ANNUAL RESEARCH REPORT 2016

VLERICK HEALTHCARE
MANAGEMENT CENTRE

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CONTENTS

04 About the Vlerick Healthcare Management Centre

05 Introduction

06 2016 ACHIEVEMENTS
1 Future of access to innovative medicines in oncology
2 Impact of uncertainty in times of network formation
3 Scheduling operating rooms: achievements, challenges and pitfalls
4 Capacity management of hospital wards
5 Data is the New Drug

15 PUBLISHED OUTPUT
• Recent publications
• Opinions
• Ongoing Research

18 Vlerick Healthcare Conference

19 Meet the Healthcare Management Centre team and collaborators
ABOUT THE VLERICK HEALTHCARE MANAGEMENT CENTRE

The Vlerick Healthcare Management Centre (HMC) is a European, Brussels-based non-profit independent think tank and education provider advancing innovative and actionable management and policy solutions in the healthcare and life sciences fields.

The Vlerick HMC is led by Prof Dr Walter Van Dyck, Vlerick Business School partner, Roche-Chaired professor and acting Director of the Centre. He leads the Centre’s biopharmaceutical and life sciences innovation & entrepreneurship activities, and is responsible for the medical technology research design and market access research agenda. Prof Dr Brecht Cardoen leads its hospital management and health services innovation and operations research agenda.

FINANCIAL AND COMPETING INTERESTS’ DISCLOSURE

The Vlerick HMC is fully owned by Vlerick Business School, a Public Utility Foundation, and funded by grants from public institutions and private organisations.

To conduct its applied business and policy research, the Vlerick HMC:

• Benefits from a Research Chair with Roche focusing on patient access to medical innovation,

• Works with MSD as a Foundation Partner aligning the pharmaceutical horizon scanning with unmet medical needs,

• Investigates time-driven activity-based costing in hospitals with Xperthis as Contract Research Partner, and

• Studies value-based healthcare of medical devices with Philips as Contract Research Partner.

Furthermore, the Vlerick HMC collaborates with ASZ Aalst, AZ Alma, AZ Jan Palfijn, AZ Maria Middelares, AZ Nikolaas, AZ Sint-Lucas, AZ Sint-Maarten, AZ Sint-Maria, Jan Yperman Ziekenhuis, Maria Ziekenhuis Noord-Limburg and Jessa Ziekenhuis, united as MINOZ Research Members.
INTRODUCTION

From its inception in 2015, building upon a research tradition of more than 10 years in hospital management, the Vlerick Healthcare Management Centre (HMC) has gradually expanded its focus on health policy and health and life sciences management. This includes the value-based healthcare strategy, healthcare operations and health information systems supporting care delivery, and health technology and innovation management.

In September 2016, we published the first output of the Roche Chair, researching patient access policy for innovative medicines, in the Vlerick Policy Paper Series. We pleaded for institutionalising a conditional dialogue between the national Belgian payer and the innovative biopharmaceutical industry. We were pleased to see that this message was endorsed by the Belgian professional oncology societies and industry and health institutions, who are now engaged with us to further study the changes required to make this work in the future.

An important prerequisite for making this conditional dialogue happen is the use of ‘big data’ in health – and I am satisfied to see the progress we’re making in PhD research in collaboration with KU Leuven Biomedical Sciences on the use of advanced Bayesian statistics and machine learning to interpret real world evidence collected from patient journeys. This is much needed for making outcome-based contracts on innovative medicines a reality.

On the value-based healthcare theme, within MINOZ we continued to deliver on our forte in operations research, developing dashboards and an in-house tool enhancing ward capacity management performance at the level of the hospital, the departments and the physicians.

Finally, this year, I’m excited to see that we also expanded our healthcare delivery research from operations to the domain of strategy-making. In strong collaboration with general and medical directors of Belgian hospitals, we developed a scenario-based outlook of the uncertain technology- and finance-driven future in an increasingly hospital network-based delivered care.

Prof Dr Walter Van Dyck
Director of the Vlerick Healthcare Management Centre
Professor of Technology & Innovation Management
Cancer as a therapeutic domain has been, and still is, largely underserved compared to other domains. This leaves many cancer patients ultimately with unresolved high medical needs. In recent years, an acceleration in therapeutic innovation is creating high hopes: especially (but not only) novel immunotherapies as a new modality in addition to chemotherapy, hormonal therapies, and targeted agents are literally shaking up long-standing treatment algorithms. Their promising broad applicability will create a tsunami effect of opportunities for patients, as well as a challenge for payers. In contrast to earlier innovations − which were often directed at specific cancer (sub)populations − these treatments represent cancer-wide innovation. Not only the broad applicability, but also the high success rate of the ongoing clinical trials, are changing variables in previously elaborated predictive budget models. With prices listed, there is a strong perception that budgetary impact for payers will be unprecedented and unaffordable in current prospects.

In our work, we have attempted to estimate these adapted budgetary prospects, taking into account all major identifiable variables. Next, we have examined how affordability could be realised at a societal level without introducing any financial burden on the individual patient level.

We have done this work in collaboration with medical and economical expertise.

**Figure 1.**

2020 projection of innovative cancer therapies – defined as targeted therapies and immunotherapies – as part of the overall Belgian pharmaceutical specialties budget for oncology.
Following our horizon scanning results, by 2020 innovative drug-based cancer treatments will represent more than 70% of the total cancer drug budget in Belgium, and all cancer drugs will consume a quarter of the total pharmaceutical specialties budget, which is projected to be around €4.6 billion by then (Figure 1). To fund the projected 2016 – 2020 oncology innovation pipeline, given the fixed pharmaceutical specialties budget annual growth rates agreed upon with industry in the Minister’s Summer 2015 Growth Pact, the agreed upon budget will be exceeded in 2018 due to a pipeline of innovative therapies becoming accessible to the patient (Figure 2). As a result, given their high-cost nature, and amplified by the more general applicability of immunotherapies across a broad range of indications, this will severely stress the Belgian pharmaceutical specialties budget for the years to come.

However, we believe that the coming innovations can be affordable pending recognition of an objective need for a (reasonable) budgetary increase for cancer medicines, which is the medicine domain with the greatest ongoing innovation wave. Secondly, there is a need for a sustained conditional dialogue between pharma and payers in letting market forces regulate prices more than they do today. We believe that, contrary to current thinking, this can be implemented – maybe at the expense of me-too and futile developments, but without jeopardising true innovation.

Building further on this work in the Chair, we initiated policy research on how the value of medical innovation is used in access decision-making and whether societal willingness-to-pay should be made contingent upon its budget impact. An important prerequisite for the conditional dialogue to happen is the national roll-out of IT infrastructure enabling the gathering of real-world performance evidence for medical solutions. This was kicked off in a Chair workshop in Spring 2016, which welcomed top level participants from Belgian and international health payers, regulators and industry. Also, in an ‘Acting with Foresight’ workshop under the MSD Knowledge Partnership, we brought all relevant health system stakeholders together to start designing a future national horizon scanning system aimed at matching innovative biopharmaceutical output with prioritised unmet patient needs.

REFERENCE
Download the full report on healthcare.vlerick.com.

ACKNOWLEDGEMENT
This report was made possible by an unconditional grant provided by Roche.

Figure 2.
2020 projection of funding released through expected mechanistic price cuts in Belgium and the expected sales from novel targeted therapies and immunotherapies. The total price reductions over these 5 years can fund 24% of the projected therapeutic innovation.
At present, it is a necessity for hospitals to participate in some sort of network formation. However, many questions remain about the role of the hospital in a network (e.g. looking from a broader perspective than solely the financial aspect: which activities and responsibilities do we, as hospitals, want to take?), the composition of networks (e.g. who is part of the network?) and how these networks can be practically exploited (e.g. how to operationalise the collaboration?). Through interviews with hospital directors of Flemish, Brussels and Walloon hospitals, several uncertainties impacting these network formations were identified, such as the privatisation of care, the changing role of the patient, scarce funding and evolving technology. During a first workshop, technology, funding and the rigidity of the legal and political system were seen as the most important uncertainties that will impact the organisation and composition of networks within a scope of 15 years. Based on discussions, we converged to a strategic framework with technology and funding as the two most important uncertainties on the axes, thereby creating 4 possible scenarios: disease care, privileged care, connected care and health care (Figure 3).

**Figure 3.** Strategic framework with technology and funding as the two most important uncertainties on the axes, thereby creating 4 possible scenarios: disease care, privileged care, connected care and health care.
In the first scenario (disease care), technology mainly has a supporting role in a pay-for-service based system. In this volume-driven scenario, hospitals compete with each other trying to defend their current position, leading to little transparency and asymmetry in hospital status.

In scenario 2 (privileged care), major technological breakthroughs have occurred, which will impact the demand for services. However, the pay-for-service based system will lead to health at 2 speeds, thereby increasing the role of insurers and private care. This situation does not incentivise the formation of hospital networks, but instead associations of physicians will gain power.

In the third scenario (connected care), no major disruptive discoveries have been made, but all available care is highly accessible to everybody through tightly regulated networks, at both the regional and national level, with the hospital as the centre of the care system. Standardised health paths have been set in place in collaboration with specialised centres and extramural care. This collaboration makes it possible to arrange payments in a bundled, value-based way.

In the fourth scenario (health care), there is a complete shift in focus from curative, disease-oriented care to preventive, health-oriented care. New innovative technology substantially has increased the extramural care activity, which is well-embedded in a big network that includes hospitals, social care, general practitioners and industry. They all share accountability for the quality of care and are rewarded based on their performance and the quality of care. The enormous amount of data available are well-analysed and used for data-supported decision making.

To evolve from ‘disease care’ to ‘health care’, the ideal scenario, several paths are possible. Major technological innovation will induce a vertical movement, while converting the funding system into pay-for-performance will induce a horizontal movement. Which movements hospitals will eventually make depend on the healthcare system in place and the technological progress that is being made. While policy is enforcing a horizontal shift from disease care to connected care, we also see initiatives following the vertical shift from disease care to privileged care. The current challenge for hospitals is to take the decisions that will pay off in any of the scenarios, thus helping to move towards robustness and resilience in the network constellation.

REFERENCE
Download the full report on healthcare.vlerick.com.

ACKNOWLEDGEMENT
This report was made possible by an unconditional grant provided by Roche.
SCHEDULING OPERATING ROOMS: ACHIEVEMENTS, CHALLENGES AND PITFALLS

MICHAEL SAMUDRA, CARLA VAN RIET, ERIK DEMEULEMEESTER, BRECHT CARDOEN, NANCY VANSTEENKISTE AND FRANK RADEMAKERS

The hospital operating theatre (OR) is a particularly expensive unit for which efficient scheduling is imperative, but complex and difficult to achieve. We studied recent literature (283 publications over the 2000 - 2014 timeframe) on the topic, aiming to deliver 3 main contributions to the community of both academic researchers and practitioners:

We developed a **framework** to classify problems and increase the ease by which interested readers can find publications fitting their setting and challenges. We see, for instance, a wide variety of operating room planning and scheduling problems that differ in the extent to which up- and downstream resources are incorporated when making the schedule (i.e. integrated scheduling), or in the extent to which the solution methods succeed in translating uncertainty in the decision-making.

We did look for **evolutions over time, common approaches and relations between the different fields** of the classification scheme. Although the volume of research output has increased substantially in the last 10 years, it is somewhat surprising that research on outpatient settings has not, despite its growing importance in reality. In addition, the number of papers studying the OR in an integrated way is (in contrast to general belief) not increasing. Most contributions choose overtime or patient waiting time as performance objective and focus on problems with day and room assignments (which patient will have surgery on which date and in which operating room) instead of capacity- or timing-related decisions. Furthermore, it appears that many authors test their method with real data, but only few succeed in reporting on successful implementation in practice.

Finally, we did point to some **common pitfalls** in the way research is performed and disseminated. Major points of attention are the need for more details on the particular hospital setting of the problem and clarification of the underlying setting- and method-specific assumptions. Moreover, researchers should select performance measures that fit the (hospital) setting, not their model or solution method.

**REFERENCE**

**ACKNOWLEDGEMENT**
We acknowledge the support given by the Research Fund – Flanders (FWO) as Aspirant (Carla Van Riet) and as project G-0309.10.
Bed capacity in hospitals currently is an important point of discussion in the Belgian hospital landscape: ‘Are there too many beds or not?’. This question is often discussed in journals and conferences targeting the Belgian healthcare professional. The change in bed capacity can partially be explained by decreasing lengths of stay, decreasing reimbursements and a shift to outpatient care. However, not only is the number of beds important, but equally important is how efficiently they are used.

Even though more and more software applications are finding their way into the hospital sector, it is still difficult to estimate how the admission flows – namely emergency (i.e. unplanned) and electives (i.e. planned) – determine bed occupancy (Figure 4). This was the 2016 focus of the MINOZ programme in which 11 Flemish hospitals participated.

**Figure 4.**
Schematic representation of admission flows into the wards.
Using testimonials and data-analytics, we looked at the connection of drivers determining bed capacity from a different perspective. A survey addressing organisation, occupancy rates and performance measures was sent to the different stakeholders within the hospital, including bed planners, physicians, members of the hospital’s management committee, and chiefs of staff. In the first workshop, we further clarified terminology and identified which variables are (less) appropriate for measuring the performance of hospital wards. Variables and concepts such as census, occupancy rate, evolution in length of stay, access block, capacity alert calls, and patients redirected to secondary wards are considered suitable parameters – although not all of these parameters are being registered in the hospitals we surveyed. Bed planners keep track of these parameters and can adjust admissions and schedules if necessary. Preferentially, this should be organised from a central point in the hospital, but that was not the case in most of the hospitals. Knowing which admission flows determine the occupancy rates in the various wards will help with the prediction of patient presence, and will help the bed planner in assigning the beds. However, in most hospitals, the percentage of the different admission flows for each department is often unknown. This is reflected in the common short-term predictions of emergency and elective admissions: emergency admissions are mainly predicted on the day itself, while electives are mainly predicted only one day in advance.

In the second workshop, 2 testimonials gave some insight into the predictions of patient presence and the organisation and implementation of the tactical planning of the surgical schedule (also known as the master surgery schedule). Furthermore, we visualised the performance parameters for the different hospitals and initiated a discussion with all participants during the workshop. We built on these insights and developed dashboards with the relevant performance measures, retrospectively.

![Figure 5](image)

**Figure 5.** Example of a dashboard with performance measures at the hospital level.
showing the performance of the wards at 3 levels: the hospital, the departments and the physicians (Figure 5).

In addition, we developed a tool that visualises the impact of the different admissions flows on bed occupancy in the wards (Figure 6). We elaborated on how these dashboards can be used in a hospital environment and what possible problems might hinder their successful adoption.

ACKNOWLEDGEMENT
We would like to thank all hospital members of MINOZ. We are particularly grateful for the hospitals’ willingness to share their data and for their special efforts to improve the data quality. We are also grateful for QuintilesIMS’s software support in developing the performance dashboards.

Figure 6.
Visualisation of the impact of the different admission flows on bed occupancy in the wards. Box plots show the expected weekly census pattern and capture dispersion.
At the end of 2012, Herman De Prins, a passionate and strategic CIO, started his journey to implement ‘Analytics as a Service’ at UCB, a global pharma company. This vision would be put into place over the period 2012-2016. Starting with agile sprints to prove analytics competence in 2012, by the beginning of 2016 the CIO felt the company was ready to upgrade its analytics capability to become a foundation of the Patient Value Strategy introduced by the new CEO in 2015. This case provides a holistic picture of an organisation striving to make an impact with analytics and big data against the backdrop of digital turbulence in its strategic environment. It covers aspects of leadership, project management, competing on analytics, and growing an enterprise analytics capability for the digital age.

REFERENCE
Vlerick teaching case 2017-02-c

ACKNOWLEDGEMENT
We express our gratitude to UCB for their cooperation and contribution to this project. This teaching case was made possible by Vlerick Business School and KU Leuven.
RECENT PUBLICATIONS


Due time driven surgery scheduling. Health care management science, forthcoming.


It’s time to invest more in our health. The Clinical Services Journal, editorial February edition.

The Oncology scanning project. Vlerick HMC Report 2015-1.

Digital Strategy at Merck Sharp & Dohme, Case added to The Case Centre with reference no. 315-044 1.

UCB: Data is the New Drug. Vlerick Teaching Case Series, No 2017-02-c.

OPINIONS

High time for utopian thinking.
Hemelsoet D. (MSD), November 2016.

Your money or your life: a critical note.
Van Dyck W., September 2016.

The need for a uniform database for real-word evidence and data.
De Celle T. and Nechelpot M. (Roche), June 2016.

Pharmaceutical IP and global healthcare: a positive alliance.
Van Dyck W. and Neels L., May 2016.

Expensive medicines… Confrontation or solutions?
Neels L. 2015.

You can retrieve the full opinion articles and other press releases in the domain of healthcare management on: healthcare.vlerick.com.
ON-GOING RESEARCH

FACTORS INFLUENCING THE WILLINGNESS TO PAY IN REIMBURSEMENT DECISION MAKING

Contact: Walter Van Dyck and Lies Schoonaert

Health policy research project in the Roche Chair investigating whether willingness to pay – in addition to being subject to medical performance and true innovativeness – can also be made contingent on the pharmaceutical specialties budgetary impact. This research question is more relevant than ever, as medicines are now becoming more systemic in nature and hence require a larger budget than precision medicines. The present pipeline of immunotherapies becoming accessible to patients provides a strong case for potential regulatory innovation, which is the subject of this research.

ALIGNING MEDICAL TECHNOLOGY SUPPLY WITH THE UNMET MEDICAL NEED

Contact: Walter Van Dyck and Lies Schoonaert

Health policy research project, with MSD as a Knowledge Partner, to identify how priorities have to be set by decision-makers to achieve maximum health, taking medical supply and unmet medical need into account.

EXPLORING VALUE-BASED MEDICAL SOLUTION ASSESSMENT

Contact: Walter Van Dyck

Health Technology Assessment project, with Philips Healthcare, to design a method for assessing the value of novel medical device and system-based solutions for its various health system stakeholders.

DATA-AUGMENTED NEW PRODUCT DEVELOPMENT: THE USE OF REAL WORLD EVIDENCE IN MEDICINAL INNOVATION

Contact: Walter Van Dyck and Tine Geldof

Doctoral research project in collaboration with KU Leuven (Prof Dr Isabelle Huys), Ghent University (Prof Dr Lieven Annemans), Roche, the European Organization for Research and Treatment of Cancer (EORTC) (Dr Jan Bogaert), and the Belgian Cancer Registry. Investigates patient-level advanced statistical methods (like Bayesian decision methods) and machine learning to explore real-world disease registry-based evidence on patient journeys and their various received therapies.

IMPLEMENTATION OF PERSONALISED MEDICINE STRATEGIES: MARKET ACCESS OF COMPLEMENTARY DIAGNOSTICS

Contact: Walter Van Dyck and Laurenz Govaerts

Doctoral research project in collaboration with KU Leuven (Prof Dr Isabelle Huys and Prof Dr Steven Simoens). Personalised medicine offers considerable potential for making a healthcare system more efficient by providing tailor-made treatments to patients. Inherent to this model is the essential role of diagnostics to provide physicians with the necessary information for personalised medicine to occur. Innovation in this particular branch of the healthcare system is key for progression towards a healthcare system based on the personalised treatment of patients. However, the market access environment on these products is hampered due to constraints in reimbursement procedures, uncertainties related to the valuation of complementary diagnostics, misaligned perspectives on partnerships, and a lack of clear supply and demand side incentives for investment.
RETHINKING WORK AND STAFFING SYSTEMS IN LIGHT OF FLEXIBILITY

Contact: Brecht Cardoen, Paul Gemmel and Lies Schoonaert

Research project within MINOZ to explore the possibilities of flexible work in hospitals, networks of hospitals, and the limitations in social legislation. These topics will be discussed in workshops with the employees of the hospitals together with testimonials from other countries and sectors.

TOWARDS AN IT ROADMAP FOR BELGIAN HOSPITALS: CHALLENGES AND OPPORTUNITIES

Contact: Brecht Cardoen, Bjorn Cumps and Mathias Boënne

Research project in collaboration with the Belgian Association of Hospital Directors and Xperthis. By means of expert interviews and case studies among Belgian hospitals, we aim to see how the changing eco-system and the changing business capabilities of hospitals impact ICT challenges and strategy, and vice versa.

TIME-DRIVEN ACTIVITY-BASED COSTING APPLIED TO CANCER TREATMENT

Contact: Filip Roodhooft and Brecht Cardoen

Research project in collaboration with the Belgian Association of Hospital Directors and Xperthis. Based on a time-driven activity-based costing model, two case studies will be developed to assess the costs of particular decisions made in a cancer care trajectory. Additional insights will be gained by comparing the two cases, as the hospitals differ in the activities that can take place in-house during the treatment process.
The Vlerick Healthcare Conference has become the annual reference in the field, taking into account a total healthcare perspective and thereby stimulating interaction among the different stakeholders in the healthcare ecosystem: healthcare providers, pharmaceutical companies, biotech firms, medtech companies and policy makers. This conference targets all professionals active in healthcare and the life sciences, and everyone simply looking to stay on top of the most important trends in the field.

The focus in 2016 was on ‘competition’ – a word that frequently carries a negative connotation, but that is becoming increasingly relevant in the healthcare field. We discussed how various aspects of competition can (or cannot) be harmonised with the solidarity principle of our society. After 2 plenary talks providing insight into the impact of competition on healthcare providers and the behaviour of pharmaceutical companies, we continued with 3 separate tracks focusing on: competition for access, competition for capital, and competition for patients. In the competing for access track, we discussed whether the relationships with the biopharmaceutical industry should be rethought to make innovation sustainable in times of budget austerity and increasingly expensive medicines. In the second track, highlighting competition for capital, we explored whether there is enough capital in the market to support entrepreneurial innovation from the ground up, and how you can secure the necessary funds. In the third track, focusing on competition for patients, we explored the balance between collaboration within a network and competition between networks. We finished the day with a lively plenary panel discussion representing the various stakeholders. According to the panel, both the industry and the healthcare provider should strive to put more emphasis on transparency.

SAVE THE DATE
FOR THE 4TH EDITION OF THE VLERICK HEALTHCARE CONFERENCE
26 OCTOBER, VLERICK BRUSSELS CAMPUS

Topic for 2017 edition:
INNOVATION BY COLLABORATION

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