Health Systems in Transition

European Observatory on Health Systems and Policies

a partnership hosted by WHO

HiT in brief

Luxembourg

THE GOVERNMENT
OF THE GRAND DUCHY OF LUXEMBOURG
Ministry of Health

LE GOUVERNEMENT
DU GRAND-DUCHÉ DE LUXEMBOURG
Ministère de la Sécurité sociale

Inspection générale de la sécurité sociale

Health Systems in Transition

Françoise Berthet, *Head of the Division for Curative Medicine at the Health Directorate of the Ministry of Health of Luxembourg.*

Anne Calteux, *Senior Counsellor for the Ministry of Health and in charge of EU coordination and the Luxembourg Presidency of the EU Council.*

Michèle Wolter, *Expert in non-monetary health care statistics at the Health Directorate of the Ministry of Health of Luxembourg.*

Laurence Weber, *Head of the statistical service of the General Inspectorate of Social Security at the Ministry of Social Security of Luxembourg.*

Ewout van Ginneken, *Senior Researcher at the Berlin University of Technology.*

Anne Spranger, *Researcher at the Berlin University of Technology, Germany.*

Luxembourg:

HiT in Brief 2015

The European Observatory on Health Systems and Policies is a partnership, hosted by the WHO Regional Office for Europe, which includes the Governments of Austria, Belgium, Finland, Ireland, Norway, Slovenia, Sweden, the United Kingdom and the Veneto Region of Italy; the European Commission; the World Bank; UNCAM (French National Union of Health Insurance Funds); the London School of Economics and Political Science; and the London School of Hygiene & Tropical Medicine. The European Observatory has a secretariat in Brussels and it has hubs in London (at LSE and LSHTM) and at the Technical University of Berlin.

List of abbreviations

ALOS	average length of stay in acute hospitals
AMMD	*Association des médecins et médecins-dentistes* [Association of Medical and Dental Doctors]
BMI	body mass index
CMCM	*Caisse médico-chirurgicale mutualiste* [Medical-Surgical Mutual Fund]
CMSS	*Contrôle Médical de la Sécurité Sociale* [Social Security Medical Review]
CN	*Commission de Nomenclature* [Nomenclature Commission]
CNS	*Caisse Nationale de Santé* [National Health Insurance]
CT	computed tomography
CTI	*Commission Technique d'Investissement* [Technical Investment Commission]
DALE	disability-adjusted life expectancy
DRG	diagnosis-related group
DSA	digital subtraction angiography
DSP	*Dossier de Soins Partagé* [shared health record]
EU	European Union
EU15	The 15 countries that joined the European Union before May 2004
EU13	The 13 countries that joined the European Union in 2004, 2007 and 2014
EU28	All 28 Member States of the European Union as of 2015
GDP	gross domestic product
GP	general practitioner
HTA	health technology assessment
IGSS	*Inspection Générale de la Sécurité Sociale* [General Inspectorate for Social Security]
IT	information technology
LIH	Luxembourg Institute for Health
LNS	*Laboratoire National de Santé* [National Health Laboratory]
MRI	magnetic resonance imaging
OOP	out of pocket
PET	positron emission tomography
PHAMEU	Primary Healthcare Activity Monitor for Europe
PPP	purchasing power parity
PPS	purchasing power standards
SDR	standardized death rate
SHI	social health insurance
SIP	Service Information et Presse
VHI	voluntary health insurance
WHO	World Health Organization

European Observatory on Health Systems and Policies
a partnership hosted by WHO

HiT in brief

Luxembourg

Introduction

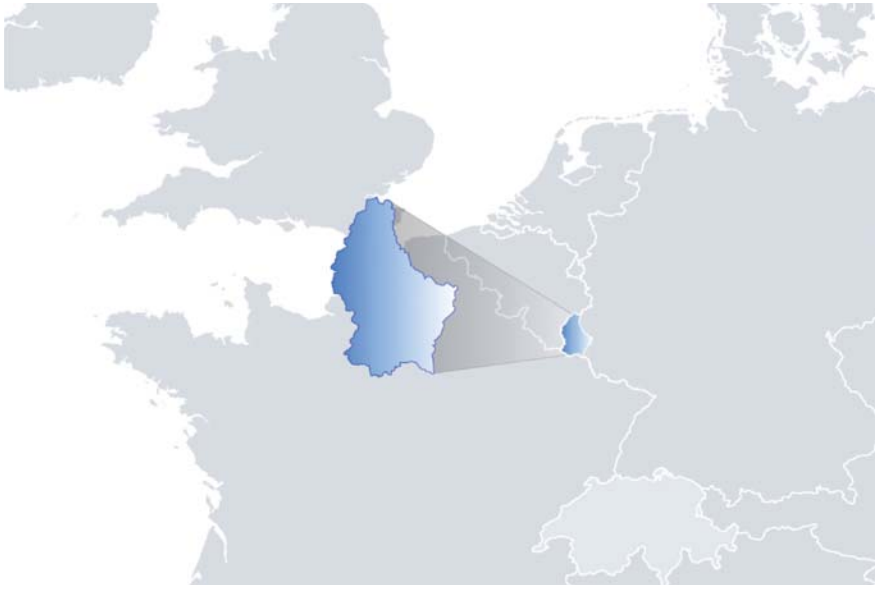
Luxembourg is a landlocked country situated in Western Europe, bordering Belgium, Germany and France (Fig. 1). It is one of the smallest countries in Europe (2586 km^2). More than 85% of the land is agricultural and woodland. In 2014, Luxembourg's inhabitants numbered 549 680 (Eurostat, 2015). The country is densely populated, with 205 people per km^2 (compared to the EU28 average of 116 in 2012). The population lives mainly in urban regions (85% in 2012). Luxembourg has the highest share of foreign residents (46% as of 1 January 2015) among the EU28. This share increased significantly by more than 69% between 2000 and 2014 (STATEC, 2015).

Luxembourg enjoys steady economic growth and low unemployment. It has the highest per capita gross domestic product (GDP) based on purchasing power standards (PPS) of all European Union (EU) member states (2.6 higher than the EU average in 2013) (Eurostat, 2015). Nevertheless, the Grand Duchy's economy did not prove immune to the global recession that started in 2008. After GDP had plummeted by roughly 6% in 2009, the years 2010 to 2013 recorded an average growth of 2%, which is still low compared to the pre-crisis growth rates, which averaged 5% in the period 1997–2007. Traditionally, the primary driver for economic growth has been the financial sector (25% of GDP). Despite this difficult economic climate, job creation was steady, which has triggered the ongoing demographic expansion, mostly driven by immigration. An unmet demand for highly qualified workers remains. Many workers choose to commute across the border: 46.6% are French; Germans and Belgians follow at roughly 22%. Among foreign resident workers, the Portuguese community is by far the biggest at almost 45%.

Luxembourg is a representative democracy in the form of a constitutional monarchy. The Grand Duchy is a rather centralized country, and is subdivided into 116 communes grouped in 12 cantons. The communes are entities with legal powers; for example, they manage their assets and collect taxes through local representatives, but under the control of the central administration represented by the Ministry of the Interior. Each commune has a communal council elected by universal suffrage for a period of five years. Legislative power is jointly exercised by the Grand Duke, the government, the Chamber of Deputies and the Council of State.

As in other European countries, life expectancy at birth continues to increase. In 2011, Luxembourgish men had a life expectancy of 79.2 years, 4.7 years below that of women. This is higher than the EU15 average of 78.8 years for men in 2011 and for women only marginally lower

Fig. 1
Map of the country



Source: Reproduced with permission of the Service Information et Presse (SIP) of the Luxembourg government © SIP.

than the EU17 average of 84.4 (WHO, 2015). The most recent data on disability-adjusted life expectancy (DALE) in 2007 was 73 for both genders combined. This is exactly the EU15 average (WHO, 2015). Accounting for gender as a determinant for DALE at age 65 shows that women also have higher values than men for healthy life expectancy (Table 1).

As reported in the national mortality surveillance system (Weber, Wagener & Hansen-Koenig, 2010), the leading natural causes of death are diseases of the circulatory system, followed by malignant tumours and diseases of the respiratory system (Table 2). As in other industrialized countries, mortality from cardiovascular diseases continues to decrease in Luxembourg. Mortality from cancer is decreasing in men (–29%) and also women (–20%), with some variation by type of cancer (Scheiden & Abeywickrama, 2013). Nevertheless, mortality from lung cancer, which is decreasing in men, is still increasing in women (+106% from the period 1980–1984 to the period of 2005–2009).

Table 1
Life expectancy at birth (in years) and mortality rate (per 100 000 population)

	1980	1990	1995	2000	2005	2010	2011	2013
Life expectancy at birth, men	70.0	72.2	73.6	75.6	77.7	78.8	79.2	79.8*
Life expectancy at birth, women	75.4	78.7	81.1	82.3	82.7	83.9	83.9	83.9*
Standardized mortality rate, men	1326.1	1086.4	997.9	860.5	743.5	678.6	650.9	
Standardized mortality rate, women	869.5	660.2	537.5	488.8	469.4	415.9	423.2	
Disability-adjusted life expectancy						73°		
Disability-adjusted life expectancy at age 65 – men*					9.2	10.5		
Disability-adjusted life expectancy at age 65 – women*					9.3	12.4		
Healthy life years – men*					62.3	64.4	65.8	63.8
Healthy life years – women*					62.4	66.4	67.1	62.9

Sources: WHO, 2015; STATEC, 2015; *Eurostat, 2015.
Note: ° = 2007.

Table 2
Main causes of death, SDR per 100 000 population, 2012

Cause of death (codes ICD-10)	Luxembourg	EU28
Communicable diseases		
All Infectious and parasitic diseases (A00–B99)	23.17	15.94
Tuberculosis (A15–A19)	0.69*	1.04
Sexually transmitted diseases (A50–A64)		
HIV/AIDS (B20–B24)	0.41	1.53
Noncommunicable diseases		
Circulatory diseases (I00–I99)	332.84	393.61
Malignant neoplasms (C00–C97)	266.90	266.94
Colon cancer (C18)	29.90	31.89
Cancer of larynx, trachea, bronchus and lung (C32–C34)	58.03	57.87
Breast cancer (C50)	19.60	19.08
Cervical cancer (C53)	1.14	2.21
Diabetes (E10–E14)	15.14	22.99
Mental and behavioural disorders (F00–F99)	45.34	33.65
Ischaemic heart diseases (I20–I25)	83.32	136.81
Cerebrovascular diseases (I60–I69)	72.49	92.37
Chronic respiratory diseases (J00–J99)	75.64	82.86
Digestive diseases (K00–K93)	44.38	45.21
External causes	60.09	46.66
Transport accidents (V01–V99)	6.54	6.34
Intentional self-harm (X60–X84)	10.56	11.85
Ill-defined and unknown causes of mortality (R95–R99)	8.05	15.45

Source: Eurostat, 2015.
Notes: * = 2011; SDR = standardized death rate.

The risk factors show differing trends: while the rate of smoking is decreasing and reached an all-time low of 16% of smokers in 2013 (compared to 24.1% in France and 18.4% in the Netherlands in 2012), rates of obesity are increasing. Obesity rates among adults (based on actual measures of height and weight) increased steadily from the first measure in 1996 of 14.9% of total population to 22.6% in 2014 (OECD, 2015). Taking the overweight and obese shares of total population together, Luxembourg has a worrying high share of 58.1%, although this reflects a decrease from 60.1% in 2011. The UK is another EU member state that has measured body mass index (BMI) data and reports higher obesity and overweight prevalence than Luxembourg (62.1% in 2013), as did Germany (60% in 2012). Neighbouring countries France and the Netherlands report estimated or self-reported obesity rates at the significantly lower levels of 44.4% and 47.9% in 2012; however, estimated or self-reported obesity rates have to be interpreted with caution since they may be an underestimation. Alcohol intake is 11.4 litres per capita for Luxembourg in 2010 (OECD, 2014).

Infant mortality rates in Luxembourg have been decreasing and in 2011 they were among the lowest in the EU with 2.8 deaths per 1000 live births (Table 3), significantly lower than the EU15 average (3.6 in 2011). The probability of dying before the age of 5 years in Luxembourg has been below the EU15 average since 1999. In 2011, it was 3.3 in Luxembourg compared to 4.3 (EU15 average). This is contrasted by a continuously high rate for maternal mortality of 16.6 compared to the EU15 average of 4.8 in 2012. It should be noted, however, that these rates are calculated upon a small population and should be interpreted with caution. Additionally, the incidence of syphilis has increased in recent years (5.4 infections in 100 000 population in 2011).

Vaccination coverage in Luxembourg is high, with vaccination rates of children between 25 and 30 months old close to or above 95%, which reflects a high level of public acceptance of the national immunization programmes. Recommended vaccines from the national immunization scheme are fully funded by the Ministry of Health.

Table 3
Maternal, child and adolescent health indicators, per 100 people, per 1000 live births, including incidence of syphilis

	1990	1995	2000	2005	2006	2007	2008	2009	2010	2011	2012	2013
% of all live births to mothers aged under 20 years	3.0	2.1	2.6	2.9	2.6	2.6	2.2	1.8	1.9	1.9	1.7	
Perinatal deaths per 1000 births	7.1	6.4	6.8	3.1	2.9	3.2	3.5	4.5	3.2	3.9	7.3	8.1
Neonatal deaths per 1000 live births	4.5	2.6	2.3	1.5	1.3	1.1	0.5	1.1	2.0	2.8*	1.7*	3.1*
Postneonatal deaths per 1000 live births	2.6	1.5	0.2	0.9	0.7	0.6	0.7	0.7	0.7			
Infant deaths per 1000 live births	7.1	4.1	2.5	2.4	1.9	1.6	1.3	1.8	2.7	2.8	2.5*	3.9
Probability of dying before age 5 per 1000 live births	8.8	4.4	3.3	2.7	2.4	2.9	1.9	2.1	3.6	3.3		
Maternal deaths per 100 000 live births	20.2	18.4	17.5	18.6		18.3	17.9		17.0		16.6	
Incidence of syphilis per 100 000	1.3	0.7	0.9	4.9	2.3	2.9	2.5	2.4	2.6	5.4		

Sources: WHO, 2015; *Eurostat, 2015.

Organization

The values and principles of the Luxembourgish health system are laid down in Article 11 of the Constitution of the Grand Duchy of Luxembourg dating back to 1868. This is further specified in the Code of Health, the Code of Social Security, with sector-specific legislation as laws as well as regulations, plus Grand-Ducal and ministerial decrees and orders. Given this long historic evolution, legislation of the Luxembourgish health system was rather fragmented and has been subject to recent reforms in order to harmonize insurance schemes.

Key principles of the health system are:

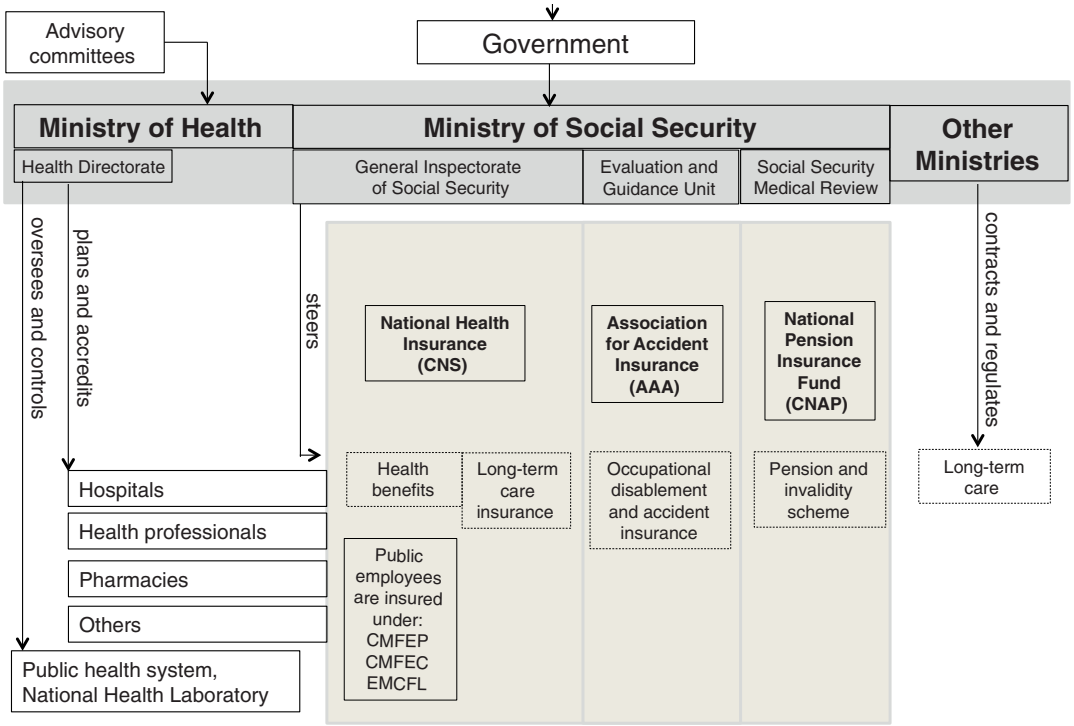
- universal coverage through a compulsory social health insurance (SHI) system, financed mainly by contributions
- SHI system consisting of three schemes for: (1) health care; (2) accident insurance; (3) long-term care
- free choice of service providers for patients and direct access to specialist services
- a central role for self-employed physicians, who are: authorized to provide health services by the Ministry of Health; compulsorily accredited to the National Health Insurance (*Caisse Nationale de Santé* – CNS); reimbursed according to tariffs as agreed with the CNS
- national planning of the hospital and pharmaceutical sectors by the Ministry of Health.

Regulatory responsibilities are split between the Ministry of Health and the Ministry of Social Security. Both ministries cooperate closely and share responsibility

for the organization, legislation and financing of the health system. This includes implementing health policy, ensuring that health is considered in all aspects of policy, and coordinating actors and activities in the system. The Ministry of Health develops health policy; enacts laws and regulations that apply to health providers; plans and organizes the delivery of care; authorizes large hospital investments; and directly cofinances public health programmes. The Ministry of Social Security develops social policy; enacts laws and regulations relating to social policy; and oversees public institutions funded by the health, accident and long-term care insurance schemes. The Ministry of the Family is responsible for licensing and inspecting long-term care facilities.

The social security regime, under the remit of the Ministry of Social Security, is a compulsory insurance scheme, which protects individuals against social risks, namely illness and income loss due to maternity, disability, age, death, work accidents, occupational illness or old age dependency. Health insurance and long-term care insurance are managed by the National Health Insurance (CNS). The CNS was created by law in 2008 and is now the single payer fund for health benefits and long-term care insurance. In 2013, it covered 756 185 insured individuals (67% residents of Luxembourg and 33% commuters) providing a standardized benefit basket for their insured individuals (CNS, 2013a). There is a separation between the primary care sector (dominated by office-based, single-handed physicians and other health professionals) and the hospital sector, which provides emergency care, specialized ambulatory services and secondary care in Luxembourg. Services in the two sectors differ in the way in which the Ministry of Health plans capacity and in how they are paid. Given the absence of a university-affiliated hospital, tertiary care is limited in Luxembourg. In addition to these two sectors, there are institutions that provide long-term care (nursing and residential care facilities), accredited by the Ministry of the Family. Fig. 2 gives an overview of the split of responsibilities and main actors in the Luxembourgish health system.

Fig. 2
Overview of the Luxembourgish health system



Source: Authors' own compilation.

Financing

The financing of health insurance – Bismarckian in origin – is based on a system of contributions from the working population, employers and the State; 40% of social contributions of the health insurance are accounted for by the State, the remaining 60% is equally shared between the insured population and employers. Long-term care insurance is financed by the State to 40% of the total expenditure, a contribution rate from insured persons and a small contribution of around 1% from electricity consumers of more than 1 million kW

a year. The overall budget of the health insurance system is determined each year by the CNS for the following year, based on multiannual expenditure forecasts. The CNS negotiates annual budgets with individual hospitals for operating costs after the global budget has been agreed by the government. Additionally, the CNS enters into negotiations with different professional groups in the primary care sector. Agreements with professional groups, such as the Association of Medical and Dental Doctors in Luxembourg (*Association des médecins et médecins-dentistes* – AMMD), regulate details of tariffs and the providers who are accredited to apply them in Luxembourg.

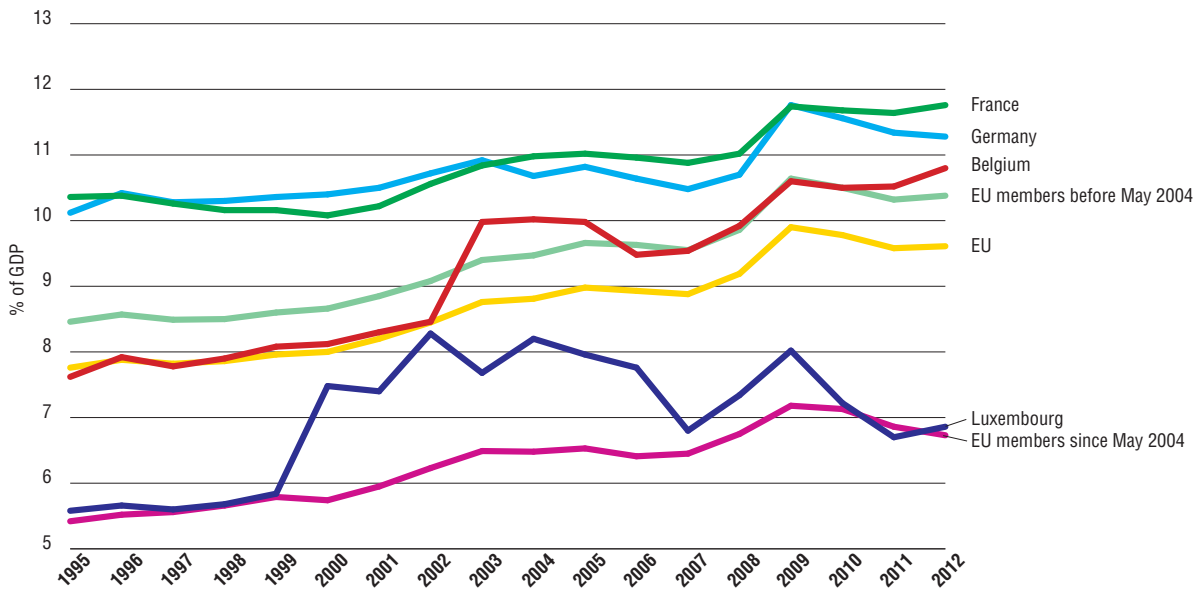
Compared to other World Health Organization (WHO) European countries, Luxembourg spends a significantly lower share of GDP than its neighbouring countries on health care (Fig. 3), which is mostly due to the fact that the country is very wealthy as reflected in its per capita GDP. In fact, Luxembourg has the highest per capita health spending in the WHO Europe region with purchasing power parity (PPP) US$6341 in 2012. In 2012, public sources were the main source of financing (83.5%), followed by out-of-pocket (OOP) payments by private households (11%) and voluntary health insurance (VHI) (4.5%). The latter is one of the lowest rates in the WHO European Region. Due to the comprehensive benefit package and insurance schemes, VHI is not very developed in Luxembourg.

The private share (mostly OOP and VHI) saw an increase from 11.1% in 2008 to 15.5% in 2012, especially driven by cost-containment reforms since 2010. Most of the OOP payments by households are for cost-sharing for services provided under the national health, long-term care and accident insurance schemes (68.2% in 2012). It should be noted that approximately 56% of the resident population have complementary insurance for cost-sharing services (the most common insurance provider being the Medical-Surgical Mutual Fund (*Caisse médico-chirurgicale mutualiste* – CMCM), and therefore receive an additional payment above the base reimbursement rate set by the CNS for certain hospital care and other services (dental treatment and eye diseases). Representing about 30% of private expenditure, direct payments for the housing costs of long-stay facilities are the second most important element of private household expenditure.

The right to health care and long-term care in Luxembourg is covered by its three compulsory insurance schemes for health, accident and long-term care. The coverage rate for the resident population was 97.2% in 2012. It is noteworthy that a significant share of the population is privately insured by their employers, e.g. EU civil servants working in Luxembourg. Contributions to insurance schemes are compulsory for all persons who are economically active (i.e. directly insured) or receive a substitutive income (sickness compensation; maternity pay; unemployment benefit; disability, old age or survivor pension; guaranteed social minimum wage).

The decision to cover health services is taken jointly by the Ministers of Health and of Social Security, on the basis of a detailed recommendation from the Nomenclature Commission (*Commission de nomenclature* – CN). In the nomenclatures, each service is assigned a coefficient, which indicates its relative value, and a key letter, which corresponds to a monetary value. This is fixed

Fig. 3
Trends in health expenditure as a share (%) of GDP in Luxembourg and selected European countries, 1995–2012



Source: WHO, 2015.

by agreement and is subject to biannual negotiations between the National Health Insurance (CNS) and the parties, e.g. professional associations, who are signatories to the agreements.

In the areas of acute and subacute care for illness, pregnancy or accidental injury, services covered include:

- medical and dental care; care provided by health professionals; inpatient or outpatient hospital care; biological laboratory tests; medical imagery
- pharmaceuticals included in a positive list run by CNS
- medical devices (spectacles, hearing aids, prostheses, etc.)
- psychiatric and geriatric functional rehabilitation; spa therapies; convalescence
- patient transportation expenses
- palliative care
- specific services provided in preventive medicine programmes for target populations (prenatal and postnatal care, immunization for at-risk populations, free contraceptive services for women under 25 years, smoking cessation, back pain treatment, etc.).

In the non-hospital sector, providers practise without direct supervision according to the status of liberal professionals and are reimbursed using the tariffs and conditions laid down in the medical procedure frameworks and in the negotiated contracts between professional groups and the CNS. In general, the CNS negotiates agreements with various professional groups in almost all fields of health care services. Once an agreement is reached, providers licensed to practice in Luxembourg are obliged to adhere to the tariffs and reimbursement rules of the CNS, most generally on a fee-for-service basis. There is no planning capacity for the Ministry of Health for the ambulatory sector. Every applicant meeting the conditions for a licence is free to open a practice and be automatically contracted by the health insurance scheme and therefore remunerated for the services provided.

In the hospital sector, services are financed on the basis of a global budget for hospital costs as established by the CNS based on the Hospital Law of 1998. The number of hospitals and minimum standards for hospital services are set by the so-called National Hospital Plan, a regulation enacted under the Hospital Law. The Hospital Plan must address the health needs of the country, as identified by national data collected on hospital services, as well as other population health-related information, while ensuring that hospitals function efficiently and stay within the budget. These provisions set by the latest Hospital Plan of 2009 apply to all hospitals, both public and private.

In addition, global contracts have been drawn up by the Ministry of Health and a variety of social, family and treatment services, in the fields of prevention and assistance, non-hospital psychiatry, chronic illnesses and substance abuse. In some specialized areas of health, the Ministry of Health develops plans to improve population health and submits these to the government to receive specific financing. The most recent ones are the National Dementia Plan adopted in 2013, developed in collaboration with the Ministry of the Family, and the National Cancer Plan valid from 2014 to 2018.

Doctors are always paid by fee-for-service, regardless of where they practise (in hospital or their own practice) or their employment status (self-employed or salaried). Medical fees for salaried physicians working in hospitals are paid directly to the hospital.

In principle, the costs of care and services are paid directly by the insured to the providers, and then reimbursed by the CNS. However, laboratory tests, hospitalization costs (except medical expenses), pharmaceutical costs and long-term care services are paid directly by the CNS (third-party payment). Some preventive medicine programmes are cofunded by the State. Health technology assessment (HTA) is not systematically performed when establishing the benefit basket of Luxembourg.

Drugs in the positive list are reimbursed at three different rates (100%, 80% and 40%), using criteria such as severity of illness, whether substitutes are available and a drug's importance in the therapeutic process, plus the financial burden for the patient. Prices for drugs for human use are determined by the Ministry of Social Security.

Resources

According to the latest National Hospital Plan of March 2009, Luxembourg has 13 hospitals located all over the country. A range of hospital mergers in recent years was strongly encouraged by the Ministry of Health. The previous hospital plan listed 18 hospitals, nine of which have been gradually merged into four hospitals. In general, one regional hospital centre is available within a manageable distance of the local population, while each of the three planning regions has at least one national specialist unit or hospital. However, most of the national specialist services are provided by one central hospital, the Centre Hospitalier de Luxembourg. Hospitals are financed from a global budget that also allows for substantial capital investments in infrastructure since the Hospital Law of 1998. The budgetary envelope for current capital budgets for 2012 amounted to €14.9 million. In addition, there are budgets for major hospital equipment acquisition (managed by the *Commission Technique d'Investissement*/Technical Investment Commission – CTI) of €3.5 million and for information technology (IT)

of €1 million. This results in relatively high availability of medical technology in Luxembourg, as shown in Table 4.

The number of hospital beds has gradually reduced since 2004; in 2014, Luxembourg had 2746 total hospital beds, of which 2103 were in acute hospitals, 466 in psychiatric hospitals and 177 were rehabilitation beds. As shown in Fig. 4, acute care beds have been reduced steadily from 5 per 1000 inhabitants in 2004 to 4 per 1000 inhabitants in 2012, and are now close to the EU average. Beds in psychiatric hospitals have been reduced markedly since 2004 and stabilized at 0.9 per 1000 population in 2012. This is contrasted by a steady increase in long-term care beds since 2004, although with 0.3 per 1000 population, Luxembourg still has limited capacity and this development has stagnated since 2011.

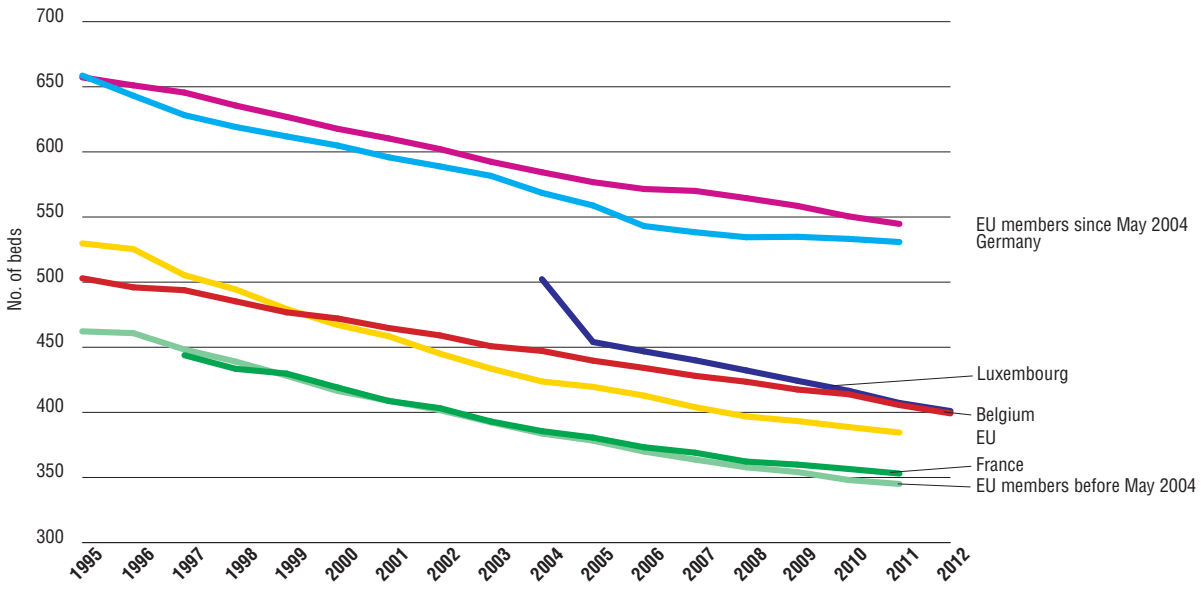
The Luxembourgish health system has proportionally lower than average number of physicians, while the number of nurses is relatively high. In 2011, there were 2.8 practising doctors per 1000 inhabitants in Luxembourg (Fig. 5). This is below the EU28 average of 3.5 and lower than in neighbouring countries. The proportion of general practitioners (GPs) is also low: 29.6% of all practising doctors in 2012. Most doctors work as self-employed medical practitioners, with most specialists dividing their time between their private practice and hospital work. In general, GPs work in private consulting practices, while most specialists are based in hospitals (although they are not salaried employees of these institutions) and also consult from their private practice.

Table 4
Diagnostic imaging technologies in hospitals and ambulatory sector per 100 000 population in Luxembourg and selected countries, 2012

	MRI units	CT scanners	PET scanners	Mammographs	Gamma cameras	DSA units
Luxembourg*	1.4 (1.4)	2.5 (2.23)	(2.03)	1.6	1.7	1.6
Switzerland	2.08	3.46	3.25	3.29	9.13	2.76
Austria	1.91	2.98	0.20	2.24	1.21	–
France	0.87	1.35	0.14	–	0.58	–
Italy	2.46	3.33	0.27	3.34	1.07	1.34
Netherlands	1.18	1.09	0.49	–	1.04	–

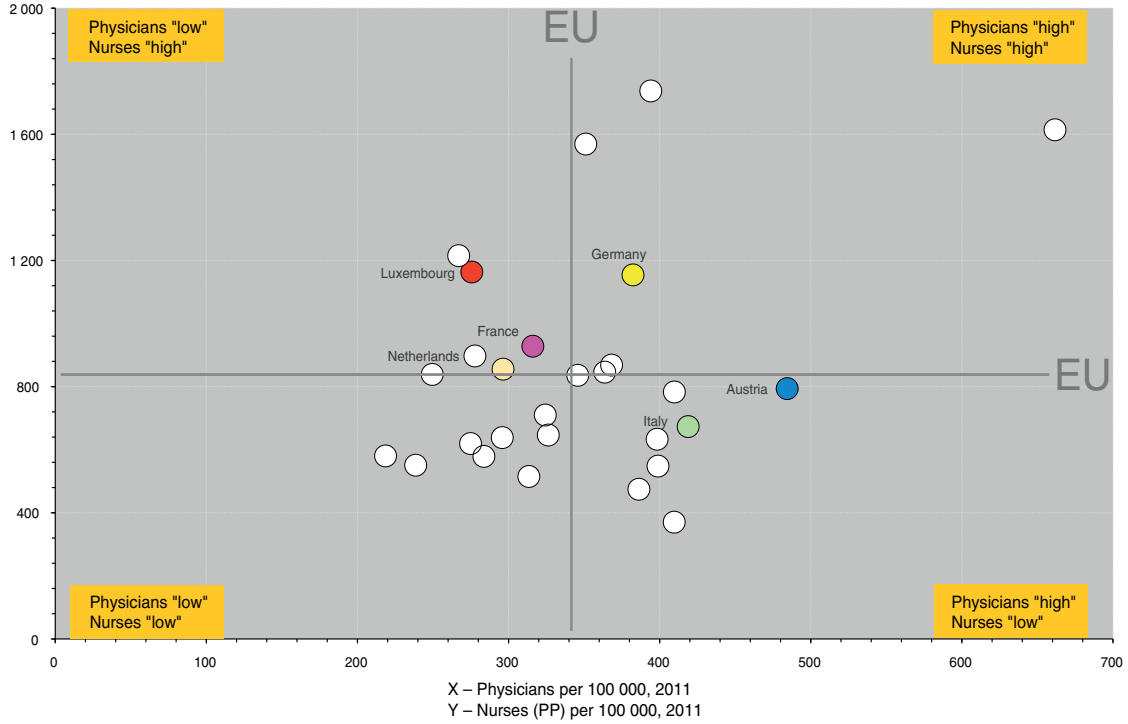
Sources: Eurostat, 2014; *Eurostat 2015 in brackets: national data from Ministry of Health 2015, valid as of January 2014.
Notes: CT = computed tomography; DSA = digital subtraction angiography; MRI = magnetic resonance imaging; PET = positron emission tomography; data for Germany are available for hospitals only and therefore not comparable.

Fig. 4
Beds in acute hospitals per 100 000 population in Luxembourg and selected countries, 1995–2012



Source: WHO, 2015.
Notes: Values for 2011 and 2012 for Luxembourg have been extracted from IGSS, 2014.

Fig. 5
Number of physicians and nurses per 100 000 population in the EU28, 2011 or latest available year



Source: WHO, 2015.

In 2012, there were 12.3 nurses per 1000 population in Luxembourg, which is much higher than the EU28 average or in any neighbouring country.

Between 2005 and 2013, the number of GPs, medical specialists and dentists increased between 9% and 12%, as was the case for midwives and nurses. Nursing personnel include: nurses providing general care; nurses specialized in paediatric, anaesthetic, intensive and psychiatric care; and graduate nurses trained abroad. The number of pharmacists, who work in pharmacies open to the public or in hospital pharmacies, saw a much smaller increase (3%). This reflects the fact that pharmacies are strictly regulated through concessions by the government. Decisions to transfer or open a new pharmacy are made by the Ministry of Health, based on demographic and geographical developments.

Several health professions cannot be trained in Luxembourg: tertiary education is not available for medical graduates (except for postgraduate training in general medicine), dentists, veterinarians, pharmacists, physiotherapists, speech therapists and other regulated health care professionals. However, it is possible to obtain professional qualifications in nursing, midwifery, care work and social assistance in Luxembourg. Especially the lack of tertiary education in Luxembourg causes a dependency on foreign-trained personnel.

Provision of service

There is a split between the hospital sector, in which the Ministry of Health is responsible for planning for adequate service delivery across the Luxembourgish territory, and the non-hospital sector, in which there is only limited planning capacity for public institutions.

Public health services are the responsibility of the Ministry of Health, more precisely the Health Directorate, which conducts studies on population health and health surveys; subcontracts registries; advises public institutions on public health issues; and supervises the network of public health authorities throughout Luxembourg. Most prominently, the public health research centre (*the Luxembourg Institute for Health* – LIH) and the National Health Laboratory (*Laboratoire National de Santé* – LNS) are part of the public health system.

In the Luxembourgish health system there is no referral system to medical specialists, meaning that patients are free to choose to visit any GP and face no obstacles to visiting medical specialists directly. Consequently, Luxembourg scores low in categories such as primary care governance and continuity of primary care, leading to a low ranking for the strength of the total primary care system in comparative studies. The Primary Healthcare Activity Monitor for Europe (PHAMEU) ranked Luxembourg as one of the few western European member states to have a weak primary care system along with Ireland

and Austria (Kringos et al., 2013), contrasted by a strong ranking for primary care in neighbouring countries. In 2011, Luxembourg had 6.6 outpatient contacts per person, which is below the EU28 average of 6.9, and close to its neighbouring countries (Netherlands 6.6 and France 6.8), but far below Germany at 9.7.

For certain specialized treatments, Luxembourg out of necessity offers a generous policy for care abroad. Referrals to institutions for complex treatments and diagnostic procedures, for which adequate quality of care cannot be guaranteed in Luxembourg, require prior approval by the Social Security Medical Review (*Contrôle Médical de la Sécurité Sociale* – CMSS). This approval must be granted if the treatment cannot be carried out without undue delay in Luxembourg, and if the treatment is categorized as essential and not available in Luxembourg (Table 5). In 2012, costs for care abroad amounted to €363 million for the CNS, representing 19.1% of total costs of the health benefit scheme. This share has been fairly stable in recent years, ranging from 18.0% in 2010 to an all-time high of 19.4% in 2014. In 2013, a total of 17 545 cases were granted authorization by the CMSS and CNS for medical treatment abroad. Of these, 12 591 patients actually received care abroad, representing 16% of all patients, which is the highest percentage of all EU member states seeking care abroad, followed by Italy with 12% and Hungary 10%, and far above the 2013 EU28 average of 4% (CNS, 2015; European Commission, 2015; IGSS, 2014).

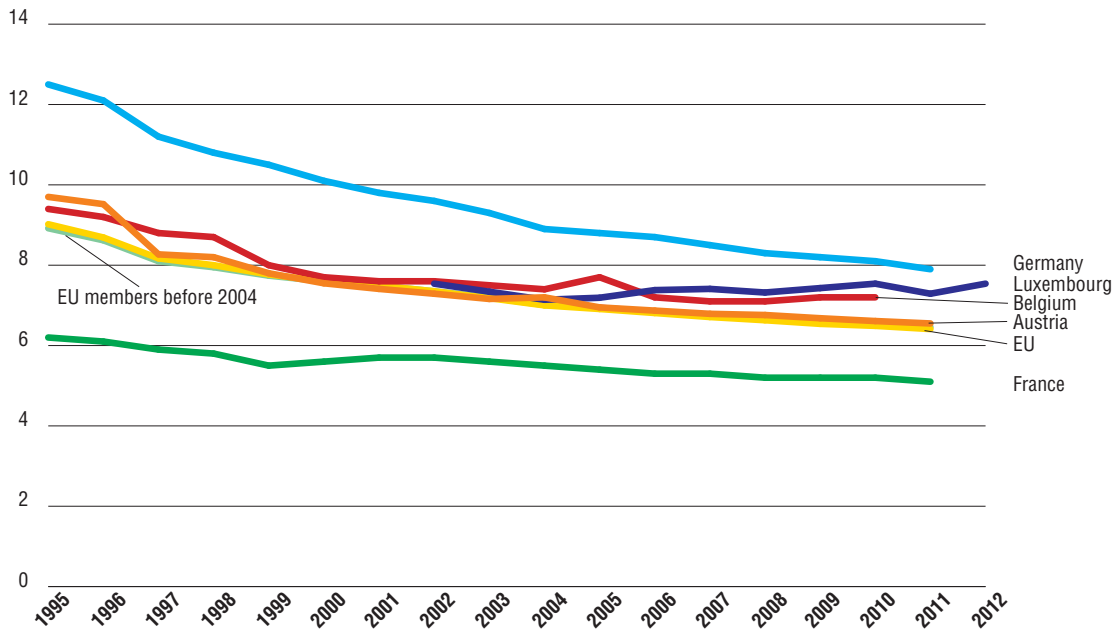
The average length of stay in acute hospitals (ALOS) has stabilized in Luxembourg at a very high level and, bucking the trend in other countries, even increased in 2012 to the 2002 level of 7.5, well above the EU average of 6.4 and just behind Germany with 7.9 in 2011 (Fig. 6).

Table 5
Number of patients benefiting from care abroad from Luxembourg

	2008	2009	2010	2011	2012	2013
Consultations	5 093	4 939	5 033	5 221	5 456	5 466
Ambulatory care	1 451	1 647	1 958	2 002	1 942	2 086
Hospital inpatient care	5 038	5 150	4 959	4 989	5 158	4 969
Rehabilitation	66	78	66	61	60	61
Analyses	62	87	73	131	116	9
Total number of patients receiving care abroad	11 710	11 901	12 089	12 404	12 732	12 591

Source: CNS, 2013b.

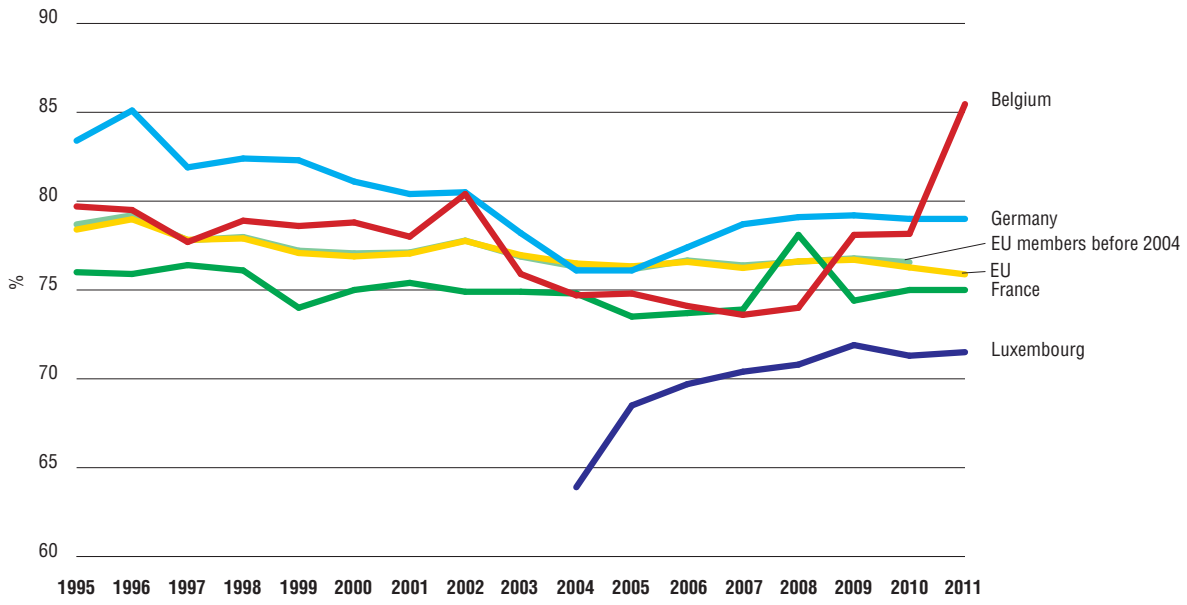
Fig. 6
ALOS for acute care hospitals in Luxembourg and selected countries, 1995–2012 (or latest available year)



Source: WHO, 2015.

This is partly explained by the lack of incentives for hospitals to reduce the average stay of patients as they are financed on the basis of their number of patient-days from a global hospital budget; they are allocated health care personnel on the basis of their patient needs. In addition, physicians are paid on a fee-for-service basis and thus earn more by treating more for longer. The bed occupancy rate in acute care hospitals in Luxembourg, as shown in Fig. 7, increased markedly until 2009 but has stabilized since at a relatively low level of 71%. This is well below the average in Luxembourg's neighbouring countries (except the Netherlands) as well as the EU average in 2011. All in all these indicators seem to suggest room for efficiency improvements in hospital care.

Fig. 7
Bed occupancy rates in acute care hospitals (%) in Luxembourg and selected countries, 1995–2011 (or latest available year)



Source: WHO, 2015.

Reforms

The Luxembourgish health system has seen sweeping reforms since the mid-2000s, aiming at sustainable financing, more transparency and coping with the challenges of a large non-resident population, ageing, and increasing costs for services and treatments abroad. In 2008, the CNS was established as the single health insurance after the merger of nine individual health care funds. It was envisioned that it would play a stronger role in cost containment by better pooling of resources and stronger purchasing. This was further emphasized under the Health Reform Law in 2010, which targeted "promoting quality and efficiency", equipped the CNS with a standardized accounting system for hospital services and introduced a new e-health infrastructure. The national eHealth agency (National Agency for Shared Information in Health) was established to manage the shared health record (*Dossier de Soins Partagé* – DSP), which was adopted in 2015. Currently in its pilot phase, this applies mostly to patients with chronic diseases before being extended to all insured individuals. It contains patient health information relevant to promoting safety, continuity of care, coordination of care and the efficient use of health care services. Patients can access their DSP online and authorized health providers automatically receive key medical data if needed.

In addition, patient empowerment was further strengthened by new legislation in 2014, which gave patients the right to receive all available information about their health status, diagnosis, and a plan of examination and treatment options, to help them make informed choices. In line with the European cross-border directive of 2011, patients are now able to access probable treatment costs and options both for Luxembourg and abroad, through the newly established patient information service which is operated by the CNS for questions relating to treatment costs and by the newly established Health Mediator for questions concerning treatments options available within the country. Both reforms will strengthen Luxembourg's position as regards holding personalized medicine high on the political agenda.

Another field of reform is medical documentation of hospital services. A set of national rules for the coding of diagnoses and for the coding of medical procedures will allow for structured and comparable documentation of hospital in-patient services, systematically compiling information on hospital utilization. Legislation is currently being drafted and the deployment of an appropriate information infrastructure should be implemented in 2016. The availability of national, structured information on hospital services provided will enable informed planning of hospital facilities, as well as respond to the provisions of the cross-border directive requiring member states to provide information on the quality and the safety of services provided.

Conclusions

The Luxembourgish health system has notable strengths. Luxembourg allocates the highest per capita spending in PPP among European countries to health. The country gets a return on this investment: life expectancy and infant mortality, two important health status indicators, are among the best in Europe. Risk factors show a mixed picture in Luxembourg: smoking rates are further decreasing, whereas overweight and obese rates remain high. The population enjoys good access to a broad range of services with relatively little cost sharing when compared to some comparable countries. Furthermore, the Luxembourgers have access to above EU average levels of acute beds, staffed with one of the highest proportions of nurses among EU countries. Because of its limited population size, certain tertiary specialty care is not available in Luxembourg but, in these cases, Luxembourg offers a very generous policy for receiving care abroad.

There is also room for improvement. For example, more could be done with the proper use of HTA when establishing the benefit basket, particularly for pharmaceuticals. Better evaluations of quality and cost-effectiveness would add value to the system. The introduction of some stronger gatekeeping and expansion of competences in primary care could also prevent unnecessary and expensive specialist visits. Furthermore, Luxembourgish hospitals have a high ALOS combined with low occupancy rates. This points to important scope for efficiency gains. Some of the planned future reforms, particularly the introduction of a national structured health information system for hospital services (a prerequisite for any diagnosis-related group (DRG) system) and HTA, aim to improve the situation, but careful implementation will be needed.

References

CNS (2013a). *Rapport Annuel 2013*. Luxembourg, CNS (http://cns.lu/files/publications/CNS_Rapp_2013_NET_.pdf, accessed 26 August 2015).

CNS (2013b). *Exercice 2013 Decompte Annuel Global*. Luxembourg, CNS (http://cns.lu/files/publications/DECOMPTE_AM_2013.pdf, accessed 26 August 2015).

CNS (2015). *Financial situation of the maternity benefit insurance scheme*. Presentation, internal document by the Ministry of Social Security.

European Commission (2015). *Patients' rights in cross-border healthcare in the European Union*. Special Eurobarometer 425, Directorate General for Health and Consumers (SANCO) (http://ec.europa.eu/public_opinion/archives/ebs/ebs_425_sum_en.pdf, accessed 26 August 2015).

Eurostat (2014). *European Database: Population and social conditions: health*. Luxembourg, European Commission.

Eurostat (2015). *European Database*. Luxembourg, European Commission (http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=demo_pjan&lang=en, accessed 26 August 2015).

IGSS (2014). *Rapport Général sur la Sécurité Sociale au Grand-Duché de Luxembourg*. Luxembourg, Inspection Générale de la Sécurité Sociale (http://www.mss.public.lu/publications/rapport_general/rg2013/rg_2013.pdf, accessed 26 August 2015).

Kringos D et al. (2013). The strength of primary care in Europe: An international comparative study. *British Journal of General Practice*, 63(616):742–750.

Ministry of Health (2015). *Questionnaire on radiology technology*. Country Profile of Luxembourg 2012, to be submitted to the United Nations Scientific Committee on the Effects of Atomic Radiation, internal MOH document, accessed 6 July 2015.

OECD (2014). *Health at a Glance: Europe 2014*. Paris, OECD Publishing (http://dx.doi.org/10.1787/health_glance_eur-2014-en, accessed 1 September 2015).

OECD (2015). *OECD Health Statistics: Health Status*. OECD.Stat (https://stats.oecd.org/index.aspx?DataSetCode=HEALTH_STAT, accessed 26 August 2015).

Scheiden R, Abeywickrama K (2013). *Le cancer au Grand-Duché de Luxembourg – 1980–2009 – Approche méthodologique de l'enregistrement et évaluation des données épidémiolgiques descriptives dans l'interêt de la sante publique*. Laboratoire National de Santé, Registre Morpholigique de Tumeurs, www.lns.public.lu/home/Cancer.html, accessed 1 September 2015).

STATEC (2015). *Information Statistiques récentes*. Communique de press, No.11. Luxembourg, Institut national de la statistique et des études économiques (http://www.statistiques.public.lu/fr/actualites/population/population/2015/04/20150408/20150408.pdf, accessed 26 August 2015).

Weber G, Wagener Y, Hansen-Koenig D (2010). *La mortalité au Luxembourg: Évolution historique, situation actuelle et perspectives futures du système national de surveillance de la mortalité*. Luxembourg, Ministry of Health (http://www.sante.public.lu/publications/maladies-traitements/statistiques-causes-deces/mortalite-luxembourg-evolution-historique/mortalite-luxembourg-evolution-historique.pdf, accessed 26 August 2015).

WHO (2015). *Health for All Database*. Copenhagen, WHO Regional Office for Europe (http://data.euro.who.int/hfadb, accessed 26 August 2015).