



The child healthcare system in Cyprus

Elisavet Efstathiou¹, Leda Theophilou², Stelios Angeli³, Adamos Hadjipanayis^{1,4}

¹Department of Paediatrics, Larnaca General Hospital, Larnaca, Cyprus

²St George's University of London, University of Nicosia

³Department of Mechanical and Manufacturing Engineering, University of Cyprus, Nicosia, Cyprus

⁴European University Medical School, Nicosia, Cyprus

Abstract

This article describes the child healthcare system in Cyprus up to June 2019. Before that Cyprus used to be the only country in the European Union without a universal National Health System. Up to 2019 child healthcare in Cyprus consisted of two separate sectors: the public and the private system. The public healthcare system is financed by the government, while in the private sector the patients pay themselves or are covered by private insurance. There is easy access to acute medical care in the emergency departments of five public hospitals across the country. However, primary care is not available free-of-charge to all children. Primary healthcare is delivered in the paediatric outpatient departments of various public and private hospitals and clinics, as well as by numerous paediatricians within private practices. Secondary care is provided mainly in the public sector and to a lesser extent in private clinics. Tertiary care is available only centrally in the capital of Cyprus, at a dedicated university-affiliated maternity and children's public hospital with specialist paediatric services. Current major child health challenges in Cyprus include dealing with obesity, mental health, chronic illnesses, and vulnerable groups. However, the basic available health indicators for children show an improving trend over time. A national healthcare system was introduced at the end of 2017 and is expected to remove the inequalities and discrepancies that currently extend over the area of child health by tackling financial, quality, equity, efficiency, and effectiveness issues.

Keywords: Education, healthcare, hospitals, infant

Introduction

Cyprus, officially named the Republic of Cyprus, is an island country in the Eastern Mediterranean with a population of over 865 thousand people. It is an independent state and a United Nations (UN) member since 1960. It attaches great importance to the peaceful cooperation among member states and adherence to the principles of International Law and the UN Charter. Since 2004, Cyprus has been a full member of the European Union (EU) and entered the Eurozone in 2008. The country is divided into six districts: Nicosia, Larnaca, Limassol, Famagusta, Kyrenia, and Paphos.

Sociodemographics

As Cyprus has been divided in two parts following international political turmoil in 1974, the information in this report refers to the areas of the island that are administered by the Republic of Cyprus.

The population of the country is 854,800 in the government of Cyprus-controlled area, according to the demographic section of the Cyprus Statistical Service at the end

of 2016. Cyprus has the third smallest population in the EU, ranking after Malta and Luxembourg, which declared a total population of 440,400 and 589,400 inhabitants, respectively, in 2016 (1). The majority of the population, approximately 67.5%, resides in urban areas and the average family size is 2.7 persons (2). The vast majority (98.8%) of the population is Greek-Cypriot. Other small ethnic groups are Maronites (0.7%), Armenians (0.4%), and Latins (0.1%), comprising 1.2% of the population (2).

The number of children aged 0–14 years was 139,300 (16.3% of the total population) at the end of 2016 (2). There has been no fluctuation in this proportion since 2008. On the other hand, there has been a gradual rise in the proportion of elderly persons since 1992, demonstrating the ageing process in Cyprus (Table 1) (2). The proportion of people aged 65 years and over is among the lowest in the EU (15.7%), while at the same time, the proportion of children aged below 15 years is among the highest (16.4%) (2).

The fertility rate indicates a continuing decreasing trend through the last three decades. There was a peak rate of

Cite this article as: Efstathiou E, Theophilou L, Angeli S, Hadjipanayis A. The child healthcare system in Cyprus. *Turk Pediatri Ars* 2020; 55(Suppl 1): S24–S40.

Corresponding Author: Adamos Hadjipanayis E-mail: adamos@paidiatros.com

© Copyright 2020 by Turkish Pediatric Association - Available online at www.turkpediatriarsivi.com

DOI: 10.14744/TurkPediatriArs.2020.17047

OPEN ACCESS This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.



Table 1. Trends in population/demographic indicators, selected years

	1992	1995	2000	2005	2011	2013	2016
Total population	610.6	650.7	693.6	738	849	858	849.8
Population 0–14 years	157.2	161.6	155.4	144.1	142.3	139.3	139.3
Population 15–44 years	274.1	290.1	311.7	333.2	399.1	387.3	375.4
Population over 65 years	68.4	72.4	78.7	90.6	110.3	119	133.1
Aged to child ratio	44	45	51	63	78	85	96
Age dependency ratio	57	55	51	46	42	43	47
Annual growth rate %	2.7	1.7	1.0	1.5	2.6	-0.9	0.8
Average family size	3.2	3.2	3.1	2.9	2.8	2.7	2.7
Average age of woman at first childbirth	24.7	25.5	26.1	27.4	27.4	28.6	29.1
Total fertility rate	2.49	2.03	1.64	1.48	1.35	1.3	1.37
Birth rate (per 1000 people)	18.6	15.2	12.2	11.2	11.8	10.8	11.1
Death rate (per 1000 people)	5.220	4.935	5.355	5.425	5.504	6.0	5.471
Distribution of population (rural/urban)	0.477	0.468	0.456	0.464	0.483	0.489	0.481
Net migration rate	16.4	9.2	5.7	11.1	21.4	-14.0	2.9
Marriage rate	8.1	10.3	13.4	8.0	7.3	6.4	7.5

n/a: Not available. Sources: Statistical service 2016

fertility (2.46 children per woman) in 1992, and since then there has been a steady drop, reaching the lowest level in 2013 (1.30 children per woman), which is below the average of the EU countries (2). Since 1995, the total fertility rate remains below the replacement level of 2.10 children per woman. The total fertility rate was 1.37 children per woman in 2016, which equals a birth rate of 11.1 per 1000 population (2). The mother's mean age at the birth of her first baby was 29 years in 2016, and the mean age at giving birth irrespective of the order of the child was 31 years. The mother's mean age at the birth of her first baby has been steadily increasing since 1980 (2).

Since 1980 there has been an increase in births by unmarried parents from 0.6% in 1980 to 19% in 2016, which is still one of the lowest among EU countries (3). The total number of divorces in 2016 was 1948. The total divorce rate was 31% in 2016, which has risen steadily since 1980. Almost half (46%) of divorced couples reported no dependent children aged under 18 years of age, 28% reported one, 17% two, and 5% reported three or more (2).

The education attainment level in Cyprus is high with 85% of secondary education graduate students entering university undergraduate programs, 10% attending postgraduate Master's degree programs, 2.4% in doctoral (PhD) programs, and only 3.0% in non-university programs. Three public universities and several private universities run the local university education system. A large number of students also choose to study abroad with the main countries of destination being Greece, the

United Kingdom (UK), Germany, as well as other European countries and the United States of America (USA). There is an increasing trend in the number of Cypriot students who choose to study in the local universities of Cyprus. A considerable rise in the number of foreign students who choose Cyprus for their university studies has also been observed in recent years (4).

Economy

Tourism, financial services, and real estate are the most important economic determinants of the Cypriot economy. The financial sector is mostly dominated by the banking sector, which also provides health insurance and management of services.

The country has enjoyed economic growth and increasing prosperity over the past two decades (1990–2011). This was a result of growth in service industries, such as banking, shipping, and tourism. Real gross domestic product (GDP) has been growing at an average annual rate of almost 4% from 1995 up until 2011. The GDP of Cyprus in 2011 was 27.5 billion USD (5). The unemployment rate reached an all-time low of approximately 3% in the mid-1990s.

Unfortunately, Cyprus encountered serious financial problems in the years that followed 2011. The over-exposure of the Cypriot banks to Greek debt and the rising level of the country's debt led to downgrades by rating agencies. By May 2011, Cyprus could no longer borrow from foreign markets. Consequently, in 2013, the government of Cyprus applied for an economic bailout program

Table 2. Macroeconomic indicators (1995–2016)

	1995	2000	2005	2010	2011	2012	2013	2016
GDP Mill \$	9.135	9.197	16.920	23.096	25.017	22.995	21.919	19.810
GDP per capita Mill \$	14.012	13.186	22.742	27.502	29.022	26.377	26.377	23352
Public expenditure (% GDP)	2.4	2.7	3	3.3	n/a	3.3	n/a	3
Unemployment rate	n/a	4.8	5.3	6.3	7.9	11.9	15.9	13.1
Youth unemployment rate (% of total labour force)	n/a	9.9	13.9	16.6	22.4	27.8	40.5	29.2
Total poverty rate*	n/a	n/a	16.1	15.6	14.8	14.7	15.3	16.1
Child (<16 years) Poverty rate	n/a	n/a	12.5	12.8	12.7	14.3	15.5	17.1
Inequality measure (gini coefficient)	n/a	n/a	28.7	30.1	29.2	31.0	32.4	32.1

n/a: Not available; *: Persons at-risk-of-poverty rate are those with equivalent available income, after social transfers, below the risk of poverty threshold. The at risk-of-poverty threshold is defined as 60% of the equivalent median income after social transfers

from the European Commission, the European Central Bank, and the International Monetary Fund. In March 2013, the Eurogroup formulated a plan involving a bail-in of depositors' savings in Cyprus. This eventually led to the closing down of one of the largest banks in Cyprus (Laiki Popular Bank), wiping out all uninsured deposits. Moreover, a massive 'haircut' of the order of 47.5% was applied to uninsured deposits of the Bank of Cyprus in order to recapitalize the bank.

Since 2012, GDP has a declining average annual rate reaching 19.5 billion USD in 2015. There has been a slight increase of GDP in 2016 (19.8 billion USD) (6). The consequences of the economic crisis were reflected in almost all domains such as construction, manufacturing, wholesale, retail trade, transport, storage and communication. Moreover, the brunt of the financial crisis had a severe, direct impact on the health services resulting in the squeezing of the healthcare budget.

In 2012, the total unemployment rate in Cyprus increased to 11.9% compared with 10.5% in EU countries (7). Moreover, during 2013, the total unemployment rate in Cyprus climbed to 15.9%, and the youth unemployment rate reached an all-time high figure of 40.5%. Since then, these numbers have been declining and in 2016, the total and youth unemployment rates were 13.1% and 29.2%, respectively (Table 2).

A recent study conducted in Cyprus exploring the impact of the financial crisis on the mental health of Cypriots showed that this was a major predisposing factor in the development of anxiety and depressive symptoms in the participants (8).

Child health and wellbeing status

The level of health in Cyprus appears to be high and comparable to that of other developed countries, as reflected

by a number of health indicators (Table 3). Life expectancy at birth, a basic indicator for population health, reached 80.6 years in 2015 across 28 EU (EU-28) countries (9). Life expectancy at birth in Cyprus is slightly above the EU-28 average in the same year (81.8 years) (9). In addition, the average Healthy Life Years in Cyprus in 2014 was higher (66.2 years) compared with the EU-28 average (61.6 years) in the same year (9). Based on the latest Eurostat data for 2015, Cyprus is among the counties with the lowest infant mortality rate with 2.7 deaths per 1000 live births compared with the EU-28 average (3.6 deaths per 1000 live births) (9).

Early neonatal deaths are low at 1.8 per 1000 live births. The uncharacteristic peak in the early neonatal deaths observed in Cyprus during 2008 was attributed to an unfortunate sharp outbreak of Legionella infection in term neonates (10). Overall, post-neonatal deaths have been declining over a twelve-year period. Although infant mortality was 11.0 per 1000 live births in 1990, it dropped to an astounding 2.6 per 1000 live births in 2016 (2).

However, Cyprus faces challenges concerning high preterm birth rates and a large proportion of low-birth-weight infants. The percentage of extremely preterm (<28 weeks), very preterm (28–31 weeks), and preterm (32–36 weeks) births is 0.5, 0.8, and 10.9 respectively. The proportion of infants born with a low birth weight of <2500 g is approximately 10.8%, whereas for those <1500 g, the figure is approximately 1.3% (2015) (11).

Maternal mortality has fallen considerably in the past two decades. In 1996, maternal mortality was 5.9 (per 100,000 total live births and stillbirths), whereas in 2014 this figure dropped to 1.5 (Table 3) (12). The mortality rate for 0 to 14-year-old children has also decreased considerably in 2016 (27.4 per 100,000 population), compared with 2004 (34.9 per 100,000) (Table 3).

Table 3. Main health indicators

	2004	2006	2008	2010	2011	2012	2014	2015	2016	Source
Life expectancy at birth	79.3	80.1	80.1	81.5	80.9	81.1	82.8	81.6	82.5	MOH
Early neonatal mortality rate per 1000 live births (0–6 d)	1.2	1.7	2.0	1.8	1.4	2.4	1.2	1.6	1.8	MOH
Late neonatal mortality rate per 1000 live births (7–28 d)	0.4	0.5	0.4	0.2	0.3	0.4	0.3	0.3	0.4	MOH
Post neonatal mortality rate per 1000 live births (8–365 d)	1.9	0.9	1.1	0.8	0.9	0.7	0.5	0.7	0.7	MOH
Infant mortality rate per 1000 live births	3.5	3.1	3.5	3.2	3.1	3.5	2.1	2.7	2.6	CSS
0–5 years mortality rate per 1000 live births	5.3	5.3	4.4	3.9	3.9	4.0	3.2	3.1	2.9	CSS
0–14 years mortality rate per 100,000 population	34.9	31.5	32.0	29	28.1	41.6	20.8	25.9	27.4	MOH
Maternal mortality rate per 100,000 live and still births	1.6	1.6	4.0	1.3	2.7	2.8	1.5	n/a	n/a	CSS

MOH: Ministry of Health; CSS: Cyprus Statistical Services

During the period 2004–2015, apart from causes of death originating in the perinatal period (37%) and congenital malformations (13%), the main causes of death in children up to the age of 14 years were external causes (14%), cancer (9%), and diseases of the nervous system and sense organs (5%). The remaining 124 deaths (22%) were due to other causes (Fig. 1). The distribution of the main causes of fatal injuries among the 0–19 years’ age group during the period 2004–2015 is presented in Figure 2. Childhood mortality by category and subcategory of mode of death during 2004–2015 is shown in Table 4. An increase in the rate of fatal injuries observed in 2005 was due to a Cypriot plane crash in Greece in August 2005 (13).

Immunization coverage

The Children’s Vaccination program in Cyprus is determined by the Ministry of Health according to World Health Organization (WHO) recommendations, in conjunction with the Immunization Committee of the Cyprus Paediatric society (14). The immunization schedule is regularly updated and modified based on current population data relating to the incidence of communicable diseases, socioeconomic status, and the international literature. The latest update of the Vaccination Scheme by the Ministry of Health was published in 2012 (15).

An appropriate and well-established immunisation program is a key component of public health services (16). A number of vaccine-preventable infections such as diphtheria, tetanus, and polio, which still affect mainly children from developing countries, disappeared from Cyprus several years ago.

High immunisation coverage and adherence to the local vaccination schedule are essential components of a successful immunisation program (17). However, currently in Cyprus, there are no centralised electronic information technology systems in place to enable systematic data recording of immunisations in order to monitor vaccination adherence and coverage at a population level. Additionally, to our knowledge, there are no published studies regarding the immunisation coverage in Cyprus. Limited data exist in relation to primary vaccinations in children aged 17–24 months, which were immunised in the public sector. The last available statistics are shown in Table 5 (Ministry of Health – unpublished data). It is worth noting that a significant number of infants and children receive their vaccinations in the private sector by community paediatricians.

Cyprus holds very high rates of vaccination coverage for the first three doses of polio, hepatitis B, and DTaP vaccine (diphtheria, tetanus and pertussis acellular vac-

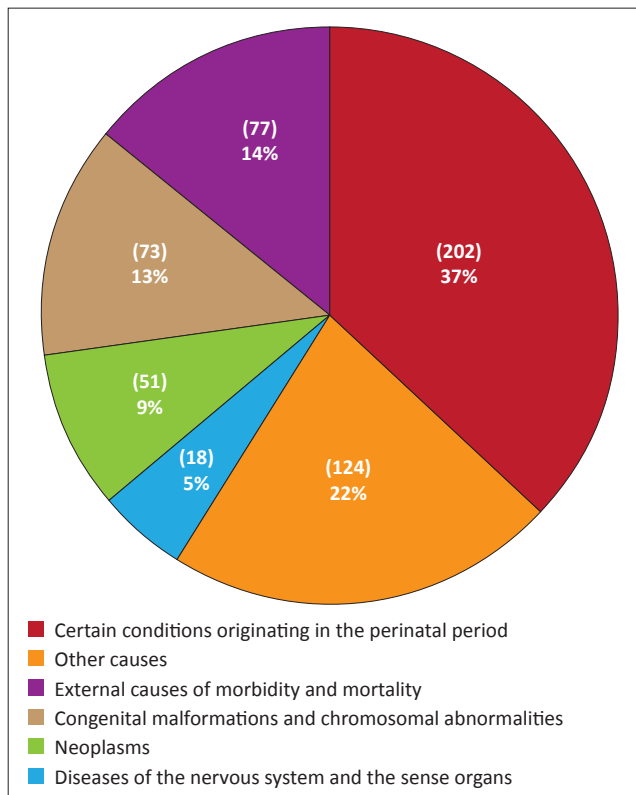


Figure 1. Main causes of death among children 0–14 years during period 2004–2015

cine), and overall vaccination rates exceed 95% of the infant population. However, the MMR vaccination population coverage is lower at 87% (Table 5), which is below the WHO’s goal (>90%). A study conducted in Australia and 17 European countries deemed Cyprus at risk of measles epidemics, which could affect mainly the susceptible population of children (18). In Cyprus, a small epidemic of the disease occurred in 2010, when 17 patients were infected following an outbreak in Bulgaria. During 2014, 10 cases of measles were observed, all of which in vaccinated individuals. An interesting finding stemming from these two epidemics is the increase in the median age of the incidents from 8 years in 2010 to 19.5 years in 2014, indicating possible gaps in population coverage.

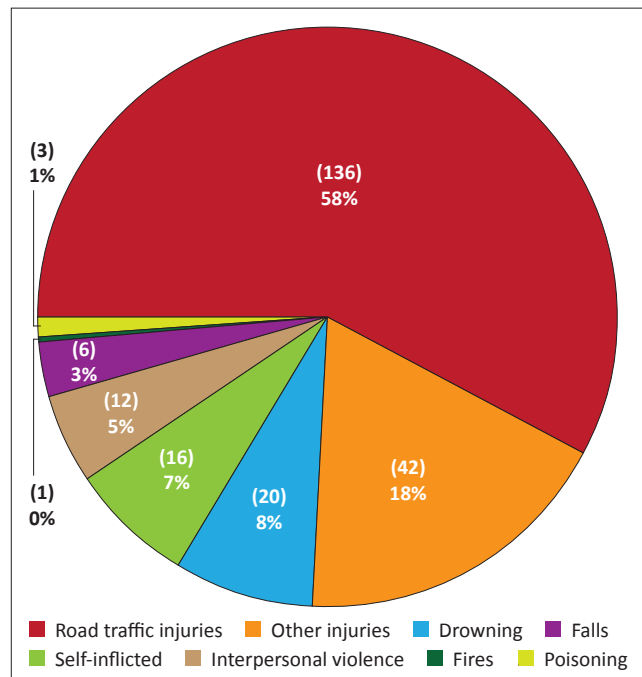


Figure 2. Causes of fatal injuries among children 0–19 years during period 2004–2015

Cyprus’s vaccination coverage rate for Haemophilus influenzae b-type (Hib), Meningococcal C, and conjugated pneumococcal 7-valent vaccine (PCV) is inadequate at 53.2%, 73%, and 20.5%, respectively (Table 5). A recent study examining immunization coverage for PCV revealed that only 50.4% of children aged 6–36 months completed the vaccination at the appropriate age (19). This finding raises alarm bells regarding the obligation to improve PCV vaccination coverage in Cypriot children, especially considering the burden attached to a possible pneumococcal infection (20).

Vaccine coverage for chickenpox remains relatively low (Table 5), despite the increase observed during 2012 compared with 2000 (38.5% vs 26.3%). This may be attributed to the fact that unlike most other vaccines, the vaccine against varicella is not offered free-of-charge by public vaccination clinics. The Varicella vaccine is amongst a group of vaccines such as Meningococcal B, Hepatitis A,

Table 4. Number of deaths for children aged 0–14 years according to the WHO Global Health estimates

Causes of death	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Communicable, maternal, perinatal and nutritional conditions	11	28	13	13	23	26	20	17	30	8	13	19	21
Non-communicable diseases	19	20	21	27	15	9	14	16	20	11	12	14	17
Injuries	3	25	4	9	3	9	4	4	4	3	3	2	
Ill-defined causes	15	11	5	2	3	3	2	2	3	6	2		
Total	48	84	43	51	44	47	40	39	57	28	30	35	38

Table 5. Immunization coverage among children aged 18–29 months (2000), 16–27 months (2003), 17–24 months (2006, 2009, 2012)

Type of Vaccine	2000	2003	2006	2009	2012
DTaP 1	99.6	100	99.5	100.0	99.8
DTaP 2	99.2	99.4	98.4	100.0	99.8
DTaP 3	97.5	97.8	96.8	98.6	98.8
IPV1	99.2	100	99.5	99.8	99.8
IPV2	98.7	99.4	98.4	99.8	99.8
IPV3	97.5	97.5	96.5	98.6	98.8
MMR	84.7	86.3	87	86.9	86.2
HBV1	97.5	97.5	98.6	99.5	99.3
HBV2	93.6	95.3	97.8	99.5	99.5
HBV3	89.0	88.4	93.2	96.4	96.2
Hib Fully	31.8	65.3	51.6	53.2	51.9
Hib Partially	44.5	32.5	47	44.9	47.6
MenC Fully vaccinated	n/a	n/a	n/a	73	73
MenC Partially vaccinated	n/a	n/a	n/a	5.5	5.5
PCV7 Fully vaccinated	n/a	n/a	n/a	37.5	20.5
PCV7 partially vaccinated	n/a	n/a	n/a	42	42
Var	26.3	38.4	39.5	36.3	38.5

DTaP: Diphtheria, tetanus and pertussis acellular vaccine; IPV: Polio vaccine; MMR: Measles, mumps and rubella; HBV: Hepatitis B vaccine; PCV7: Conjugated pneumococcal 7-valent vaccine; Hib: Haemophilus influenzae type b vaccine; MenC: Conjugated meningococcal C vaccine; Var: Varicella vaccine; n/a: Not applicable

and Rotavirus vaccines, which are currently only available in the private sector, at a cost.

Recently, there has been a rise in anti-vaccination movements, provoked by numerous non-evidence-based reports. Responding to this, the Cyprus Paediatric Society launched a targeted vaccination campaign aimed at educating the public and increasing vaccination coverage.

Acute, chronic diseases and risk behaviours

Data regarding the patients treated in outpatient settings or outside of hospitals is not systematically recorded in Cyprus, and therefore cannot be reported.

The overall mean annual incidence of type 1 diabetes mellitus (T1DM) in Greek-Cypriot children aged less than 15-years between 1990 and 2009 was estimated as 12.5 per 100,000 population, accompanied by a rising trend in the incidence during recent years. This is consistent with the global annual increase in the incidence of T1DM, which is estimated as 2% to 5% per year and is a cause of concern due to the health and resource-related implications (21, 22).

The prevalence of allergic diseases in Cyprus is increasing and is more striking among children living in rural areas, and has been shown to exhibit environmental and lifestyle variations in this population (23). Regional data revealed that the prevalence of current wheeze and lifetime asthma in 2008 among children aged 7 and 8 years was 8.7% and 17.4%, respectively. The prevalence of eczema was estimated as 13.5% and the incidence of allergic rhinoconjunctivitis was 5.2% (23).

In Cyprus, the prevalence of overweight (20.2%) and obesity (8.9%) in children and adolescents has risen during the last decade (24). This trend may be attributed to a variety of lifestyle factors such as changes in dietary patterns, reduced physical activity, and sedentary behaviour (e.g. watching TV) (25–27). A study that assessed the dietary habits of Cypriot children and adolescents aged 6–18 years revealed that the quality of their diet was poor (28).

At the other end of the spectrum, a national study examining the nutritional status among preschool children in Cyprus revealed that the prevalence of underweight was 2.3%, wasting was 2.8%, and stunting was 1.1%, according to the relevant WHO definitions (29).

Tobacco use data from the survey at the end of the year 2016 revealed that current tobacco use and current cigarette smoking among teenagers aged 13 and 15 years was 19.5% and 13.9%, respectively (30).

Organization and governance of child healthcare services

Previous health system

Up to June 2019 the healthcare system in Cyprus consisted of a public and private sector. The public sector is fully financed by the government, whereas in the private sector the patients pay themselves or are covered by their private insurance.

Individuals with an annual income of less than €15,400, the chronically ill, and civil servants are eligible to receive free public sector healthcare. It is estimated that approximately 83% of the population fall into one of the above categories and are deemed eligible for free public sector health services (31). People who do not meet the above criteria must pay themselves or use private health insurance in order to finance their health needs in the public or private sector. It is estimated that approximately 20% of the population has voluntary health insurance (VHI) coverage (32).

Six public hospitals (five district hospitals and one paediatric/maternity hospital), a number of district health

centres and many smaller sub-centres, which are all organised and managed centrally by the Ministry of Health, deliver public services. Health providers working in the public sector have the status of civil employees. They are salaried workers and are not engaged in private work. The public sector's total expenditure allowance is financed by the annual state budget.

The private sector consists of private hospitals, polyclinics, clinics, diagnostic centres, and independent practices. The private sector's expenses are covered by self-financed payments and VHI. Additionally, there are some workers' union schemes that have their own health service providers offering almost exclusively primary care. Semi-state organisations such as the Cyprus Telecommunication Authority and the Electricity Authority of Cyprus also offer health services to their employees via private health providers.

Furthermore, professional associations play an essential role in the network of the health system. These include the Cyprus Medical Association, the Cyprus Nurses and Midwives Association, the Union of Public Doctors and the Union of Public Nurses, the Pancyprian Association of Private Hospitals, the workers' union of the Pancyprian Federation of Labour, the Cyprus Workers' Confederation, the Democratic Labour Federation of Cyprus, and some voluntary and non-governmental organisations.

The Cyprus Paediatric Society is an organisation that encompasses all Cypriot paediatricians (primary, secondary and tertiary care). The aim of the Cyprus Paediatric Society is to promote child health and to represent the professional interests of Cypriot paediatricians (33).

Financing of the health system

The total health expenditure in 2016 was approximately 6.8% of GDP. The Cypriot GDP was estimated to total 20 billion USD in 2016 (34). Approximately 43% of the total health expenditure is financed by the government (public sector).

The overall health expenditure as a proportion of GDP has remained steady since 2004. A considerable decline of GDP during the financial crisis in 2013 resulted in a smaller share being allocated to health expenditure. The current public health system is funded via general taxation but does not provide free health cover for all citizens.

Health expenditure in Cyprus is lower than in most European countries. During 2015, Cyprus spent €1597 per capita on healthcare, compared with the EU average of €2797 per capita. The government spent 7.1% of its total budget

on health in 2015, which is the lowest percentage among the EU countries (35).

Child healthcare in Cyprus

A range of providers offer child healthcare in Cyprus. These include: (1) public hospitals, rural public healthcare centres, private hospitals, and private clinics or polyclinics, where primary care general paediatricians or emergency physicians can be consulted; (2) secondary care, which is available at public (mainly) or private hospitals with paediatric inpatient wards by general paediatricians or paediatric subspecialists; (3) tertiary care based in the Archbishop Makarios III Hospital, which is a university-affiliated maternity and children's hospital with specialised paediatric services such as Paediatric Intensive Care, Paediatric Surgery, Paediatric Oncology, Neonatal Intensive Care, Child and Adolescent Mental Health services, supported by a number of paediatric subspecialists.

A range of healthcare professionals, other than physicians, are based and provide services at the above settings such as nurses, midwives, health visitors, physiotherapists, speech therapists, psychologists, dieticians, and social workers.

There are 277 registered paediatricians in Cyprus, 28% (77) of whom work in the public sector, providing primary, secondary, and tertiary healthcare. The remaining 72% (200) are independently practicing paediatricians based mainly at private clinics, offering primary care for children from birth through to adolescence.

The total child population (age 0–14 years) in Cyprus is 139,300. This corresponds to approximately 502 children per paediatrician. Indeed, all parents in Cyprus have the opportunity to choose a paediatrician to treat their child at the primary care level.

Primary care paediatricians usually act as the first point of contact and have the key coordinating role for a child's ongoing care. They perform routine reviews, developmental screening, immunisations, health education, and deal with any acute illness. They communicate with other healthcare providers to organise a child's care and help patients who require more specialised care to navigate the healthcare system. Furthermore, they may make referrals to secondary or tertiary care for further investigations, when required.

Public sector healthcare is provided by five general hospitals situated in Nicosia, Limassol, Larnaca, Famagusta, and Paphos, and a maternity and children's hospital located in Nicosia. There are also two smaller rural hospitals

Table 6. Public hospitals in Cyprus, year established, number of beds

	Year established	No of beds	No of pediatric beds at pediatric units	Number of pediatricians per area/Hospital	Number of nurses at pediatric units	Total number of nurses at public sector
Nicosia General Hospital	2006	414	0	0	0	1331
Nicosia the Archbishop Makarios III	1984	222	36	49	34	
Limassol General Hospital	1993	305	32	12	27	650
Larnaca General Hospital	1984	172	25	7	22	351
Paphos General Hospital	1989	135	18	6	18	300
Famagusta General Hospital	2008	70	16	3	16	164
Total		1318	127	77	117	2796

situated in Kyperounta and Polis Chrysochous, which offer various services, including inpatient care for adolescents and primary care for children. The distribution of total beds, paediatric beds, paediatricians and nurses in each public hospital, as well as the year of establishment, is shown in Table 6.

The total number of beds in paediatric public hospital wards is 127, according to the Health Statistics of the Statistical Service in 2015 (36). The Archbishop Makarios III hospital is a specialised hospital for Maternity, Women's and Children's health. It serves as the main paediatric hospital in Nicosia and the tertiary paediatric referral centre for specialist child services. At the heart of this hospital are two paediatric wards, with a capacity of 36 beds, a neonatal intensive care unit hosting 48 cots, a paediatric intensive care unit with 12 beds, a paediatric surgery ward (16 beds), a paediatric oncology ward (12 beds), and a paediatric neuropsychiatry department (8 beds). There are also a number of paediatric outpatient subspecialty units including paediatric cardiology, paediatric neurology, clinical genetics, and paediatric endocrinology and diabetes unit. Paediatric physiotherapy and speech therapy departments are encompassed in the hospital facilities.

Primary care is also provided to children in rural public healthcare centres by paediatricians of the public sector, in collaboration with health visitors. There are 18 Maternity and Child Welfare clinics distributed in urban and rural areas of Cyprus, staffed by approximately 100 health visitors (36).

The Ministry of Health commits a specific annual budget for each public hospital according to its individual needs and requirements. This often results in insufficient cost-effectiveness and disorganised use of available resources. Furthermore, the information technology of the healthcare system is not yet well established and there

is a lack of a universal electronic medical record-keeping system, which in turn affects the development and overall quality of healthcare in practice.

State institutions provide community-based services to support children whose families face difficult circumstances, as well as children with disabilities and special needs. These institutions come under the umbrella of Social Welfare services, which take overall responsibility and include day-care nurseries for pre-school age children, state institutions for children, the Nicosia Youth Hostel (boys), the Youth Hostel for teenage girls, special state institutions for teenagers, as well as state institutions for children with severe special needs. 'Nea Eleousa' provides services for mentally disabled children in Cyprus. It represents the first state institution centre for the care of children with severe mental disabilities; it has been active since 1977 and accommodates 32 residents. The main goal of residential care is to help children develop their physical and mental skills, whilst involving and supporting the families in their daily care (37).

Organised services for the rehabilitation of children and adolescents with acquired brain injuries are not yet available in Cyprus. Usually, when a child needs rehabilitation, the family of the child organises the necessary treatment and receives financial support from the government.

Provision of services

A wide spectrum of health promotion and disease prevention programs are provided and coordinated by the Public Health Services in Cyprus. The majority of these incorporate activities relevant to child health.

It is of paramount importance for public health services to coordinate the medical services, health visitors, and the mother and child health centres, in order to organise effective programs towards achieving these objectives.

Contributing to this effort are local authorities, voluntary and non-profit organisations, as well as various ministries such as the Ministry of Agriculture, Natural Resources and Environment, the Ministry of Labour and Social Insurance, and the Ministry of Education and Culture. All these organisations coordinate and perform a variety of cross-sectorial activities such as the prevention of domestic violence, child abuse, childhood obesity, illegal drug use, and sexually transmitted diseases. In addition, they collaborate towards the implementation of programs focused on food safety and healthy nutrition.

The most important priorities of the Public Health Services in Cyprus involved in child health are the following: epidemiologic surveillance of infectious diseases; services for expectant parents; pregnant women and children; school health services; immunisation services; control of environmental and communicable diseases; and health education and promotion.

Health monitoring unit

The Health Monitoring Unit is an essential body established by the Ministry of Health focusing primarily on the health surveillance of the local population. Its responsibilities include the collection, analysis, and dissemination of data, as well as the measurement of different trends in health indicators. Additionally, the Health Monitoring Unit organises the clinical coding in public hospitals, which is an essential prerequisite for the introduction of a remuneration system based on diagnosis-related groups (DRGs).

Surveillance and infectious disease control

A special unit has been established by the Ministry of Health for the surveillance of all infectious and communicable diseases. This system is governed by the following groups: (1) the mandatory reporting system of the WHO for the incidence of communicable diseases; (2) the reporting system of sexually transmitted diseases; (3) the reporting system for foodborne infectious diseases; (4) the voluntary reporting system of infectious diseases for which diagnosis is through laboratory tests; (5) the reporting system of diseases and syndromes for which diagnosis is only clinical.

Services for expectant parents, pregnant women and children

Health visitors in coordination with other health professionals deliver health promotion and health education programs for infants, children, and pregnant women under the auspices of the Department of Medical and Public Health Services. In addition, they assess children's growth and development; perform screening tests as well as counsel and support parents.

The Ministry of Education in collaboration with the Department of Medical and Public Health Services (health visitors) have the responsibility for health promotion in children as well as helping to develop a healthy school environment.

The most important health services are medical and dental screening examinations, vision-screening tests, hearing screening tests, scoliosis screening tests, vaccinations, and the prevention and control of epidemics. An important area of school health services is the identification of potential psychosocial health problems in students with an emphasis on domestic violence, abuse, school bullying, and alcohol and drug addiction. Paediatric psychiatry specialists and social services are also involved and contribute to this effort when necessary.

Immunisation services

Immunisations in the public sector are offered free-of-charge for all children and adolescents. Health visitors perform the immunisations in maternity centres under the supervision of paediatricians. In the private sector, the paediatricians themselves mainly perform the immunisations. The Ministry of Health estimates that paediatricians in the private sector perform 58% of the immunisations for the child population.

Other activities related to public health

A wide range of health programs has been organised in Cyprus under the harmonisation of public health services. These programs include screening for the detection of chromosomal anomalies in pregnant women, national thalassemia screening, Friedreich ataxia screening, the monitoring and surveillance program for pandemic influenza (H1N1), the nutrition program in elementary schools, and participation in the European network of health promotion in schools (38).

Additionally, research is being conducted in a number of studies assessing specific risks and harms to environmental health. Recently, our country participated in a study performing human bio monitoring on a European Scale, in order to measure pollutants or their metabolites in human specimens as a means of estimating individual and population exposure to potentially hazardous agents (39). Moreover, a two-year project, the SINPHONIE project, was performed in Cyprus in collaboration with 25 European countries aiming to describe schools' indoor environments, examine potential health risks to school children and school staff, and to develop guidelines and recommendations for healthy school environments in Europe (40).

Accessibility, adequacy and quality

Limited data exist about the accessibility, adequacy, and quality of public health services. In spite of this, specific areas linked to public health services demonstrate that these are accessible and high quality, at a national level. These areas include the high immunisation coverage for routine vaccines, the low prevalence of HIV/AIDS, the ranking for essential health indicators (e.g. low infant and neonatal mortality), and the generally good level of the population's health. Prevention programs targeting childhood obesity, healthy diet, and smoking have not yet produced convincing, definite beneficial outcomes.

Patient pathways

The patient pathway is illustrated in Figure 3. Almost exclusively, paediatricians of the public and private sector offer healthcare for children. In the private sector, parents have the right to choose the paediatrician they prefer for their child's medical care. This is more difficult in the public sector, though still achievable to a certain extent.

Public sector paediatric outpatient departments provide services daily from 7:30 to 14:30. A child can be brought to consult a paediatrician without prior appointment. The cost of the visit depends mainly on the total annual income of the family. The majority of residents meet the criteria for a free-access and are eligible to consult a general paediatrician at a concessionary rate of €3 per visit. The rest of the non-eligible population pay according to fee schedules set by the Ministry of Health for the use of public services. The paediatrician may prescribe medications, order diagnostic tests or make a referral to a paediatric subspecialist at a public hospital at a minor additional cost. There are waiting lists for some paediatric subspecialties including paediatric cardiology or radiology investigations. This poses serious barriers to the use of these services. For this reason, some parents choose to visit paediatric subspecialists or radiology centres in the private sector and cover the costs personally or via their VHI.

In a large proportion of children, primary and acute healthcare provision is delivered in the private sector. There are 200 paediatricians working in the private sector who provide mostly primary healthcare services, either in their individual practice or in partnerships. Parents have the right to choose the paediatrician for their children, the access to care is easy, and the only barrier is the cost. The usual method of payment is privately or through VHI.

Data regarding the number of consultations in the private sector is scant, but it is estimated to be equal to the amount of consultations in the public sector.

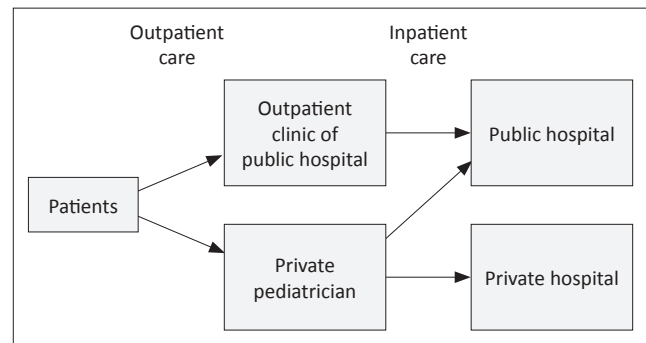


Figure 3. Patient's pathway in the current health system in Cyprus

Parents' decision to consult a paediatrician depends on a variety of factors such as personal preference for a particular paediatrician, existing barriers to access in the public sector, the severity of the child's illness, the desire for more personalised care, the ability to pay, and the existence of VHI. In recent years, there has been a steady increase in the number of parents using the public sector for their children's immunisations, as well as acute health problems.

Inpatient care for children is almost exclusively provided by public hospitals, with a total number of 127 beds. A small number of private clinics have suitable setups, resources, and trained paediatric nursing staff for managing child inpatients. Private paediatricians usually refer children who need admission to hospital to paediatricians based in the public sector. They rarely admit children at private hospitals.

Day care

Day centres offer care for children with specific conditions and allow medical treatment and discharge all on the same day. There are no available data on day care services for children in the private sector. In the public sector, the paediatric oncology department in Arch. Makarios III Hospital offers 12 beds for day care services (e.g. chemotherapy).

Emergency care

Emergency care includes all acute medical services to patients with life-threatening conditions that need urgent management. Emergency services in Cyprus are delivered by the emergency departments of all main public hospitals, as well as by some private hospitals. The ambulance service of the Ministry of Health is responsible for transferring patients to the public hospitals' emergency departments. There are 57 ambulances and a number of these have special equipment for transporting newborns and patients with special needs.

Ambulances are based in all emergency departments, in some health centres and special ambulance stations. All

ambulances are staffed by a qualified nurse and, where required, by a doctor who can provide first aid and urgent medical treatment. The emergency department personnel evaluate the patient and determine if the patient needs admission to hospital.

Everyone on the island has easy access to the emergency departments of public hospitals, at a fee of €10, because they operate on a 24-hour basis and do not require a doctor's referral.

Safeguarding-child protection

Social Welfare Services play an essential role in the protection and safeguarding of children. The Social Welfare Services department consists of 257 social welfare service officers and 149 residential officers covering the entire country.

In cases where a family is deemed incapable of providing adequate physical and psychological care for a child, the Director of Social Welfare Services is authorised by legislation to take the child into their care and to assume parental rights. The child may then be separated from the biological family and be placed in a foster family or as a last resort in residential placements, the latter in cases of children with serious behavioural problems and other difficulties. In parallel, practical and psychological support and counselling are offered to the child and family in order to achieve the earliest possible reunion of the child with a healthy family.

The law on the prevention of violence in the family and the protection of victims regulates the provision of appropriate assistance to victims of violence. The reported law was introduced in 1994 and modified in 2000 (41). Social Welfare Officers are responsible for handling cases of reported violence. According to the law, everyone, and in particular healthcare professionals, must refer any act of violence to the Social Welfare officer.

Mental healthcare

The provision of mental health services in children and adolescents is available in both the public and private sector. Due to the lack of reliable data at a regional or national level, no estimates are available on the number of children who use mental health services, or on the nature of their disorders or mental health problems. With reference to the provision of services, currently fifteen child and adolescent psychiatrists are active in Cyprus (42). The majority of them are self-employed in their individual private practices. However, detailed information on the provision of mental health services in the private sector is lacking. Paediatric psychiatrists, in most cases, provide

mental health treatment or interventions together with other professional groups including psychologists, speech therapists, special education teachers, and social workers who form a multidisciplinary team. Referrals are usually made directly by paediatricians or school psychologists.

In 2002 the Cypriot Society of Child and Adolescent Psychiatry was established (43). The association participates in national and European projects and aims to contribute to the development of mental health services for children and adolescents in Cyprus. The society endorses the major objectives of the EU concerning Mental Health which are: prevention, care and therapeutic intervention, promotion and awareness, and activities against stigmatization (43).

The public mental health service operates under the control of the Ministry of Health, which has its own budget. There are four community outpatient units for child psychiatry in the public sector, one in each of the four cities of Cyprus (Nicosia, Limassol, Larnaca, Paphos). Paediatric psychiatry departments offer a range of services to children and adolescents aged 0–17 years including psychiatric examinations, treatment, and some forms of individual or family psychotherapy (44).

The main public outpatient unit providing Child and Adolescent Psychiatry services operates in Arch. Makarios III Hospital in Nicosia. Available services include counselling and psychosocial intervention. The unit consists of child psychiatrists, clinical psychologists, mental health nurses, and an occupational therapist.

Due to the limited number of child psychiatrists and clinical psychologists in the public sector, a comprehensive 24-hour service has not yet been established. In addition, an initiative towards purchasing creative art therapists services (drama, art and music therapists) was successfully implemented during 2010 (44).

The first and only inpatient adolescent Mental Health Unit was established in Arch. Makarios III hospital in 2012, and it receives referrals from all over Cyprus. It is an eight-bed capacity unit and accepts adolescents aged 12–17 years for inpatient care. The number of available inpatient beds is extremely low compared with high-income countries (45). The main diagnoses of the inpatients include serious mental disorders that cannot be treated on an outpatient basis, as well as life-threatening conditions such as psychoses, eating disorders, obsessive compulsive disorder, emotional disturbances, and behavioural problems. Due to the limited availability of hospital beds and the restricted age criteria for adolescent inpatients, management and follow-up is generally organised on an outpatient basis.

Furthermore, within the network of public mental health services, school/educational psychologists provide various mental health services to schools such as counselling, mental assessment, and psychologist support.

Children with neurodevelopmental problems

There are no policies or official procedures in place concerning developmental screening in Cyprus. In the private sector, it is up to the clinical skill of each private paediatrician to identify developmental problems and in the public sector paediatricians in coordination with the health visitors who perform developmental screening. There is no organised multidisciplinary team regarding the care of children with neurodevelopmental problems. In the private sector, there are a few centres that provide multidisciplinary teams (child psychiatrists, child neurologists, speech therapists, occupational therapists, music therapists), and their cooperation is a matter of individual choice.

Once the treating physician suspects that a child may have a neurodevelopmental problem, they refer the child to a paediatric neurologist. The public paediatric neurology outpatient department (Arch. Makarios III Hospital) consists of three paediatric neurologists, two nurses, and a neurophysiologist. Accordingly, the waiting time for an appointment can be long. Families may opt for a private sector appointment, which is an expensive alternative.

Therefore, the economic status of a child's family may influence the level of care that a child with neurodevelopmental problems receives. The state provides a monthly allowance according to the financial status of the family caring for a child with severe neurodevelopmental problems, but this is seldom enough to fully cover the work of the multidisciplinary team.

Dental care

Dental health in children is mostly provided by the private sector. Public oral healthcare is provided on an outpatient basis in hospitals and in health centres, which operate on a daily basis in many urban and rural areas. Furthermore, the Public Dental Service (PDS) provides oral health education at schools to all children aged 6–12 years. In addition, four mobile units pay regular visits to elementary schools, which have limited access to dental care due to their remote location, and offer free treatment and preventive services.

According to a recent study, only a small proportion of children make use of PDS and our national healthcare system is setting up almost exclusively for preventive care to children aged up to 16 years (46). This is of concern and

may motivate the Cyprus government to plan services providing dental treatment to the child population.

The current total number of dentists in Cyprus is 732. Forty (6%) are occupied in the public sector. The dentist-to-population ratio is one per 1000 (47).

Recognized specialties in oral healthcare include orthodontics, oral surgery, dental alveolar surgery, and oral and maxillofacial surgery. A comprehensive spectrum of dental services, including curative and preventive services is offered by the PDS in hospitals. The field of curative services includes restorative dentistry, periodontology, endodontology, pedodontics, as well as oral and maxillofacial surgery, and partial and complete dentures. Preventive services are mainly offered to schoolchildren in the form of oral health education programs (48).

Vulnerable population

Vulnerable populations include patients who are racial or ethnic minorities, the socioeconomically disadvantaged, the underinsured, or those with certain medical conditions. Members of vulnerable populations often have health conditions that are exacerbated by inadequate healthcare (49).

Even though the economic resources allocated to the healthcare system in Cyprus are limited, access by marginalized and disenfranchised groups is possible. In this respect, these children can have equal opportunities to achieve at least a dignified quality of health in keeping with the rest of the population.

Asylum-seekers and refugees are entitled to free access to and the use of the public healthcare system if they live in a reception centre, or receive welfare benefits, or are able to demonstrate a lack of sufficient resources, or belong to a vulnerable group.

The type of services covered at minimum are emergency healthcare, essential treatment of illnesses, and serious mental disorders (50). However, serious barriers to access may exist for some groups, such as migrants. This may sometimes lead to inadequate healthcare, limited use of essential services, and ultimately to adverse health outcomes. Unmet medical needs due to access barriers, mainly for preventive services (such as laboratory and screening tests) and dental care have been reported in up to 18.9% of immigrants, in a survey published in 2011 (38).

Chronic illnesses

Because Cyprus is a small country, children with chronic conditions or special needs obtain centralized health-

care. The main inpatient and outpatient secondary and tertiary centre is the Arch. Makarios III Hospital in Nicosia. Children with endocrine and metabolic diseases, severe and refractory asthma, cystic fibrosis, primary ciliary dyskinesia, congenital heart diseases, genetic and metabolic diseases, chronic renal diseases, severe immunodeficiency, epilepsy and cerebral palsy, and paediatric surgical problems, may be referred to paediatric subspecialties based in this hospital for their treatment and follow-up. The hospital has integrated specific clinics for these paediatric subspecialties, which also provide outpatient care.

Medications and follow-up visits in children with chronic conditions are mostly provided free-of-charge after the diagnosis, under financing by the State. Few paediatric subspecialist paediatricians such as paediatric cardiologists and paediatric endocrinologists work in the private sector, but in most cases, they offer only outpatient care. A multidisciplinary team is in place at the paediatric endocrinology unit of Makarios Hospital and is made up of a paediatric endocrinologist, a dietician, certified nurse educators, and psychologists. At the time of diagnosis, a child with T1DM is referred to the centre for structured education and support. A management plan is formulated for children and their parents. An organized educational program for professional caregivers involved with children with T1DM in kindergartens, schools, and sports activities is not yet well established.

It has recently become more apparent that the increasing number of children with T1DM in Cyprus requires qualified healthcare professionals in order to provide the best care for these children (21). The Cyprus Diabetes Association is a non-profit organisation for the support of children and adolescents with T1DM (51). The association organises regular educational lectures and provides guidance, useful websites, and information relating to novel T1DM therapies. In addition, it provides free-of-charge equipment that are required for a child with T1DM.

Currently in public hospitals, there is a lack of permanently based qualified professionals in certain subspecialties of paediatrics, such as, paediatric metabolic disorders, and paediatric rheumatology, as well as some surgical subspecialties (e.g. cardiac surgery). Children who have conditions related to the above specialties are under the care of the paediatricians of Makarios Hospital, who coordinate their management plan under the guidance of special centres abroad. Indeed, a cooperation with King's College Hospital in London has been in place during recent years for children with chronic gastrointestinal conditions, financed by the State.

Another important issue regarding child health in Cyprus is the care of children with beta thalassemia. Cyprus is among the countries with the highest incidence of thalassemia worldwide. About 600 people in Cyprus have beta thalassemia and 16% of Cypriots are carriers of the beta thalassemia trait (52). Cyprus was the first country to implement a successful population prevention program based on premarital screening (53). The Cyprus Thalassemia Centre situated in Nicosia deals with thalassemia, sickle-cell anaemia and other hereditary anaemias in children and adolescents (54). Children with beta thalassemia receive appropriate care including blood transfusions and chelation in special thalassemia sub-units located in each Cyprus district under the guidance of the Cyprus Thalassemia Centre.

Maternity and neonatal care

In 2015, there were 9425 births in Cyprus according to national statistics (11). Sixty-five percent of births occurred in the private sector. The foetal mortality rate was low at 3.3 per 1000 births. The neonatal mortality rate was also low at 1.9 per 1000 live births. Thirty percent of births were from mothers of foreign origin. The majority (77%) of mothers were aged between 20–34 years, with 21% aged over 35 years. There was a relatively high proportion of premature births (under 37 weeks' gestation) of 12.2%. In 2015, 57% of women delivered by caesarean section in Cyprus, which is the highest in WHO's Health for All publication. Caesarean sections were performed proportionally more in the private sector (61% of private sector births) compared with public hospitals (49% of public sector births). Approximately 40% of caesarean sections were elective. There has been a rising trend over the last decades in Cyprus for caesarean sections in both the public and private sectors (11).

Neonatal intensive care unit admissions in 2015 reached 703 neonates, or 7.5% of total live births in that year. Fewer women chose to breastfeed exclusively (29%) compared with women who used mixed feeding (62%) in the first 48 hours after birth (11).

In Cyprus, maternity services are distributed in both the public and the private sector. There is only one tertiary Neonatal Intensive Care Unit, at Archbishop Makarios III Hospital, in Nicosia. A small level 2 neonatal care unit has recently begun to operate in Limassol. These are the only two sites where maternal and neonatal services co-exist. Non-resident paediatricians, who attend deliveries and decide whether a baby needs to be transported to the Neonatal Unit, cover the rest of the maternity services, public or private. A number of normal vaginal deliveries are performed by midwives, who are competent in assessing the baby after birth before deciding if a paediatrician should review the baby.

Newborn screening test

The newborn screening test is provided by the Centre for Preventive Paediatrics, which is a non-profit organisation founded in 1988. Since its establishment, the centre has successfully implemented the Newborn Screening Program for the detection of congenital hypothyroidism and phenylketonuria. Blood samples from all over Cyprus are sent for processing to the centre's biochemical laboratory. In addition to early diagnosis, the centre provides ongoing monitoring of disease progression and treatment, in those diagnosed with either of the two diseases. Children are also followed up regularly by the centre regarding their physical and psychomotor development (55).

Since 2004, the centre has offered the Neonatal Hearing Screening Program, which aims at the early detection and diagnosis of hearing loss in neonates.

The annual budget of the centre is approximately €620,000. The budget is partly covered by State funding, contributions from individuals, companies and organisations, as well as from events organised by the centre's Association of Friends (55).

Major health system reforms

A national health system (GeSY) was voted by the Parliament in June 2017 and has the following elements: (1) Universal, meaning that every Cypriot will contribute and at the same time will be covered by the GeSY; (2) Socially-oriented, covering the entire population, without exceptions, and regardless of their financial capacity; (3) Integrated, meaning that the healthcare system covers all basic health services with the possibility of participation of all providers both from the private and public sectors; (4) Accessible, meaning that the GeSY will allow the recipient patient to freely choose their healthcare services provider, without barriers or restrictions.

The GeSY is an independent insurance fund in which contributions will be paid to healthcare providers (physicians, nurses, clinics, pharmacists, hospitals, physiotherapists) in exchange for healthcare service provision to the citizens of the Republic of Cyprus. The State, employers, and employees will contribute to this fund as following: From March 1st, 2019, employees will contribute 1.7% of their income, their employers a further 1.85%, and the state a further 1.65%. The self-employed will contribute 2.55% of their income, and pensioners, those living on income from rent and other independent means, and government officials will contribute 1.7% of their income. Then, from March 1st, 2020, onwards contributions will increase to 2.65% of their income for employees, 2.9% for their employers, 4.7% for the State, 4% for the self-em-

ployed, and 2.65% for pensioners, those living on independent means, and State officials.

Services will be provided based on medical needs and not based on the citizen's financial status. Therefore, even non-income citizens (e.g. unemployed, children, students, soldiers, public benefit recipients) will have equal access to health services.

The responsibility of GeSY management lies with the Health Insurance Organization (HIO). The HIO is a legal entity governed by State law, run by a board of 11 members composed of representatives of the government, employers, employees, and patients (56). Health services within the GeSY are offered by all public and private health providers contracted to the HIO. These providers must meet the minimum requirements on their qualifications, infrastructure, and equipment.

Beneficiaries of the GeSY are all citizens who have their permanent residence in areas controlled by the Government of the Republic and fall into one of the following categories: Cypriot citizens and European citizens residing and working or having acquired the right of permanent residence. GeSY recipients are entitled to access to health services by first selecting a general practitioner (GP) and registering on their patient list. It is noteworthy that children will register with a paediatrician chosen by their guardian. The patient will first have to visit the GP, or the paediatrician in the case of a child, who is responsible for making the first assessment and initiating appropriate treatment. In cases where specialized services are needed, the GP or the paediatrician, will be responsible for referring the patient to those services.

Assessment of child health

No official survey or report concerning child health assessment and healthcare outcomes across the child population has ever been conducted in Cyprus. To our knowledge, there is a lack of data concerning important areas such as equity issues to service access, inappropriate or insufficient equipment, oversupply of paediatricians, replication of services, overuse of expensive medicines and antibiotics, as well as efficiency and effectiveness matters such as oversupply of hospital beds and laboratories. Additionally, quality aspects including long waiting lists for a variety of paediatric subspecialties in the public sector, lack of standard procedures, and guidelines for children with chronic diseases are a major challenge concerning child health in Cyprus. The limited data relating to immunisation coverage reveal that Cyprus holds high immunisation rates for routine vaccines. As a final point, infant and neonatal mortality rates are progressively improving.

Table 7. Strengths and weaknesses summary of the child health care system in Cyprus**Limitations of the child health system in Cyprus**

- Lack of universal free access to primary care.
- Lack of standard protocols and guidelines for children with chronic illnesses.
- Numerous gaps in the management of childhood and adolescence mental health problems.
- Absence of certain paediatric subspecialties in the public sector (e.g. paediatric rheumatology, metabolic medicine).
- Lack of computerised electronic health records and IT systems.
- Continuing education courses for child health professionals.
- Limited quality assurance monitoring systems for children with acute and chronic illnesses and for immunizations.
- Equity issues to service access.
- Lack of adequately developed, well-coordinated, multidisciplinary team for children with mental health problems or complex medical needs, further affected by the limited skill mix between professionals associated to child health.
- Establishment of a better-coordinated care for children with neurodevelopmental disorders is urgently needed. input by a team of health professionals consisting of general pediatricians, paediatric neurologists, psychologists, speech therapists, occupational therapists and social workers.

Recent developments in child health care in Cyprus

- Setting-up a new neonatal level 2 unit and a child-adolescent mental health inpatient unit.
- Improvement of welfare and child protection services.
- Improvement of school health services.

Conclusions and lessons learned

Every child deserves to enjoy the highest possible standard of healthcare. In keeping with this important principle, Cyprus is striving to achieve a nationwide health system with universal coverage and enhanced benefits, especially in the child population. The implementation of an GeSY is in its final phase, in the midst of disputes regarding financial, quality, equity, efficiency, and effectiveness issues. The strengths and weaknesses of the child healthcare system in Cyprus are summarized in Table 7.

Conflict of Interest: The author have no conflicts of interest to declare.

Financial Disclosure: The author declared that this study has received no financial support.

References

1. European Union. Living in the EU. Size and population. Available at: https://europa.eu/european-union/about-eu/figures/living_en.
2. Cyprus Statistical Service. Demographic Report, 2016. Available at: https://www.mof.gov.cy/mof/cystat/statistics.nsf/index_gr/index_gr?OpenDocument.
3. Eurostat Statistics Explained. Marriage and Divorce statistics. Available at: http://ec.europa.eu/eurostat/statistics-explained/index.php/Marriage_and_divorce_statistics.
4. Cyprus Statistical Service. Education Statistics 2014-2015. Available at: http://www.mof.gov.cy/mof/cystat/statistics.nsf/populationcondition_24main_en/populationcondition_24main_en?OpenForm&sub=4&sel=4.
5. The world Bank Data.Cyprus. Available at: <https://data.worldbank.org/country/cyprus>.
6. European Commission. Cyprus Healthcare and Long Term care Systems. Available at: https://ec.europa.eu/info/sites/info/files/file_import/joint-report_cy_en_2.pdf.
7. Eurostat Statistics Explained. Unemployment statistics. Available at: http://ec.europa.eu/eurostat/statistics-explained/index.php/Unemployment_statistics.
8. Stavrou G, Paikousis L, Jelastopulu E, Charalambous G. Mental Health in Cypriot Citizens of the Rural Health Centre Kofinou. *Healthcare (Basel)* 2016; 4: 81.
9. Eurostat Statistics Explained. Mortality and life expectancy Statistics. Available at: http://ec.europa.eu/eurostat/statistics-explained/index.php/Mortality_and_life_expectancy_statistics.
10. Yiallourous PK, Papadouri T, Karaoli C, et al. First outbreak of nosocomial Legionella infection in term neonates caused by a cold mist ultrasonic humidifier. *Clin Infect Dis* 2013; 57: 48–56.
11. Republic of Cyprus Ministry of Health. Cyprus public and private maternity units. Important perinatal health indicators for the year 2014-2016. Health monitoring unit, 2018. Available at: [https://www.moh.gov.cy/moh/moh.nsf/All/8DC461429CBC4DE7C22579CE002EF07D/\\$file/Perinatal%20Health%20Report%202018_Cyprus%20Maternity%20Units%202014-2016.pdf](https://www.moh.gov.cy/moh/moh.nsf/All/8DC461429CBC4DE7C22579CE002EF07D/$file/Perinatal%20Health%20Report%202018_Cyprus%20Maternity%20Units%202014-2016.pdf).
12. Republic of Cyprus. Cyprus Statistical Service. Health 1990-2015. Available at: http://www.mof.gov.cy/mof/cystat/statistics.nsf/populationcondition_23main_en/populationcondition_23main_en?OpenForm&sub=3&sel=2.
13. Republic of Cyprus Ministry of Health, Health Mon-

- itoring Unit, Fatal injuries report 2014-2015. Available at: <https://www.moh.gov.cy/Moh/MOH.nsf/All/1027CF-3C1A82C408C22579CA004186CA?OpenDocument>.
14. Cyprus Paediatric Society. Vaccination Schedule for children. Available at: http://venice.cineca.org/documents/cyprus_ip.pdf.
 15. Republic of Cyprus Ministry of Health. Immunization Scheme 2012. Available at: <https://www.moh.gov.cy/moh/moh.nsf/All/54D2487EB7E56075C2257AFB-00469C87?OpenDocument>.
 16. Lahariya C. “Health system approach” for improving immunization program performance. *J Family Med Prim Care* 2015; 4: 487–94.
 17. Akmatov MK, Kretzschmar M, Krämer A, Mikolajczyk RT. Timeliness of vaccination and its effects on fraction of vaccinated population. *Vaccine* 2008; 26: 3805–11.
 18. Andrews N, Tischer A, Siedler A, et al. Towards elimination: measles susceptibility in Australia and 17 European countries. *Bull World Health Organ* 2008; 86: 197–204.
 19. Hadjipanayis A, Efstathiou E, Alexandrou M, et al. Nasopharyngeal Pneumococcal Carriage among Healthy Children in Cyprus Post Widespread Simultaneous Implementation of PCV10 and PCV13 Vaccines. *PLoS One* 2016; 11: e0163269.
 20. Musher DM. Infections caused by *Streptococcus pneumoniae*: clinical spectrum, pathogenesis, immunity, and treatment. *Clin Infect Dis* 1992; 14: 801–7.
 21. Skordis N, Efstathiou E, Kyriakides TC, et al. Epidemiology of type 1 diabetes mellitus in Cyprus: rising incidence at the dawn of the 21st century. *Hormones (Athens)* 2012; 11: 86–93.
 22. Maahs DM, West NA, Lawrence JM, Mayer-Davis EJ. Epidemiology of type 1 diabetes. *Endocrinol Metab Clin North Am* 2010; 39: 481–97.
 23. Kolokotroni O, Middleton N, Nicolaou N, et al. Temporal changes in the prevalence of childhood asthma and allergies in urban and rural areas of Cyprus: results from two cross sectional studies. *BMC Public Health* 2011; 11: 858.
 24. Savva SC, Kourides YA, Hadjigeorgiou C, Tornaritis MJ. Overweight and obesity prevalence and trends in children and adolescents in Cyprus 2000-2010. *Obes Res Clin Pract* 2014; 8: e426–34.
 25. Lazarou C, Panagiotakos DB, Kouta C, Matalas AL. Dietary and other lifestyle characteristics of Cypriot school children: results from the nationwide CYKIDS study. *BMC Public Health* 2009; 9: 147.
 26. Lazarou C, Soteriades ES. Physical activity patterns among preadolescent children in Cyprus: the CYKIDS study. *J Phys Act Health* 2009; 6: 185–94.
 27. Lazarou C, Soteriades ES. Children’s physical activity, TV watching and obesity in Cyprus: the CYKIDS study. *Eur J Public Health* 2010; 20: 70–7.
 28. Tornaritis MJ, Philippou E, Hadjigeorgiou C, Kourides YA, Panayi A, Savva SC. A study of the dietary intake of Cypriot children and adolescents aged 6-18 years and the association of mother’s educational status and children’s weight status on adherence to nutritional recommendations. *BMC Public Health* 2014; 14: 13.
 29. Savva SC, Tornaritis M, Chadjigeorgiou C, et al. Prevalence and socio-demographic associations of undernutrition and obesity among preschool children in Cyprus. *Eur J Clin Nutr* 2005; 59: 1259–65.
 30. World Health Organization. WHO report on the global tobacco epidemic, 2019. Available at: http://www.who.int/tobacco/surveillance/policy/country_profile/cyp.pdf?ua=1.
 31. Cylus J, Papanicolas I, Constantinou E, Theodorou M. Moving forward: lessons for Cyprus as it implements its health insurance scheme. *Health Policy* 2013; 110: 1–5.
 32. Insurance Association of Cyprus. Insurance in Cyprus 2009: Directory and Statistical Information, 2010. Available at: <file:///Users/kare2019/Desktop/IACANNUALREPORT0001.pdf>.
 33. Theodorou M, Charalambous C, Petrou C, Cylus J. Cyprus health system review. *Health Syst Transit* 2012; 14: 1–128.
 34. OECD, European Commission. Health at a glance: Europe 2016. Available at: https://ec.europa.eu/health/sites/health/files/state/docs/health_glance_2016_rep_en.pdf
 35. OECD. State of Health in the EU Cyprus. Country Health profile 2017. Available at: http://www.keep-eeek.com/Digital-Asset-Management/oecd/social-issues-migration-health/cyprus-country-health-profile-2017_9789264283329-en#.Wmul46hl-Uk#page3.
 36. Cyprus Statistical Service. Health and Hospital Statistics, 2015. Available at: [http://www.mof.gov.cy/mof/cystat/statistics.nsf/All/39FF8C6C587B26A6C22579EC002D5471/\\$file/HEALTH_HOSPITAL_STATS-2015-280617.pdf?OpenElement](http://www.mof.gov.cy/mof/cystat/statistics.nsf/All/39FF8C6C587B26A6C22579EC002D5471/$file/HEALTH_HOSPITAL_STATS-2015-280617.pdf?OpenElement).
 37. Republic of Cyprus. Social Welfare Services. Community work. Available at: <http://www.mlsi.gov.cy/mlsi/sws/sws.nsf/All/6C21D32724F868AFC225736F00339E8A?OpenDocument>.
 38. HUMA Network. Access to healthcare and living conditions of asylum-seekers and undocumented migrants in Cyprus, Malta, Poland and Romania. Paris: Médecins du Monde HUMA Network; 2011. Available at: http://interwencjaprawna.pl/docs/wpdt2011_1_en.pdf.
 39. Democophes: Demonstration of a Study to Coordinate and Perform Human Biomonitoring on a European Scale. Available at: <http://www.eu-hbm.info/democophes>.
 40. Sinfonie PROJECT: Schools Indoor Pollution and Health, Observatory Network in Europe. <http://sinfonie.rec.org/>.
 41. Law which provides for the Prevention of Violence in the Family and Protection of Victims. Available at: [http://www.mlsi.gov.cy/mlsi/sws/sws.nsf/All/6C894C26ECA9F6A3C2256E7E004E1C16/\\$file/Law%20](http://www.mlsi.gov.cy/mlsi/sws/sws.nsf/All/6C894C26ECA9F6A3C2256E7E004E1C16/$file/Law%20)

- which%20provides%20for%20the%20Prevention%20of%20Violence.pdf?OpenElement.
42. Cyprus Medical Association. Available at: <http://www.cyma.org.cy/el/page/home>.
 43. Cyprus – ESCAP. Available at: <https://www.escap.eu/index/escap-members/cyprus>.
 44. Mental Health Services. Available at: https://www.moh.gov.cy/moh/mhs/mhs.nsf/index_en/index_en?OpenDocument.
 45. CAMHEE. Cyprus and adolescent Mental Health in Europe: Infrastructures, Policy and Programmes. Available at: http://ec.europa.eu/health/ph_determinants/life_style/mental/docs/camhee_infrastructures.pdf.
 46. Charalambous C, Maniadakis N, Polyzos N, Fragoulakis V, Theodorou M. The efficiency of the public dental services (PDS) in Cyprus and selected determinants. *BMC Health Serv Res* 2013; 13: 420.
 47. Cyprus Dental Association: 2010. <http://www.dental.org.cy/>. Accessed 15 January, 2009.
 48. Charalambous C, Theodorou M. Oral health status of the children living in Cyprus. *Hellenic Stomatological Review* 2011; 55: 29–36.
 49. Waisel DB. Vulnerable populations in healthcare. *Curr Opin Anaesthesiol* 2013; 26: 186–92.
 50. AIDA. Health Care Cyprus. Article 9II(1)(a) Refugee Law. Available at: https://www.asylumineurope.org/reports/country/cyprus/health-care#_ftnrefl.
 51. Cyprus Diabetes association. Available at: <http://www.diabetes.org.cy/>.
 52. Thalassaemia International Federation. Available at: <http://thalassaemia.org.cy/>.
 53. Angastiniotis MA, Hadjiminias MG. Prevention of thalassaemia in Cyprus. *Lancet* 1981; 1: 369–71.
 54. ENERCA. Cyprus thalassaemia center. Available at: <https://enerca.org/members-centers/center/6/cyprus-thalassaemia-centre>.
 55. The Centre for Preventing Paediatrics. Available at: <http://www.cpp.org.cy/centre-en.asp>.
 56. Health Insurance Organization. Available at: <http://www.hio.org.cy/>.