



# Child healthcare in Hungary

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## Abstract

We describe the strengths and challenges of the child healthcare system in Hungary. The number of children has been steadily decreasing since 1982. The number of live births per thousand population has decreased from 12.1 to 9.3 between 1990 and 2015. In 2015, the infant mortality rate was 4.2 deaths per 1000 live births, the lowest ever recorded in Hungary. In 2012, 96% of infants were ever breastfed, following the guidelines, and 65% were exclusively breastfed. Vaccine coverage is over 99%. Primary care paediatricians provide primary healthcare for children under the age of 18 years. There is a special pediatric and a special preterm new-born transport system. The network of Neonatal Intensive Care Units within Hungary was set up in 1975, with the participation of 10 Neonatal Intensive Care Units. In 2015, there were 206,507 inpatient hospital admissions for children aged 0–18 years to acute hospitals. Acute pediatrics is mainly provided in pediatric departments in general hospitals with inpatient and outpatient care. After finishing medical university, there is a 5-year period of postgraduate pediatric training in certified hospitals and university pediatric departments. Hungary's healthcare system is on the brink of disaster. Low salaries and poor working conditions force physicians to either go abroad or work at a private institutions. Hungary will face a major shortage of paediatricians within ten years. The average age of paediatricians in Hungary is 59, 46% of whom are age over 60 years. Several efforts are being made to solve this complex problem.

**Keywords:** Education, healthcare, Hungary

## History of child healthcare. History of paediatrics

The organised healthcare of children can be traced back to the Middle Ages. All pediatric knowledge was described in a small booklet published in Nagykároly, 1771, written in Hungarian. There was no organised pediatric care and pediatric education established until the 19<sup>th</sup> century. Ágoston Schoepf Merei established the “Private Institute in Pest for Orthopaedics” at his own expense, and later the “Poor Children Hospital in Pest” in 1839 (1).

When an international medical congress was held in Budapest in 1909, a pediatric section was organised for the first time, and János Bókey was asked to be the chairman of this section. He proposed the establishment of an international organisation, which was approved, and the next year the International Paediatric Association (IPA) was created in Paris (1).

## About Hungary

Hungary is a medium-sized European country with a territory of 93,030 km<sup>2</sup> situated in the Carpathian Basin in Central Europe. The population is about 10 million, of whom approximately 1.8 million are children and adolescents age under 18 years. Hungary is divided into 19 provinces. None of them has a high degree of independence concerning financial and administrative affairs. Hungary is a rather centralized country (2, 3).

As regards the political system, Hungary operates as a democratic republic with an elected Parliament. Legislative power is exercised by the unicameral National Assembly, which consists of 199 members. Members of the National Assembly are elected for four years. The Prime Minister is the head of the government, and the President is the head of state and holds a largely ceremonial position.

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Executive power is exercised by the government. Legislative power is vested in both the government and the Parliament. The judiciary is independent of the executive and the legislature.

Hungary is an independent, democratic and constitutional state, which has been a member of the European Union (EU) since 2004. Since 1989, Hungary is a parliamentary republic. The main political parties are: Fidesz – Hungarian Civic Alliance, having an ideology of National conservatism and Regionalism, the Christian Democratic People's Party, representing the ideology of Christian democracy and Social conservatism, and the Hungarian Socialist Party, having a political ideology of Social democracy and Social liberalism. Movement for a Better Hungary (Jobbik), represent Hungarian nationalism and Political radicalism, and finally, Politics Can Be Different, whose ideology is Green politics.

Fidesz is a major national-conservative political party in Hungary. It has dominated Hungarian politics on the national and local level since its landslide victory in the 2010 national elections on a joint listing with the Christian Democratic People's Party, securing its parliamentary supermajority, which it managed to keep in 2014. Fidesz also retains current majorities in the county legislatures (19 of 19), almost all (20 of 23) urban counties and Budapest city council. It is a member of the European People's Party (EPP). The present government is a coalition of Fidesz and the Christian Democratic People's Party (2, 3).

Hungary is a member of the Central European Initiative (CEI), European Organisation for Nuclear Research (CERN), Euro-Atlantic Partnership Council (EAPC), Food and Agriculture Organisation of the United Nations (FAO), International Atomic Energy Agency (IAEA), International Criminal Court (ICC), International Federation of Red Cross and Red Crescent Societies (IFRC), International Monetary Fund (IMF), International Telecommunications Satellite Organisation (ITSO), Interpol, International Organisation for Standardization (ISO), International Telecommunication Union (ITU), North Atlantic Treaty Organisation (NATO), Nuclear Energy Agency (NEA), Organisation for Economic Co-operation and Development (OECD), United Nations (UN), United Nations Educational, Scientific and Cultural Organisation (UNESCO), United Nations University (UNU), Visegrad Group, World Health Organisation (WHO), World Trade Organisation (WTO), and has signed both the United Nations Convention on the Rights of the Child and the European Human Rights Convention (2, 3).

### Demographic characteristics

Hungarian life expectancy at birth has risen between 1990 and 2015, for males from 65.13 years to 72.09 years, and females from 73.71 years to 78.61 years. The gap between life expectancy at birth for males and females has fallen from 6.96 years to 4.90 years. Nonetheless, the Hungarian life expectancy at birth (76.02 years) was lower than the average of the 28 countries in the EU (80.87 years) (Table 1) (4–6).

The Hungarian population was 9,855,571 on January 1<sup>st</sup>, 2015. The number of females per thousand males was 1.099, as a result of women living longer than men. The proportion of 0–14-year-old children was 14.5%. The number of children has been steadily decreasing since 1982. Besides the decrease in the proportion of children, the proportion of those aged 65 or over has increased by 4.6 percentage points between 1990 and 2015 (from 13.3% to 17.9%). The causes of the aging population, on the one hand, are people living longer, and low numbers of live births on the other (4) (Table 1).

In 2015, about 30% of the Hungarian population lived in rural areas, 18% in the capital city of Budapest, and 52% in other cities. Twenty-five years ago, the proportion of people who lived in the capital was a little higher (19%), and the proportion that lived in rural areas and other cities was lower.

The number of live births per thousand population decreased from 12.1 to 9.3 between 1990 and 2015. The number of live births was 91,690 in 2015. The number of deaths per thousand population slightly decreased from 14.0 to 13.4 in the same period. The number of deaths was 131,697 in 2015 (4) (Table 1).

Since the number of live births was lower than the number of deaths, the Hungarian natural population has decreased. There has been a negative rate of natural increase in Hungary since 1981. If the ratio remains the same, the last Hungarian would live alone in 2262.

The number of marriages per thousand populations decreased from 6.4 to 4.7 between 1990 and 2015. The number of marriages was 46,137 in 2015. The numbers of divorces per thousand populations were 2.4 in 1990 and 2.1 in 2015. The number of divorces was 20,315 in 2015 (Table 1). In 2011 the distribution of the Hungarian population at the age of 20 by marital status (compared with EU) was the following: 27.5% (28.1) single, 47.7% (55.3) married, 12.3% (8.9) widowed, and 12.4% (7.4) divorced (7, 8).

One-fifth of all households with children were single-parent households. This rate has increased since 1980 from

**Table 1. Population, vital events indicators (1941–)**

	1949	1990	2001	2005	2010	2015
Population						
Male	4,423,420	4,984,904	4,851,012	4,793,115	4,756,900	4,695,779
Female	4,781,379	5,389,919	5,349,286	5,304,434	5,257,424	5,159,792
Total	9,204,799	10,374,823	10,200,298	10,097,549	10,014,324	9,855,571
Number of females per thousand males	1081	1081	1103	1107	1105	1099
Population density per km <sup>2</sup>	98.9	111.5	109.6	108.5	107.6	106.0
Marriages						
Number	107.820	66.405	43.583	44.234	35.520	46.137
Per thousand inhabitants	11.7	6.4	4.3	4.4	3.6	4.7
Divorces						
Number	12,556	24,888	24,391	24,804	23,873	20,315
Per thousand inhabitants	1.4	2.4	2.4	2.5	2.4	2.1
Live births						
Number	190,398	125,679	97,047	97,496	90,335	91,690
Per thousand inhabitants	20.6	12.1	9.5	9.7	9.0	9.3
Deaths						
Number	105,718	145,660	132,183	135,732	130,456	131,697
Per thousand inhabitants	11.4	14.0	13.0	13.5	13.0	13.4
Natural increase, decrease (-/+)						
Number	84,680	-19,981	-35,136	-38,236	-40,121	-40,007
Per thousand inhabitants	9.2	-1.9	-3.4	-3.8	-4.0	-4.1
Total fertility rate	2.54	1.87	1.31	1.30	1.25	1.44
Reproduction rates						
Crude	1.223	0.912	0.633	0.631	0.609	0.699
Net	1.060	0.891	0.624	0.623	0.602	0.692
Average life expectancy at the birth						
Males	59.3	65.1	68.2	68.6	70.5	72.09
Females	63.4	73.7	76.5	76.9	78.1	78.61
Foetal losses						
Induced abortions						
Number	–	90.394	56.404	48.689	40.449	31.176
Per hundred live-born	–	71.9	58.1	49.9	44.8	34.0
Foetal deaths						
Number	–	18,295	16,292	17,528	16,710	16,802
Per hundred live-born	–	14.6	16.8	18.0	18.5	18.3
Total number	–	108,689	72,696	66,217	57,159	47,978
Number per hundred live-born	–	86.5	74.9	67.9	63.3	52.3
Infant deaths						
Number	17.327	1.863	789	607	481	383
Per thousand live-born	91.0	14.8	8.1	6.2	5.3	4.2

10%. The majority (86%) of single-parent families were headed by a female lone parent (8).

The total fertility rate decreased from 1.87 live births per

woman to 1.44 between 1990 and 2015, well below the replacement level of 2.1 (and the net reproduction rate decreased from 0.891 to 0.692 between the same periods) (4, 8) (Table 1).

**Table 2. Infant mortality rate by birthweight and age**

Age	Infant mortality under one year of age by percent		
	<2499 grams	>2500 grams	All
0 days	27.6	9.5	22.5
1–6 days	31.7	16.1	27.2
7–27 days	16.3	13.1	15.4
28–365 days	24.4	61.3	34.9
All	100%	100%	100%

**Table 3. Infant mortality and incidence of diseases in different years**

Year	2005	2010	2015
Infant mortality rate in Hungary	6.2	5.3	4.2
Infant mortality rate in North East part of Hungary	7.5	5.5	4.5
Iron deficiency per 10,000 inhabitants	267.6	310	417.6
New diabetes mellitus	13.8	20.4	25.5
Hypertension	46.0	62.5	64.7
Scoliosis	231.3	246	318.3
Asthma	287.3	476	626.2

The average age of women giving birth for the first time has been increasing continuously. In 2014, the mean age of females at first birth was 28.27 years (9) and the mean age at childbirth was 30.14 years. In most Organization for Economic Cooperation and Development (OECD) countries it was equal to or larger than 30 years in 2014 (10).

The teenagers' fertility rate has been decreasing (23.1 live births per 1000 teenage women in 2014, 39.5 in 1990) (8, 11), but this was extremely high compared with other EU countries, for example, it was 2.6 in Austria in 2012 (12).

In Hungary, 8.9% of live births were low birth weight (LBW) (under 2500 grams) in 2014. The percentage of babies with LBW has remained unchanged for 20 years. The percentage of live births with LBW varies by region with the highest proportion of babies with LBW being born in Northern Hungary (11.0%) and the lowest proportion being born in Central Hungary (7.6%). Also, the rate of infant mortality by birth weight and by regions is different across the country (8, 13) (Table 2, 3).

The rate of deliveries by cesarean section in Hungary is - compared with many other European countries - very high, about 35% of births in 2012, with an increasing trend from 28% in 2005 (14).

In the 2011 census, 38.9% of Hungarians were Catholics, 13.8% were Protestants, about 2% with other religions, and 18.2% were non-religious (27.2% were non-responders) (8, 15).

#### Pediatric care

Hungary ranks 20<sup>th</sup> in the Rich Countries (29) for child well-being across five variables in the latest United Nations Children's Fund (UNICEF) Innocenti Report Card (16).

#### Infant mortality

In 2015, the infant mortality rate was 4.2 deaths per 1000 live births, the lowest ever recorded in Hungary. The rate was 264 per 1000 new-borns in 1915 (Table 1) (4, 8, 17, 18). Over the past 100 years, infant mortality has fallen considerably, thanks to the unique Hungarian Visiting Nurse system. Nevertheless, Hungary had the fifth highest infant mortality rate among 24 EU member states in 2013 (19).

The Hungarian infant mortality rate of 4.6 per 1000 live births in 2013 was slightly lower than the Central European average of 5.6 per 1000 live births, but was higher than the reported Western European average of 3.2 per 1000 live births (18).

Some 22.5% of all infant mortality occurred within 24 hours of delivery, a further 27.5% during the early neonatal period, and 15.4% during the late neonatal period. Thus, 65% of the infants died in the first 28 days after birth, and 35% in the postneonatal period. Detailed statistics by birth weight are shown in Table 2 (20).

Low birth weight is one of the most important risk factors for infant deaths. In 2014, the infant mortality rates for babies with very low birth weight (under 1500 grams) as well as with LBW (under 2500 grams) were 174.4 and 35.6 deaths per 1000 live births, respectively (Table 2). This is much higher than the rate of 1.5 for babies with normal birth weight (over 2500 grams) (8).

The distribution of infant mortality shifted towards LBW. In 1990, 9% of babies died before the first birthday had a birth weight under 2500 grams, and 66% of LBW babies died before their first birthday. In 2010, the prematurity rate was unchanged and 72% of the dead babies were born with LBW (20). An increased risk of infant mortality was found in boys compared with girls. Infants had a higher risk of infant mortality if their mothers had either no formal education or had only primary education. Infant mortality rates were the lowest for babies of mothers aged 25 to 29 years and the highest for babies of mothers aged under 20 years (3.7 and 6.4 deaths per 1000 live births, respectively, in 2014) (Hungarian Central Statisti-

cal Office) (20). The distribution of cause of infant death showed that immaturity-related conditions were the most common cause of infant deaths in 2014, with 56.1% due to these causes. Congenital anomalies were another major cause group, accounting for 28.0% of infant deaths (8, 20). The incidence of sudden infant death syndrome (SIDS) has unchanged during the last 30 years. It was 0.18–0.36 per 1000 live births (21).

In 2014, the perinatal mortality rate was 6.3 deaths per 1000 total (still and live) births, the rate of stillbirths was 4.6 per 1000 births, and the early neonatal death was 1.8 per 1000 births. Since 1997 (following a change to the stillbirth definition, the cut-off point changed from gestational age of 28 weeks to 24 weeks), the rate has fallen by half.

The number of fetal losses was 47,978 in 2015, which was half the number of live births. Sixteen thousand eight hundred two fetal losses were fetal deaths and 31,176 were induced abortions (8). There was a very high rate of abortions in Hungary: 356.93 abortions per 1000 live births compared with 207.58 in the EU in 2014 (Table 1) (4).

The maternal mortality rate decreased from 20.69 to 6.56 per 100,000 live births between 1990 and 2014; however, in 2015, 15 women died during or within six weeks of the end of their pregnancy in Hungary, which resulted in 17 deaths per 100,000 maternities (8, 22).

The rate of deliveries by cesarean section in Hungary is very high compared with many other European countries, about 35% of births in 2012, with an increasing trend from 28% in 2005 (14).

#### **Childhood mortality**

The mortality rate for children aged 1–14 years has also decreased over recent years. Although 45 deaths per 100,000 population were registered in 1990, there were only 14 in 2014. In 2014, cancers, external causes of morbidity, and diseases of the nervous system were the most common cause of death for children aged 1–14 years (8).

#### **Childhood morbidity**

The main reasons for the hospitalization of 0 to 14-year-olds in 2012 were diseases of the respiratory system (20%), injuries (13%), and infectious diseases (9%) (8). In 2015, the incidence of diabetes in 0 to 14-year-olds was 25.5 per 100,000 for type 1 and 0.9 per 100,000 for type 2, whereas the EU22 average was 18.2 (8, 23).

A regional analysis has documented problems relating to the musculoskeletal system for one-third of all school-aged

children. The prevalence of atopic diseases, asthma, hypertension, and diabetes mellitus is increasing (8, 13) (Table 3).

#### **Lifestyle factors**

According to the Health Behaviour in School-Aged Children Research Study, about 19% of all school-aged children in Hungary are overweight; this rate has increased over the past 20 years. About 26% of 15-year-olds smoke daily. About 47% of boys and 35% of girls regularly drink alcohol at least once a week. Both smoking and drinking rates are above the European average (24–26).

Frequent or excessive intake of alcohol was reported in 11.5% of adolescents. The prevalence of smoking showed a decrease from 20% in 2006 to 12% in 2012. Smoking was observed more frequently in adolescents living in poor families. Boys and girls in Hungary smoke with more than 25% reporting that they smoke at least once a week, which is in contrast to 15% of 15-year-olds in Nordic countries (26, 27).

Alcohol abuse/intoxication at least twice in their lifetime is reported by more than 40% of 15-year-olds in Hungary. The rate of alcohol abuse among boys is at least 10% higher than those of girls (26, 27).

Among 15-year-olds in Hungary, boys tend to report excess weight more often than girls; one in six boys and one in ten girls reported being overweight or obese in 2009–10 (26, 27). Young people who report being overweight are more likely to miss eating breakfast, are less physically active, and spend more time watching television. Reported rates of excess weight have increased slightly over the past decade in Hungary. Average reported rates of overweight and obesity across Hungary increased between 2001–2002 and 2009–2010 from 12% to 15% among 15-year-olds (27).

Physical activity in adolescence is beneficial for health. One in five girls and one in three boys in Hungary report that they undertake moderate-to-vigorous exercise regularly, according to results from the 2009–10 HBSC survey. At the age of 11, Hungary stands out as strong performers with 30% of boys reporting exercising for at least 60 minutes per day over the past week. Children were least likely to report exercising regularly at the age of 15. A higher proportion of boys consistently reported undertaking physical activity both at age 11 and at age 15 (26, 27).

Fruit consumption was relatively low in Hungary. Girls were more likely to eat fruit daily, 27% in contrast with 25% among boys. The gap between the fruit consumption of boys and girls was rather significant at age 15

years. Eating vegetables daily was less common in Hungary. Similar to fruit-eating, a higher proportion of girls ate vegetables daily. The disparity was especially large in Hungary, where 22% of girls, but only 20% of boys reported eating vegetables each day (26, 27).

### Children at risk of poverty

In 2014, 27.8% of children in the EU-28 were at risk of poverty or social exclusion (AROPE) compared with 25.4% of adults (18–64 years) and 17.8% of the elderly (65 years or over). In Hungary, this number was 42.1% in 2014, and 38.7% in 2010 (with an increasing trend). This is clearly above the European average of EU-28 and EU-19 countries (28).

### Ethnic groups in Hungary

The ethnic composition of the population is as follows: Hungarian 85.6%, Roma 3.2%, German 1.9%, other 2.6%, unspecified 14.1%. The percentages add up to more than 100% because responders were able to identify more than one ethnic group (15). The Roma population has considerably shorter life expectancy compared with the non-Roma population. The status and problems of the Roma (gypsy) population have been at the forefront in Hungary and have called for numerous benevolent interventions. Roma children are especially vulnerable populations. A study on the health of the Hungarian Roma population has reported some results on the health of Roma new-borns and infants, showing a very high prevalence of LBW, and an infant mortality rate four times higher than that of the general population. Successful planning and implementation of programs aimed at the improvement of their health status must be based on solid facts regarding their problems and the causes behind (29). Borsod county has poor and Roma inhabitants. The average rate of Roma population was 6–8.5% here, but it reached 89% in some areas (8, 13). Every health indicator is worse than the Hungarian average (Table 3). The infant mortality rate was 6.8 per 1000 births among boys and 8.0 among girls in 2012. The relationship between higher infant mortality rates was strong among Roma and socioeconomic conditions, with a high incidence of risk factors among pregnant women, especially smoking during pregnancy (57%), and poor environmental conditions; especially housing. These socioeconomic conditions and health behaviors increase the relative risk of lower birth weight and other non-favorable outcomes (30). Looking at the survey dataset as a whole, the vaccination rate of Roma children is among the most sensitive ones for Roma vulnerability of all health indicators covered in the regional survey. It is more than three times lower than the vaccination rate for non-Roma children living nearby. When it comes to reported vaccination rates, the lowest levels are reported for Roma children in Bosnia and

Herzegovina (18% never vaccinated) and Romania (10% never vaccinated), and the highest levels are reported in Hungary (99% vaccinated) (30).

Still-birth in the most disadvantaged areas reached 6 per 1000 births, and the perinatal mortality ranged around 8–9 per 1000 births. Seventy percent of pediatric practices with vacant posts, or served by substitution, are situated in this area. Also, in these areas, the mean age of family physicians is very high, above 60 years of age.

Smoking prevalence levels are consistently higher in Roma than in non-Roma communities. Roma people tend to have illnesses associated with poor diet and stress (31). Depression and psychosomatic symptoms are common and there is a high frequency of eye and dental problems, which can be attributed to poor diet and malnutrition (31). Poor health and an unhealthy lifestyle are significant problems associated with low income (32). A recent (but not representative) survey among adolescents (age 13–16 years) in Hungary who already used drugs found a large difference between the rate of drug use among Roma (22%) and non-Roma (2%) populations (33).

Tobacco use has a strong association with lower levels of education. These patterns can also be found in Roma communities. A higher smoking prevalence for Roma communities has been found in Hungary and other European countries. Pregnant women who admitted smoking in pregnancy was 58%, in comparison with 20% of non-Roma pregnant women. Eighty-five percent of pregnant Roma women reported smoking before pregnancy (34). The United Nations Development Programme (UNDP) surveys suggest the real health problems of Roma are perceived only when they reach acute forms and are strongly linked to access to health services and the level of health knowledge and culture.

Roma women start having children at a younger age than the majority of the population, and 26.9% had given birth to five or more children (compared with 2.6% overall).

Among interventions to support Roma women's health, mediation is reported to be an increasingly successful method. Roma health mediators are almost exclusively women and provide a key bridge between Roma women and healthcare systems. They facilitate access to services such as antenatal care and vaccination. Hungary has cooperated with Bulgaria and Slovakia in this mediator program.

The European Union Agency for Fundamental Rights (FRA) found in 2012 that only 50% of Roma children at-

tended pre-school or kindergarten. Although 90% of Roma children aged between 7 and 15 years old are reported to be in school, poor school attendance and high drop-out rates were reported (35). Almost 50% of all school-age Roma children do not finish primary school. Girls were more likely to drop out than boys, as they marry early and subsequently family obligations take precedent. Education is less frequently completed by girls than boys.

Poor educational attainment can impact on long-term occupational outcomes. In Hungary, only 20% of Roma are employed, compared with 55% in the non-Roma population (34). Employment rates for Roma women are typically lower than for men. As a consequence of high unemployment, many Roma live in poverty (35).

Roma children had respiratory infections four times higher than the national average and 30% of Roma children had diarrhea (3 times higher than in the general population). Moreover, skin diseases and asthma were more common among Roma children. Regarding birth weight, Hungarian Roma infants had significantly more births with a birth weight below 2500 g at most gestational ages, and they were twice as likely to be born prematurely (36).

According to a Comparative Health Survey of the Inhabitants of Roma Settlements in Hungary, the prevalence of smoking more than 20 cigarettes per day was 2 to 5-times higher among the Roma population than in the general population. Moreover, the prevalence of smoking was considerably higher among Roma people aged older than 30 years than in the lowest income quartile of the general population (37).

## Prevention

### IV.7.1. Screening

Three ultrasound examinations are compulsory or recommended for screening during the fetal period. After birth, babies undergo a variety of screening and surveillance interventions, starting with new-born blood spot screening for inborn disorders of metabolism. Their blood is tested for more than 20 diseases through tandem mass spectrometry and enzymatic tests. There are two specialised laboratories for this screening in Hungary. There is also a neonatal objective hearing check, hip screening, and a general physical examination in the Neonatal Unit, usually performed by the pediatric staff before they leave the postnatal ward. Forty-eight working hours after arriving home from the delivery department, a special Visiting Nurse visits the mother and baby to support the mother, advise on health promotion, including breastfeeding, and to assess any risk factors. The Primary Care Paediatrician/

General Practitioner (GP) also visits the newborn and the mother in the first week and advises on aspects such as health promotion and immunisation. Free chemoprophylaxis with vitamin D and K and fluoride is provided for all infants. During early infancy, screening for hip dysplasia is performed using ultrasound.

The Hungarian breastfeeding committee recommends exclusive breastfeeding during the first 6 months of life. The Baby-Friendly Hospital Programme has significantly improved breastfeeding in neonatal units for premature infants as well. In 2012, 96% of infants were ever breastfed, according to the guidelines, and 65% were exclusively breastfed (38–40).

The Paediatric Strategy makes recommendations to further develop parental and child education e.g. via the website; <http://www.asztmasuli.hu/>. Advice leaflets about common conditions are available and specific to children and their parents.

The screening program includes preschool developmental assessments, school health services, and a comprehensive program of immunisations. During the school years, further checks, including vision and hearing, are carried out by the school teams that include school nurses, community medical officers, and dental officers.

### IV.7.2. Specific prevention - immunisation

A National Immunisation Plan (NIP) has been in effect in Hungary since the mid-1950s and it was mandatory since its introduction. The costs for children are covered by the national budget and exemptions are allowed only for medical reasons. Primary care physicians or primary care paediatricians are responsible for the implementation of the NIP up to the age of six years, after which the program is school-based.

The NIP begins with a universal BCG vaccine for infants at the maternity hospitals before discharge. This is followed by diphtheria-pertussis (whole cell)-tetanus (DPT) and subsequently replaced in 2006 by an acellular pertussis component pentavalent vaccine (DaPT-IPV-Hib-IPV). Immunisations were performed at 3, 4, and 5 months with boosters at three and six years till 2006, since then the primary doses are given at 2, 3, and 4 months, the boosters at 18 months and 6 years. In response to polio epidemics in the 1950s, the oral polio vaccine (OPV) was introduced. However, polio immunisation of infants has been initiated by an inactivated polio vaccine followed by OPV since 1992 because of some vaccine-related polio cases. Since 2006, OPV has been replaced by the inactivated version (IPV) all through our schedule.

Measles prevention began in 1969 with a live attenuated vaccine. Rubella was added in 1989 and since 1991 the measles-mumps-rubella vaccine has been given with a starting dose at 15 months and a booster dose at 11 years of age.

Hepatitis B immunization began in 1999. Since then, mandatory screening of all pregnant women has been in place for the hepatitis B antigen (HBsAg), as well as active or passive immunisation of new-born infants if needed.

Haemophilus influenzae type b (Hib) prophylaxis began in 1999 (at 3, 4 and 5 months old) in conjunction with DPT immunisation. In 2006, the combined acellular DPT inactivated polio and Hib vaccine (pentavalent vaccine) was introduced. Pneumococcal conjugate vaccine (7 valent) was introduced in 2008 at 2, 4, and 18 months. It was at first free, but not mandatory; however, the uptake was 83% for all eligible infants. The 7-valent vaccine was replaced by the 13-valent version in 2010. Pneumococcus and Hib/DPT vaccination are usually given at the same time. In the school program, a dapT and the second MMR at 11 years, HPV-2 for girls, voluntary based, at 12 years and hepatitis B at 13 years are included.

The meningococcal C vaccine has been available on a voluntary base with 70% reimbursement for years, however, since January 1<sup>st</sup>, 2017, it is offered to all children aged under 2 years with 100% reimbursement, still on a voluntary-based approach.

The Hungarian NIP is similar to those in other European countries. Vaccine coverage is over 99%. Vaccines not included in the NIP are also available on the private market for prescriptions.

The vaccination rate against e.g. varicella virus (not included in NIP) increased and showed a positive result on a reduction of chickenpox with a decrease from 12.8% to 2.4% in children aged under 2 years.

In case of an outbreak of a vaccine-preventable infection, intervention by post-exposure antimicrobials and vaccines are provided free by the relevant public health authorities (e.g. hepatitis A or meningococcal infections). If a rabies virus infection arises, the full vaccine series are provided free. As part of the wound care guideline, free tetanus toxoid is administered to those who are not yet fully immunised. Seasonal flu shots are offered for high-risk children according to national guidelines.

A rather small, mainly web-based anti-vaccination movement is active in Hungary too and should be handled

better before they succeed in destroying the value of vaccines in the eyes of parents and young adults. The main tool in communicable disease control is the comprehensive, high coverage, budget financed immunisation program, which should be protected because it provides herd immunity to those who we cannot immunise for various reasons (e.g. acute or chronic immune disorders, serious interventions) (41, 42).

#### **Disabled people**

Early support means that infants and children up to 6 years of age with a general developmental delay can be treated by pedagogic therapy in combination with other therapies, such as physiotherapy, occupational therapy, or speech therapy.

Conductive Rehabilitation (Pető Method) (43) is a highly developed therapeutic approach for children and adults with neurologic conditions such as cerebral palsy, stroke survivors, multiple sclerosis, Parkinson's disease, and acquired brain injury. This method is based on a combination of educational and therapeutic knowledge. It is not a miracle treatment; however, it provides a continuous learning process, and builds up a unique partnership between the patient and conductor towards overcoming motor challenges and improves quality of life.

According to the national education system, every child is required to attend primary school after the age of 6 years. Special schools for children with disabilities have specially trained teachers. Classes with few children facilitate the teaching of children with intellectual and physical disabilities, hearing and visual loss, speech delay, or educational problems.

Neurorehabilitation is an early therapeutic and diagnostic method to prevent brain lesion sequelae in new-born and infants at risk of brain injury, which was developed in Hungary by professor Ferenc Katona. It is based on the view of brain plasticity in the young nervous system and considers the repetition of certain therapeutic exercises based on activation of the elementary sensorimotor patterns, which are very similar to ultimate (adult) motor activities. The elementary sensorimotor functions are activated by gravity through the vestibular system and are under the control of the basal ganglia, the reticular system, and the paleocerebellum. The method needs very active family participation but offers the advantage that it can be used in any pediatric service and does not require specialised materials (44).

Dévény Special Manual Technique and Gymnastics Method (DSGM) is a new therapeutic method in motion

rehabilitation proven by several decades of practical experience. It builds on a new approach, applies radically new technical elements and implementation; therefore, it opens new, previously unknown opportunities in medication. This original therapeutic method has been developed by a physiotherapist and rhythmic gymnastics coach Anna Dévény since 1976, based on the experiences of her two professions (45).

### School in hospitals

There are special Hospital Schools at three Children hospitals, five University Paediatric Departments and six Pediatric wards in County Hospitals in Hungary. The teaching is held mostly both in dedicated school rooms and in the hospital wardroom. The rooms and teaching materials are paid by the hospitals. Special rounds for hospital teachers, psychologists, physiotherapists, nurses, and paediatricians concentrating on individual patients were reported.

### Algorithms

The Pediatrics and Neonatology Clinical Program has developed several algorithms to help standardise care for children in the whole country. They provide a guide to solving practical problems systematically by using branching logic. These algorithms are about performing tasks in the correct sequence and in a timely fashion. Almost 30 algorithms have been developed so far, and the full list of these is now available at <http://www.eum.h/protokolok> or [www.kollegium.aeek.hu](http://www.kollegium.aeek.hu) or [www.obdk.hu](http://www.obdk.hu).

### Palliative care

Tabitha House for children is a member of the Hungarian Hospice-Palliative Association. They take care of children with a life-limiting illness, based on “A Guide to the Development of Children’s Palliative Care Services” produced by the Association for Children with Life-threatening or Terminal Conditions and their Families (ACT).

### Dental care

Free dental services are available to all children up to the age of 16 years.

### Pharmacy

Health insurance does not endorse all drugs prescribed for children but provides support for the price of medicines. The level of support is regulated by law and the doctor’s prescription orders.

### Pediatric primary care

Primary care paediatricians (PCPs) with a five years long postgraduate education in hospital pediatrics and a degree in general pediatrics provides primary healthcare

for children under the age of 18 years. Eighty percent of children younger than 14 years are cared for by a PCP and 20% by a GP because of the shortage of paediatricians. For children aged between 15 and 18 years, 40% are cared for by a PCP. After age 19 years, everybody is cared for by a GP. However, out of the 6700 physicians delivering primary care, a total of 23% are PCPs (13, 46). PCP-based practices are usually situated in urban territories, while children living in rural parts of Hungary only have access to GPs in their mixed practices. Historically, all real advances in pediatric primary care in Hungary started during the 1960s, when predominantly female paediatricians from pediatric departments of general hospitals or the few pediatric hospitals, while seeking a better family-friendly work environment, started to work as PCPs. This method of healthcare was mostly available at that time in larger cities, definitely not in the rural areas of Hungary, around residential neighborhoods of those times’ widely spread block buildings, and was integrated into the healthcare system of pediatric hospitals or local departments. Therefore, at that time, the main principle of the praxis arrangement was organised upon territorial settings. Decades later, the 1989 revolution brought the possibility for Hungarian citizens to choose their primary care doctor on a free basis, and consequently, all territorial arrangement ended. However, the system of visiting nurses - on duty for more than a century - remained arranged according to former geographic principles. This fact leads to situations where one PCP/GP has to be in contact with 10–20 visiting nurses or vice versa, making communication on a particular issue understandably difficult. Meanwhile, the basic implementation of the system of primary pediatric healthcare was set up between 1992 and 1994. It was integrated into local governmental institutes politically and financially, while professionally to family physicians. Recognizing the apparent threat deriving from the above-mentioned facts, the Association of the Hungarian Primary Care Paediatricians was founded, firstly rather as an advocacy organisation, later even more as a professional field in primary care pediatrics. Nowadays, the association has around 1300 PCP members, with strong national contact with the Hungarian Paediatric Society and international contact, both to the European Academy of Paediatrics and the European Confederation of Primary Care Paediatricians.

The PCP/GP is the first port of call for most children with a medical need, and many conditions are managed entirely by the PCP/GP and their practice staff. For acute conditions that require specialist assessment and opinion, they can refer patients directly to acute care. PCP/GP referral to hospital, either as an emergency or by referral to a clin-

ic, is the usual way of accessing hospital services. Parents do have direct access to a hospital via the emergency department (ED); however, this is generally discouraged because parents often go there with banal, non-emergency problems. Most PCPs work full-time in their practices and usually see 50–80 children daily. They work alone and are supported by nurses and visiting nurses.

Primary care, provided in the community primary care health centers, is conducted on weekdays from 8:00 a.m. to 8:00 p.m. in 3–4-hour segments per day. Since these working hours are regulated by local municipality and health authorities, usually there is little or no flexibility in these arrangements. During working hours, the first access to outpatient pediatric care is via a PCP or GP's office. Both can refer their patients to other specialised colleagues offering outpatient subspecialty care or to hospitals offering inpatient care when indicated. The lack of medical services by paediatricians during weekends and nights is a weak point in ambulatory child healthcare in villages and small towns. Only in the major cities are such emergency services by paediatricians provided. Out of working hours, primary care is usually provided by GP co-ops, where local GPs work together to provide on-call coverage. However, recently an increasing number of ambulance services with pediatric personnel have been contracted by local municipalities to deliver out-of-hours services for children. Chronic conditions, such as diabetes mellitus or asthma, can be managed in a variety of ways, although the PCP/GP will mostly be involved in the ongoing management.

As detailed above, parents have a free choice when choosing a physician, but recent regulations only allow to move from one PCP to another only once yearly.

Current challenges of the primary care pediatric workforce are as follows: (a) population problems (79% of PCPs are women and the mean age is 59 years); (b) difficulties when selling practices or going on retirement; (c) little or no interest from young paediatricians to enter the system; (d) downgraded or missing supervisory and controlling system; (e) limited competencies; (f) burnout.

Recent media appearances raised countrywide awareness of the severe decrease in the number of PCPs, which will soon lead to an increased number of children having access only to GP-based primary care in mixed practices (Table 4).

The problem with the GP system delivering the first contact to children covers the lack of pediatric training particularly in infant care, preventive care, and child-friendly

**Table 4. Number of physicians and hospital beds in Hungary**

Date	1990	2010	2015
Number of active physicians	23,883	33,943	35,854
Active physicians per 10,000 inhabitants	31.7	34	36.5
Number of active hospital beds	101,954	71,160	68,613
Hospital beds per 10,000 inhabitants	98.3	71.5	69.8
GP and PCP	5864	6451	6277
PCP		1525	1460
Inhabitants per one GP and family paediatrician	1769	1548	1566

healthcare. There are several international and even national papers referring to a more effective way to use the paediatrician workforce in primary care. Those studies show better results in both mandatory and non-mandatory vaccination coverage, antibiotic use, undue hospital referrals, follow-up of chronic diseases, malignancy awareness, non-communicable diseases, and the so-called new morbidities.

More increasingly, there are moves to provide specialist nurses, so-called „visiting nurses” to support children (and their parents) living with normal or chronic conditions. The range of services typically provided in primary care includes the children's developmental checks and validating immunisation services. There is a strong emphasis on the role of public healthcare, screening, surveillance, and health promotion. According to the attractive experiences already gained by some Northern European countries (Sweden, Finland and even the UK) using highly professional, advanced pediatric nurse practitioners in primary care settings may be part of the future of primary pediatric healthcare.

#### Emergency care for children

Outpatient and inpatient care for children with accidents or sudden life-threatening diseases is characterised by a well-organised vehicle or helicopter transport system organised by the National Ambulance Service (NAS). The NAS has recently formed regional ambulance organisations in seven regions. The NAS has 253 ambulance stations. The developmental concept was to be able to arrive at the scene within 15 minutes after being alerted, following the EU Directives about the rescue. There are three categories of ambulance stations by the number and types of ambulance vehicles. Rescue controlling is an integral part of ambulance work, and then the NAS manages the whole vehicle fleet along with unified professional principles from 19 rescue control call centers with a nation-wide coverage of telecommunication ap-

paratus. The ambulance units ride 38 million kilometers of roads in Hungary per year. Seven thousand five hundred employees work in the NAS, performing more than one million tasks per year. The main types of rescue units are the paramedic/physician units and the patient transporting teams. The special ones are the adult and pediatric medical passenger cars, the paramedic passenger cars, the Mobile Paediatric Intensive Care Ambulance Unit, ambulance motorcycles and scooters, mass accident units, and Mobile Intensive Care Units for transporting and observing severely injured patients. The helicopter service covers the entire area of Hungary, thus, allowing a pick-up of patients within a minimum time regardless of the distance to the next hospital. The Hungarian Air Ambulance Non-profit Ltd., as a part of the NAS, operates seven airbases in Hungary with AS-350B and EC-135 T2 CPDS rescue helicopters (47).

There is a special pediatric transport system and a special preterm new-born transport system. “Szent Márton” and “Gyermekmentő” Paediatric Medical Service Foundation has been running the two specialised Mobile Paediatric Intensive Care Ambulance Units (PRAMs). There are about 2100 emergency calls per year, in and around Budapest. Two-thirds of the calls are rescue operations, the remainder being inter-hospital transports. The Central Dispatch Centre of the Hungarian National Ambulance and Emergency Service commands the PRAM to the site of accidents where children may need emergency care. Ambulance units, working on-site, very often ask for help to provide the appropriate care for children. In such a case, dispatchers command this unit as well. The PRAM is dispatched for inter-hospital transports if a child who requires ventilation support needs to be moved from one hospital to another, or if a sudden change in the state of the child is to be expected during the transport. The PRAM very often transports ventilated children to Budapest, from hospitals all over the country. The leader of the 3-member unit is always a pediatric specialist with experience in intensive care: a pediatrician or an intensive care anesthesiologist. The PRAM carries out 17–20 infant reanimations, every year. Half of them are successful (48).

The network of Neonatal Intensive Care Units (NICU) within Hungary was set up in 1975, with the participation of 10 NICUs. Thanks to the hard work of the NICUs, there was a dramatic drop in perinatal mortality (by more than 70%) and an increase in the survival rate of premature babies as well as improved prospects and quality of life of ex-preterm infants. However, despite these initial remarkable successes, it became clear that the mortality of those premature babies who were born outside the

NICUs and required transportation for intensive care and mechanical ventilation was much greater than of those babies who were born in the NICUs. Therefore, a professional transport system between these centers and other hospitals was set up. The problem was a lack of financial resources. Fortunately, a businessman from Austria, Peter Cerny, actively wanted to provide support to Hungarian pediatric healthcare. He agreed to buy an ambulance car, which was equipped with all the necessary medical equipment, with the support of many other sponsors. This first ambulance car became operational in 1989 by the Peter Cerny Foundation (PCA), which had been established the previous year, and since that time the PCA has continuously been operating a neonatal transport service. It operates in Budapest and the surrounding region of 130–140 km inhabited by more than 4.5 million people. This 24/7 service transported a total of 67,618 babies over the 21 years of its operation. To avoid life-threatening respiratory problems, mechanical ventilation was performed in 13,858 cases. The number of resuscitated children has risen to 1361 (49).

The Hungarian Preterm and Newborn Saving Foundation was established in 2007, by the co-operation of eight regional preterm and ill newborn saving foundations, which provides a national network for preterm and newborn saving transport in more than 80% of the country (50). These, together with the PCAs, cover the entire country.

#### **Pediatric secondary care**

There are 23 public and four religious hospitals in Budapest, plus the departments of Semmelweis University. There are two hospitals for children in Budapest: the public Heim Pál Children’s Hospital and the Bethesda Children’s Church Hospital, plus two pediatric departments at Semmelweis University, and also a pediatric ward at “Szent János” County Hospital. There are special pediatric wards for cardiology, infectious diseases, and neurosurgery at the “Gottsegen György” Hungarian Institute of Cardiology, “Szent László” Hospital for Infectious Diseases, and the National Institute of Clinical Neurosciences respectively, all in Budapest.

There are 69 hospitals, three Departments of Pediatrics of the Medical Universities (at Debrecen, Pécs, and Szeged), and a private hospital in the countryside of Hungary. Within these facilities, there are 35 pediatric wards in secondary or tertiary care county general hospitals. The most important pediatric centers in Hungary, besides Budapest, are the “Velkey László” Child Health Centre in Miskolc, and the three Paediatric Departments of the Medical Universities in Debrecen, Pécs, and Szeged.

In 2006, there were eight hospital beds per 1000 population, and seven in 2012 (Table 4) (51, 52). In 2015, there were 206,507 inpatient hospital admissions (i.e. emergency and elective admissions excluding day cases) for children aged 0–18 years to acute hospitals. This represents 9.95% of all inpatient admissions to acute hospitals. The highest rates were observed in the 0- to 4-year-old age group. The rate of hospitalisation has decreased for all age groups from 2008. The average length of stay for children with acute illness in hospitals was 6.3 days in 2005 and 5.2 in 2012, 4.03 days in 2015, compared with 7.8 days for adults (53). The average length of stay for the newborn at single spontaneous delivery was 6 days in 2006, 5 days in 2012 (54), and 3 days in 2015. The total number of bed days spent by children in acute hospitals was 879,119 in 2015, compared with adults with 18,656,160 bed days. This value represents 4.71% of adult's bed days. The average bed occupancy rate for children was 65.33% compared with 75.10% in adults. The mortality rate for children was 0.21%, compared with 3.51% for adults.

Acute care for children is mainly provided in pediatric departments in general hospitals with inpatient and outpatient care. Those who warrant advanced care in PICUs, specialist pediatric surgical care, cardiac intervention, pediatric oncology, and subspecialty multidisciplinary assessments are transferred promptly to one of the tertiary centers. Dedicated PICUs for the management of critically ill infants and children are also located in Children Hospitals and Departments of Paediatrics at Medical Universities.

There are five university-affiliated major teaching hospitals in Hungary. The majority of the pediatric units are also accredited for the teaching of medical students from the associated universities.

#### **Pediatric tertiary care**

There are 38 pediatric subspecialties, such as cardiology, hemato-oncology, nephrology, endocrinology and diabetology, neonatology, and intensive care. Paediatricians with subspecialty training are mainly working in the Pediatrics Department at Medical universities and in larger regional hospitals. There are also specialised outpatient clinics for children with different chronic diseases. Eighty percent of subspecialists work in children's hospitals, which offer follow-up clinics for children and adolescents until age 18–20 years. There is regular bidirectional communication between the paediatric subspecialty teams and the patient's PCP/GP on current treatment and investigations. After age 18–20 years, a guided transfer to adult care is organised by a child healthcare team, but sometimes it is not successful. Intensive care is provided by neonatal and

PICUs. Training for subspecialties takes approximately 2–3 years, after finishing the pediatric residency.

Separate pediatric emergency departments are only in children's hospitals and some large county hospitals. In larger hospitals, emergency services for children are generally integrated into adult services, where paediatricians act as consultants.

Pediatric nursing is pivotal in the inpatient care of sick children and based on the type and complexity of care, various units have general nurses, registered children's nurses, clinical nurse managers, clinical nurse specialists, and advanced nurse practitioners.

Pediatric inpatient care also receives support from trained personnel in physiotherapy, dietetics, speech and language therapy, and pharmacy, in addition to the excellent 24/7 support from laboratory and diagnostics, including advanced imaging facilities.

#### **Cross-border child care**

Hungary offers cross-border healthcare to patients from countries, mostly surrounding Hungary, that are not able to treat children with rare diseases.

#### **Pediatric care in mixed settings - within adult care facilities**

There are only a few separate Departments of Pediatric Urology, Pediatric Orthopaedics, Pediatric Otolaryngology, Pediatric Ophthalmology and Pediatric Dermatology in the Capital City. Outside Budapest, children are still treated in adult departments (urology, otorhinolaryngology, ophthalmology, dermatology, orthopedic surgery, traumatology, and neurosurgery). Almost one-half of all children undergoing tonsillectomy are treated in adult wards.

#### **Postgraduate training of child health professionals**

After finishing medical university and receiving a medical doctor degree, there is a 5-year period of postgraduate pediatric training in certified hospitals and university pediatric departments. During the first 2 years, there is basic pediatric training in general pediatric departments. After this period there are rotations of training at specialised wards, such as nephrology, gastroenterology, neonatology, endocrinology, intensive unit, traumatology, surgery, otolaryngology, emergency department, primary care pediatrics, preventive care, and community health. Ninety percent of the training program is practical hands-on work, and 10% is theoretical work, which is followed by a board examination. Training in a further pediatric subspecialty can begin after the qualification as a general pediatrician, taking two or three years in specialised pedi-

atric departments, and is completed with a board examination. All practicing medical physicians have to prove participation in further training. They must collect 250 credit points, every 5 years, by documenting continuous medical education, attending medical conferences and courses. A retaking of board examinations at regular intervals is not required.

Specialised pediatric nurses care for children in hospitals and pediatric outpatient clinics. Visiting nurses look after pregnant women, new-borns, infants, and school-age children (55).

Multiple national and regional congresses and seminars are held annually by more than 15 different national or regional pediatric or subspecialty societies. More than 100 medical journals appear in print or online at regular intervals in Hungary, seven of which are in paediatrics. The most important is *Gyermekgyógyászat* from 1950, published bimonthly (Paediatrics in Hungarian, <http://gyermekorvostarsasag.hu/folyoirat.aspx>).

### Economy

According to the the OECD, Hungary spent 7.8% of its GDP on healthcare in 2012. Total health expenditure was 1688.7 USD per capita in 2011, 1098.3 USD governmental-fund (65%) and 590.4 USD private-fund (35%) (56).

### Health insurance

The first mining health insurance was founded in 1496. The modern insurer was established in 1907, named “National Workers’ Sick-benefit and Accident Fund”. The first steps to overall health insurance took place in 1928. In 1938, the social services were complete, and the Hungarian social health insurance system was the most progressive and charitable in Eastern and Central Europe. After World War II, the communist government fully nationalized social insurance used the centralized Semashko state control. Since then, the Hungarian healthcare system has been state-owned, overall and available for all of the people. After the communist era, Hungary transformed its healthcare system to a more pluralistic, decentralized model from in 1990. This resulted in the creation of the National Healthcare Fund (NHF) in 1993. The NHF, predominantly based on a social insurance system, is the public organisation currently controlling the management of healthcare in Hungary. Eighty-three percent of the financing for healthcare comes from taxes and other public revenues. From 2011, the government has centralized the system again (57).

Health insurance contributions are collected from employees, who pay 3% of their total income, and employers who pay 15% of the employee’s gross salary plus a lump

sum tax or ‘healthcare contribution.’ The population also pays local and national income taxes, which help to finance the investment costs of healthcare. Patients pay co-payments on certain services, including pharmaceuticals, dental care, and rehabilitation. These out-of-pocket payments have increased substantially since 1990, and currently contribute 18% to healthcare financing. State budgetary assistance is provided for capital costs, and in picking up the slack of underfunding. The result is a mix of tax and social insurance-based funds responsible for financing Hungary’s system. The costs are calculated per patient and according to diagnosis-related groups and the case-mix index (57).

According to the OECD, 100% of the total population is covered by universal health insurance (58). Diagnostic and all therapeutic care is free of charge for all children and adolescents until the end of education, mothers or fathers with baby, students, pensioners (everyone over 62), people with low income, disabled persons (including physical and mental disorders), priests and other church employees and is covered by health insurance. Therapeutic care also includes psychotherapy, physiotherapy, speech therapy, and occupational therapy. Preventive care, including vaccinations and other prophylactic drugs, laboratory screening, hip ultrasound, outpatient and in-hospital treatment for children, is free of charge. If a parent wants to join a child during a hospital stay, it is also free. If they need a single room or other extra accommodation there may be a small fee. Usually, 90% of all children are accompanied by one parent during a hospital stay.

Participation in the insurance scheme is mandatory for everyone in the workforce, including the self-employed. All church hospitals and some of the private caretakers also operate under the NHF framework. All citizens are covered, regardless of their employment status, with the government paying contributions for certain groups, such as the unemployed and pensioners.

Expatriates employed by Hungarian companies are entitled to free healthcare in the same way as Hungarian nationals, while those employed by foreign companies or joint ventures in Hungary will need to find out whether they are eligible. Although non-Hungarians who make payments to the NHF (e.g. through deductions from their wages) can receive treatment in a public hospital at a very low charge (see above), they usually prefer private hospitals. Contributions to the NHF can be proven by presenting one’s social security card (“TB’-kártya), which is issued by the State.

The European Health Insurance Card (EHIC) is accepted in Hungary for emergencies, both at walk-in clinics

and hospitals if they are contracted with the NHF. Most pharmacies accept the card, although some have been known to refuse it. Only the subsidized cost is payable for prescribed medicine (59). Non-Hungarians who are not insured are only entitled to essential health services free-of-charge, in case of an emergency or acute condition. This includes basic services, out-patient services, and in-patient treatment.

Patients from member states of the EU are entitled to treatment in Hungary. Costs are reimbursed by their health insurance up to the quantity the same treatment would amount to in their home country. First aid and emergency treatment are free for everyone, including tourists. It is highly recommended to arrange some kind of travel/health insurance before visiting Hungary.

Public funding of Hungary's health system is less than adequate, however, and patients may be required to contribute to the cost of medical care. Due to the low wages of medical staff, there is also a tradition of paying gratitude money to physicians and nurses after operations or childbirth. Although subsidized, there is a charge for prescriptions. So-called "gratitude payments" - another legacy of communism - require, in practice, a cash payment to have access to better treatments. According to the survey conducted by the Euro health consumer index in 2015, Hungary was among those European countries in which unofficial payments to physicians were reported most commonly (60). Because of past hiring policies, Hungarian hospitals often have redundancies of physicians, and a lack of nurses, resulting in an unproductive misuse of human resources. Pediatric units and hospitals suffer from insufficient financing.

### Human workforce

In 2012, 3150 paediatricians (70% were females) actively worked in the healthcare system. Approximately 55% of paediatricians worked in their primary care practices, 40% in hospitals, and 5% in other institutions. More than 90% of hospital paediatricians worked full-time and approximately 75% performed regular on-call duties. Based on the number of paediatricians being trained and those who retire each year, it can be said that Hungary will have a decreased and insufficient number of paediatricians.

### Problems

Hungary's healthcare system is on the brink of disaster. Low salaries and poor working conditions are causing physicians to either go abroad or work at a private outpatient or inpatient facility. More and more patients are choosing private healthcare for procedures that could represent important revenue generators for the public healthcare

system. Meanwhile, the billions of Forints distributed at the end of 2014 by the NHF were not sufficient to clear up public utility arrears and settle debts with suppliers.

According to data obtained from the Health Licensing Office (EEKH) (61), as of September 2014, 1500 physicians and nurses requested certificates attesting to their healthcare credentials necessary for employment abroad, virtually the same as in 2013. This is not equal to how many health professionals left the country. However, the growing shortage of public healthcare professionals in Hungary indicates many are trying their luck abroad. In 2013, 405 Hungarian healthcare workers left to take jobs abroad. In September 2014, this number was 558, most of the physicians being aged under 30 years. According to official statistics, more than 8000 physicians and more than 2500 nurses and midwives left Hungary over the past 8 years to take jobs abroad. These numbers do not include pharmacists and other healthcare workers. The shortage of specialists is already harming patient safety, and the outward migration of healthcare professionals will continue to grow unless the government raises salaries and improves working conditions.

Hungary will face a major shortage of paediatricians within ten years. The average age of paediatricians in Hungary is 59 years, 46% of whom are aged over 60 years. Of the 1498 pediatric practices in the country, one-third are staffed by physicians aged 50–60 years. Ten years from now, many of these physicians will be retiring and leaving many empty positions with no one to take them. One hundred forty practicing paediatricians are aged over 70 years, "a mere 40 of them are in good health." Over 100 pediatric practices closed their doors in the last 7–8 years, forcing parents to take their children to more distant physicians in other towns, or to mixed practices where the physicians primarily care for adults and may not be competent in caring for children. Paediatricians study for five years to care specifically for children, whereas family physicians receive only four months of pediatric training, consisting of two months of theoretical and only 6 weeks of practical training. This is not nearly enough for them to have adequate competence in caring for children.

Low wages are not the only reason that young people are not attracted to practicing pediatrics. Wages for physicians have increased 25–30% in recent years, and many physicians now receive a net monthly salary of 200–300 thousand forints (USD 680–1020). The rather poor working conditions, as well as administrative demands, deter many physicians from practicing medicine in Hungary upon completion of their studies (62). Several efforts are being made to solve this complex problem. Different

grants are offered for young physicians to choose pediatrics in general and primary care in particular at all four medical universities.

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