

**SociALL. Making social care technologies accessible to all**

**WP2. Assessment of upskilling needs & Dissemination I**  
**Activity 2.2 - Desk research**

**Slovakia**



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## Long-term care in Slovakia

Long-term care is the provision of complex medical, nursing and custodial services for a long period of time, in some cases as permanent care. Slovak legislation does not define long-term care as a combination of social and health services provided on a regular and long-term basis. These two systems of care are also strictly separated in public perception. Health care is legally and formally provided by the state, while social care, including care for the elderly, disabled or chronically ill, is provided in part by the state, regions, charities and private institutions. The integration of social and medical care in the Slovak Republic is not systematically regulated by national legislation. Moreover, the approach to long-term care (LTC) as long-term social and medical care in Slovakia has undergone several major changes in the last 15 years. In 2005, the Ministry of Health submitted a proposal for an Act on Long-Term Care and Integration of People with Disabilities with a concept of an integrated LTC system. This law was not adopted and the concept was changed back to providing separate social and medical services. Today, individual parts of the LTC system are included in several regulations and laws. LTC is interpreted in terms of two types of needs - social care and medical care. This includes LTC from the point of view of disabled people and the problems of their needs and social inclusion. The second part is related to care for the elderly and the chronically ill. The main principles are continuously included in several national health and social strategies.<sup>1</sup>

For greater transparency, parts of the Slovak long-term care system are presented in the following figure:

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<sup>1</sup> Marek Radvanský And Viliam Páleník: The Slovakian Long-Term Care System 2010

Current system is vertically divided into three types of facilities and has lack of home care services		
Facilities of social services	Facilities with mixed social and nursing services	Hospitals providing social services (currently transforming to nursing facilities)
It is suggested to create a network of integrated facilities, providing horizontal services at home in every facility providing long-term services. Level of care is set by independent expert review team for long-term care. (There are separate review teams for elderly, psychiatric clients, etc.)		
----- Social services with basic nursing care ----- Social services with medium nursing care ----- Social services with widened nursing care		

*Figure 1 – Development of long-term social and healthcare facilities*

Both social and medical long-term care services in Slovakia can be divided into formal and informal care - see Figure 2. Formal care is provided by the public network of social and health institutions or by private medical institutions. Informal care is provided on an institutional basis (more than 1 day) and also through outpatient care and home/nursing care. Ambulatory care can be provided on a daily basis and is usually medically related. Formal home care is subdivided according to the type of services provided.

Medical-related services such as home care are covered by health insurance. Social services are provided by the social welfare system; expenditure is covered by lower level administration (municipalities and regions) through taxation and co-payments from the care recipient. Informal care at home is usually provided by a family member or a close person. A family member or close person providing intensive informal care may be supported by cash or similar benefits (social contribution may be paid to the caregiver). Other types of informal care are not covered by any legal agreement and are not usually paid.<sup>2</sup>

<sup>2</sup> Marek Radvanský And Viliam Páleník: *The Slovakian Long-Term Care System 2010*

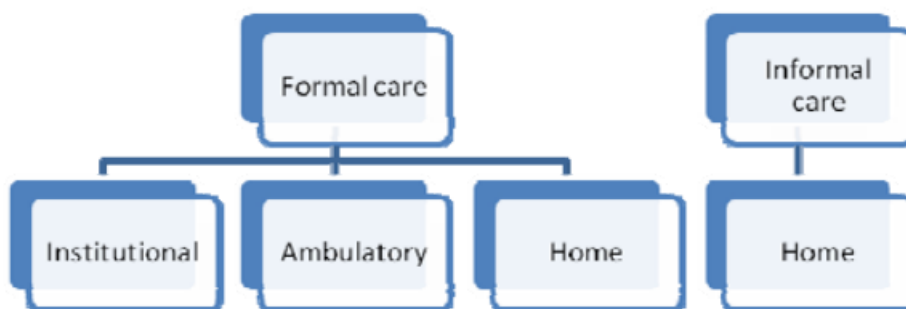


Figure 2 – Overview of LTC system in Slovakia

## Social care professionals' educational background

### **Social work**

In Slovakia, anyone choosing social work as their career will need at least a bachelor's degree. Ideally, should graduate with a degree in social work and earn a BSW (Bachelor of Social Work). However, if someone already has a college degree in a related field, such as Psychology, they may be able to get a job in social work. It takes most people four years to complete a BSW.

Many jobs require a master's degree in social work (MSW), which students who already have a bachelor's degree can usually earn in two years. If someone wants to do therapy, they will need an MSW. Students at this level take more advanced courses focused on their area of interest.

Examples:

- Child abuse and neglect
- Social work with children and adolescents
- Practice in home and institutional care with older adults

To teach in a social work program at a college or university, it is necessary to have a doctorate in social work (DSW or Ph.D.). This degree will take at least four years to complete. DSW programs are clinically based, while Ph.D. programs focus on research.

Doctoral students train to become leaders in the field. They learn how to advance in the profession through scholarly research and are trained to teach others to become social workers.

Many graduate programs have an option for applicants who already have a bachelor's degree in social work. These are called advanced standing programs, and students who get into them already have a certain number of credits in social work and therefore need less classes to complete their MSW diplomas. Because they already have social work knowledge, they can begin their internships earlier than students who do not have a BSW. Typically, they must have an undergraduate degree from a program that has received accreditation from the Council on Social Work Education.

Applicants to PhD programs usually need an MSW or Master's degree in a related field. You can expect to go through a strict interview procedure before the program will admit you. To apply to graduate school, you will need to take the Graduate Record Exam (GRE).<sup>3</sup>

## **Nursing**

According to the law, an accredited nursing course of 220 hours is required to work as a caregiver. Some caregivers have taken fewer hours of nursing courses than required by law, e.g. 216 hours. How can the course taken be converted into a nursing course in accordance with the required scope? The law clearly stipulates that the fulfillment of the qualification prerequisites necessary for carrying out the occupational activity of a caregiver in the field of social services (including the provision of home care services) is deemed to be the fulfillment of the relevant degree of vocational education obtained in the field of education with a focus on caring or on the provision of health care or, alternatively, the completion of an accredited course of at least 220 hours. No exception may be made to the above requirement, even if the caregiver would fall one hour short of the required minimum course. The aim of this provision is to ensure the professionalism and quality of the provision of care within the social service (including home care) in the interests for the safety of the social service provided to the recipient.

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*3 How to Become a Social Worker - BSW, MSW or DSW (chalized.com)*



If the accredited course is less than 220 hours but less than, for example, 200 hours, another accredited course of the prescribed duration must be taken. One possible solution is to take a 'supplementary' course in the missing range or in the range of hours defined by the educational institution, provided that the latter issues the graduate with a document (certificate) of completion of the 220-hour course, also on the basis of the completion of a previous course whose range did not reach 220 hours.<sup>4</sup>

It is positive that **Slovakia** ranks among the countries where nursing has its place among the professions and it is defined by law. Slovakia also accepts the International Labour Organization (ILO) core conventions on care work, but in the real situation it has so far failed to create decent conditions for the survival of care workers in Slovakia, as evidenced by the large migration of these workers, especially to Austria and Germany (Pichler 2011). This puts Slovakia rather in the second half of socio-economic development in the EU. However, these working-age professionals are able to generate considerable labour value, which they bring to developed countries. The receiving countries receive cheaper labour, moreover, without the need for prior investment in training or education. Our society is losing a great deal of labour potential and the investment it has made in their upbringing and education by the outflow of caregivers. Reducing the number of home care workers is contrary to the employment strategy. This results in further social exclusion of clients, unavailability of social services and inaccessibility of care services (100th ILO Annual Conference 2011).<sup>5</sup>

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*4 employees-social-services.pdf (gov.sk)*

*5 Care starostlivosť in Slovakia and the EU | Prohuman*



## Home nursing care in Slovakia<sup>6</sup>

### **Basic concepts**

Home nursing care in Slovakia has been operating in the health care system since 1995 and is part of out-of-hospital health care.

Home care is an important and inseparable part of individual long-term health care. The need for complex home care in Slovakia is increasing both for clients/patients and for health care workers. Surveys show that up to 90% of citizens prefer to receive health and social care at home. As the number of elderly people is increasing all over the world, including Slovakia, the elderly will be the only age group with a growing population in the near future. We should be aware of a significant fact that the number of people over 65 years of age, i.e. those in need of health and social care, is constantly increasing and will be the largest group. As old age is typically associated with advanced stages of chronic diseases requiring treatment in the form of follow-up and care, support for the development of complex home care in Slovakia is of great importance. The aim of home care is to provide complex care in coordination with outpatient and institutional care and the provision of nursing services.<sup>7</sup> Nursing home care agencies provide care to improve the quality of life, reduce hospitalization, recovery and medical costs.

The Agency for Home Nursing Care (ADOS) is a health care facility that provides comprehensive home nursing care for the sick and midwifery care to women whose medical condition is not expected to require continuous stay in an institutional health care facility and for people who have refused institutional health care.

Anyone who is ill is entitled to it if they need specialist health care. It is provided for patients of all ages and diagnostic groups. Patients themselves or relatives of the sick

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<sup>6</sup> *What is home nursing care + list of agencies - Health and Prevention - Health - Truth*

<sup>7</sup> *M Lezovic 1, B Taragelova, M Beresova: Home care in Slovakia 2011*



person may apply if the sick person is discharged from hospital to home treatment and needs to be treated.

ADOSs contract with health insurance companies for the reimbursement of the health care provided. Their activities are therefore covered by public health insurance. It is true that each health insurance company has its own rules; if it does not reimburse for a certain procedure, the patient must be informed of this at a right time. A list of the procedures covered by the relevant health insurance company is annexed to each contract.

The service is usually recommended by the GP, the treating specialist, the inpatient health facility or requested by the patient.

### **Services provided by home care agencies<sup>8</sup>**

#### **The treatment**

- is intended for immobile or partially immobile patients who require professional care and are unable to attend the outpatient clinic independently
- it is provided by qualified nurses on the basis of a general practitioner's proposal and a written agreement between the agency and the patient (or the patient's representative)
- may be paid for by the client or by health insurance

#### **The range of nursing services provided:**

- wound care
- treatment of pressure sores
- treatment of shin ulcers
- treatment of stomas in a non-ambulatory patient
- administration of drug infusions (on written authorisation by the doctor)

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*8 What is home nursing care + list of agencies - Health and Prevention - Health - Truth*



- central venous catheter care
- epidural catheter care
- esotracheal, nasotracheal and tracheostomy cannula care
- administration of injections
- nursing rehabilitation by a nurse
- nursing hygiene (for wounds or pressure sores in the sacral area only)
- prevention of pressure sores
- patient positioning
- measurement of blood pressure, pulse, temperature
- training in insulin administration
- treatment of the oral cavity in the cancer patient
- blood, urine and throat swabs
- cleansing or therapeutic enema
- catheterisation (women only), urinary catheter care

## **Rehabilitation**

- is intended for patients after injuries, vascular accidents or surgeries who require medical rehabilitation and are unable to attend rehabilitation facilities independently
- it is provided by qualified physiotherapists and physiotherapists on the basis of a proposal by a rehabilitation physician and a written agreement between the agency and the patient or his/her representative
- may be covered by the client or partly by health insurance

## **Care**

- is designed to support the independent living of seniors or to help relatives caring for seniors, e.g. when they need to care for relatives during work or vacation
- the care service is not covered by health insurance, the client pays for the service



### **Range of possible performances:**

- providing companionship (supervision, talks, walks)
- provision of meals (small shopping, delivering meals from the canteen, cooking simple meals, preparing and serving meals)
- helping with hygiene
- domestic help
- accompanying (to the doctor, to examinations, to hospital, etc.)
- activating the client (reading, board games, light physical exercises)

### **Institutional long-term care is provided in the following facilities<sup>9</sup>:**

Medical facilities which include:

- Institutional medical care facilities,

Outpatient medical care institutions, which include:

- Inpatient (facility intended for short-term medical care)
- Home care agency
- Mobile hospice (home palliative care)

Institutional medical care facilities (licenses are approved by the self-governing region):

- Hospital: general, specialised - licenses approved by the Slovak Ministry of Health
- Sanatorium
- Hospice (palliative care)
- Nursing home

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<sup>9</sup> Marek Radvanský And Viliam Páleník: The Slovakian Long-Term Care System 2010

Social care institutions provide general social counselling and social rehabilitation as well as accommodation in long-term care facilities. Other services provided by social care institutions (in addition to day care and sheltered housing) are laundry, cleaning and cooking. Specific services are listed below, together with a description of each institution. Facilities for persons dependent on the help of others and for pensioners are:

- A **sheltered housing facility** where a social service is provided to a person who is dependent on the help of another person or who is in need of supervision, enabling them to live independently. The facility mainly provides supervision, social care, accommodation and conditions for cooking.

- **Home for the elderly** provides a social service for pensioners or for people who have reached retirement age and is dependent on another person's help and who needs help in this kind of facility for other serious reasons. In addition to basic social services, nursing care and recreational and cultural activities are provided at the facility for seniors.

- **Nursing facility** provides social services to adult people for shorter period, who are dependent on the help of other person and it is not possible to provide another service. In a nursing facility, physical help from another person, nursing care and basic social services are provided.

- **The rehabilitation centre** is a social service for a person who is dependent on the help of another person, who is blind, deaf or hard of hearing. The rehabilitation centre also provides physical help from another person. If only outpatient care is provided in a rehabilitation centre, there is no need to provide cooking, accommodation, ironing and laundry in this type of facility. If accommodation is provided, it may be for a limited period of time. In the rehabilitation centre it is also given social counselling to family or people who secures help to people dependent on help in the home environment, from the purpose of help in rehabilitation.

- **House of social services** provides social services to a person who is dependent on the help of another person and the level of his dependence is at least V (on a scale of



six grades), or to a person who is blind or practically blind, and the level of his dependence is at least III. In the house of social services there is provided physical help of another person, nursing care, personal equipment, allowances given by ordinance. Children can also be treated in this type of institution (with education and other necessary services).

- **Specialised institutions** provide social services to persons who are dependent on the help of another person and the level of their dependence is at least V and also have a medical disease, usually Parkinson's disease, Alzheimer's disease, pervasive developmental disorder, multiple sclerosis, schizophrenia, dementia, blind-deafness and AIDS. In addition to basic social care, specialised institutions provide assistance from another person, nursing care, personal equipment, and allowances granted by decree. Children can also be treated in this type of institution (with education and other necessary services).

- **Day care** provides social care for a person who is dependent on the help of another person, but their need for dependence is only for part of a day. In daily stationary it is provided help of other person, cooking, work and social therapy, leisure activities. In this facility it is also given social counselling or help to family or people, which ensures help to person dependent on help in the home environment, for the purpose of helping in rehabilitation. Other complementary and domestic social services.

- **Nursing care** is a social service provided for persons who are dependent on the help of other person and the level of their dependence is at least II and is dependent on daily activities of self-care, activities of treating household and basic social activities. The scope of activities is provided on the basis of the decision of the Social Advisory Committee and is set by the municipality in hours. The minimum scope of social care cannot be less than the set level of dependency.

- **Transport care** is a social service provided for people with severe disabilities who are dependent on individual transport by motor vehicle or for people with disabilities and limited mobility or orientation.



- **Guide service** is a social service provided to a person who is practically blind or blind and a person with a mental disability. Reading may also be provided for blind people.

- Other complementary social services such as the provision of **personal assistance**, **interpreting** and **administrative assistance**, etc. An important secondary form of assistance is the loan of assistive devices.

- **Informal home care** is usually provided by a family member or a close person and is not covered by a legal agreement and the family member receives a social allowance for home care according to the Act. No. 447/2008 on financial allowances.

An overview of the usual types and duration of services provided in selected institutions is shown in Figure 3.

	Type of services			Length of Service			Institutional or home	
	Medical care	Social care	Nursing care	Daily care	Short term	Long Term	Institutional care	Home care
Facilities of institutional medical care	X				X		X	
Daily / Nursing stationary		X	X	X			X	
Agency of home nursing care	X			X				X
Mobile hospice	X		X	X				X
Hospital (general, specialized)	X				X		X	
Ambulatory (primary, specialized)	X			X			X	
Sanatorium	X		X		X	X	X	
Hospice	X		X		X	X	X	
Nursing care facility		X	X		X		X	
Facility of supported living		X				X	X	
Facility for seniors		X	X			X	X	
Rehabilitation centre		X	X	X	X		X	
House of social services		X	X	X	X	X	X	
Specialized facilities	X	X	X		X	X	X	
Other complementary social services		X		X				X

Figure 3. Overview of the provided social and medical services in the Slovak Republic

## Demand and supply of care

In recent years, the National Audit Office of the Slovak Republic (NKU) has been investigating the design of the education system for health professionals.

“The shortage of nurses and caregivers can be felt in hospitals or outpatient clinics in all regions of Slovakia”, says the NKU vice-president. By comparison, there are 5.7 nurses per 1,000 inhabitants in Slovakia, 13.9 in Germany, 10.4 in Austria, 8.6 in the Czech Republic and 6.6 in Hungary. According to the National Health Information Centre, there were almost 31,500 nurses working in the Slovak health system in 2019. The number of nurses has decreased by 5% over the last ten years.<sup>10</sup>

The United Nations estimates that there are about half a billion people with disabilities in the world. Of this number, there are around 500 thousand in Slovakia.<sup>11</sup>

Across Europe, activities to help people with disabilities have been gaining momentum over the last five years. An anti-discrimination article has been adopted, according to which a person cannot be discriminated against based on his or her disability. Since 2000, this prohibition has also been in the Charter of Fundamental Rights. On the contrary, the Charter considers the right of disabled people to 'benefit from measures designed to ensure their independence, social and occupational integration and participation in society' to be a fundamental right.<sup>12</sup>

According to the Slovak Ministry of Labour, Social Affairs and Family, there are about 183 thousand people in need of long-term care and almost half of them are older than 65. More than 38 thousand people receive formal institutional care, more than 70 thousand people receive some kind of formal home care and about 60 thousand people

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*10 Patients experience shortage of nurses, caregivers in hospitals and outpatient clinics - News - Supreme Audit Office of the Slovak Republic (gov.sk)*

*11 Home care (zomieranie.sk)*

*12 Disabled people often don't know their rights - www.sme.sk*

receive some kind of informal care. It is roughly estimated that about 20% of people in need of long-term care do not receive any kind of long-term care.

### **Institutional care**

Institutional care in Slovakia consists of several types of institutions. Altogether, there are more than 38,000 beds in the whole long-term care system. This number is insufficient, especially in long-term care facilities for the elderly. In some institutions the waiting list is several years. More than 2/3 of all beds are in public institutions, the rest in private ones. The majority of private institutions are set up for social care.

### **Home care**

Home care is a priority for people with a secure social background and is the least stressful. The most important part of home care is informal care provided by family and close relatives, which is provided for all persons requiring some level of long-term care. Informal care is mainly provided by family or close persons. Under certain conditions, this type of care can be financed by state contributions as an income supplement. The second type is formal home care and formal home nursing. In 2007, about 70 thousand people received some kind of formal home care. Of these, more than 40 thousand were over 65 years old.

### **Semi-institutional care**

A small part of the long-term care system is made up of institutional facilities that provide mostly temporary care on a daily basis, such as inpatient day care, mobile hospice care and outpatient care.<sup>13</sup>

## **Attendance allowance and early retirement**

Attendance allowance is a sickness benefit that you can use if you are attending to a sick parent (or spouse's parent) personally for a full day. The entitlement to nursing allowance is based on a form from the Social Insurance Institution issued by a doctor

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<sup>13</sup> Marek Radvanský And Viliam Páleník: The Slovakian Long-Term Care System 2010





at a health care establishment when someone determines the need for personal and full-day nursing or care.

### **Conditions for entitlement to sickness benefits**

- a certificate from a competent doctor stating that the medical condition necessarily requires treatment by another person
- the existence of sickness insurance or the duration of a protection period
- only one person is entitled to the sickness benefit and only once

### **Entitlement to Attendance Allowance in 2022**

Only a person who has reached the age of majority, has full legal capacity, is physically and mentally able to carry out the care and has written consent to care of the person with a disability is eligible to apply for a care allowance. This person may or may not be in a family relationship with the cared-for person.

However, if an eligible person who is not in a family relationship with a person with a disability wishes to benefit from the caregiver's allowance, it is necessary that the person and the caregiver live in the same household or have the same permanent residence. For family members, the cohabitation requirement does not apply.

The assessment of entitlement to the care allowance is preceded by an assessment of the independence of the severely disabled person. The assessment results in the determination of the degree of dependency, which can range from I to VI. A severely disabled person is dependent on care if his/her degree of dependence on the assistance of another natural person is V or VI and he/she is also dependent on the assistance of another person for at least 8 hours a day. <sup>14</sup>

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*14 Entitlement to Attendance Allowance in 2023 | TENA CGR*



## **Early retirement for mothers**

In the federal support program for people with limited opportunities provided a fairly large number of measures. In particular, the mother of a disabled child who has raised him/her for at least 8 years, can retire early. She just needs 15 years of working experience to do so. In accordance with the Labour Code, mothers with a disabled child have the option of working part-time or weekly. In this case, wages are provided in proportion to time. It should be remembered that this opportunity is granted until the child is 16 years old.<sup>15</sup>

## **Innovation in healthcare – tech enhanced tools**

### **Deploying applications in healthcare**

Slovakia is currently facing the considerable challenge of an ageing population and a consequent change in the structure of our population. Hand in hand with the growing number of seniors, the demand for healthcare will also grow. Given that this is a Europe-wide phenomenon and that the ratio of the number of working people to the number of pensioners is falling, access to healthcare will deteriorate. We will have to be very careful with the available capacity of doctors, nurses and other health professionals and use it efficiently. This is where new technologies could help us.

Healthcare has been a department that has long been bypassed by effective solutions. The level of investment in innovation in this sector can be assessed as negligible or non-existent. However, healthcare is not a sector that has avoided technological change, although looking at Slovak hospitals it may seem so.

In 2020, Martin Barto pointed out the enormous potential of technologies in healthcare, which are unfortunately not being implemented in Slovakia, and which could qualitatively move our healthcare to a higher level in relation to patients. The author

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<sup>15</sup> Allowance for the care of a disabled child. Rights of disabled children. Social protection of disabled persons (srimathumitha.com)



would like to put forward a proposal for debate on whether we should not specifically address the implantation of new technologies in Slovakia.

**Sensors** that allow us to monitor various variables such as blood pressure, pulse, ECG, blood oxygen concentration or the color of the whites of the eyes will help us to make better use of the capacity. The **doctor-patient interaction**, in this way, does not have to be direct, but can take place **remotely**, with a quality equivalent to a standard doctor's visit, saving time. If **intelligent apps** are used, which have learned to recognize disease tips based on images of different skin conditions, the patient can send an image of a suspicious skin change to the dermatologist and the dermatologist will decide whether the condition requires a personal visit or not. This is mainly a technology that we should implement in the country as soon as possible as we are leading in the table of doctor visits.

Similarly, **smart apps** can assist doctors in analyzing X-ray and CT scans as well as MRI recordings. **Databases** of millions of scans with subsequent confirmed diagnostic conclusions are available today and can greatly speed up and refine the work of doctors evaluating scans. We will thus reduce the congestion in outpatient clinics and with specialist doctors, who are already in short supply, and at the same time attract the attention of the younger generation of health professionals.

However, these technologies may not only serve patients, but also healthy people in the (often neglected) issue of prevention. They can become a tool to help monitor the achievement of certain health goals (e.g. walking, weight). Of course, there may be a question of the degree of confidentiality of the data, but some aspects can be solved by blockchain technology, which can guarantee that health data is unbreakable. Estonia uses this technology, where data is distributed (i.e. not in one central repository) and thus virtually unbreakable.<sup>16</sup>

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16 *New technologies for healthcare - Martin Barto - (blog.sme.sk)*

## Telemedicine and remote diagnostics

Telemedicine and remote diagnostics is not new, but it has been in the spotlight in recent years. People were staying at home during the spread of coronavirus and since then taking advantage of remote medical consultation. We have such services in Slovakia, but it is clear that they cannot be a substitute for a visit to the doctor.<sup>17</sup>

Telemedicine is a way of delivering healthcare remotely, making it more accessible, cost-effective and increasing patient engagement. Since the first telemedicine trials in the latter half of the 1950s, advances have moved forward so much that doctors and patients can now share information in real time without both being in the same place. Using telemedicine, doctors can make a diagnosis, consult on a patient's health with other remote medical personnel, or monitor a patient remotely using mobile medical devices to collect data (e.g., blood sugar or blood pressure). All without patients having to wait to be seen in a healthcare facility. For example, in the US, they have set up a bedless hospital in Missouri called Mercy Virtual Care Center, which offers remote diagnoses and treatment methods. Turkey started work on "digital hospitals" in 2013, and in 2016 one of the top four digital hospitals in Europe (Tyre Public Hospital) was established.<sup>18</sup>

Goldmann Systems, a.s. decided to join the call "**IT companies help Slovakia**" by providing a comprehensive remote monitoring platform for the needs of the public and the state. The platform itself allows patients to monitor their physiological functions important for the development of COVID-19 infection - such as temperature and blood oxygen saturation (remote monitoring using a thermometer, an oximeter and a transmission HUB) - in the comfort of their home - or in this case, in home quarantine.<sup>19</sup>

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<sup>17</sup> A doctor in Slovakia will also examine you remotely. Telemedicine is a huge hit in the world (startitup.sk)

<sup>18</sup> Digital Health (itapa.sk)

<sup>19</sup> Telemedicine | Goldmann Systems - Customized Information Systems

## Digital Hospital

In a broader context, a digital hospital can be defined as a hospital with maximum use of information technology in administrative, financial and medical processes. In a digital hospital, all kinds of communication tools and medical devices are integrated, and medical staff and patients can exchange data inside or outside the hospital using telemedicine and mobile medicine procedures.

The driving force behind the concept of the digital hospital as we know it today was the implementation of EHRs (electronic health records) into healthcare practice, replacing traditional "paper-based systems" between 2000 and 2007. After the financial crisis of 2007-2008, which hampered the flow of investment in technology and operational changes to new services, investment in EHRs began again in a big way.

## eHealth

Rather, eHealth can be seen as a generally desirable concept of embedding technology into healthcare and making patient care more integrated and accessible. The World Health Organization considers eHealth to be one of the fastest growing areas of health today and is making efforts to promote eHealth policy, practice and governance, to raise awareness of eHealth in Member States at a local, regional or national level. There are a relatively large number of initiatives at both global and European level. In this context, mention may be made of the European Commission project Communication on Digital Transformation of Health and Care in the Digital Single Market or the Global Observatory for eHealth project of the World Health Organization.<sup>20</sup>

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<sup>20</sup> *Digital Health (itapa.sk)*



## TREX solution

The **TREX solution**<sup>21</sup> (since 2011) offers a large number of additional devices to ensure maximum user comfort. In particular, it can monitor the movement of residents in the area, it can identify various situations related to disability or limited abilities of the resident, where the time aspect of the required intervention of medical and sanitary personnel is important.

**Pocket Call Receiver:** It is used to receive calls primarily from ATOM alarm buttons, but also from other NEAT devices (max. 128 devices in one Trex). Receipt of the message is indicated by acoustic and vibration signaling and, at the same time the caller information is shown on the display. If D-POS modules and D-ATOM wristbands are used in the system, it is also possible to announce the location from where the patient is calling. From the TREX it is possible to call for assistance from another nurse who is also equipped with a TREX or, for example, to trigger an acoustic or other alarm in case of danger.

**Repo+ - Radio Repeater:** It serves to increase the radio range. It receives the signal from the individual NEAT components and re-transmits it amplified. It can be programmed to respond to the signal of some or all nearby transmitters. By using multiple repeaters, it is possible to cover relatively large objects.

**ATOM - bracelet with emergency button:** It is used to summon the nurse. It is worn as a wristwatch or hung around the neck. It can also be used as a wall button, for example in the shower. It can also be hung by a lanyard above the bed within reach of a lying client. The ATOM is powered by a lithium battery with a lifetime of 5-10 years, is waterproof and mechanically resistant.

**HAPA - adapter for atom:** The adapter, made of acrylic glass, is used to easily press the ATOM button in case the elderly or disabled have difficulty using the smaller button on the device. It allows the alarm to be triggered by, for example, an elbow, head or other part of the body. It also allows wall mounting.

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<sup>21</sup> *Digital Health (itapa.sk)*



**PULL - wireless wall-mounted emergency call point with lanyard:** Suitable for bathrooms, toilets or as a room wall alarm. Thanks to a cord that runs all the way to the ground, it is easy to reach.

**BELL - wireless doorbell button:** The squeeze is signaled on the TREX pocket unit. Suitable, for example, for closed compartments or for night operation.

**PUSH - wireless large-area call button:** The squeeze is signaled on the TREX pocket unit. Suitable for e.g. bedside mounting, in rooms, in the corridor to summon a nurse.

**FALL - fall detector:** Automatically detects if the client falls to the ground. It senses acceleration in two different axes and uses intelligent evaluation to maximize detection reliability. It is worn on a trouser belt.

**SAFEFLOOR - detection mat:** Suitable, for example, for controlling the movement of clients. Includes INKA module for wireless signal transmission to the Trex receiver.

**SAFEBED - mattress pad:** It is designed to detect vital signs, bed abandonment or falls from bed. It detects micro-movements caused by breathing and heartbeat. It informs the nurse if respiratory and cardiac arrest should occur or if the client gets up or falls out of bed. Includes INKA module for wireless signal transmission to the Trex receiver.

**Epilepsy Alarm - bed pad for epileptic seizure detection:** Like SafeBed, plus epileptic seizure detection. Includes INKA module for wireless signal transmission to the Trex receiver.

**URINAL ALARM - bed pad for urine detection:** It detects bedwetting and notifies the nurse on the TREX receiver display. Includes INKA module for wireless signal transmission.

**PIR - infrared wireless sensor:** The sensor is used to monitor movement and to inform the nurse. For example, it can guard certain areas where patients should not have access to, etc.

The advantages of the TREX system are wireless two-way communication, easy installation and operation. The systems are deployable almost anywhere in express time. The use of the systems is possible in the health care, social sphere, in domestic environments as well as in manufacturing companies and industry.

The TREX system can contain more than 30 wireless components with different functionality and focus, which makes it suitable for covering a wide range of requirements and functionalities.<sup>22</sup>

## Futuristic solutions

### **Smart clothing**

The University of Žilina has long been conducting research on smart textiles, which can be used to produce smart clothing. Their main task is to monitor the vital functions of people wearing them. The basic functions monitored include: blood pressure and heart rate, respiratory rate and depth, and perspiration. For example, the researchers tested the quality of two types of textile multifilament silks with high electrical conductivity. These were fibres coated with a layer of silver. In the next step, the experts examined a wide variety of technological options for the preparation of two- and three-component blended yarns, using the technology of combining standard (Ba, PP, PES, PA, Lycra) and special electrically conductive fibres into a single electrically conductive blended yarn.<sup>23</sup>

### **Robots, brain computer**

There is more and more talk about **robots and their use in medicine and nursing**. In some countries already facing the challenges of an ageing society (e.g. Japan, Taiwan), robots are already being trialled to handle helpless patients. Robotic parts, equipped with sensors and body-computer interfaces, can replace or strengthen

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<sup>22</sup> *Systems for social facilities and hospitals | NudzovéTlačidlo.sk (nudzovetlacidlo.sk)*

<sup>23</sup> *Smart clothing wins prestigious award - SCIENCE FOR A DOSAH (cvtisr.sk)*





amputated or non-functioning limbs. Similarly, **devices that have a brain-computer interface** may help restore or improve vision or hearing in the future. In other words, many people with significant disabilities, who are limited in their lives, will have their life options significantly expanded and will no longer be dependent on society for support. At the same time, this would make the work of caregivers easier and more efficient, reduce the number of patients directly dependent on them and alleviate the shortage of caregivers in our circumstances.

But robots have wider applications. Today, there are about five thousand **surgical robots** in the world (one in our country, ten in the Czech Republic), which enable very gentle operations for tumour removal, gynaecological or even some heart operations. The main benefit of robotic equipment is that it will enable even average surgeons to achieve top performance, i.e. the quality of operations will increase, the reoperation rate will decrease and, above all, the patient will return to normal life sooner. Another advantage is in connection with the introduction of 5G technology in telecommunications. The power of transmission will allow operating robots to be used remotely. Robots will also find wide application in routine dosing and administration of medicines, thus saving manpower. <sup>24</sup>

## Summary

- Recently, the problems of ageing and the increasing demand for long-term care services have become a key issue in society.
- There are several barriers to accessing long-term care in the Slovak long-term care system. The main ones are financial barriers, geographical barriers (uneven distribution of providers) and organizational barriers (sometimes waiting times for social care for the elderly are several years).
- Home care in Slovakia has been part of the health care system since 1995 and is part of non-hospital health care. The Agency for Home Care (ADOS) is a health care institution that provides comprehensive home care services to patients and

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*24 New technologies for healthcare - Martin Barto - (blog.sme.sk)*

persons who are not considered to have a health condition that requires continuous stay in an inpatient health care facility, as well as to persons who have refused inpatient health care.

- The most important part of home care is informal care provided by family and close relatives, which is available to all persons requiring some level of care. Informal care is mainly provided by family and close relatives. Under certain conditions, this type of care can be financed by state contributions as an income supplement. The second type is formal home care and formal home nursing. In 2007, about 70 thousand people received some kind of formal care at home. Of these, more than 40 thousand were over 65 years old.
- In 2011, the TREX system was established, which is intended not only for the network of social institutions, but also for hospitals and rehabilitation facilities. It is a wireless system with many features that ease the difficulties of the healthcare system and home care. A few years ago, the University of Žilina developed a 'smart clothing' system that also aims to make everyday life in the healthcare system easier.
- With the 'explosion' of COVID, telemedicine as a discipline has also taken off, and the time has come to bring the Slovak healthcare system up to modern European standards.
- Certainly, Slovakia's health sector faces fundamental problems in terms of care. We could not find any information (publications, articles, etc.) on the level of knowledge of innovative technologies among care professionals at the national level. They are used in home care only by small and medium enterprises, which have their own, non-public training protocols, whereby they train their employees themselves.



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