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Title:
Hospital pharmacy in Belgium: from moving boxes to providing optimal therapy

Authors and affiliation:
Thomas De Rijdt a,b, Franciska Desplenter * a,c

a Belgian Association of Hospital Pharmacists (ABPH-BVZA), Cliniques Universitaires St Luc, Pharmacy Department, Avenue Hippocrate 10, 1200 Brussels, BELGIUM
b University Hospitals Leuven, Pharmacy Department, Herestraat 49, 3000 Leuven, BELGIUM
c Z.org KU Leuven, University Psychiatric Hospitals Katholieke Universiteit Leuven, Campus Kortenberg, Pharmacy Department, Leuvensesteenweg 517, 3070 Kortenberg, BELGIUM

* Corresponding author:
Postal address: Belgian Association of Hospital Pharmacists (ABPH-BVZA), Cliniques Universitaires St. Luc, Pharmacy Department, Avenue Hippocrate 10, 1200 Brussels, BELGIUM
Email: siska.desplenter@bvza-abph.be

Abstract
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Key words
Hospital pharmacy, Belgium, BVZA, ABPH, BAHP
Manuscript

A concise guide through the labyrinth of the Belgian Health System

In Belgium, responsibilities for health policies are shared between the federal (national) level and the federated entities (regions and communities). The federal level is responsible for the regulation and financing of compulsory health insurance, the determination of minimum standards for hospital services, the financing of hospital budgets and heavy medical care equipment, the legislation covering professional qualifications, and the registration of pharmaceuticals and their price control. The federated entities are responsible for health promotion; prevention; different aspects of care such as maternity, child care, elderly care; implementation of minimum standards for hospitals and the financing of hospital investment; and of 2015 accreditation of hospital pharmacists. In the past years there is a tendency to move decision making from the national level towards the federated entities whilst financing stays an important national responsibility. Figure 1 gives an overview of the Belgian health system highlighting financial flows as well as the supervision.

The budget for public health expenditure is fixed by a legal real growth norm (4.5% since 2004). In 2007, Belgian total health expenditure was 10.2% of gross domestic product (GDP) whilst it was 8.6% of GDP in 2000 and 7.2% of GDP in 1990. The growth in health expenditure in Belgium is similar to that in other Western European countries which can be explained by several factors such as the increasing number of elderly people, higher expectations, growth in real GDP and increasing implementation of new health technologies. Health expenditure expressed in US$ PPP (purchasing power parity) per capita was 3595 in 2007, which was the sixth highest health expenditure per capita among the EU27 countries.

The Belgian health system is based on the principle of social insurance characterized by horizontal solidarity (between healthy and sick people) and vertical solidarity (based to a large extent on the labour incomes) and without risk selection. Financing is based mostly on proportional social security contributions related to taxable income and, to a lesser extent, on progressive direct taxation, and a growing area of alternative financing related to the consumption of goods and services. The Belgian social security system is compulsory for every Belgian citizen. Both employer and employee contribute to this social security system. Beside this state part of the health care system, there is a private part as well since Belgian citizens are obliged to join a health insurance fund (called mutuality). Additionally, the Flemish Government introduced in 2001 an additional insurance for non-medical care which is obliged for all people above age 25 and inhabited in Flanders. The yearly fees are managed by the Flemish Government and are meant to support (elderly) patients with high care needs for non-medical help and service support. Besides these compulsory parts, complementary systems of health insurance are offered both by the mutuality’s and by private insurance companies for extended care as well as for travel care.

Patients in Belgium participate in health care financing through official co-payments and diverse supplements. The main payment mechanism is the fee-for-service payment. There are two systems of payments: (1) a direct payment (mainly for ambulatory care), where the patient pays for the full cost of the service and then obtains a reimbursement from the sickness fund for part of the expense; and (2) a third-party payer system (mainly for ambulatory drugs and hospitals), where the sickness
fund pays the provider directly and the patient is only responsible for paying any co-payments, supplements or non-reimbursed services. However, the third-party payer system can be applied under specific conditions for ambulatory care to ameliorate the financial access for vulnerable population groups. 2

The basic feature of the Belgian hospital financing is its dual financing system according to the type of services provided. 2,6

1/ Services of accommodation (nursing units), emergency services (anaesthesia, sterilization, operating theatre, plaster room) and nursing activities in day hospitalizations are financed via a fixed prospective budget system (called BFM = Budget of Financial Means) based on so-called “justified activities” and “justified beds” with a focus on pathology-weighted length of stay (LoS). The case mix of each individual hospital is multiplied by the national average LoS per pathology group, also called “justified LoS”. This hospital budget is composed of three major parts which are further divided into subparts (see Table 1). Item B5 comprises costs related to the hospital pharmacy for services delivered to inpatients (while services for outpatients and day clinic are funded by a profit margin on the product price). This budget differs between hospitals and is revised per year.

2/ Medical and medico-technical services (consultations, laboratories, medical imaging and technical procedures) and paramedical activities (physiotherapy) are mainly paid via a fee-for-service system to the service provider. Together, these two remuneration systems account for almost 80% of a hospital’s revenue.

Besides this dual financing system, hospitals receive additional funding from outpatient and inpatient dispensing of pharmaceutical products. For general hospitals reimbursed medication for inpatients is for 75% at the expense of the hospitals medication lump sum budget (which are on the edge of covering the real cost) while the remaining 25% is refunded via a fee for product based at the manufacturers price; so no profit margin is allowed. For non-reimbursed products or medicines dispensed to outpatients a margin of 21.74%, with a maximum of € 7.11 per biggest package available on the market, on top of the manufacturers price is billed. Medication in psychiatric hospitals is funded by a lump sum budget.

Other revenues are: specific ambulatory activities, such as day care, dialysis and rehabilitation, which are mainly reimbursed per patient via lump sums; subsidies for investments from the federated authorities (communities); supplements charged to patients; non-hospital activities, such as commercial operations and homes for the elderly, nursing homes, cafeteria, newspaper shop, etc.; and private legacy or corporate grants.

**Health information: moving towards eHealth**

An overview of the Belgian population and demographic indicators including key health status indicators such as live birth rate and death rate is given in Table 2. The fertility rate has increased very slightly from 1.7 children per woman between 15 and 49 years old in 1980 to 1.8 in 2007. In recent years, the birth rate has also increased slightly to 11.7 per 1000 population in 2007 after declining continuously up till 2002. The death rate declined slightly from 11.5 per 1000 population in 1980 to 9.5 per 1000 population in 2008. Individuals aged 65 years and older made up 17.1% of the population in 2008 compared to 14.3% in 1980. 2

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In Belgium, life expectancy at birth is 82.6 years for females and 77.1 years for males (2007) (see Table 3) \(^2\); respectively 82.8 and 77.3 years in 2009 and 83.0 and 78.0 years in 2013 \(^7\). Since 1980, life expectancy has increased on average by three months per year. Infant mortality, which represents the ratio of the number of child deaths under one year of age per 1000 live births, has declined between 1980 and 2007 from 12.1 to 4. \(^2\) Amenable mortality (deaths avoidable through good quality health care) was scored as 96 in 2011 and 94.1 in 2012 expressed as standardized death rates per 100.000 inhabitants. Preventable mortality (deaths avoidable by public health interventions) was estimated as 214.9 in 2011 and 212.9 in 2012 expressed as standardized death rates per 100.000 inhabitants. \(^10\)

In Belgium, a great deal of detailed data is collected on health and healthcare. In 2009, 131 central databases containing different types of health-related information were found in Belgium. \(^2\) With the Act of 21 August 2008, a Belgian eHealth digital platform has been set up to permit an electronic exchange of secured data between all health actors. This platform is a public institution of social security and provides digital access to all health information and applications through one portal site. The mission of the platform is to promote and support a well-organized exchange of electronic information among all actors in health, with the necessary guarantees regarding the patient’s security, the protection of the patient’s and caregiver’s privacy and respect for medical confidentiality. \(^11\)

One specific medication-related example of data collection are the pharmacovigilance reports focusing on the monitoring of the safety of medicines. This is centralised by the Federal Agency of Medicines and Health Products (FAMPH). Both patients and health care professionals can report on adverse drug reactions. Reports can be made on paper using yellow cards or by completing an online form (available since 2010). \(^12\) This dataset feeds EudraVigilance, the European level of pharmacovigilance. \(^13\) It has to be noted that numbers of reports are low. However, a change in culture is seen as each hospital is setting up its own report system for medication incidents. Reporting incidents is increasing and more openness is observed enabling discussions on incidents and defining actions for improvement.

**Health workforce shifting from box movers to providers of therapy**

In Belgium pharmacists are working in hospitals since the early 1950’s but it took until 1976 before the presence of a pharmacist became mandatory by law and universities installed a one year postgraduate course, including 3 months of practice training, to become a certified hospital pharmacist. In 1991 a royal decree describes for the first time the minimal function of a hospital pharmacy and in 2003 the professional title of hospital pharmacist is recognized and becomes subject to accreditation in order to work in a hospital pharmacy. In 2009 the decree on guidelines for pharmacists is updated for community pharmacists, introducing the need for a quality system, pharmaceutical care and the shift from just dispensing products to counselling of the patient. It will take at least until 2016 before the draft of the updated guidelines for hospital pharmacists will be published, but this does not stop the sector to evolve in order to meet the requirements of the job in a quick changing world; therefore in 2012 the educational programme changed. Now, candidates need a pharmacist degree (2 years bachelor and 3 years master at university level including a 6 month training in a community pharmacy) before they can start 3 years of specialisation, which is
partly financed by the government. The number of new students is limited to respectively 20 and 30 per year for the Walloon versus the Flemish region who both spread their number of students pro rato over their universities who offer a interuniversity programme per region. Students are selected based on their curriculum and a personal interview for a professional jury. The first year consists mainly of courses, including management and pharmaco-economics, and training on classic tasks, the second year focusses in depth on clinical pharmacy skills and the third year is oriented in function of the thesis topic. Spread over these 3 years a practice training from at least 3500 hours is required. The training includes distribution, compounding, production, clinical trials, central sterilisation, radiopharmaceuticals, clinical pharmacy, pharmacy and therapeutics committee (P&T committee). Students can obtain a provisional recognition after the first year. To catch up all working pharmacists on the same level as the new graduates the professional association organized the relevant courses, especially clinical pharmacy and management, for all their members. 14-20

After graduating, hospital pharmacists have to enrol in lifelong learning to maintain their professional recognition which is needed to work in a hospital. Courses, scientific publications, presentations, posters, attendance of congresses but also a personal development plan can be used to gather credits. Over a period of 5 years the hospital pharmacist needs to earn 120 accreditation points with at least 15 points in each of the following domains: 1) organisation and management of the hospital pharmacy, 2) control and prevention of infections, 3) pharmacotherapy, 4) hospital technology and 5) radiopharmaceuticals. Postgraduate education is mainly organized by the professional associations of hospital pharmacists and the universities. The new educational programme and accreditation provides the hospital pharmacist with the necessary skills for all of his tasks so credentialing isn’t an issue. In practice most pharmacist’s job description consists of a mix of classic tasks, clinical pharmacy and a specific domain of expertise (e.g. antineoplastics, management, supply chain management, geriatrics). Past projects while introducing clinical pharmacy services in the hospital have shown that a complete breakdown in job description between classical and clinical is counterproductive and cross-fertilisation over domains and colleagues works synergistic.

For dispensing and compounding the hospital pharmacist can be assisted by pharmacy technicians who work under his supervision and responsibility. The number of technicians is set by law to a maximum of three per pharmacist. In 1997 a royal decree installed their professional job title and regulated the study programme for pharmacy technicians while before there were no minimum requirements. The level is set to secondary education and includes a practice training of 300 hours in a pharmacy (community or hospital) but is not adapted for the specific tasks of the technician in the hospital environment so hospital pharmacist have to provide specific training on the job (e.g. aseptic compounding, single-dose distribution, specific hospital medication, ...). Some high school bachelor programmes like ‘medicinal laboratory techniques’ and ‘pharmaceutical and biological techniques’ added extra courses so their graduates can demand a recognition as pharmacy technician. For other tasks the hospital pharmacist can enable all other staff as long as he/she can prove that they’re fit for the job (eg. administrative, warehouse, economist, ...). To guarantee high quality compounding most big hospitals start hiring industry pharmacists who can also operate as qualified persons for phase 1 and phase 2a clinical trials where, since a few years, GMP (good manufacturing practice) is required. Staff involved in clinical trials has to be GCP (good clinical practice) accredited. 21,22

The tasks and responsibilities of all healthcare practitioners are described in legislation and will be updated soon in relation to the planned changes. The hospital pharmacist is the only responsible for
the whole of the pharmaceutical process and he/she reports directly to the CEO. He/she orders, receives and stocks all pharmaceutical products (medication, sterile medical devices, implants, medicinal gas, medicinal nutrition and point of care tests) and guarantees quality, conformity and traceability. He/she compounds and dispenses, where he/she can be assisted by pharmacy technicians. He/she counsels patients and gives advice on therapy to other practitioners. He/she is an active member of the P&T committee, the committee medical devices, the antibiotic committee, the infection control committee and is involved in check of appropriateness of therapy and the accreditation process. The hospital pharmacist is responsible for the quality and conformity of medicinal gas in bulk and cylinders and is responsible for the outcome of the central sterilization department. He/she is responsible for billing and good economic governance of the pharmacy. A shift from box mover to a provider of therapy has been completed during the last 10 years making the hospital pharmacist a part of the multidisciplinary team around the patient. This was achieved by reengineering the pharmaceutical process and risk assessed task shifting to technicians and operators freeing up the time to engage in pharmaceutical care on a higher level and this is reflected in publications of activities of Belgian hospital pharmacists. Only medication for in-hospital use can and must be dispensed although the list with exceptions is recently extended, meaning that discharged patients get their medicines in the community pharmacy. Hospitals cannot offer community pharmacy services although the first private community pharmacy on the hospital grounds has been introduced in July 2014. Pharmacy technicians are allowed to compound and dispense under supervision and responsibility of a hospital pharmacist. 15,21

Prescribing is still the monopoly for medical doctors, besides dentists and midwives who are allowed to prescribe medication related to their activities. In order to optimize the healthcare process there may be an opportunity to allow hospital pharmacists in the future to alter doses or routes of administration for specific programs or therapies. In some hospitals nurses or doctors in training are allowed to prepare the prescription before validation by the physician. In the hospital an electronic validation of the prescription is allowed. 15

Only nurses and physicians are permitted to administer medication to patients in the hospital. In some settings the patient is allowed and trained to manage his medication, in that case this is followed by a nurse. Nurses can specialize in specific domains such as HIV, wound management, .... In the operating theatre a specialized nurse assists the hospital pharmacist in the management of the decentral stock of implantable medical devices. 15

The hospital pharmacist has to delegate, under his responsibility, some activities to supporting services. In that case a service level agreement is made. Examples are maintenance of pipelines and tanks for medical gas, transport of medication, management of ward stocks for sterile medical devices such as syringes and needles. Compounding is eligible for outsourcing to colleagues or commercial compounding centres and are subject to contracts; the dispensing pharmacist stays responsible for the quality and conformity of the preparation. 21

The professional association of hospital pharmacists works with members who volunteer to represent the profession at the authorities and who develop new standards and projects within special interest groups. Both the Walloon and Flemish pharmacist are gathered in sister associations which delegate members of the board to the national association who is the official contact.
**Investing in professional health services**

In 2015 Belgium counts 18,618 pharmacists, a number that recently increased by 3 % per year, of whom 59 % lives in the Flemish speaking part, 32 % in the French speaking part and 9 % in Brussels, the capital region. An extra 4,5 % works abroad. Overall 70 % of the pharmacists is female and this percentage increases till 80 % in the new generation (20-35 years old). Approximately 3000 pharmacists are retired and the median age of active pharmacists is between 40-45 years old.

Most active pharmacists (approximately 90 %) work in one of the 4954 community pharmacies (1 pharmacy per 2220 inhabitants) in Belgium. Pharmaceutical industry employs about 750 industry pharmacists in different domains such as research, production, regulatory and marketing. Another 450 colleagues are practicing as pharmacist clinical biologist. For some it is also possible to aspire a career at the authorities.

In October 2012 the authorities recognized the special professional title of hospital pharmacist which requires a pharmacist’s degree, a degree of Master of Science in hospital pharmacy and a 3 year training and is subject to an accreditation based on sufficient postgraduate education. Begin 2015 Belgium had 1248 recognized hospital pharmacists (82 % are female; 60 % are Flemish) of whom 987 are active in approximately 150 hospitals. The gap can be explained by the recent peak of retirements as most of the hospital pharmacists started their career in 1976 when Belgian law required a pharmacy in the hospital. The minimum number of pharmacists is set by law to 1 per 150 beds but is in practice nearby 1 per 100 beds and should evolve to 1 per 75 beds if clinical pharmacy services are required on every ward.\(^{24-28}\)

Most hospitals are using a mixed drug distribution system in which they have ward stocks for common medication and individual delivery for more expensive and harmful drugs. Only very few have a 24 hours distribution system in place and this number is not increasing. Electronic cupboards are often used in the emergency services, for emergency stocks and to dispense controlled substances and recently for expensive medical devices in the operating theatres. Robots and electronic cupboards are making their entry although they are not yet capable of covering the needs of larger hospitals.\(^{29}\)

Reconstitution of medication, prior to administration, is done by nurses on the ward. An evolution towards ready-to-use (RTU) medication is noticed. Antineoplastic drugs and other potential hazardous drugs are already prepared in the hospital pharmacy or can be outsourced to other hospital pharmacists or, recently, to commercial compounding centers. Compounding (capsules, syrups, dermatology products, sterile preparations, ...) is done in the hospital pharmacy. Implementation of PIC/s PE 010-4 guidelines as a standard is expected soon.

Most hospitals are implementing or are already using a computerized physician order entry system (CPOE), some even with basic or advanced clinical decision support on board and one hospital already deployed hospital wide bedside scanning. This trend is supported by the government who is promoting and providing an eHealth-platform where summaries of the medical records can be exchanged amongst the patient’s healthcare providers. Other eHealth services contain, amongst others, a trusted third party timestamping service that guarantees the authenticity of electronic prescriptions; SAM, a medication timestamping database that allows systems to communicate on medication
without using the brand names; KHMER, a medical data standard able to exchange structured clinical information and RCT, a central register for tracing implantable medical devices. 30-34

In 2002 the first of 9 hospital pharmacies became ISO-9001 certified and to share this philosophy with all members the association of hospital pharmacists published in 2006 the first edition of a peer review checklist which is updated to the fourth edition in 2014. 28 The fifth edition (expected in 2017) will include quality accreditation standards to help hospital pharmacists preparing for (re)accreditation by JCI, Qmentum/NIAZ or other ISQua accredited organizations. In 2008 the first hospital became NIAZ accredited and in 2010 the first JCI accreditation followed. Currently over 90 % of all hospitals are working on a hospital accreditation (mostly JCI or Qmentum/NIAZ) as suggested by the government. Besides accreditation the hospital sector works on quality indicators (e.g. quality of prescription, handling of high alert medication) to score hospitals and these results are made available to the public on the website of the Flemish government. 35

Since two decades the function of hospital pharmacists is evolving from box mover to provider of medication therapy and the focus shifts from product to patient. This is achieved by introducing clinical pharmacy services in the hospital. From 2007-2014 this evolution was supported by the government through partial funding of pilot projects and interactive “Clinicamps”. Since January 2015 this funding has become a structural part of the normal financing for all acute hospitals. 36 The implementation of clinical pharmacy services is based on a risk analysis and is a mix of a) central medical record revision, b) developing and implementing clinical rules for clinical decision support systems and c) the hospital pharmacist on the ward. This trend is also noticed in public pharmacies where since 2009 a quality system is mandatory and pharmacists are structurally expanding their role as a patient counselor.

Access to medical products, vaccines and technology as practical examples of the Belgian health care organisation

In this section we will highlight some aspects of the Belgian health care organisation from a practical point of view including 1/ the vaccine monitoring system; 2/ hospital logistical issues including procurement procedures and 3/ notification of implantable medical devices; and 4/ substitution of biological medicines as new technology example.

First, vaccination policy is a shared responsibility of the Federal Ministry of Health and Social Affairs as well as the regional Ministries of Health. The regional authorities are responsible for the implementation and promotion of the recommended vaccination programmes and are in charge of purchasing most of the traditional infant and adolescent vaccines. The National Vaccination Committee is responsible for the vaccination recommendations. Children between 0 and 3 years are invited to the public baby clinics (“Child and Family” in Flanders and “Birth and Children Office” in the French community) for the vaccination programme, which is for free (both the vaccines as well as the consultation with the general practitioner). Polio vaccination is the only mandatory vaccination in Belgium. Since 1999 “Child and Family” is registering every administered vaccine in Vaccinnet, an online vaccination database. 37 For school-age children, a school health system organizes preventive consultations and offers vaccination recommended for that age group and is also free of charge. A coverage of 60-80% is completed by this school health system whilst general practitioners have a
complementary role for the remaining 20-40%. After school age, there is no public health service any more offering vaccinations, except for active population through the occupational health physician. Some of these vaccines are offered free of charge or through the Fund for Occupational Diseases (such as hepatitis vaccines) or through the employer (travel vaccines for travelling employees or flu vaccine for hospital employees). Travel clinics provide specific counselling and vaccination services. 38

Second, in 2012, the European Directive 2004/18/EC was fully implemented into Belgian law thereby obliging all hospitals to apply public procurement procedures to all contracts. This new law details the conditions contracting authorities should apply: it concerns price and contracts of goods, services and works. The European Directive 2004/18/EC has the following objectives: tenders must be public in order that all suppliers are able to participate, procedures have to be transparent, selection and award criteria must be objective, decisions should be reasoned, and last but not least, all suppliers must be treated equally. To support the Belgian hospital pharmacists and to assist in the implementation of the new law, the Belgian Association of Hospital Pharmacists (BVZA-ABPH) has organised workshops and information sessions, and collected and disseminated information and examples of tenders (even at cross border level) to all members. 39 Experience is growing rapidly however many concerns exist amongst pharmacists as preparing a public procurement for medicines is demanding in time and in human resources which might outbalance the financial benefits. Public tendering can be very effective for medical devices as they can be bought all over the world as long as they have a CE-label and are notified to the authorities. Public procurement on European level is limited for medicines as there’s a prohibition to import drugs that are on the Belgian market and reimbursement is only granted for drugs licensed in Belgium limiting the number of providers and thus lowering the market effect of tendering but in the same time protecting the official Belgian market for counterfeit meds.

Third, another example within the hospital logistic field is the notification and traceability of implantable medical devices. It is applicable to the reimbursement of invasive implants and medical devices and allows for notification on implants bearing an CE certificate. Companies which market implants in Belgium must directly notify their products to the national database. Implants which have not been notified, but are subject to notification requirements, are not accountable to patients or insurance companies. All implantations and removal must be registered in the database which contains details of all long-term implants and invasive medical devices. This compulsory notification enables the development of an inventory of all implants in Belgium, facilitates future recalls in case of incidents and provides data for evaluation of quality as a key to preventive recalls. 40

Fourth and finally, the apparition of biosimilars was a new opportunity to guarantee accessibility to affordable treatments and to enhance financial sustainability of national health systems. However, even if biosimilars seem to be increasingly adopted in countries, Belgium has one of the lowest biosimilar uptake rates in Europe. 41 Only the prescriber can decide to change from an original product into a biosimilar (or vice versa) and pharmacists do not have a right for substitution for these biological products. 42 The present Federal Minister of Health is planning a campaign to increase the biosimilar uptake. Currently, infliximab has two biosimilars on the market and hospitals start public procurement procedures. It could be that the original product is the preferred option when such procurement procedure is finalised but it is at least a sign that hospitals are considering carefully the use of a biosimilar for starting up the treatment for a new patient.
Future directions and concluding statements

New technology, the strive for optimal quality and patient safety but also the limitation of resources more than ever forces the healthcare process to evolve. In this reengineering is room for task purification, new tasks and services, lean management, risk analysis, seamless care, pharmaceutical care, ... but also new tasks and different financing and the obligation of making choices. This evolution is also reflected in the draft of the new royal decree describing the guidelines for good hospital pharmacist practices: To comply with the EU recommendation for qualitative compounding PIC/s PE 010-4 is proposed to be the standard. For inpatients medication should be dispensed in single dose packaging and traceability is required for all drugs and implantable medical devices; for the latter a national register is already in place and all hospitals will be obliged to connect with it by January 2016. The new decree will also explicit the responsibility of the hospital pharmacist regarding to the central sterilization unit, as where he’s now only responsible for the result of the process.

The European falsified medicines directive, expected by the end of 2015, will oblige all pharmacists to check out the serial number of the secondary package out of a national repository at the moment of dispensing; as in the hospital medication is dispensed by the single dose a lean method of checking out boxes should be developed. 43

In 2014 the minister of health presented a 5 year road map to reorganize healthcare in order to guarantee safety and quality at an affordable cost. In this plan an e-health platform is crucial to facilitate interdisciplinary and transmural healthcare. Hospitals are encouraged to engage in networking around centers of excellence and financing is altering in a way all stakeholders are involved. Reimbursement of healthcare will further evaluate to a lump sum system and expensive drugs will be reimbursed per milligram rather than per dispensed vial. Clinical pharmacy services are supported as they can be cost-effective if well oriented. Maybe the time is now to think about giving restricted prescriber rights for hospital pharmacist as they can manage dosing of medication in relation to therapeutic drug monitoring and patient parameters such as renal function, antibiogram, ... The risk stratification of patients will be more and more supported by artificial intelligence and data-mining resulting in personalized clinical rules and alerts guiding the healthcare professionals.

Currently a huge evolution is taking place: hospital pharmacy today cannot be compared with hospital pharmacy five years ago and hospital pharmacy within five years from now but with the new education program the hospital pharmacists are prepared for a bright future.
References


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29. https://www.youtube.com/watch?v=oP5DNbB8RoY
Figures and Tables

Figure 1 Overview chart of the Belgian health system
Table 1 Composition of the hospital budget

<table>
<thead>
<tr>
<th>Part</th>
<th>(capital costs) (8%)</th>
<th>A1 investment charges</th>
<th>A2 short-term credit burdens</th>
<th>A3 investment charges for some medico-technical services, which are exclusively financed via the hospital budget (not via fees)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part</td>
<td>B (operational costs) (&gt; 90% of the budget)</td>
<td>B1 common operational costs (administration, maintenance, laundry) (30%)</td>
<td>B2 clinical costs (personnel and medical equipment) (40–50%)</td>
<td>B3 medico-technical departments (radiotherapy, MRI and PET scans) (1%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B4 some specific (mostly) lump sum costs (as a result of legal obligations), e.g. hospital hygiene, quality assessment, palliative care and recording of hospital data</td>
<td>B5 pharmacy costs (2%)</td>
<td>B6 costs for carrying out the social agreements for personnel not included in the budget of financial means (2%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B7 extra costs for teaching hospitals or university function of the hospital (applied scientific research, the development of new technologies and the training of specialists) (3%)</td>
<td>B8 specific costs for patients with a weaker socioeconomic profile or social function of the hospital (0.5%)</td>
<td>B9 extra-legal financial benefits.</td>
</tr>
</tbody>
</table>

Part C Corrective measures

Table 2 Population and demographic indicators for selected years from 1980 until 2008

<table>
<thead>
<tr>
<th>Total population (thousands; 1 January)</th>
<th>1980</th>
<th>1990</th>
<th>2000</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population, female (% of total)</td>
<td>51.1</td>
<td>51.1</td>
<td>51.1</td>
<td>51.1</td>
<td>51.0</td>
<td>51.0</td>
<td>51.0</td>
</tr>
<tr>
<td>Population ages 0–14 years (% of total)</td>
<td>20.3</td>
<td>18.1</td>
<td>17.6</td>
<td>17.2</td>
<td>17.1</td>
<td>17.0</td>
<td>16.9</td>
</tr>
<tr>
<td>Population ages 65 and above (% of total)</td>
<td>14.3</td>
<td>14.8</td>
<td>16.8</td>
<td>17.2</td>
<td>17.2</td>
<td>17.1</td>
<td>17.1</td>
</tr>
<tr>
<td>Population ages 80 and above (% of total)</td>
<td>2.6</td>
<td>3.5</td>
<td>3.5</td>
<td>4.3</td>
<td>4.4</td>
<td>4.6</td>
<td>4.7</td>
</tr>
<tr>
<td>Population growth (average annual growth rate)</td>
<td>+0.1</td>
<td>+0.2</td>
<td>+0.2</td>
<td>+0.5</td>
<td>+0.6</td>
<td>+0.7</td>
<td>+0.8</td>
</tr>
<tr>
<td>Population density (people per sq km)</td>
<td>323</td>
<td>326</td>
<td>335</td>
<td>342</td>
<td>344</td>
<td>347</td>
<td>349</td>
</tr>
<tr>
<td>Fertility rate (births per woman 15–49)</td>
<td>1.7</td>
<td>1.6</td>
<td>1.7</td>
<td>1.8</td>
<td>1.8</td>
<td>1.8</td>
<td>–</td>
</tr>
<tr>
<td>Live birth rate (crude, per 1 000 people)</td>
<td>12.6</td>
<td>12.4</td>
<td>11.2</td>
<td>11.3</td>
<td>11.5</td>
<td>11.4</td>
<td>11.7</td>
</tr>
<tr>
<td>Death rate (crude, per 1 000 people)</td>
<td>11.5</td>
<td>10.5</td>
<td>10.2</td>
<td>9.9</td>
<td>9.7</td>
<td>9.6</td>
<td>9.5</td>
</tr>
<tr>
<td>Age dependency ratio (0–14 and 65+ / 15–64 years)</td>
<td>52.4</td>
<td>49.4</td>
<td>52.5</td>
<td>52.3</td>
<td>52.3</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>% of urban population</td>
<td>95</td>
<td>97</td>
<td>97</td>
<td>97</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Population aged 25–64 having completed at least upper secondary education (%)</td>
<td>–</td>
<td>–</td>
<td>58.5</td>
<td>66.1</td>
<td>66.0</td>
<td>68.0</td>
<td>69.6</td>
</tr>
</tbody>
</table>

Sources: Eurostat 2009; OECD 2009a; WHO Regional Office for Europe 2008a (August).
Table 3 Mortality and health indicators for selected years from 1980 until 2007

<table>
<thead>
<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Life expectancy at birth, total</td>
<td>73.3</td>
<td>76.1</td>
<td>77.8</td>
<td>79.1</td>
<td>79.9</td>
</tr>
<tr>
<td>Life expectancy at birth, males</td>
<td>69.9</td>
<td>72.7</td>
<td>75.0</td>
<td>76.2</td>
<td>77.1</td>
</tr>
<tr>
<td>Life expectancy at birth, females</td>
<td>76.7</td>
<td>79.5</td>
<td>81.4</td>
<td>81.9</td>
<td>82.6</td>
</tr>
<tr>
<td>Total mortality rate, adult, male (deaths per 100 000, standardized rates)</td>
<td>1291.1</td>
<td>1055.0</td>
<td>925.5</td>
<td>823.7</td>
<td>–</td>
</tr>
<tr>
<td>Total mortality rate, adult, male (1–6 years) (deaths per 100 000, standardized rates)</td>
<td>462.5</td>
<td>345.2</td>
<td>303.9</td>
<td>267.9</td>
<td>–</td>
</tr>
<tr>
<td>Total mortality rate, adult, female (deaths per 100 000, standardized rates)</td>
<td>772.13</td>
<td>602.14</td>
<td>539.2</td>
<td>500.2</td>
<td>–</td>
</tr>
<tr>
<td>Total mortality rate, adult, female (1–6 years) (deaths per 100 000, standardized rates)</td>
<td>230.4</td>
<td>178.87</td>
<td>154.3</td>
<td>141.2</td>
<td>–</td>
</tr>
<tr>
<td>Mortality rate, infant (0–1 years) (deaths per 1 000 live births)</td>
<td>12.1</td>
<td>8.0</td>
<td>4.8</td>
<td>3.7</td>
<td>4.0</td>
</tr>
<tr>
<td>Mortality rate, infant (1–4 years) (deaths per 1 000 live births)</td>
<td>–</td>
<td>–</td>
<td>1.05</td>
<td>0.8</td>
<td>–</td>
</tr>
</tbody>
</table>

Sources: ¹ OECD 2009a; ² WHO Regional Office for Europe 2010 (March); ³ FPS Economy 2009.  
Notes: Mortality rate, infant (1–4 years) – own calculation. ⁴ 1999; ⁵ 2004.