SPATIAL DISTRIBUTION OF SPECIAL EDUCATION FOR VISION IMPAIRED PEOPLE

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Abstract. *The article treats spatial analysis distribution of activities within special education of vision impaired children, pupils and students in the Czech Republic. It response to the research questions: What are territorial differences in content and volume of special education of vision impaired people? Are there any regional disparities? The authors applied several scientific methods – a standardized form for recording of particular contact the teacher with vision impaired person in Special Education Centre, database design, spatial analysis and map compiling. The study confirms a significant increase of disability in higher age and dominant role of the family in the care for a person with vision impaired people. The research confirmed the dominant role of regions as special needs centres authorities. Based on a unique survey the study quantified special needs centres activity.*
Keywords**:** *atlas, disability; map; spatial distribution. special education; vision impaired people*

Introduction

In the Czech pre-school, primary and secondary education, the educational services are provided to approximately 1,656,000 children (EACA, 2011). Almost 103,000 children of these are children with special educational needs (including disability, health deprivation and social disadvantage). In particular, children with physical disabilities and physical handicaps use the services of Special Educational Centres (SECs), one of two types of school counselling facilities in the country. The main SECs' task is defining (diagnosis and counselling) special educational needs for children, pupils and students on grounds of disability at kindergartners, primary and secondary schools in the whole country (Burian, Brus & Voženílek, 2013). In a broader context, the SEC clients are also students' parents, guardians (legal representatives), teachers and schools in which pupils are educated (Tuček, Pászto, & Voženílek, 2009).
The SECs' activities impact the success of educating tens of thousands of children. In many studies (Brychtová, Popelka & Voženílek, 2012) the high dependence of families caring for children with disabilities in institutions, advisory and consulting field were confirmed. Questions of optimization of network devices, as well as the availability of services for the target group are widely discussed in the Czech Republic. However, the discussion is so far without processing adequate measurements and analyses by means of special education and also by spatial (territorial) approaches. Therefore, a unique project within a system of measuring the availability of counselling and diagnosis of

SECs in the Czech Republic for public authorities (Ministry of Education, regional authorities, etc.) was conducted. That system resulted in a unique set of data and cartographic output. Geoinformation technologies, mainly tools of GIS, were applied for the spatial information integration of all investigated activities and for the advanced calculations in order to detect all the arguments for the network optimization and the SEC activities (Vondráková, Vávra & Voženílek, 2013; Popelka, Brychtová & Voženílek, 2012; Voženílek, 2002a, 2002b, 2009).
One of the main objectives of the authors' research is to investigate spatial distribution of consulting and diagnostic SECs' advisory in the Czech Republic, mainly to process spatial analysis distribution of activities within special education of vision impaired children, pupils and students in the Czech Republic. The GIS tools were used to manage spatial distribution of all investigated activities and to suggest all possible changes for their optimizing.

Mapping of Special Educational Centres for vision impaired people

The Czech SECs are part of the pedagogical-psychological counselling system to children, youth and their parents, teachers and other educators. The SECs' activities include the systematic special education, psychological, diagnostic and advisory work with children of the target group. Primarily it is for pupils with special educational needs by reason of mental disability, physical, visual, auditory, speech disorders, autism spectrum disorders and the combination of the so-called basic disability. Providing appropriate special educational support is an essential prerequisite for the successful education of this group of students (Brus, Voženílek & Popelka, 2013).
The research was based on an objective assessment of the availability of appropriate services of the special educational centres for visual impaired people in terms of their spatial locations within the territory of the Czech Republic (almost 80,000 sq. km), to assess the volume, type and selected aspects of their activities. This objective was fulfilled through cartographical visualization of information of investigated themes (Dvorský, Snášel &Voženílek, 2009, 2010).
The SECs' infrastructure was mapped in sense of staffing, facilities and other characteristics (see Table 1). There are totally 21 SECs for visual impaired people in the Czech Republic (without detached units). Information about the SECs' infrastructure have been identified in collaboration with the staff of regional offices and the Czech Ministry of Education, part of which was provided by the Institute for Information on Education.

Table 1

The overview of the mapped characteristics of the SECs' infrastructure

mapped characteristics	**possible attribute**
SEC address	region, city, street, postcode
SEC founder	Ministry of Education, regional authority, municipal authority, private founder
Year of SEC establishing	1990 etc.
SEC specialisation (disability)	mental, physical, visual, auditory, speech disorders, autism spectrum disorders and combined
SEC staff	Total number of employed
SEC staff structure	Number of special educators, psychologists and social experts
Specialisation of special educators	asked whether the SEC has a specialist for mental, physical, visual, auditory, speech disorder or autism spectrum disorders
Equipment by diagnostic tools	description of standardized instruments for measurement of selected areas, such as intellect, family climate, school climate, pathopsychological phenomena, ADHD / ADD, school readiness and others

The SEC network in the Czech Republic covers the needs of students with disabilities at an insufficient level (particularly in terms of accessibility). Special educational center for visual impaired people covers the territory of the Czech Republic very sporadically. In most regions there is only one such center. In the Karlovy Vary Region (the westernmost part of the state) it is even completely missing. The opposite situation is the concentration of the SECs in the middle of the west of the country (see Fig. 1).

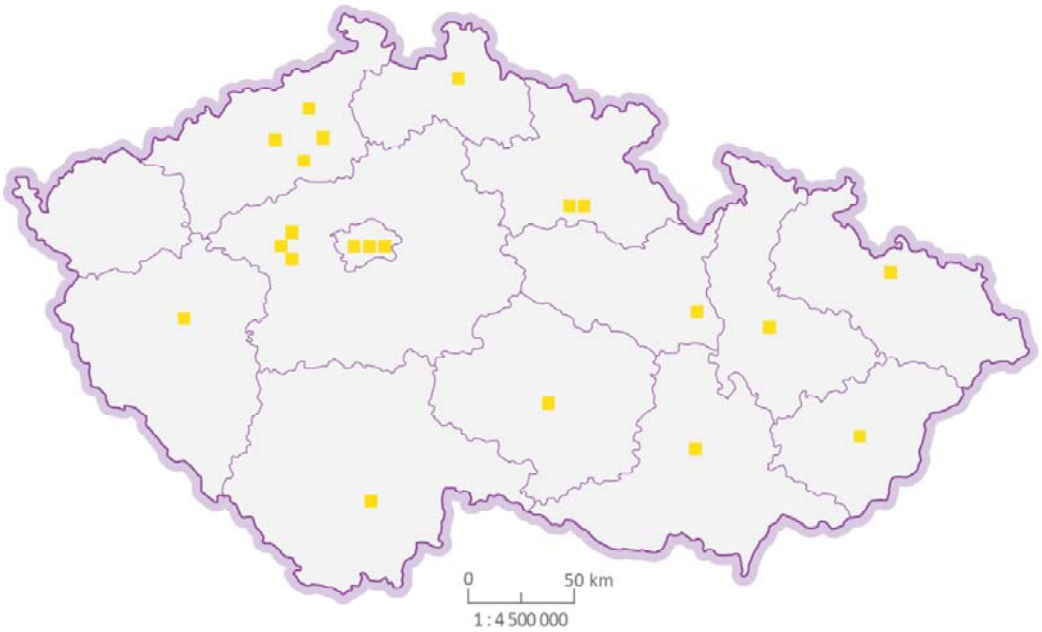

Figure 1 **Territorial distribution of the Special Education Centres in the Czech Republic in 2011**

Relatively comprehensive pilot survey to verify the structure of survey data on services was designed and brought well-structured SEC data collection for further investigation. Pilot data collection which was attended by SEC of two regions was conducted from September to December 2010. The basic element, that was verified (and subsequently used during the actual data collection) in the pilot testing, was the record of each "SEC educator's contact with the client." Therefore, each SEC staff recorded selected range of information about each service provided by the client (Svobodová & Voženílek, 2010). To ensure anonymity necessary (it was a procedure with the data bound to a disability, so-called sensitive personal data under the Act) personal information such as name, exact date of birth and address of residence were not recorded.
Data containing information on gender and age of client, type and severity of his disability, and other (for details see Table 2) were monitored. Record geolocation was made by postcode of residence of the client and the place where the SEC educator contacted the client.

Table 2
Collected data on the volume and type of services provided to clients by own exploration of SECs

mapped characteristic	**possible attribute**
date of contact	number of week in year
gender of client	girl, boy, group of client (gender is not recorded)
age of client	age category 0-2, 3-5, 6-11, 12-14, 15-19, 20-26
school grading of client	attended grade in school
residence of client	postcode and municipality name
place of contact	SEC, client's home, social welfare institution + postcode and municipality name of contact place
form of transport	bean which transported the client, or employee - car, city transport, walk
accompany of client	themselves, family member, teacher, other
depth of client's disability	none, light, moderate, severe
kind of contact	examination, education, re-education, screening, etc.
who initiated the contact	client itself, SEC, court, doctor, etc.

The SEC educators used the paper form (Fig. 2 left) to notice all required information about the meeting with a client (or immediately after). Once a week, all paper forms were recorded through a web form project (Fig. 2 right). Two-stage data collection (first fill out the paper form and then copy it into the web form) was designed from two reasons. The SEC staff usually does not use a computer during contact with the client and in many cases (diagnosis, screening) the typing of records could acted inappropriately and disturbing. The data was stored in spatial database for further analyses in GIS.

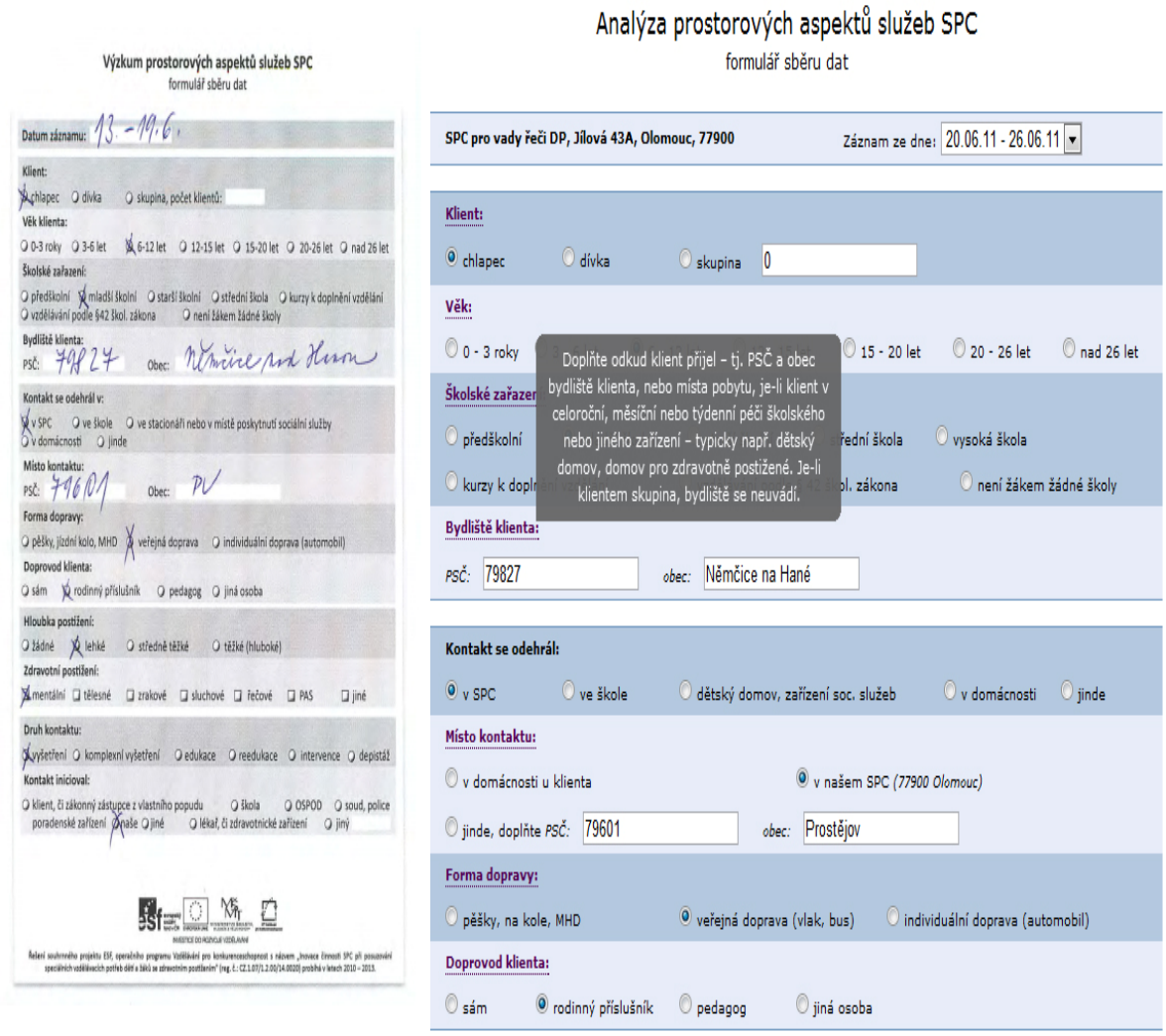

Figure 2 **Paper form (left) and a web form (right) with context-sensitive help filled in by SEC staff for each contact with the client**

From January to December 2011, collecting information and field offices in 21 SECs for visual impaired people in all regions of the Czech Republic (excluding Prague) was organized in the main survey.

Analyses and results

Data for analyses were obtained in two ways: by providing their own research and government organizations, the Institute for Information on Education and the Czech Statistical Office. Spatial analyses of the activities of the SECs for visual impaired people provide a basis for decision-making activities founding institutions, justification of optimization of the network and subsequent SECs' services (Voženílek, Kudělka, Horák, Snášel, 2012). Therefore, the authors performed various spatial analyses, for example location accessibility by network analysis, and identified regions with insufficient percentage of special education. All results from spatial analysis inform about the SECs' activities and

can also serve clients with special needs and their families to find a specific place of care.

The clients with visual disabilities receive their care mostly in the centres focused on their kind of disability (Fig. 3). But they are also clients of a number of other SECs. There are several SECs, which prefer work in group. They are mostly "historically" (from its establishment) focused on visual impairment. In each region one centre (often traditional centre at an initial "special school") dominates and the group work is also significantly more provided there. In the westernmost region, where there is not a centre exclusively for visual impairment, other three of five centres serve visual impaired people.

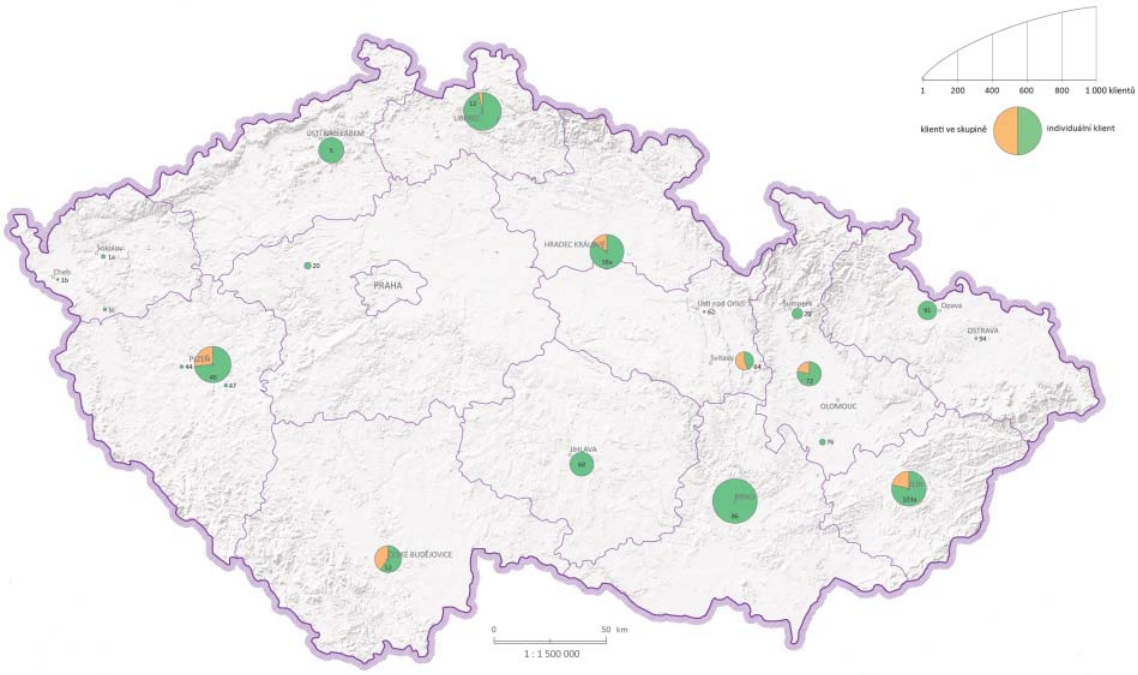

Figure 3 **Clients of SECs for visual impaired people according to form of work**
Explanations: left orange semi-circle – clients in group, right green semi-circle – individual client.

The clients of preschool, lower and higher primary school age make an approximately equal clientele of centres focused on visual impairment. The research shows that the centres for other disabilities do not serve visual impaired people. This confirms the high specialization of advisory activities in this segment. The map on Figure 4 shows that most regions have the only one SEC, which provides care for nearly all clients with visual impairment.

Very sparse and uneven distribution of addresses of clients with visual impairment, who attend the centres confirms that the use of SECs' services, is subject to nearness of the center. Only slightly higher concentrations of client addresses in the nearest center were proven.

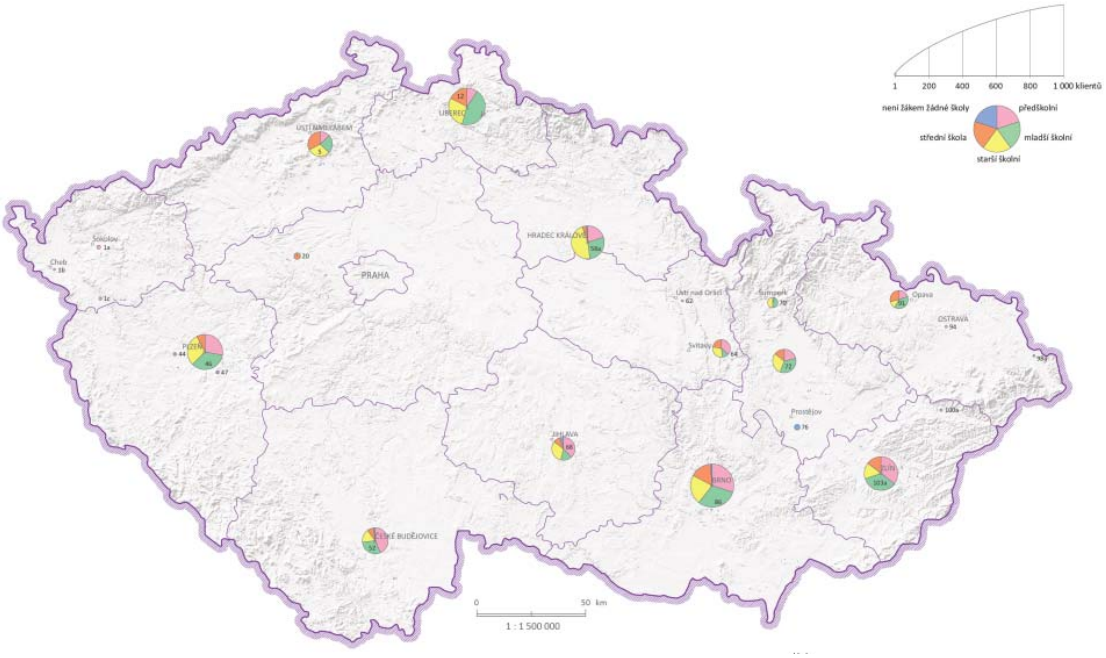

Figure 4 **Clients of SECs for visual impaired people according to school grading**
Explanations: pink sector – kindergarten, green sector – lower primary, yellow sector – higher primary, orange sector – secondary, violet sector – non

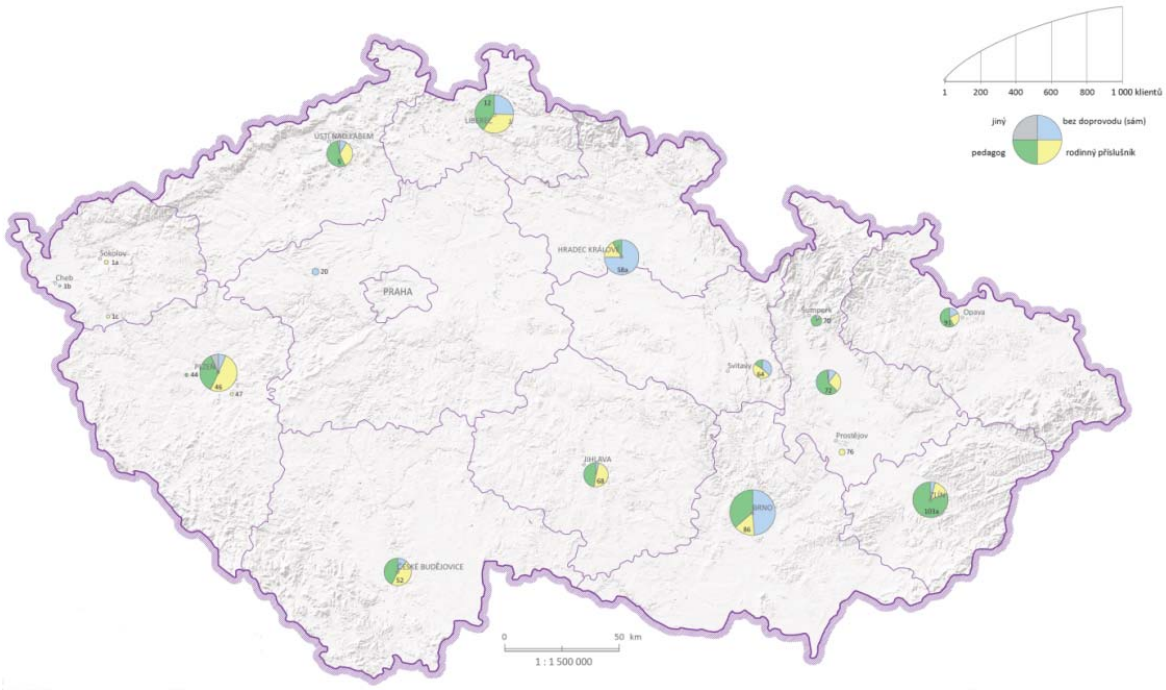

Figure 5 **Clients of SECs for visual impaired people according to accompany.**
Explanations: blue sector – alone, yellow sector – family member, green sector – teacher, grey sector – other

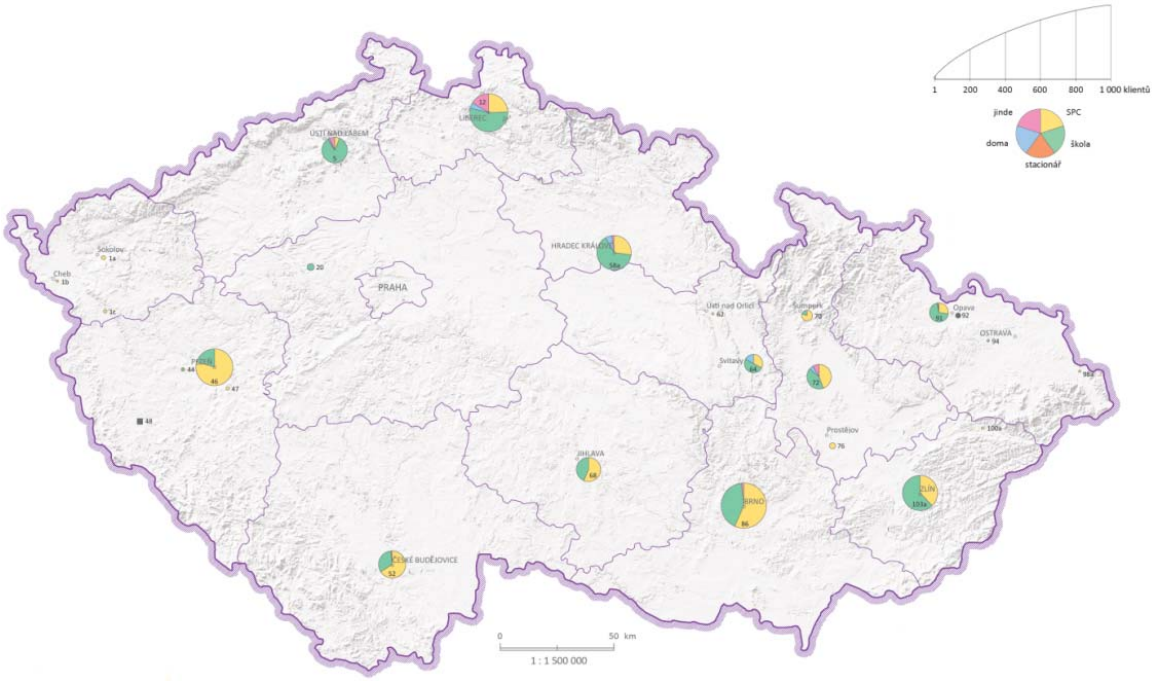

Figure 6 **Clients of SECs for visual impaired people according to place of contact**
Explanations: yellow sector – SEC, green sector – school, orange sector – care centre, blue sector – home, pink sector - elsewhere

It is surprising that while the most frequent accompaniment of visual impaired clients to the SEC is a teacher (42%). Several SECs are attended by clients accompanied by family members, in some cases attended alone (see Fig. 5). Higher accompaniment by teachers may be due to changes in legislation in 2011, which re-diagnosis was decreed. This could be the reason for the increased number of accompaniment by teachers.

Contact with visual impaired clients was taken place evenly in the SECs (45%) and schools (48%). The research distinguished three situations for the main regional SECs – prevailing contacts in the SECs in the south of the country, prevailing contacts in schools in the east of the country and varied structure of places of contacts in the remaining parts of the country (Fig. 6).

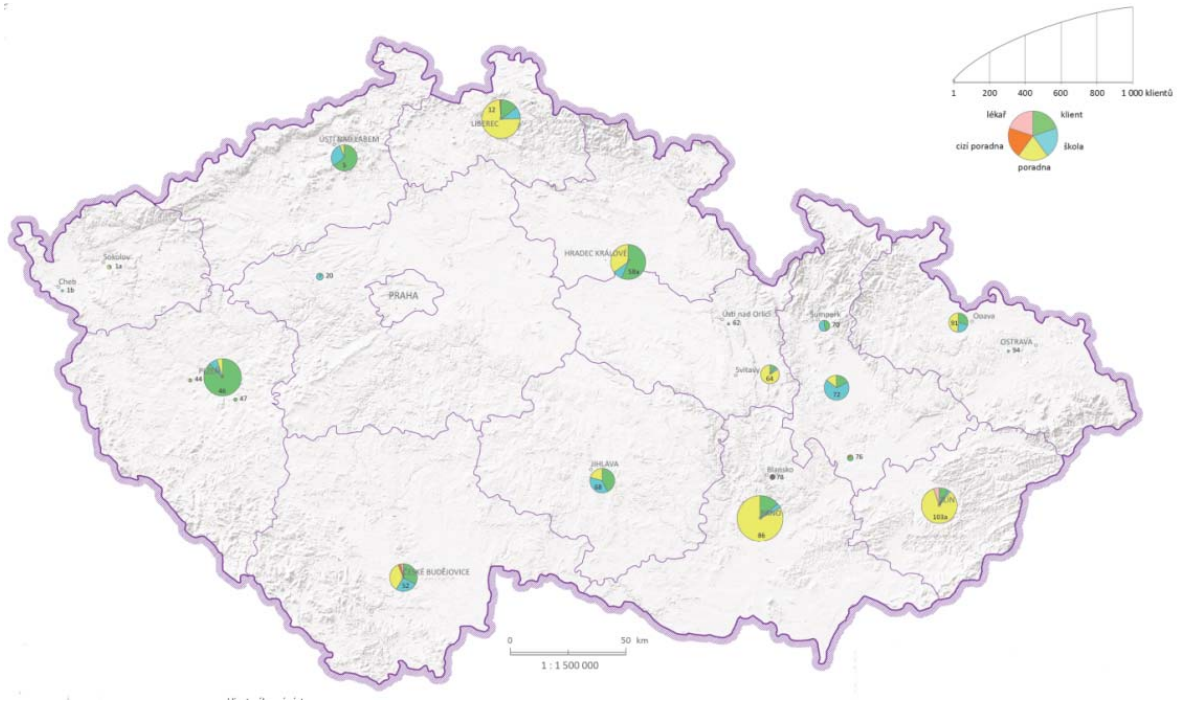

Figure 7 **Clients of SECs for visual impaired people according to initiation of contact**
Explanations of sectors: green – client, blue – school, yellow – domestic advisory centre, red – another advisory centre, pink – physician

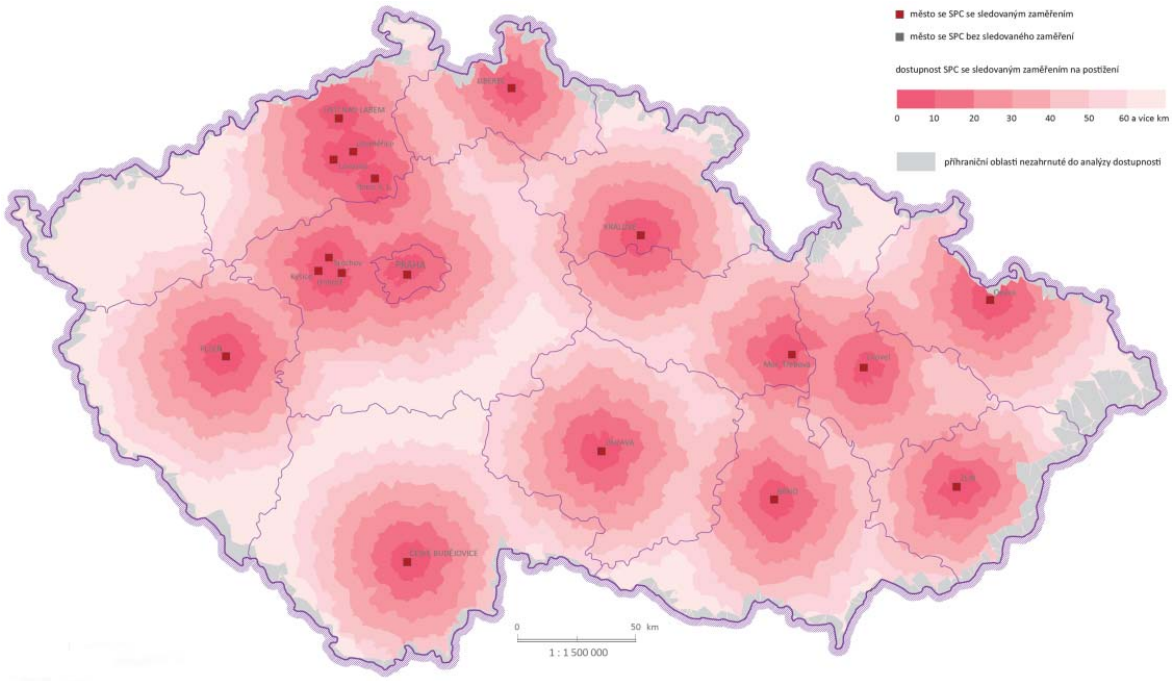

Figure 8 **Accessibility of SECs for visual impaired people**
Explanations: graduating red interval 0–10–20–30–40–50–60–and more km.

The situation when the initiator of the contacts is a family member is almost 33%. The term "initiating SEC" includes also ongoing intervention that is planned by the SEC professionals. It is interesting that three big SECs have more than ¾ initiations by "Domestic Advisory", three other big SECs have

prevailing the initiations by a family member (Fig. 7). Only one SEC has the most initiations by school.

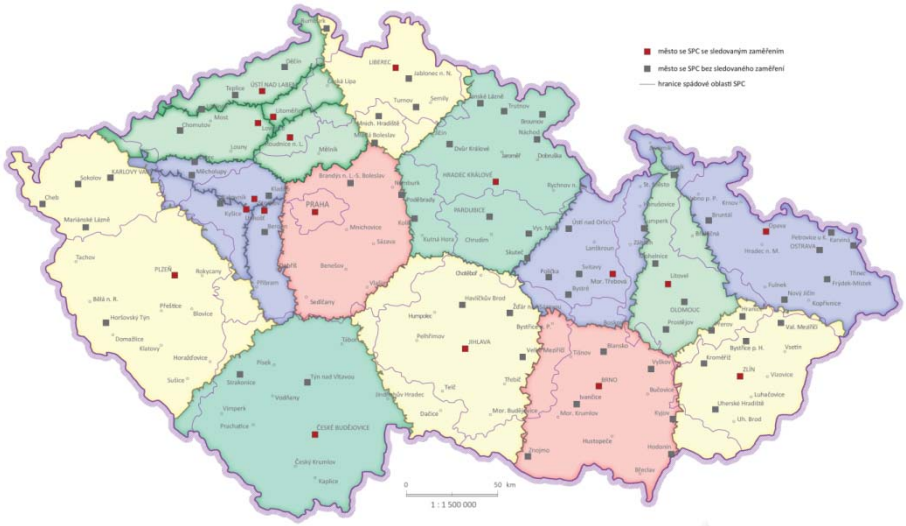

Figure 9 **Catchment areas of SECs for visual impaired people**
Explanations: red squared symbol – city with SEC for visual impaired people, grey squared symbol – city with SEC for another disability

Conclusions

The research resulted in critical knowledge for SEC managers, personnel of departments of education and social affairs of the public authorities, the relevant department of the Ministry of Education and Ministry of Social Affairs and the wider public. The results (Voženílek & Michalík, et al. 2013) provide a comprehensive overview of the activities of the SECs for visual impaired people in the Czech Republic (Popelka & Voženílek, 2012).

The informational value of the maps has already been applied at all levels of the educational system of the Czech Republic. Ministry staff and regional offices (these authorities act as founders of the vast majority of SECs) acquire irreplaceable and still undetected in the Czech Republic on the structure of SEC activities, availability of services for clients of different groups (children and students, parents, schools) and in particular more or less (not) justifiable differences in activity comparable type of this type of advisory bodies. Finally, the research meets the last entry made by investigators of the project: to provide a strong basis of the arguments of children and parents of students with visual impairment (possibly their organizations) in their logical requirement for high-quality, standardized, accessible, accurate and professionally acceptable time special education diagnostic or advice service (Horák, Kudělka, Snášel & Voženílek, 2011).

The research results became a strong argument and a source of expert claims for political decision-making at regional and national level.

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