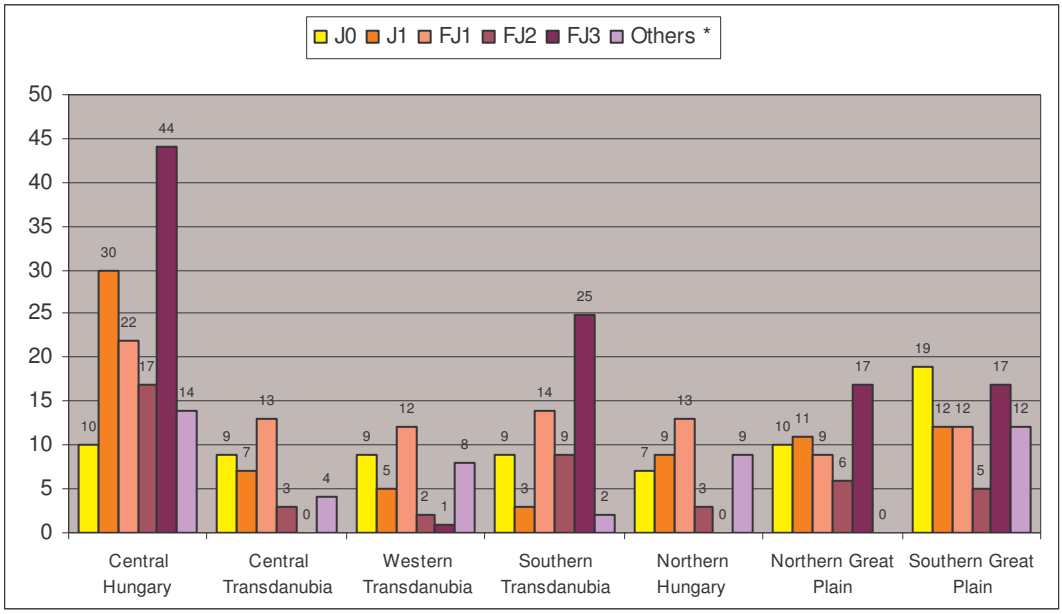
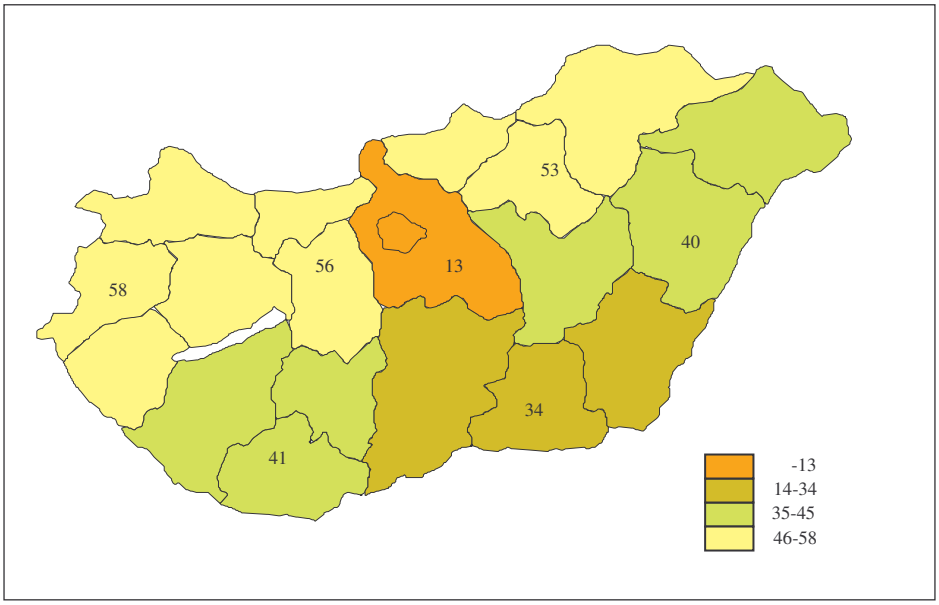


Fig. 2. Distribution of the medical diagnostic laboratories by classification in the regions, 2002
(Source: Own calculations and editing based on OLI data)



*State hospital laboratories, department/ward laboratories (small/quick labs), isotope laboratories, microbiological laboratories. BM, private
J0, J1= outpatient service, FJ1, FJ2, FJ3= inpatient service

Fig. 3. Values of the complex development index by regions
(Source: Own calculations and editing)



Because of this untenable situation two endeavours came into the forefront to einsuring the the economical and efficient operating in the past years. One of the main features of them that the laboratory by its own strength saves up the necessary sourches to the maintenance, that is supports itself. For this purpose its infrastructure will be transformed in such a way that it should be possible to supply examination results by fewer instruments and bigger efficiency. According to the other approach began the search of the exterior sources that means the inclusion of private resources for operating of the laboratory (functional privatisation or full privatisation). As the results of both solutions by the fruition of the modernisation and the system-based function becoming to front the opportunity is open to establish the optimal and adequate to the current claims capacity of the laboratory. By that the operating becomes more economical and the qualitative service improves, and hereby the health care institution can serve the patients' interests more efficiently. In this way the laboratory instead of consuming cost item will become an important information source of which advantage can be taken actively and making possible the elastic adaptation to the changing health care needs of supply area (a city, a county, in certain cases a region) of the health care institution in question.

During our empirical examinations analysing the indicators of the laboratory provision system we received more results should be emphasized according to our judgement:

The trends in the number of laboratory examinations having a priority in public health also prove the diagnostic significance of the laboratory activity. Valuing the results verifiable that the number of the observed parameters in the examined period (2001-2003) increased continously. The number of the analyses helping the care of the diabetic patients shaped as follows: the glucose grew by 6.0 per cent and the HbA1c was by 41.0 per cent higher. The lipid assays playing a role in the illnesses of the circulatory system and the obesity based on the comparison of the data increased by 24.5 per cent. The number of IgE examinations giving important information for diagnosis of allergic diseases grew by 41.3 per cent, and the allergen specific IgE assays increased by 73.5 per cent.

Collection and analysis of the thirty examinations most performed in 2003 call the attention for an important feature, too. The results prove it on the one hand, that analyses that can be carried out in the area of the out-patient services, the health institutions try to account inside these frameworks. Saving by this the HBCs proportions being used for the diagnostic examinations, what can be devoted to other interventions next. On the other hand, considering the combination of the laboratory tests visible that the analyses using for diagnosis of the allergy and diabetes

counting as the epidemic, and measuring and monitoring of the blood level of the fats playing a role in the illnesses of the circulatory system and the obesity very well performable in the framework of the out-patient care.

Seeing these results we can conclude that from the health institutions operating in the lower level (family doctor's services) and in the middle level (primarily from the specific out-patient health care centres – if they already exist) of the progressive health care by the help of a well organized test-sample gathering system would be solvable – without the patients travelling – the completion of the different diagnostic analyses in the laboratories designated for it. All this the reduction of the regional inequalities of the health care can be possible to a certain extent.

Our results show that the number of laboratory tests per 100 inhabitants grew within each region in the observed period (2001-2003) as follows. The most significant increase was measured in Central Transdanubia (+17.9%) and in Southern Great Plain (+13.8%), in the least measure in Northern Hungary (+6.4%) – while within this period the inhabitants' number of the regions decreased. In 2003 an average of 17.8 laboratory tests were performed for every Hungarian citizen. Based on the examination of the regional differences we found that the index was highest in Central Hungary (22.8) and in the Southern Great Plain region (18.3), lowest in Northern Hungary (14.0) and Western Hungary (14.5) region.

Concidering infrastructural development of the medical laboratory provision system we can say that the number of the different types of instruments increased singifically, by 62.5 per cent in the examined period (2001-2003), and the measure of the automatisation grew by 59.3 per cent. These data prove well the fast, continuous and qualitative development of this profession.

Summarizing the change of quantity and combination of the human resources can be identified that in the examined period (2002-2003) the employees' number in the medical diagnostic laboratories was growing slightly, within job groups a considerable restructuring was experienced. The number of professionals increased in total, but within this group the number of staff with a degree in medical studies decreased, while the number of staff with other university and college degree was grew. The highest ratio of change meant the number of the medical diagnostic laboratory analysts with a college level increased by 112.8 per cent. The number of non-health diplomas grew by 6.5 per cent. The number of medical laboratory technicians decreased by 0.2 per cent. In the group of other employees the number of the help-assistants grew in the greatest measure (+7.7%). The number of staff making documentary activity showed a bigger increase (+22.5%). Considerable decrease was

experienced in the number of auxiliary-workers (-7.7%).

On the basis of number and classification (J0, J1 – out-patient services, FJ1, FJ2, FJ3 – in-patient services) of the medical diagnostic laboratories in 2002 the main regional differences are reflected in the following (Figure 2): Overall, most laboratories are in Central Hungary (137), in Southern Great Plain (77), in Southern Transdanubia (62), the least in Central Transdanubia (36) can be found. In that classified in category FJ are 244, 55.0 per cent of the overall number of laboratories. Most of them are in Central Hungary (83), in Southern Transdanubia (48), in Southern Great Plain (34) and the least are in Western Transdanubia (15). Most of the laboratories (104) classified in FJ3 (top-level of the in-patient and out-patient services), 23.5 per cent of total number of laboratories. These, expect for one, work in universities faculties of medicine (81) and in national institutes (21). Most of them in Central Hungary (44) and in Southern Transdanubia (25) can be found, in Northern Great Plain and in Southern Great Plain are in equal number (17), in Western Transdanubia is one, and in Central Transdanubia and in Northern Hungary cannot be found. Number of the laboratories classified in category J are 150, 33.9 per cent of all laboratories. Most of them in Central Hungary (40), in Southern Great Plain (31), in Northern Great Plain (22) and the least in Southern Transdanubia (12) operate. Within category J considering the regional distribution by number at the fourth place in the row standing the laboratories classified in the lower category J0 (equal to level of primary care), 16.5 per cent of the overall number of laboratories. The most of them work in Southern Great Plain and the least in Northern Hungary, and in the rest regions almost at the same number can be found. Seeing these data can be concluded that relative few laboratory belong to this category in total, and their regional distribution very uneven. However, our opinion is these are the medical diagnostic laboratories that may get a greater role already in the health care system, primarily working as the diagnostic background of the out-patient care centres for medical treatment or diagnosis that already started and established in most micro-region, or in connection with the transformation of the structure of the health care also in the regional provision organization. We believe that this is the laboratory provision level where the regional supply differences are reducible largely with the insurance of the suitable sample transport. As a result, the equal opportunities for access to the health care may be increased.

On the basis of the results of different analyses to identify inequalities at regional level cumulatively can be determined that in respect of the examined indicators the leading position of Central Hungary unambiguous which can be explained by central role of Budapest filled in the health care, too.

Consequently, examining data by complex area development index Central Hungary is the most developed (minimum score) amongst the regions – if this region is disregarded because of its special situation then this place is given to Southern Great Plain region – and the „least-developed" is Western Transdanubia region. Northern Great Plain and Southern Transdanubia are almost at the same level in the mid-field position. Northern Hungary and Central Transdanubia are in a bit better situation than Western Transdanubia region ending the order. (Figure 3)

Moreover, the dissertation presented several content results that are outside the scope of theses.

6. Discussion

Completion of the paper happened with an practice-oriented aim, too. Exploration of the characteristics and territorial structure of the medical laboratory provision system, and the compilation of its resource list was conducted by an intention that it can be starting point of the solution of regional supply organizational tasks came into the foreground in the health care.

Additional results of the database created during the research is that it contains the most information on the regional connexion-system of the examined factors, which may be necessary for the analysis and planning of the regional developments. On this basis can be defined the blank-areas for which there are no suitable data available. In the latter case the necessary statistical, database development and research needs can be formulated.

Present data file will enable many different analysis and creating additional indexes using the existing indicators. All these can promote the description and comparison of the professional processes, the examination of the regional differences, the development of capacities according to the local needs, and the survey of the improvement possibilities. Furthermore, may be used as a tool for the analysis of the trends. Indicators can help in replying to the next professional questions: Where are we currently (the standard of the present supply)? Why are we here (reasons of problems)? Where do we wish to get? What have to be done for that? With the expansion of the scope of regional information can be continuous the content improvement of the database which can create the basis of the acquisition of further knowledge.

Examinations carried out provide a simply transparented overview on the general status of health, the demographic situation, the economic and social situation, the health infrastructure, the human resources and on the peculiarities of the medical diagnostic laboratory provision system, and on the spatial position of these factors emphasizing the regional

differences. By monitoring and analysing of the socio-economic, social, demographic, health features and processes there is a possibility to prepare for changes in time and space and the adequate response.

We hope that our examinations may facilitate the cognition of the regional dimensions of the medical diagnostic laboratory services and the definition of the future possible development directions. Results could contribute to the implementation of the rational function, the optimal use of the capacities, for ensuring the compliance with the changing claims, and to the planning and forming of the medical laboratory network of the potential health regions, and/or may be used as a basis for additional more detailed examinations.

Our hope is that the results of research are suitable for informing specialists involved in this area, and in future may be the starting point of organization of the medical laboratory diagnostic provision system by regional needs.

Eventually, the most important aim of the paper that the analyses will draw attention to the disproportions and on the basis of these the development priorities can be defined. The results and the database was created during the research may be used to help in the construction of the development policy of each territorial unit.

All this we would like to reach that the operation of the laboratory provision system can be more patient-centred or to bring the medical laboratory services closer to the patients.

7. Conclusions

The important role of the medical diagnostic laboratories played in health care provision system becoming evident during the research thus in order to improve health care conditions the rationalise of operation of this sector is essential. Functioning of medical laboratory is a diagnostic activity and provison of information at a consultation level. However, it is necessary to take it into account that the laboratory works to an order, that is to say the examinations shall be carried out at the request of the clinical professions. As a consequence, the laboratory provision system can contribute to improving the quality of life of the population to the extent that in justified cases use their services and the diagnostic information provided by them is used for the patient, that depends primarily on a doctor treating the patient.

On the basis of the results of the research have to say that the structure of the laboratory provision system is highly decentralized and fragmented, and there are unused capacities which do not match the existing needs. In several health institutions, and in county or town community hospitals, there are ward or department laboratories besides

the central laboratory. At medical universities, working alongside the central laboratory, there are 17-25 badly used laboratories, operating independently and in paralell with each other. It should be noted that this is due to the fact that at clinics, by reason of dispersion of buildings resulting from pavilion-structure, separate laboratories were settled into each building and sites dealing with healing.

For liquidation of crisis situations caused by the contradictions of present financing it is necessary the formation of a system which ensure to keep the services at a constant level and improvement, too.

The price and operation of the laboratory instruments and automatic equipments meeting the current requirements demand the up-to-date professional competence and knowledge and the highest possible level of utilization. Application of the more costly and special procedures requires the concentration of the laboratory resources (material and human) and developing the levels of the progressive laboratory provision system for the efficiency, economy, quality assurance and expected standard of the laboratory health care. For the implementation of this the centralization being related to the regional reorganization may be the solution. In the provided area the laboratories could be operated in a concentrated way. One of the main conditions of this is the organization of the professional sample transport and the fast reporting of the laboratory results. In the laboratory centres the high-level expertise and the modern devices and instruments make it possible to develop the lead role at regional level, and contribute to ensuring the higher-level medical laboratory supply of the given area. In our opinion one of the advantages of the regional organization of the laboratories could be that hereby a concentration on a scale of the resources (human, financial, material) can be realized that cannot be achieved by the laboratories individually.

The achievement of these goals however, indispensable the survey and careful consideration of the local capabilites and claims. But it will entail further research.

Based on the examinations made at the national and regional level can be stated that the activity of the medical diagnostic laboratories constitute the relevant part of the health care. The well-functioning medical diagnostic laboratory network is one of the securities of the high-standard health care. For the proper performance of this task permanent feed-back contact necessary between the clinician and the laboratory expert.

Based on the results of research it is likely that the progressive services within the framework of the regional health care organization will be the key to the reduction of the regional inequalities. For the establishment of medical diagnostic laboratory provision system providing progressive services of each region further studies are necessary,

deeper than the current one, will be carried out at county and micro-region level moreover, at the level of each health institution and department, which entail a local knowledge, too. That the model has been created how can be used at county and micro-region level can justify a practical testing that presuppose more studies.

Decaying general state of health of the Hungarian population and its large regional differences, the transformation and spatial differences of disease structure because of ageing society, the crisis of the health care system and the creation of the equal opportunities in access to the equal health services are the more and more urgent problems of our day. Tasks to be solved pressing and drawing attention to the health care. Within the Hungarian geography the objectives and methods of the geography of health are suitable for exploration and identification the spatial structure of these problems and for promoting to solve them.

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