



Leiden University  
Medical Center

TRANSLATING  
INNOVATIONS  
> FROM SCIENCE  
TO HEALTH

TRANSLATING  
INNOVATIONS  
> FROM SCIENCE  
TO HEALTH



# CONTENTS

FOREWORD	7
----------	---

CHAPTER 1	
<b>Strategic vision: Our role in society</b>	<b>8</b>
1.1 LUMC's role in society	9
1.2 Meeting challenges	11
1.3 Cooperating with our environment	13

CHAPTER 2	
<b>Cutting-edge innovation</b>	<b>16</b>
2.1 Societal outreach: Priorities	17
2.2 Integrated and distinctive	21
2.3 Working on innovation: from laboratory to clinic, at bedsides and regionally	25

CHAPTER 3	
<b>Distinctive in integrated core tasks</b>	<b>28</b>
3.1 Patient care	29
3.1.1 Academic care	29
3.1.2 Cooperating for the benefit of patients	31
3.1.3 Value-Based Healthcare & Quality and Safety	33
3.1.4 Medical technology: Data Science, robotics and e-health	35
3.2 Research	39
3.2.1 State-of-the-art infrastructure for researchers	39
3.2.2 Coaching and support for researchers	41
3.2.3 Quality of research and Open Science	41
3.2.4 Valorisation	43
3.3 Education	47
3.3.1 Enquiry-based and interprofessional education	47
3.3.2 Interdisciplinary and international learning environment	49
3.3.3 Educational innovation and blended learning	49
3.3.4 Connection with everyday practice	51
3.3.5 Education and advanced training	51

CHAPTER 4	
<b>Interaction between regional and international environment</b>	<b>56-65</b>
• Leiden University	• City of Leiden
• Leiden Bio Science Park	• LUMC-Campus The Hague
• Haaglanden Medical Center	• Regional acute care
• Medical Delta	• Erasmus Medical Center
• Delft University of Technology	• NKI-AVL
• Patients' organisations	• NFU
• International partners: LERU and EUROLIFE	

CHAPTER 5	
<b>Cooperation in a flexible organisation</b>	<b>66</b>
5.1 Culture and leadership	67
5.2 Strategic talent management	69
5.3 Smart working	71
5.4 Renewal and investment	73

CONCLUDING REMARKS	
<b>Translating Innovations: from science to health</b>	<b>76</b>
Acronyms and abbreviations	78
Literature consulted	79





# FOREWORD

The strategy plan presented in this document describes the LUMC Executive Board's strategic vision for the hospital and its environment over the next five years. Many people have helped us formulate this vision, identify our objectives and work on the associated implementation plan. It has been inspiring to us to think about our future with employees from across our organisation and with many of our partners. Their engagement has helped solidify this plan and build a basis of support for achieving our ambitions.

Our new strategy builds on the results of our previous plan, 'Noticeable Added Value', which emphasised internal cohesion and cooperation, quality improvement, and a well-defined identity ('profile') for the LUMC. It provided the basis for exploring new horizons with numerous challenges.

The present strategy plan outlines our strategic vision and describes the long-term ambitions that guide our entire organisation. Our ambitions were defined in a SWOT analysis and are reflected in our chosen profile, which integrates patient care, research and teaching. These are our core tasks and it is our aim to connect them as much as possible to achieve optimal synergies.

We have used the ambitions described in our plan to outline our objectives. Our employees can refer to this outline in their daily work. As an organisation, we need a compass that combines our long-term strategic vision with short-term objectives. Achieving our long-term ambitions by implementing short-term plans will enable our organisation to remain flexible and respond agilely to a changing environment.

We hope that both our organisation and our environment draw inspiration from this strategy plan. It gives us a lasting framework for the decisions we will be taking over the next five years. Cooperation beyond our own walls is a prerequisite for successful innovation. We would like to strengthen the ties between the LUMC and its environment and leave a better LUMC to future generations. Our sights are set on translating innovations: from science to health.

## **The Executive Board of Leiden University Medical Center**

Prof. Pancras C.W. Hogendoorn, *Member of the Executive Board and Dean*

Henk P.J. Gerla RA, *Member of the Executive Board*

Prof. Willy J.M. Spaan, *Chair of the Executive Board*



# 1

## Strategic vision: Our role in society

### 1.1 LUMC's role in society

*'As an innovator, the LUMC aims to improve healthcare and people's health'.*

This is our mission, which we will achieve by providing our patients with optimised, state-of-the-art healthcare based on pioneering research and innovative teaching, in cooperation with our partners within and outside our region. Our ambition is to become one of Europe's top ten University Medical Centres affiliated with a research-intensive university.

We will be able to do this thanks to our employee's commitment and based on our core values: personal, connecting and enquiring. Each and every employee is intrinsically valuable and also adds value through his/her personal engagement with others. We seek to connect the LUMC and its environment but also patients and care providers, lecturers and students, researchers and care providers, employees and the organisation, our core tasks and our core values. We do this with a keen sense of enquiry: by being open to the opportunities that arise, including in our interaction with our surroundings. This is how we create added value for our patients and for society.

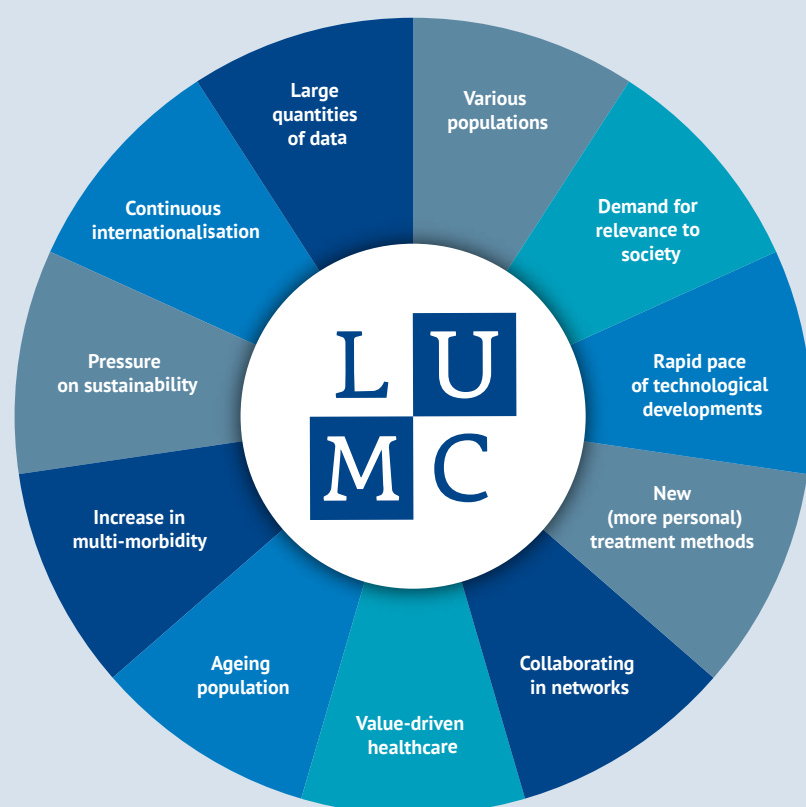
As a knowledge institution with international ambitions, we do ground-breaking work to promote a healthy society by performing cutting-edge research and providing innovative teaching. Close cooperation within our region – Leiden, The Hague, Delft, Gouda and Haarlem – makes this possible. We offer our patients outstanding academic healthcare at costs that are acceptable to society. We train our students in research and patient care, turning them into ambitious doctors, innovative researchers, pharmacists, clinical technicians, nurses and other medical and paramedical professionals. We inspire our colleagues and people from all over the world with our training and advanced training in an international learning environment.

Innovation comes about in the interaction between research and practical applications in patient care, and in the education we offer students and professionals – in short, in our core tasks. In our view, interaction between these core tasks is essential to innovation at the LUMC. We acquaint students enrolled in university, higher professional and occupational training programmes with the latest research findings and innovative applications in healthcare. This rouses their curiosity and prepares them for lifelong learning. Patients, particularly those who suffer from a rare or complex disorder, are assured of state-of-the-art medical treatment. Researchers find inspiration and test their findings in clinical practice, knowing they have access to reliable data and innovative technology.





## External developments



## Sources of inspiration

**Prof. Richard Barker '2030 The Future of Medicine' (2011)**

*'We speak of the right patient receiving the right treatment at the right time. But we should add "in the right setting" [...] For better patient service and convenience and for the greatest economy we need to move care as far upstream as possible'*

**Dutch National Research Agenda (2015)**

*'Every tumour is different: How can we understand cancer well enough to be able to develop a treatment for every possible type?'*

**NFU 'Sustainable Health' Research Agenda (2016)**

*'Regenerative medicine is expected to provide the basis for numerous new types of medical treatment'*

**Health Council of the Netherlands**

**'Research that makes you better' (2016)**

*'The UMC is developing into the academic motor of research and innovation for healthcare and prevention in its broadest sense, with a strong regional role, alongside its already well-developed national and international orientation'*

We value our cooperation with the business sector, seeing it as a means to facilitate innovations and their practical application.

Our professionals provide top-quality academic care on a daily basis. Our main focus is on patients who require academic medical care. Patients are our most important partners, both during treatment and in research. Firm agreements with our regional partners about basic and acute care are therefore essential. Our multidisciplinary cooperation with other hospitals is important for the teaching and training we provide. After all, we want our students to be familiar with the entire spectrum of healthcare and research.

We need top talent to rank among the international top. That is why we have made strategic talent management – the process of discovering and recognising, recruiting, developing and retaining talent – one of our priorities. Our divisions, departments and directorates must cooperate smoothly to ensure smooth interaction in an ever-changing environment. For us, cooperation and connection are crucial.

### 1.2 Meeting challenges

We live in times of profound change. The United Nations and the World Health Organization have prioritised the health of the world's population as one of the most important issues worldwide. Rapid advances in technology and medical treatment represent both an opportunity and a potential threat to the sustainability of our healthcare system. Specific challenges include the ageing population, the growing number of people with one or more chronic disorders, and the associated rising costs. Our affluent lifestyle has given rise to new diseases. Society has become more critical of the quality of university medical centres (UMCs) and their output. Over the next few years, our healthcare, research, education and advanced training must change to ensure affordable, viable and effective care for all. Together with our patients, we seek short-term solutions in our region, offering patients care at home, close to home or, if necessary, in a UMC.

Over the next five years, the LUMC will draw on its research and clinical strengths to explore three of society's priorities in greater depth: oncology, regenerative medicine and population health. The ageing population will lead to a sharp rise in the number of cancer patients in the next few years. Innovative treatments will become available as we acquire more knowledge in the fields of immunology and autoimmunology, pharmacology and personalised medicine. Regenerative medicine holds out the promise that we can actually repair organs, tissue and cells. In future, we may finally be able to cure diseases that are now chronic (with all the costs and burdens this involves). In the next few years, our focus will shift to health promotion and prevention. Our healthcare system is under pressure, partly due to lifestyle disorders such as arthrosis and obesity. This is where behavioural change and prevention can achieve major results. Together with our partners in the region, we aim to play a leading role in developing solutions for prevalent urban



## Core values

Our core values are the foundation of and source of inspiration for the way LUMC employees think and act, day by day.

Together we bring these core values to life. They give us a unique identity, discernible to anyone dealing with the LUMC.

Our core values are:

- personal
- connecting
- enquiring

Based on these values, we wish to achieve translating innovations: from science to health.

### *Personal*

To us, 'personal' means taking responsibility for your role in society by being authentic, taking a genuine interest in others, being caring and people-centred, and by

welcoming assessment. It means adding value to someone else.

### *Connecting*

To us, 'connecting' means having an open attitude, listening actively, suspending judgement, inviting dialogue, openly discussing matters, focusing on cooperation, feeling responsible for and having confidence in others. It means adding value to a network.

### *Enquiring*

To us, 'enquiring' means being eager to learn, being daring, discovering, being flexible, thinking in terms of chances and opportunities, drawing the outside world in, showing initiative and wanting to improve continuously. It means adding value to society.

health issues. Technology and its utilisation in medicine provide new opportunities to tackle these challenges in patient care, teaching and research. Data science – which allows us to recognise meaningful patterns in large quantities of data – opens up the possibility of personalised and preventive healthcare.

## 1.3 Cooperating with our environment

The major challenges of today require multidisciplinary cooperation, both within and outside the LUMC. There are more than 1.7 million people in our densely populated region. We have a very close relationship with Leiden University. Important partners within the university are the faculties of Mathematics and Natural Sciences, Social Science and Governance & Global Affairs. The LUMC also has close ties with other regional care providers and knowledge institutions. We cooperate with a large number of nursing homes and rehabilitation centres, mental healthcare organisations, GPs, pharmacists and midwives. We do this to give every patient optimal care as close to home as possible. The LUMC aims to be the driver behind innovation in patient care, research and teaching. Within this context, we cooperate with the Netherlands Federation of University Medical Centres (NFU) and bilaterally with other UMCs in the Netherlands. It is important for the LUMC to engage with the business sector to ensure rapid valorisation of our research results (knowledge valorisation).

Viewed from a worldwide perspective, our location is exceptionally favourable. Western Europe is one of the world's leading regions in Life Sciences & Health, with a high concentration of knowledge-intensive institutions. Within the Netherlands, the Province of Zuid-Holland (also known as the 'Medical Delta'), with its concentration of companies in Leiden Bio Science Park (LBSP), is acknowledged internationally as an important player in this field. Public and private parties work together here on important medical, biomedical and technological innovations and cutting-edge healthcare solutions. We seek contact with partners – in the region, in Europe and around the world – who complement us and support the fulfilment of our mission.

We coordinate our healthcare services with other players in the region. As a member of the Regional Partnership on Training and Education (OOR Leiden), we work with other hospitals (Alrijne Hospital, Groene Hart Hospital, Haaglanden Medical Center and the three Reinier Haga Group hospitals: Haga Hospital, Reinier de Graaf and LangeLand Hospital) to optimise advanced training of medical specialists and nurses, and to offer our trainee doctors broad clinical experience. In addition, we increasingly cooperate with Spaarne Gasthuis in Haarlem and Hoofddorp.



To undertake knowledge-building and knowledge valorisation, we work with various companies, mainly in the Leiden Bio Science Park. The Medical Delta is the regional catalyst at the interface of health, technology and innovation. The unique expertise at Delft University of Technology in such fields as engineering and nanotechnology generates opportunities in research, education and healthcare innovation. We work directly with Erasmus MC by cooperating academically in a select number of care and research programmes. Together with our partners, and with LUMC Campus-The Hague, we will play a growing role in the greater metropolitan area of The Hague in prevention, population research, general medical practice and urban issues.



## OBJECTIVES DEFINED IN CHAPTER 1

- The LUMC ranks among the top ten European university medical centres.
- By seeing that innovations in patient care, research and teaching are valorised, the LUMC is becoming more relevant to society, year by year.





## 2 Cutting-edge innovation

The LUMC has an integrated identity ('profile') that incorporates all of its core tasks. We are proud to be an international leader in research, we are proud of our excellent patient care, and we are proud of our innovative approach to preparing young people for their careers in healthcare. We aim to be an innovator in human health and healthcare in general. This means that we offer innovative treatments and diagnostics, ensure that people remain healthy (for longer), and accomplish breakthroughs in research that we then apply in medical practice. We can only do this by streamlining the innovation process, from ground-breaking research and translational and clinical research to bedside innovation and application in the region and beyond. What is essential in this respect is the enduring connection between research at the LUMC and cooperation between researchers, doctors, students and our patients.



### Oncology: innovation and research for the direct benefit of patients

The LUMC Oncology Center provides patients with the best possible oncological care. It is also a driver of innovation and research. The centre makes use of state-of-the-art diagnostic and treatment methods to optimise individual results. For example, innovative research at the centre has resulted in new therapeutic vaccinations against cervical and other forms of cancer.

Patients take centre stage at the LUMC Oncology Center, with all twenty-five departments working together in multidisciplinary teams of specialists, nurses and paramedics to deliver the best possible

treatment. Case managers are the designated contacts for patients and their family during the entire care process and there is ample attention for the psychosocial and social problems that generally accompany the disease.

The LUMC Oncology Center cooperates closely with Regional Oncology Network West and with a network of colleagues in the Netherlands and abroad. For example, the LUMC works with the NKI-AVL on ground-breaking research in immunology and the molecular biology of cancer.

### 2.1 Societal outreach: Priorities

Healthcare innovation is vital to tackling the challenges that society will face in the next few decades. The LUMC aims to contribute to progress, drawing on our connection with society and our patients. We have chosen a unique profile that aligns with the major research challenges described in the Dutch National Research Agenda, the NFU Research Agenda for Sustainable Health and other policy documents. We recognise that the fields of oncology and regenerative medicine are of critical importance to society. They are almost identical to our strengths in research and clinical practice. Society increasingly demands an approach geared towards improving the health of the *entire* population, i.e. population health.

We therefore intend to make a compelling and distinct contribution to:

- 1 Oncology
- 2 Regenerative medicine
- 3 Population health

Because the LUMC focuses on individuals, i.e. on personalised medicine, we expect that in the future, every innovative diagnosis and treatment that we offer our patients will be person-specific and customised.

## Regenerative medicine: organs-on-a-chip and stem cell hotel

To truly cure patients with a chronic disease, we must first cure their diseased organs. That is what regenerative medicine aims to do.

A revolutionary approach of this kind requires new types of cooperation between doctors, researchers and the business sector. The LUMC is exploring the various options by opening a 'stem cell hotel'. The hotel 'guests' work on innovative techniques, such as reprogramming the cells of patients into stem cells for tissue repair. They benefit from our knowledge and from our facilities, including the

Good Manufacturing Practice production facility. Together with its partners, the LUMC is exploring what is needed to use stem cells in the treatment of chronic diseases.

The LUMC is also cooperating with other knowledge institutions to develop 'organs-on-a-chip', small organs and microscopic measuring instruments. Creating stem cells from patient cells allows us to study diseases in minute detail and develop new forms of treatment.



Based on our three societal outreach priorities, we will focus on:

- cancer, the most common cause of death today
- regenerative medicine, a promising branch of research for curative therapy
- population health, a relatively new domain that focuses not only on healthcare but also on health promotion.

The LUMC excels in oncology, both in research and in the treatment of many different types of cancer. Examples of our strengths include: tumours in bones and soft tissue, haematology, gastrointestinal tumours, breast and intestinal tumours, skin lymphomas and eye melanomas. Our oncological patient care is concentrated at the LUMC Oncology Center, where we use the latest methods based on cutting-edge research. The LUMC is the most important national centre of expertise in various fields, e.g. diagnostics and treatment of tumours in bone and soft tissue, treatment of eye melanomas and skin lymphomas. Our focus in the next few years will be on building our expertise in lung cancer and its treatment and on developing personalised oncological immunotherapies. The LUMC participates in the Holland Proton Center (Holland PTC), giving us unique opportunities to improve and refine this innovative treatment option and to conduct ground-breaking medical research. In addition, we are part of the independent Oncode Institute, which brings together top Dutch researchers in basic oncological research.

Regenerative medicine focuses on influencing and mobilising the body's restorative ability, thereby stimulating the self-healing capacity of diseased tissue and organs. Treatment can be applied at organ, tissue, cellular or molecular level. Research involving the organ-on-a-chip model, used in the development of personalised medicine, is a contributing factor; such miniature models are being studied at the pre-competitive non-profit Institute for human organ and Disease Model Technologies (hDMT), initiated by the LUMC. The LUMC has been a pioneer in regenerative medicine for more than fifty years. In 1965 we carried out the first European bone marrow transplant and in 1966 the first kidney transplant. Internationally, we are in the vanguard in the transplantation of kidneys and islets of Langerhans in patients with type 1 diabetes. In the future, we hope to use advanced cell therapy to cure this type of diabetes and other chronic disorders so that patients no longer require daily care. We are working towards this goal in the public-private partnership RegMed XB (regenerative medicine crossing borders), where we are in charge of two of the three main projects (focusing on final stage renal failure and diabetes). In the near future, the Leiden Stem Cell Hotel will drive this type of research. We can manufacture innovative products in our GMP (Good Manufacturing Practice) facility and thus carry out the entire process of ground-breaking, translational and applied research ourselves.





## Population Health: innovative approach to infectious diseases

Infections are the biggest threat to the health of populations worldwide.

The Leiden Controlled Human Infection Center (L-CHIC) is unique in the world. Here, volunteers are infected with micro-organisms or parasites in a controlled environment, allowing us to speed up research into the effectiveness of vaccines or drugs and saving time and reducing development costs. One example is our advanced research into a malaria vaccine.

To manage tuberculosis resistance, the LUMC is seeking to develop a test that can predict who will develop the disease. At the moment, anyone who

is infected is administered antibiotics, whereas without treatment only a small proportion would actually contract the disease. If we know in advance who will become ill, we can make more appropriate use of antibiotics.

Based on the insight that epidermal and intestinal bacteria are important to health, the LUMC is studying these bacteria as a possible basis for new forms of treatment.

Our population health approach will result in greater insight into the prevention of (resistant) infections in the Dutch population and specific international population groups.

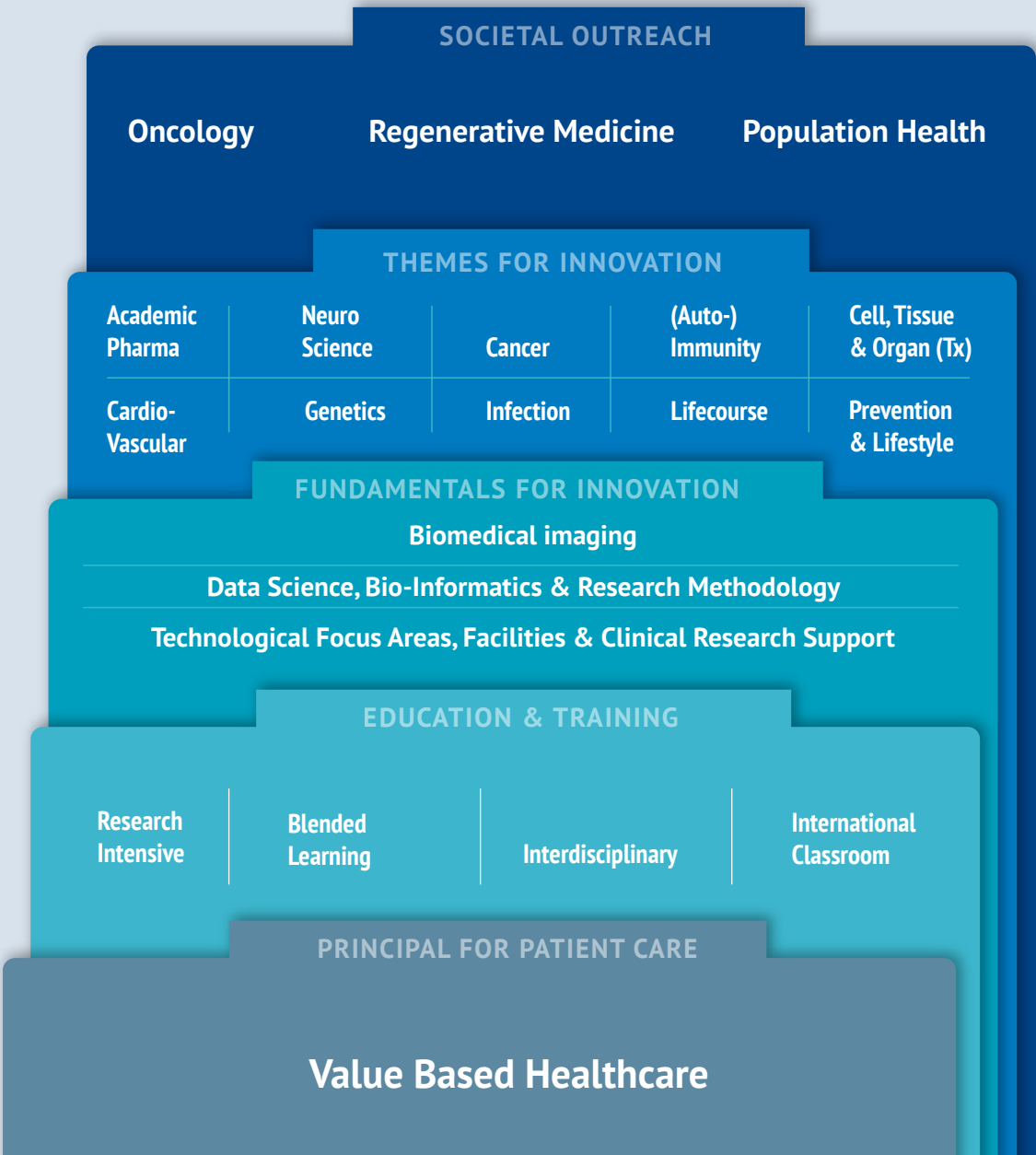
Changes in society and demographic trends are putting pressure on our healthcare system. In addition to their innovations in academic care, UMCs are increasingly expected to contribute to healthcare solutions that will make care accessible and affordable now and in the future. This is why we have opted to prioritise population health, with a view to sustainable healthcare and health promotion. At the LUMC, population health involves studying the transition from health to disease in the population and how to reduce the risk of disease. It involves developing and testing interventions to promote health. This is a relatively new priority for us, but in view of its importance to society and the associated regional opportunities, we have chosen to maximise our efforts in this field. The LUMC-Campus The Hague has made a promising start, in cooperation with research groups at the LUMC and Leiden University. In line with our advanced training for GPs, our master's programme in Vitality and Ageing, and our proposed (research) master's programme in Population Health Management, we are focusing on promoting the health of large groups of people who have similar profiles, making use of data analytics. Infectious diseases also form a serious threat to public health, a concern that is at the heart of our new Leiden Controlled Human Infection Center (L-CHIC). We are also cooperating with the Dutch Center for One Health (NCOH) and the Dutch antimicrobial resistance initiative (CARES).

### 2.2 Integrated and distinctive

We have top researchers in Leiden, a sound basis for achieving our ambitions. Research at the LUMC has a solid reputation, both in the Netherlands and internationally, demonstrated by bibliometric data and our ability to recruit. Our basic research is ground-breaking. The way in which we integrate ground-breaking research, translational research, clinical research and applications in academic care makes us distinctive, supported by our state-of-the-art infrastructure, research facilities and patient care. This is how the LUMC attracts talented researchers and care professionals. At the same time, our distinctiveness generates support from society in the form of public funding and recognition. Our patients and their referring doctors know they are in good hands at the LUMC.

Cross-departmental synergy has grown enormously in recent years. The tendency to look inward is increasingly giving way to inter-departmental and inter-divisional partnerships, such as the Heart-Lung Center, the Transplant Center and the Oncology Center. Within our profile areas, researchers have made enormous strides towards closer, more successful cooperation. We have reorganised our teaching and embedded it into the line organisation, setting an example for our other two core tasks. In the next few years we will push forward with our commitment to closer integration and greater synergy. The societal outreach priorities we have selected demand exceptional focus in our research. Sometimes this requires a shift in emphasis, at other times the clustering of research. This is why, based on society's demands and our unique set of research ambitions, we have opted to divide our profile areas into ten innovation themes that reflect society's demands. We see this as an interim step towards establishing a small number of centres within the LUMC in line

Cutting-edge innovation



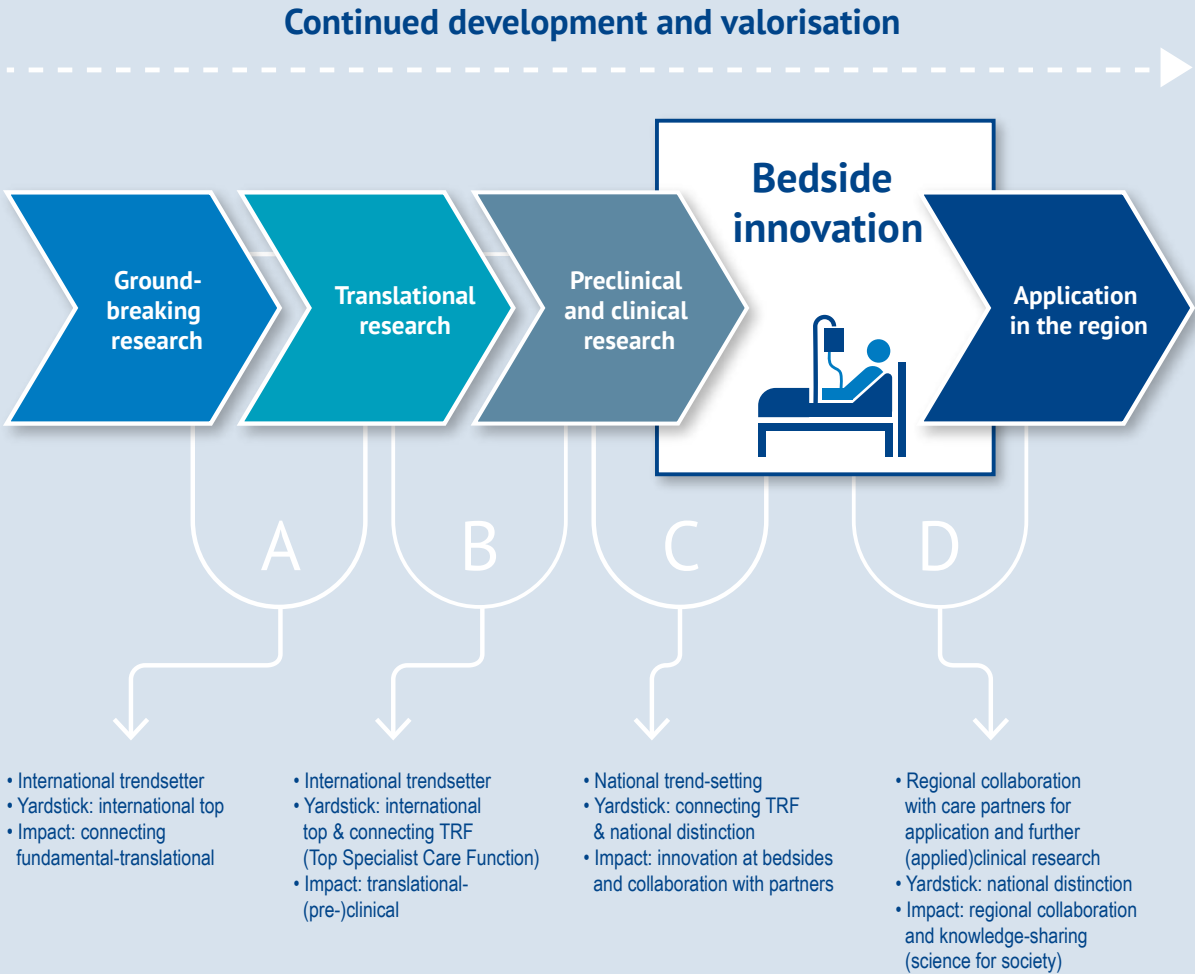
with our research and clinical strengths and ambitions. Eventually, our core tasks will be fully integrated into these proposed centres.

The foundations that we have built for sustainable health, such as data science, are fundamental to innovation. Without biomedical imaging and our technological focus areas (TFAs), our ground-breaking research would not be possible. At the same time, we carry out innovative research that focuses on the ongoing advancement of technology itself. In recent years we have clustered facilities and laboratories, promoting cross-fertilisation and cooperation and resulting in even more promising connections. As a result, we are optimising the way we use this valuable infrastructure and will continue to do so.

The success of a knowledge-intensive organisation such as the LUMC depends on the relationship between the autonomous expertise of our professionals and the strategic objectives of the organisation. New insights emerge when enquiring researchers are at work. Their efforts must be supported and, at times, brought into line with the organisation’s ambitions and objectives. That is why effective communication with the organisation’s line management is an important prerequisite for innovation. In our academic care and in our clinical research within the ten innovation themes, we apply the principles of Value-Based Healthcare (VBHC). VBHC therefore links patient care and research. The same can be said of our centres of expertise for rare diseases and our role in European Reference Networks.



The LUMC's innovation pipeline



2.3 Working on innovation: from laboratory to clinic, at bedside and regionally

The LUMC's role in the community is that of an innovator. Innovation can start in a laboratory or in another research setting and then requires practical application: at our patients' bedside, in our outpatient departments, in other hospitals within and beyond the region, or at home.

Innovation also entails a transition to the future, from ground-breaking work to increasingly broader application, until it becomes routine. Education and training, including continuing professional development, play a key role in this process.

Every patient at the LUMC can contribute to knowledge-building and innovation, e.g. by participating in a study. Patients participate in clinical studies not only for their own benefit, but also, and in particular, for the benefit of future patients. Our patients are important partners in healthcare, research, education and training. They come to the LUMC for our knowledge and we learn from their experiences. The combination of research and patient care means that the outcomes of medical and biomedical research can be translated to a bedside application within a single institution. Eventually, those outcomes also find their way into innovations that people can use at home, e.g. e-health applications. Our aim in the next few years is to do more to present research and research applications in patient care to relevant patients' organisations. We regard their experiences as an indicator of added social value.



## OBJECTIVES DEFINED IN CHAPTER 2

- At the LUMC, research contributes to a better understanding of the causes and mechanisms of diseases and to the improvement of diagnostics and treatment.
- At the LUMC, every patient is included in a study.
- The ongoing development of the ten subject areas in our research and in our clinics leads to medical and biomedical innovations and applications.
- At the LUMC Oncology Center, all of our core tasks interact in an innovative and caring environment. Tertiary referral care is patient-centred and delivered in close consultation with patients.
- The LUMC manages Regional Oncology Network West in cooperation with its regional partners. Patient care is offered close to home when possible, and elsewhere only if not.
- The LUMC is building its international networks and partnerships in the field of oncological research, innovative diagnostics and treatment to guarantee state-of-the-art patient care.
- The LUMC is the leading hospital in the Netherlands for regenerative treatment.
- Leiden is the European research hub for regenerative medicine because it has created a unique infrastructure that takes the results of stem cell research to patients.
- The LUMC trains analysts, specialists, top-calibre employees and PhD candidates based on knowledge transfer and exchange in order to achieve continuous innovation in regenerative medicine.
- The LUMC is a knowledge centre in the field of population health. It is known and accessible to patients, the public and professionals, and has an integrated regional network of professionals working in primary, secondary and tertiary care.
- The LUMC has clustered research and teaching in the field of population health based on a powerful data infrastructure.
- Innovation and interventions based on population health research are deployed visibly in the clinic, in neighbourhoods in the cities of Leiden and The Hague, and internationally in developing countries.





# 3

## Distinctive in integrated core tasks

### 3.1 Patient care

Over the next few years, the LUMC will focus on a number of tasks related to patient care with a view to improving the stature and distinctiveness of our academic care. We are working to improve our position in tertiary referral care by developing centres of expertise for rare diseases. We participate in (and if necessary coordinate) European Reference Networks to ensure sustainable international knowledge transfer. We share knowledge acquired internationally with our regional partners in the care chain. Our guiding principle in designing our care organisation is Value-Based Healthcare (VBHC). Concepts such as Just Culture and Safety 2.0 help us to improve the quality and safety of the care we provide. The reliable recording and integration of care data and the subsequent evidence-based use of data also go to improve the quality and innovation of the care process.

The emphasis at the LUMC is on connecting academic care and medical and biomedical research to facilitate innovation and improvements in healthcare. We aim to generate value according to the principles of VBHC, ensuring patients of perceived benefits at socially acceptable costs. We engage in active dialogue with patients about their wishes and needs, something that requires close cooperation between the doctors, nurses and other care professionals on our medical teams. Our care professionals must be equipped to act in the interest of patients, who are always the focal point of our attention.

#### 3.1.1 Academic care

The LUMC concentrates on academic care. We define academic care as complex and highly specialised tertiary referral care (TRF) delivered to patients with severe or rare diseases or disorders that are difficult to treat, often requiring special diagnostics. They are referred to the LUMC by general hospitals or other referrers to receive care that cannot be offered elsewhere (last resort function). Our definition also includes acute care, an important aspect of which is multi-trauma care. Patients who require acute care can turn to the LUMC at any time of the day or night. We also provide basic patient care, mainly for our academic care patients, allowing us to continue bedside training for medical professionals. The LUMC therefore helps deliver the right care in the right place and at the right time, catering to the wishes of patients and society.



## European Reference Networks: rare endocrinological disorders

European Reference Networks (ERNs) are partnerships between centres of expertise that aim to improve care for patients with rare disorders, with treating physicians, researchers and patients' representatives all playing an active role.

The LUMC's Endocrinology department coordinates the Endo-ERN. This extensive European network, which has made significant progress in developing virtual consultations, focuses on patients of all ages. Endocrinological diseases include all disorders of hormone-manufacturing organs. Besides common disorders

such as diabetes, many other endocrinological diseases are rare or even very rare. It can take a long time before a disorder this rare is identified. By collecting data from patients across Europe, both researchers and treating physicians gain more insight into these rare diseases.

Specialists throughout Europe can obtain advice on the best possible treatment for their patients through an ERN. The Endo-ERN can give patients who have been searching for years new hope for a better quality of life.

Together with its regional partners, the LUMC organises patient care so that every patient has access to the best possible and most innovative care available, in line with the latest research, tailored to individual needs and at acceptable costs. Patients from all over the Netherlands and abroad receive academic care within the framework of our tertiary referral and last resort function. We play a regional role in acute care. In recent years, we have worked with our regional partners to organise basic patient care. We lead the way in transferring the task of basic patient care to general hospitals and other regional care providers. For instance, care for children with diabetes is mainly provided in Alrijne Hospital. Over the next few years, we will continue working with our regional partners to bring care even closer to patients, supported by medical technology and e-health. Regional cooperation also ensures that the various parts of the care chain are properly attuned to one another and allows the quality of the chain to be monitored and improved. Our point in all this is to create a regional academic medical network. At the LUMC itself, this also means improving the efficiency of the care process, including patient logistics and capacity planning. This too is in our patients' interest.

Academic care at LUMC has been divided into specific clusters, making it easier for patients to recognise our strengths. Each specific cluster covers patient care, research, and education and training. We share and build our knowledge of rare diseases through the European Reference Networks (ERNs), thus contributing to the development of European guidelines. Undertaking joint research into the origins and treatment of rare diseases makes it possible to improve care for all such patients, both in the Netherlands and abroad.

### 3.1.2 Cooperating for the benefit of patients

Regional cooperation in patient care is crucial for all patients, but it is becoming even more important as we shift our focus to high-complexity care. Together with our regional partners, we can achieve our shared ambition of offering low-complexity/high-frequency care across many locations close to people's homes while at the same time delivering high-complexity/low-frequency care at one central location. For example, to encourage innovations in care, we need applied clinical research involving large groups of patients with common disorders.

There are several different forms of regional cooperation and each partner in our network adds value to the entire process, and therefore for patients. A few examples: in obstetrics and perinatal care, the LUMC works closely with primary-care midwives in the interest of mothers and infants. In Regional Oncology Network West, a Comprehensive Cancer Network (CCN), we work closely with regional partners to optimise integral care for every cancer patient in the region. Each partner has its own set of responsibilities. The University Cancer Center Leiden-The Hague – a partnership between the LUMC and Haaglanden Medical Center (HMC) – allows us to improve care for cancer patients and make it more accessible. Our rheumatologists hold weekly outpatient consultations in Alrijne Hospital. The LUMC runs a haemophilia treatment centre in partnership with Haga Hospital.





## Value Based Healthcare: value-driven care

Value-Based Healthcare (VBHC) forms the basis for patient care at the LUMC. Patients should benefit from our care, measured against their own standards and at acceptable costs. To ascertain whether that is indeed the case, we continually ask patients how they have benefitted from treatment, not just in terms of their physical health but also their sense of well-being.

The LUMC has gained a wealth of experience from its VBHC oesophageal and thyroid cancer pilots. They are the basis for new disease-oriented care teams, which operate at inter-departmental level. VBHC depends on making constant improvements

to care (and the quality of care) based on reliable and low-threshold monitoring of patients' perceptions and care outcomes. This means that we must be able to access clinical data to obtain the right quality information. The innovative methods involved mean that care teams – which are assembled on the basis of a disease, not a department – must undergo intensive training.

The VBHC approach supports clinical research at the LUMC, particularly in terms of quality of care and quality of life. Without data on the patients' long-term well-being, it is impossible to establish whether an innovation is valuable.

The radiotherapy departments of the LUMC and the Reinier de Graaf Hospital in Delft share a department head. We work closely with other hospitals in the region to deliver care to patients with neurological disorders. Other potential regional partnerships could focus on the scope of demand for cardiovascular care, linked to the composition of the regional population and its expected growth. Last but not least, as of 2018 the hospitals in The Hague and the LUMC will have a single medical research ethics board to assess research involving human subjects.

The LUMC will work the HMC to explore the potential for closer cooperation based on a long tradition of partnership, for instance in the fields of cardiology, neurosurgery, vascular surgery, oncology and traumatology. Closer cooperation means that the LUMC will continue its role in trauma care in The Hague/Leiden. One advantage of closer cooperation is that people in urban areas will benefit more quickly from innovations, helping both organisations meet their responsibility to the community. To achieve this, we also need to work with our other regional partners, within the context of varying alliances.

The LUMC joins other UMCs in researching care needs for diseases and disorders for which no cure has so far been found. One example of focused academic cooperation is our partnership with Erasmus Medical Center in paediatrics, gynaecological oncology and rheumatology. We are starting to explore the possibility of extending this cooperation to include a number of dedicated activities. We are specifically seeking synergies that will lead to a strong national and international position. Recently, we also launched a national platform for stem cell transplants in children with UMC Utrecht. Another partnership, this time with the AMC, is the Rembrandt Institute, meant to promote cardiovascular research in both UMCs.

### 3.1.3 Value-Based Healthcare & Quality and Safety

The LUMC uses Value-Based Healthcare (VBHC) to inspire care innovations that will lead to relevant improvements in the quality of life at socially acceptable costs. VBHC helps us to assess the value of research innovations and – if there is proven added value – to improve patient care, both at the LUMC and elsewhere. This is how VBHC connects our core tasks of research and patient care. We regard patient experiences as an important barometer for the quality we deliver. We seek to increase patient involvement in the diagnostics and treatment of their diseases. Shared decision-making is therefore being broadly implemented at the LUMC.

## Innovation for patients: Heart-Lung Center

The powerful interaction between complex academic patient care and innovative research is especially apparent in our Heart-Lung Center. The basis for its success is multidisciplinary teamwork, resulting in innovation for patients.

For example, the centre has developed the Box, a unique e-health application containing a blood pressure monitor, scales and ECG equipment. The application makes it possible for patients to collect data at home for a digital consultation with their doctor. Patients are satisfied with the Box. To improve the treatment of heart valve disorders, the LUMC is working on a way to replace donor

valve cells with the patient's own cells. Cells in a patient's heart change in such a way that they can function as an internal defibrillator in the event of imminent heart failure. The technique involves a type of gene therapy.

Surgeons, radiotherapists and oncologists who treat lung cancer focus on improving the chance of survival and the quality of life of patients.

The Heart-Lung Center will continue to develop and apply innovations in the future, ensuring that the LUMC will remain in the vanguard in utilising regenerative medicine for heart and lung diseases.

We have established a firm basis for our VBHC approach in recent years with a strong emphasis on patient safety. That basis is formed by our Quality Dashboard, Care Innovation Programme, LEAN projects and shared decision-making. Taking charge of this development is our Directorate of Quality and Patient Safety, along with LUMC's VBHC Steering Group. The topic 'Quality and Patient Safety' is addressed by an advisory committee of the same name, made up of our LUMC ambassadors. The committee assesses proposals for care improvements and issues advice, thus strengthening two-way communication.

The LUMC promotes a safe internal organisational culture ('just culture') for quality and patient safety. The health of patients and their perception of the care they receive play a central role in this. At the LUMC, we aim to create a culture of trust, learning and responsibility. A just culture is an organisational culture in which dialogue is paramount and mutual responsibility is standard. It is a culture in which people are willing to communicate with one another constructively and in which they work together to explore the boundary between acceptable and unacceptable behaviour where necessary. A just culture is based on the idea that no one makes mistakes deliberately, and that every employee enjoys the organisation's support and trust. The LUMC offers its own care professionals structural support of this kind in the form of Peer Support. A just culture entails that each employee is open-minded and welcomes assessment. Disaster-related research is undertaken in the same spirit, by our own professionals trained in the Just Culture and Safety 2.0 concepts. This should make the care we provide at the LUMC even safer.

### 3.1.4 Medical technology: Data Science, robotics and e-health

From robotics to e-health, medical technology offers new opportunities for healthcare innovation. Data plays an ever-increasing role in healthcare. Advances in technology are making large quantities of care-related data ('Big Data') available at the LUMC and in our network of care providers. Sound and reliable record-keeping is necessary before action can be taken based on such data. When care data is exchanged and stored correctly, blockchain technology can satisfy safety and privacy requirements. It is important for care providers to meet these requirements by making responsible use of data in their communication with one another and with patients. Blockchain is a distributed database that stores data in blocks, protecting files against manipulation and falsification. Another important factor is that proper care data storage and processing will reduce possible errors and costs. Ultimately, our aim is to use care data to improve the quality of diagnostics and the treatment we offer our patients. The LUMC data warehouse contains data from all over Europe. We aspire to play a prominent role internationally and become the leading care data centre of expertise in the Netherlands. One important factor in this effort is our independence, as we run the data warehouse ourselves.





## Surgical innovations: minimally invasive and image-guided surgery

In cancer treatment, surgical removal of a tumour often offers the best chances for a full recovery. The LUMC is working on surgical innovations that will optimise patients' chance of survival.

The surgeons and employees in our Clinical Pharmacy and Toxicology department are closely involved in developing luminescent materials, known as markers, which selectively bind to a tumour. A special camera enables a surgeon to see precisely where the border is between cancer and healthy tissue. A luminescent marker can also be used to colour body parts, e.g. urinary tracts,

which should not be removed. This innovative approach is being developed in cooperation with the CHDR, which has experience in administering new substances to volunteers and patients. Our Pathology department examines whether the marker properly colours the tumour and assesses the quality of the surgical removal.

It is our ambition to continue developing image-guided surgery for key-hole and robotic surgery. Eventually, this approach should become the new standard in cancer surgery.

The LUMC develops ground-breaking technology, and we are also in the vanguard in applying technology with proven added value in patient care. Technological innovations have a greater chance of succeeding when they can be applied straight away in the clinic, as the example of minimally invasive surgery demonstrates. Technology changes healthcare: it alters the roles of team members and the interaction between doctors and patients. This is why the LUMC has joined forces with Delft University of Technology and Erasmus MC in setting up a Clinical Technology Programme. The programme serves to educate a new generation of clinical technicians in the use of medical technology in clinical practice. It is our aim that every student at the LUMC learns about medical data and health analytics at an early stage. Technology also offers patients new opportunities for active participation in their own care. Patients and care professionals will have more frequent status updates, facilitating customised support. Nurses and paramedics join us in thinking about care innovation. Improving patient logistics and process innovation will ensure greater efficiency in the operating theatre, in Intensive Care and onwards. The LUMC continues to search for opportunities to work with companies on developing technological innovations and testing them in practice. We enter into public-private partnerships where the focus is always on the interests of, and added value for, patients and healthy people. The LUMC plays a ground-breaking role in connecting more data within its region for the benefit of our patients and our research.

The umbrella term 'e-health' encompasses important developments that can improve healthcare and make it more accessible. It is partly about offering an effective alternative in communication and administrative procedures, for example writing out prescriptions, making appointments and passing on laboratory results. Moreover, e-health offers unique new options for (secondary) prevention by furnishing information and personalised care to specific groups of patients and healthy people. E-health perfectly complements our wish to offer care close to patients' homes and to do everything possible to meet the demands of individual patients and their family. Our work on developing digital consultations is also in keeping with this process. In future, a significant number of physical appointments will be replaced by digital appointments. At the moment, there is little research evidence underpinning the use of new e-health applications. The LUMC is an acknowledged specialist in this area in the Netherlands. We have the methodological know-how and resources to go from implementation to validation within six months and to subsequently market evidence-based e-health applications with added value. This process has already resulted in various successes in evaluating apps for patients with chronic disorders such as diabetes, cardiovascular disease, COPD (Chronic Obstructive Lung Disease) and kidney disease.





### 3.2 Research

The LUMC is firmly positioned in the international field of medical research. Our basic research results in new discoveries. It is ground-breaking and vital to the development of future innovations. Without ground-breaking research, there would be no breakthroughs in knowledge. We nurture our particularly solid foundation of pioneering research and conduct translational and clinical research to develop innovations and improve healthcare – known as the ‘from bench to bedside’ principle. Our ambition is to understand diseases and their origins so that we can improve healthcare in cooperation with patients and society. Our efforts are closely aligned with the Dutch National Research Agenda and, therefore, with questions raised by society. We are a clear presence in various European research consortia. We intend to boost our position visibly over the next few years, at the same time actively involving our strategic international LERU (League of European Research Universities) partners. We can only do this by continuing to invest in state-of-the-art facilities, so that we can attract and retain top talents. An open and reliable research culture and knowledge valorisation are indispensable if we are to achieve our objectives.

#### 3.2.1 State-of-the-art infrastructure for researchers

A future-proof infrastructure is essential for research and innovation, for example the development of personalised medicine. Our technological profile is in keeping with our international ambitions and helps us attract talented researchers who want to push the boundaries using the latest facilities. Our research is supported by three types of infrastructure:

- technological focus areas (TFAs)
- methodological and research IT infrastructure
- clinical research infrastructure.

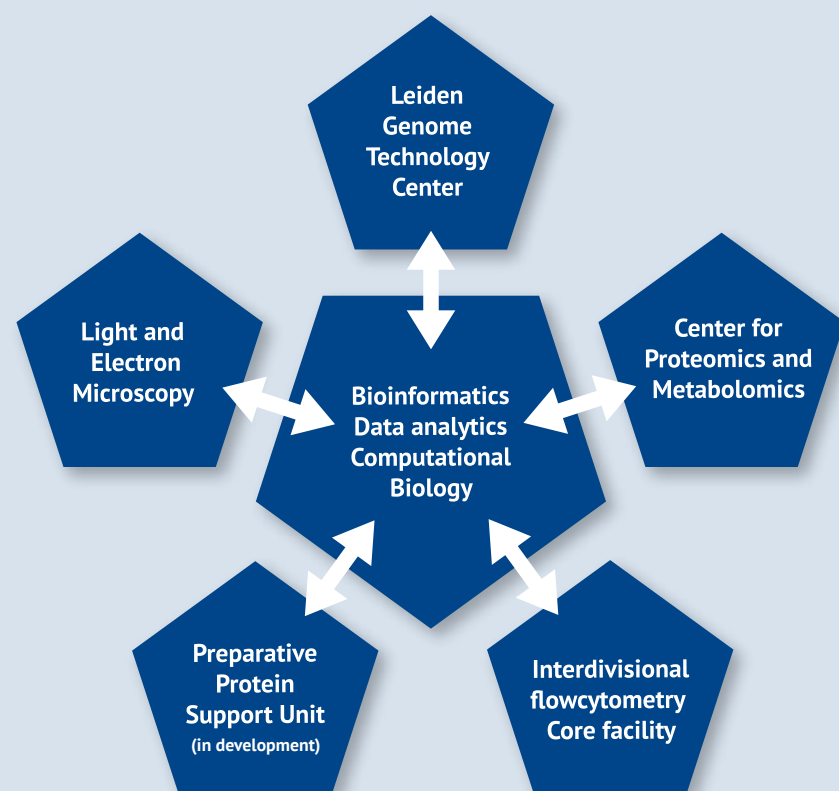
The LUMC’s TFAs cluster R&D facilities, equipment and knowledge, carry out excellent research and develop methods or technologies for their designated fields. They further offer technological services and support to LUMC research groups and their partners. Methodology and IT form the backbone of contemporary research and that is why we reappraise our infrastructure in this area continuously. The same goes for our clinical research infrastructure, both at the LUMC itself and elsewhere, within the context of multi-centre studies.

Our research infrastructure is one to be proud of. The Leiden Genome Technology Center and our Center for Proteomics and Metabolomics provide researchers with the instruments they need to study the fundamentals of disease and health. Our flow cytometry core facility, the largest in the Netherlands, gives our researchers a head start in identifying and specifying cells whose roles in disease processes are as yet unknown. By studying these cells at microlevel, we are able to identify disease mechanisms or measure the effects of various forms of treatment. In the field of imaging, we have access to state-of-the-art

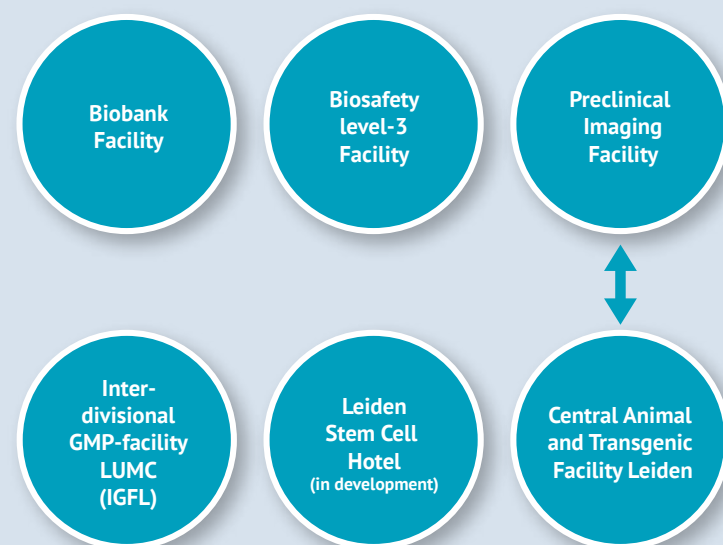


## State-of-the-art infrastructure for research

TFAs:



Facilities:



technology for visualising proteins and molecules in the minutest of detail, for example in cooperation with NeCEN at Leiden University. Our 7Tesla and MRIs often play a vital role in prestigious international research. In the near future, researchers within and outside the LUMC will be able to use our Leiden Stem Cell Facility for the GMP production of cell products for clinical application. Bioinformatics and data processing help to generate new knowledge and form the basis for personalised medicine and personalised prevention.

### 3.2.2 Coaching and support for researchers

Early recognition of talent helps us to conduct top-calibre research and procure external funding. The LUMC Graduate School is upgrading the coaching and training of our PhD candidates in accordance with professional standards. We will continue this process over the next few years in consultation with Leiden University. The LUMC Graduate School encourages young talents and is a rich source of talented PhD candidates. Committed professors give PhD candidates and young researchers personal coaching. We also actively scout for emerging and advanced research talents. The Research Directorate supports talented researchers who are applying for individual grants and in doing so promotes their careers. We intend to boost this support over the next few years to optimise researchers' career efforts, step by step. Obtaining European and international funding makes it possible to offer top talents customised support. International experience is an increasingly important factor in grant awards, and we therefore encourage our novice researchers and post-docs to gain such experience.

### 3.2.3 Quality of research and Open Science

While the quality of our research is apparent from traditional academic parameters such as articles published in renowned international journals (peer review), another important indicator is the degree to which our research contributes to patients' health and their quality of life. We want our research to lead to innovative treatment, new drugs or medical/biomedical breakthroughs. Whether our research efforts are sustainable depends in part on our long-term ability to recruit, resulting in some instances in relatively sizeable research groups. Our sustainability in research also depends on the degree to which our own (young) talents are given room to develop and excel. Coaching by reputable professors and clinicians plays an important role in this respect. The LUMC aims to consider such matters as succession and, therefore, continuity, in good time.

Research is publicly funded. The knowledge we accrue should therefore also be publicly available so that our publications and the underlying data contribute to new discoveries. This is why the LUMC acts in accordance with the principles of Open Access and Open Science. In 2020, Open Access will be the standard for publications within our sphere of influence. Open Science requires attentiveness to Data Stewardship, i.e. the proper management of research data according to the FAIR principles (Findable, Accessible, Interoperable & Reusable), which we intend implementing in our own departments. Other actions include the introduction of an electronic laboratory journal, the integration of



our existing research support desk, and the establishment of a central support desk for clinical research. The LUMC continues to invest in research IT under the headings ‘data’, ‘support’, ‘cooperation’ and ‘knowledge-sharing’ and makes grateful use of the expertise of our partners, including Delft University of Technology and the faculty of Mathematics and Natural Sciences at Leiden University.

The LUMC promotes an honest and reliable research culture. In accordance with the principles of Good Research Practice (GRP), we will include research monitoring and auditing in the LUMC quality system for both preclinical and clinical research. We want departments that carry out preclinical and clinical research to implement GRP.

### 3.2.4 Valorisation

When it comes to innovations in diagnostics, cell therapy, clinical technology, immunotherapy and autoimmunology or new drugs, valorisation is often the only route to broad application – but it is not an easy one. Clearly, the product must ultimately meet strict standards before it will be granted marketing authorisation. The LUMC supports the valorisation of promising innovations, often in public-private partnerships with existing companies or companies that have yet to be established. Product marketing requires a knowledge of corporate finance, rules and regulations, production and logistics. That is why it is crucial to join forces with the private sector.

Our Technology Transfer Office (TTO), LURIS, facilitates the legal aspects and business development of our intellectual property. Explicit and transparent rules describe the conditions under which employees may participate in the valorisation of ‘their’ innovation. We also invest in training our entrepreneurial medical and biomedical professionals in intellectual property law, socially responsible innovation, ethics and entrepreneurship. The ultimate objective of all these efforts is genuine healthcare innovation that promotes the quality and accessibility of future healthcare.

The LUMC increasingly cooperates with the Province of Zuid-Holland on regional knowledge-building and valorisation. One example is our successful cooperation with the Economic Board for Zuid-Holland (EBZ) and the Innovation Quarter (IQ). Together with the provincial authorities and the City of Leiden, we are investing in innovation in regenerative medicine.

Another example is IQ’s investment in Ncardia, a rapidly-growing stem cell technology company and an LUMC spin-off. Ncardia’s solutions enable pharmaceutical developers to test their medication on human heart cells and neurones at an early stage of development. Investments such as these accelerate international growth. Cooperating with public and semi-public partners is an essential part of the innovation process.





## Drug development: Leiden as a virtual pharmaceutical company

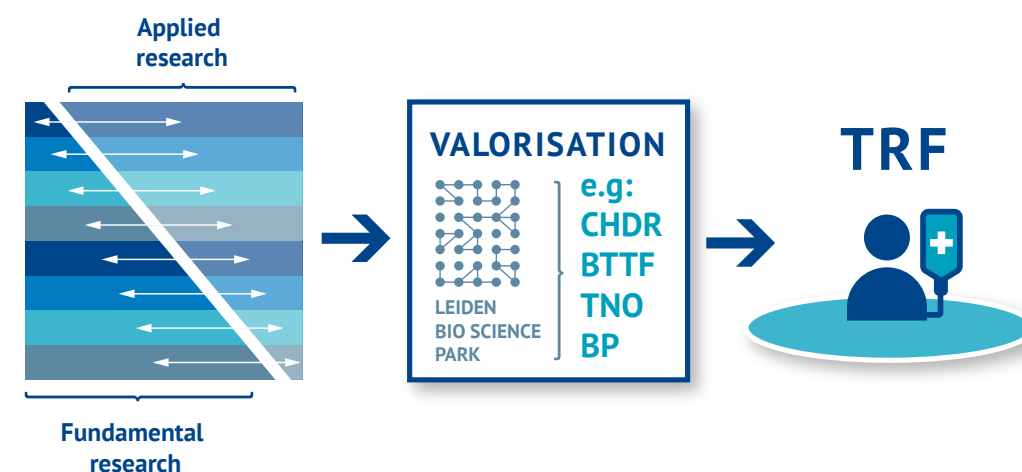
As a group, the LUMC, the Leiden Institute of Chemistry, LACDR, CHDR and LBSP have all the expertise and facilities needed to design, develop and test new innovative medicinal drugs. Together, we focus on products that are less interesting to the business sector because they are meant to treat rare diseases (small target group) or because the relevant patent has expired.

The LUMC is working on effective cancer drugs that have fewer adverse side effects. For instance, we are searching for an alternative to doxorubicin, a powerful drug that, unfortunately, also damages the heart. Research by NKI-AVL and the LUMC has revealed that doxorubicin works in two ways.

Follow-up research has shown that a similar product, known as aclarubicin, works in the least harmful of these two ways. Exploratory studies show that aclarubicin is safer and more effective than the current drugs. It is not available, however, so the Leiden partnership is manufacturing it. The LUMC wants to continue developing aclarubicin and use it clinically to treat leukaemia and other types of cancer. This is one example of a drug that the LUMC has taken through the entire process from bench-to-bedside.

In the future and together with its partners, the LUMC will continue to develop more drugs to fight cancer and other diseases.

The relocation of the European Medicines Agency (EMA) to the Netherlands is good for Leiden Bio Science Park and the LUMC. We see opportunities to liaise with the EMA and its visitors, e.g. through mutual knowledge-sharing. The short distance separating the EMA and the LUMC will allow our doctors and researchers to consult quickly when developing a new therapy, e.g. for a rare disease, making it easier to bridge the gap between research and clinical application. We expect that the arrival of the EMA will attract new companies and start-ups engaged in drug development to the Leiden area, and boost the LUMC's knowledge eco-system.



## Enquiry-based education: encouraging students to be enquiring

The LUMC's strategic vision of education centres on 'enquiry-based education'. Our teaching is nourished by research. Students learn to grasp complex problems by asking questions, reasoning and finding empirical evidence. This requires them to take an active approach to learning.

For medical students, this means that, when faced with a clinical problem, they search methodically for a diagnosis and the best treatment.

For instance, during their traineeship students learn to collect data as part of their academic training and use these skills later for analysis in their own research. In the bachelor electives,

research forms the basis for a deeper understanding of clinical matters. In the Biomedical Sciences, research and learning are almost synonymous. The *frontiers of science* courses are pressure cookers in which master's students go from concept or clinical question to final research project, step by step. Students are supported and encouraged to find traineeships which key into their ambition and talents.

Enquiring students realise that an enquiring attitude is a necessary skill in finding solutions to health-related issues.



## 3.3 Education

The LUMC trains students for tomorrow's world. Education at the LUMC is closely linked to patient care and research, ensuring that students see and hear about the latest advances in medical science and practice. The LUMC has extended its range of study programmes in recent years. It trains people to become doctors, researchers, clinical technicians, pharmacists, analysts, dieticians and nurses. We continue to provide professional training and continuing professional development for our alumni, employees and other professionals. Together with our partners from Leiden Regional Education and Training (OOR Leiden), we train junior doctors to become medical specialists, GPs, pharmacists or clinical researchers. The LUMC does this on the assumption that all professionals will carry on learning throughout their careers.

The LUMC focuses on students who wish to learn and achieve more. We train enquiring students who are interested in research to master skills that will allow them to develop and communicate ideas. We expect our students to be willing to invest in their own future. Once we have finished developing our range of master's programmes in the next few years, they will be perfectly aligned with society's most pressing issues. We will also reinforce connections between our various study programmes in the years ahead. The LUMC continues to innovate in education by focusing on quality and innovative educational concepts in blended learning.

### 3.3.1 Enquiry-based and interprofessional learning

The LUMC adheres to the strategic vision of Leiden University with regard to education. Central to that vision is enquiry-based learning (EBL): by actively helping to formulate research questions, assess results, and discuss and communicate outcomes, students learn (or teach themselves) a spirit of enquiry. Enquiry-based learning requires students to participate actively and to be inquisitive. Technological innovations encourage this process. The next step is to apply this approach in practice. Our students participate actively in research and patient care, both in the Netherlands and abroad, through our extensive exchange network. LUMC students are not just onlookers, but participants in everything that happens in research and patient care.

New trends and developments in healthcare and research mean greater complexity. Although care professionals are expected to specialise, they must also have the ability to look beyond the boundaries of their own fields when they work in multidisciplinary teams. In all our programmes, our students and professionals work on mastering the right skills, such as creative thinking and problem-solving, cooperation and communication. They also learn to appreciate the expertise and qualities of other disciplines, by learning and working together in interprofessional teams. Our students are in charge of their own learning process. They learn to be agile and to master skills that will enable them to find their way in new healthcare-related professions.





### Blended learning: innovative education for future doctors and researchers

By applying technological innovations in education, future doctors and researchers will be better prepared for their roles in the world of health and healthcare.

Technology has personalised studying and made it independent of time and place. In the multifaceted LUMC-MOOC on renal transplants, students learn about the important aspects of transplantation. A 3D film will soon give students a front-row seat in the operating theatre during a transplant. Online discussions between thousands of international MOOC users offer an instructive look at a differing views.

Microsoft Hololens® has taken centre stage in the teaching of anatomy. The spectacle-shaped Hololens gives students a three-dimensional view of human anatomy. They operate the hologram with all its anatomical details themselves. In the past, doctors in training found it difficult to apply book learning to patients. Today's students have fewer problems because they can see and experience anatomy first-hand.

Technological innovations that facilitate blended learning are changing education at the LUMC. Our students' experiences are helping us improve the quality of the education we provide while we prepare them for their future tasks at the same time.

#### 3.3.2 Interdisciplinary and international learning environment

Personal contact between students and between students and lecturers in an inspiring environment contributes enormously to successful knowledge transfer. We foster a community based on learning and enquiry in places designed for enquiry-based education. These are physical and virtual meeting places that allow students and lecturers to work together and share their knowledge. The LUMC allows for differences between students by considering individual learning needs, learning objectives and motivation in education and training as well as the interchangeability of medical and biomedical study programmes. We also build knowledge and launch new initiatives in education by combining various disciplines.

An international outlook is essential in research and also very important in contemporary patient care. At the LUMC, our highly skilled professionals should feel at home in an international environment that encompasses different cultures. They must have intercultural skills and a good command of written and spoken English. Both lecturers and students will receive support in improving their English language skills.

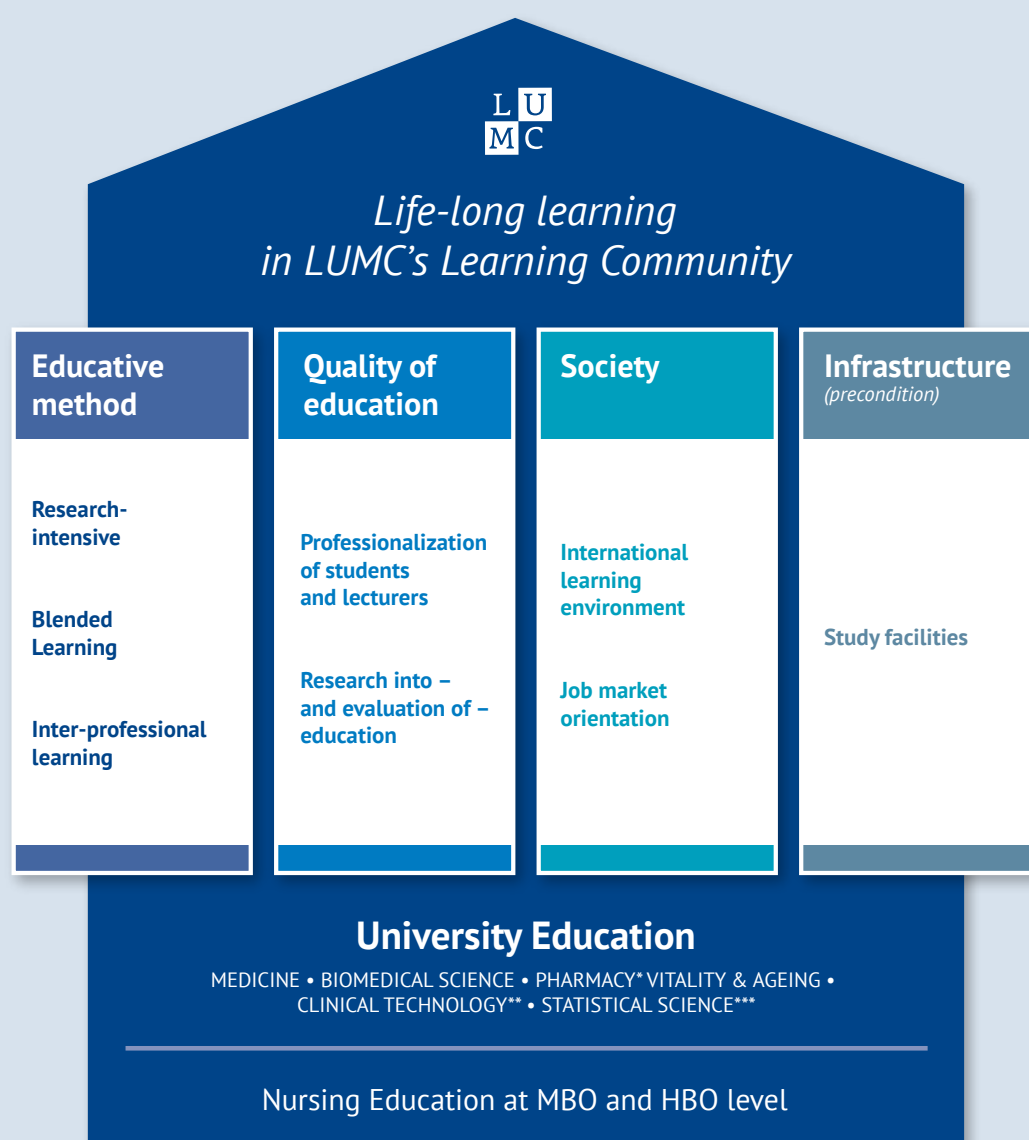
The LUMC also encourages Dutch students who wish to broaden their international outlook and students from other countries who wish to study at the LUMC. That is why, within Europe, we work closely with our partners in the LERU (League of European Research Universities) and EUROLIFE. Beyond Europe, we focus on Indonesia, Brazil, China and Japan, in conjunction with Leiden University. We ask the leading researchers and doctors on our teaching staff to encourage students to obtain international experience.

#### 3.3.3 Educational innovation and blended learning

The LUMC has opted to apply blended learning alongside inspiring face-to-face instruction. We make use of innovative digital learning methods, such as SPOCs (Small Private Online Courses), MOOCs (Massive Online Open Courses), flipping-the-classroom and 3D technology. Specific investments in digital teaching applications enable our educational organisation to provide efficient and effective instruction in line with the expectations of the current generation of students. It goes without saying that the quality of teaching comes first. Some of our proprietary digital products are now being used in places far beyond Leiden. Our MOOCs on kidney and pancreatic transplants and on anatomy are offered not only to our own Medicine and Biomedical Sciences students but also to partner universities and students from other countries. We intend to extend this range over the next few years.

Education must continue to innovate because what society expects from professionals is changing. What's more, technological innovation can make education more appealing. We can customise our teaching for individual students, allowing us to optimise the logistical process surrounding teaching and learning at the LUMC. We find it important to have

## Education at the LUMC



\* Together with the faculty of Mathematics and Natural Science, University of Leiden,

\*\* Together with TU Delft and the Erasmus MC,

\*\*\* Together with the faculty of Mathematics and Natural Science, Social Sciences, University of Leiden

state-of-the-art study facilities and to meet all the conditions necessary for students and their peers to make the most of themselves, with our students being involved in identifying those conditions. We also take an abiding interest in our lecturers' continuing professional development. Lecturers can only get the best out of students if they can get the best out of themselves as teaching professionals. Educational research is an essential part of the innovation process and quality improvement in education.

### 3.3.4 Connection with everyday practice

The education of future care professionals is undergoing far-reaching modernisation, in keeping with the new professional profiles. Study programmes that train students to become nurses or doctor's assistants increasingly combine theory and practice (work placements). Together with mboRijnland and Leiden University of Applied Sciences, we are working to upgrade nursing education on the basis of evidence-based practice (i.e. applied research). The LUMC supports the consolidation of nursing training in higher vocational education (HBO). Academically trained nurses are an important cornerstone for the development of the nursing care process. They will increasingly help to organise and innovate care processes in the region and the chain. Study programmes for nursing and medical support professions are being revised both at national and regional level. This reform will enable nurses and medical support professionals to comply with the requirements of further job differentiation and the changing demand for specialised care, so they can provide the care that patients want and need. The nursing programme increasingly helps to give shape to education and training in the changing care chain.

### 3.3.5 Education and advanced training

During the final year of their master's programme in Medicine, students have an opportunity to familiarise themselves with the specialisation they wish to pursue. This 'dedicated transition year' smooths the path between our basic medical degree programme and our advanced programmes for medical specialists. Students at the LUMC who participate in the dedicated transition year may enjoy an advantage when enrolling for the advanced programme of their choice. In the years ahead, we will continue refining the subject combinations for the dedicated transition year. These combinations allow students to explore a general area of medicine in a practical sense without having to select a specialisation or train to become a GP.

The Leiden Education and Training Region (OOR Leiden) is a compact region with a very diverse patient population. Ambitious educators are working together to become the most attractive educational region in the country, one that sets an international example of how to collaborate on training highly skilled, patient-centred professionals who are capable of reflecting. Over the next few years, we will be working towards a more integrated educational continuum, from basic training to 'lifelong learning'. Facilities available at regional level will provide the educational institutions with the necessary support in this respect.



## Training: 'control, role and region' at OOR Leiden

The advanced medical training courses at OOR Leiden are based on the premise of 'control, role and region'. A doctor who is training as a specialist (AIOS) has more control over his/her own training and grows into various roles. The region facilitates this learning process.

A trainee gynaecologist from the Groene Hart Hospital wants to focus on complex cancer care. One day a week she sees patients at the LUMC outpatient department. In addition, she organises multidisciplinary video-conferencing sessions to consult the various specialists involved, requiring her to organise IT support. Funding is another item

she must address. If her colleague at the LUMC wishes to gain more surgical experience, he checks the communal system to find out when the Haga Hospital has room for a trainee specialist on days when there are no gynaecological operations at the LUMC.

It is the ambition of our OOR region to facilitate flexible learning pathways for all specialisms. Trainee specialists have the challenge of growing into a range of complex roles that align with their development into medical specialists of the future.

LUMC's advanced medical training programmes and its quality assurance system are organised in accordance with the indicators of the KNMG Scherpbier 2.0 report. Specialists who receive their training in the Leiden Education and Training Region (OOR Leiden) combine broad cooperative skills with in-depth professional competences. Cross-disciplinary training will focus more on working in teams, seeing patients as partners, patient safety and medical leadership. Trainee specialists will have greater control over their own training. We are in fact individualising the training process, which for trainee specialists entails a different, more flexible training programme than in the past. At the same time, the aim at the national level is to shorten the average length of such programmes. That means that the length of time trainee specialists spend at teaching hospitals will vary. A regional approach is being developed within the OOR Leiden to facilitate this flexibility.

LUMC Boerhaave Continuing Medical Education has carved out a name for itself in the Netherlands with regard to lifelong learning. Increasingly, international continuing education is being offered competitively online. The LUMC is therefore boosting its online visibility and, by offering more innovative courses and programmes, its market position. In doing so, the LUMC will seek to optimise the balance between online and on-campus education. The LUMC is focusing more and more on the international market, in keeping with internal trends regarding TRF, ERNs and research lines. Achieving this aim will require closer internal cooperation between the line departments and LUMC Boerhaave Continuing Medical Training.







## OBJECTIVES DEFINED IN CHAPTER 3

### Objectives defined in Chapter 3.1

- The LUMC wishes to achieve sustainable growth, mainly in academic (TRF) healthcare.
- The LUMC's guiding principle in patient care is VBHC.
- Healthcare professionals at the LUMC have access to optimal facilities enabling them to carry out their complex work at the highest level in an open and safe culture.
- The LUMC aims to offer patients the best possible quality of healthcare in a safe environment. This aim is supported by all employees in consultation with patients.
- The LUMC uses evidence-based Data Science and medical technology to significantly improve diagnostics, treatment and the quality of healthcare.

### Objectives defined in Chapter 3.2

- Open Access is the norm at the LUMC.
- Research at the LUMC is carried out according to the FAIR principle.
- Research quality and sustainability are guaranteed at the LUMC, both internally and in relation to the outside world.
- The LUMC distinguishes itself with a state-of-the art research infrastructure.
- Researchers at the LUMC receive optimal support in their research and in procuring funding.
- Researchers at the LUMC are highly conscious of their impact on society, public entrepreneurship and the potential for valorisation.

### Objectives defined in Chapter 3.3

- University training at the LUMC is based on the principle of enquiry-based education.
- At the LUMC, blended learning, implemented across every curriculum of university education, produces the best customised innovative education.
- The LUMC is a magnet for talent. It has a significant number of international students and encourages its own students to gain international experience.
- Lecturers at the LUMC receive customised training and support in their efforts to provide high-quality education (continuing professional development of lecturers).
- The study programmes in nursing and medical support professions are aligned with the new professional profiles.
- The revised curriculum and training capacity are such that a sufficient number of nurses can be trained at regional level.
- LUMC Boerhaave Continued Medical Training has a strong position in the domestic and international market in providing on-campus and online continuing medical training.
- A regional approach means that trainee doctors (AIOs) are offered a shorter, more individualised training path.



## 4 *Interaction between regional and international environment*

Cooperation is essential to achieving our objectives. We cooperate with others based on our strengths and when value can be added. Every day, LUMC professionals work with colleagues in the region, across numerous organisations in the Netherlands and around the world. Thanks to cooperation, we have already learned and achieved a great deal. These efforts will become even more important over the next few decades, specifically because we foresee the emergence of a single academic medical network. Cooperation also requires an effort on the part of our employees: personal commitment, mutual concern and trust, engagement and a willingness to take a step back on behalf of someone else at times. The LUMC will not only become more visible to the outside world in the next few years, but it will also bring the outside world to the LUMC – a necessary step if we are to achieve our ambitions. All cooperation benefits from mutual appreciation and good communication, whether it concerns general policy-making or, for instance, consulting about or with a patient. In that sense, every LUMC employee is an ambassador for our organisation.

The number of international contacts between individual researchers, doctors and professionals far outstrips the number of employees at the LUMC. This says something about our international outlook. We publish articles and draw up healthcare guidelines with colleagues from all over the world. We exchange best practices around the globe for the benefit of our patients. Foreign PhD candidates are keen to obtain their degrees here because they receive excellent coaching from top-calibre researchers and can make use of outstanding facilities. Lecturers from foreign partner universities teach classes in our minors. A growing proportion of our master's degree students come from abroad. Wherever international cooperation helps us achieve our ambitions, we encourage it. We actively seek contact with the outside world.





### Leiden University

We are proud of our connection with Leiden University, one of the most prestigious research universities in the world. In its core tasks of teaching and research, the LUMC helps to accomplish the aims of the university's institutional plan (2015-2020: Freedom to Excel). Joint research activities, PhD programmes and double appointments of professors with the faculties of Mathematics and Natural Sciences and Social Sciences are prime examples of inter-faculty collaboration. We also run the Pharmacy and Statistical Sciences degree programmes together. At the LUMC-Campus The Hague, we have partnered with the faculty of Governance & Global Affairs, specifically in the Administrative Science Institute. In The Hague, at Leiden University College The Hague, we also contribute to the international honours programme in Global Health and Public Health.

### City of Leiden

We have historical ties with the City of Leiden but our relationship looks to the future. Life Sciences & Health, for example, is an important theme for the local and regional economy and for the ongoing development of the LBSP. The LUMC cooperates with Leiden University and the university of applied sciences in the 'International Knowledge City' programme, including such themes as 'the city as a laboratory'. In 2022 Leiden will be the European City of Science, the Science Capital of Europe. The campus on and near the LUMC's premises is important. We are working with the municipality to improve access, facilities and accommodation for international employees, who also have the support of the Expat Centre. The LUMC has a responsibility to the community as Leiden's largest employer and as such it is keen to consult with the municipality. Our 'sustainable kilometres' initiative encourages LUMC employees to use 'green' transport for their commutes. We are there to serve the City of Leiden and its residents and to help them solve health issues in neighbourhoods and at schools.

### Leiden Bio Science Park

The LUMC is located in the middle of the Leiden Bio Science Park (LBSP), the site of various knowledge institutions and more than a hundred international biomedical companies, including many start-ups. The factor that connects them is innovation in Life Sciences & Health. A number of companies and start-ups in the LBSP are LUMC research spin-offs. Innovation and valorisation, alongside research and education, strengthen our ties with companies in the LBSP. We work with them in seeking new solutions that will get innovations on to the market as quickly and reliably as possible. We supply the innovation pipeline with ideas and prepare skilled researchers for a future in one of the LBSP companies. We work with partners experienced in market development to reinforce the LBSP's innovation landscape.





## Cooperation in the region: LUMC-Campus The Hague

At LUMC-Campus The Hague, our Population Health outreach priority is being implemented in a city with more than half a million residents with urban health-related problems. Our main target groups are young people, the elderly, ethnic groups and people with unexplained physical complaints.

The LUMC supports the Haagse Vaten project, managed by Haga Hospital, in which GPs and medical specialists from The Hague cooperate on combating cardiovascular diseases. The LUMC is working on the practical use of risk scores, which should reduce pressure on A&E departments at hospitals in The Hague.

Together with the Trauma surgery and Geriatrics departments of two hospitals in The Hague, the LUMC is helping to prevent hip fractures among the elderly and improve rehabilitation for those who nevertheless suffer a broken hip.

It is the ambition of LUMC-Campus The Hague to become a unique School of Population Health: sound methodology with a clear focus on the aforementioned target groups and with a specific interest in oncology, cardiovascular diseases and psychological problems.

## LUMC-Campus The Hague

LUMC-Campus The Hague is a partnership between The Hague's Haga Hospital and the HMC, Leiden University, GGD Haaglanden, the City of The Hague and the LUMC. In Wijnhaven, we have a team working on urban health issues in The Hague. LUMC-Campus The Hague will soon be offering fully-fledged master's programmes, e.g. in Population Health Management. In consultation with our partners, we will extend our research activities to include other domains, based on the challenges and agendas of the City of The Hague in health matters.

## Haaglanden Medical Center (HMC)

The LUMC has worked closely with the HMC for many years in such fields as oncology, cardiology, neurosurgery and traumatology. Closer cooperation between the LUMC and HMC will give patients even better access to academic healthcare in the third-largest city of the Netherlands and ensure that the highest level of trauma care (level 1) is sustainable in the Leiden-The Hague urban region. This will also allow more patients to contribute to research at the LUMC. Closer cooperation can result in various advantages for patients in our region in other ways as well; the LUMC and HMC will work together to explore the substance of such cooperation and the form it should take.

## Regional acute care (ROAZ)

The LUMC cooperates closely with other hospitals in the region. In terms of regional acute care (ROAZ), it cooperates with the municipal health services (GGDs), the Haaglanden and Hollands-Midden regional ambulance services, and with GP emergency surgeries in the Leiden, Alphen, Gouda, Delft and The Hague region. The regional acute care network is becoming increasingly important in providing acute care for vulnerable elderly persons and people suffering mental confusion, and in regional cooperation regarding antibiotic resistance (ABR), in which nursing homes also play an important role. The challenge is to avoid fragmentation by reaching agreement on acute care with all the partners in the chain.

## Medical Delta

Medical Delta, the partnership between Leiden University, Delft University of Technology, Erasmus University, Erasmus Medical Center and the LUMC, seeks to become the most important innovation region for human health. It will operate in accordance with the Dutch National Research Agenda and the NFU's 'Sustainable Health' research agenda. Combining technological and medical expertise can accelerate the practical application of medical innovations. One example is the joint development of the Holland Proton Therapy Center (Holland PTC), which treats patients suffering from a complex type of cancer.



## Cooperation in the region: neurosurgery

The Neurosurgical Cooperative of Holland (NcCH) ensures that every patient, from Gouda and Delft to Haarlem, receives optimal care in the right place. Neurosurgeons regularly make guest appearances in one another's operating theatres for specific operations.

All brain tumours are treated at the HMC, and the LUMC carries out extremely complex key-hole cranial base surgery, e.g. to remove pituitary gland tumours. Neurosurgeons at Haga Hospital join neurologists from the LUMC to treat Parkinson's patients with Deep Brain Stimulation. The HMC

and the LUMC have a single team to carry out emergency surgery for high-risk brain and spinal column disorders. Joint Leiden-The Hague clinical research provides much more clarity about which patients should undergo surgery in the treatment of spinal disc hernias. Operations are preferably carried out in a non-academic hospital.

The LUMC, HMC and Haga Hospital are aiming to form a single neurosurgical centre. Their ambition is to rank as one of the top European centres in terms of care, clinical research and education.

## Erasmus Medical Center (Erasmus MC)

An organic form of cooperation has evolved between the LUMC and Erasmus MC in recent years. Examples include the joint appointment of a single department head of Paediatric Medicine and such partnerships as Genomescan, Medical Delta and Holland PTC. Over the next few months, the LUMC and Erasmus MC will reach agreements on specific forms of academic cooperation in a select number of TRF fields, such as organ transplants.

## Delft University of Technology

Delft University of Technology is the LUMC's most important partner for technology, innovation and medical advances. A coordinator will be examining the possibility of a joint research agenda and other activities over the next few years, for example whether we can work together on optimising the use of robotics to improve patient healthcare. Radiology, Radiotherapy, Orthopaedics, Gynaecology and other departments already have successful partnerships with Delft, and the LUMC and Delft University of Technology are partners in the Institute for human organ and Disease Model Technologies (hDMT), a consortium in the field of regenerative medicine. The LUMC, Delft University of Technology and Erasmus MC jointly run the bachelor's degree programme in Clinical Technology and the master's degree programme in Technical Medicine.

## The Netherlands Cancer Institute–Antoni van Leeuwenhoek Hospital (NKI-AVL)

With oncology as one of our priorities, the LUMC wishes to reinforce its research and patient care in this field and is therefore intensifying its cooperation with the NKI-AVL. The research activities of the two institutions are complementary, offering ideal opportunities for synergy. Cooperation has become sustainable in nature, with double appointments for researchers in such fields as radiotherapy and radiotherapy imaging, translational immunotherapy and immunotechnology, for example in the departments of Radiotherapy, Pathology, Medical Oncology, Immunohaematology and Blood Transfusion.

## Patients' organisations

In addition to individual patients, patients' organisations are becoming increasingly important partners for the LUMC. By listening to patients' organisations and taking decisions together with patients, we are better able to gear our patient care and research to the issues that affect patients and their family and discover whether our innovations are wanted and relevant. We also have other ways of incorporating patients' advice into our organisation, for instance through our clients' council and through direct contact between patients and care providers. Patients and their organisations play a crucial role in assessing research funding and as partners in European alliances, e.g. in relation to rare diseases.





#### Netherlands Federation of University Medical Centres (NFU)

The NFU represents the eight UMCs in the Netherlands and acts as a coordinating body and lobbyist. In recent years, UMCs have worked with and through the NFU to improve the quality and safety of patient care, to guarantee the sustainability of healthcare, and to encourage innovation by means of academic research. The UMCs also coordinate tertiary referral care with one another. Through our membership of the NFU, we can turn to our fellow UMCs as interlocutors and sounding boards.

#### International partners: League of European Research Universities (LERU) and EUROLIFE

As an institution, the LUMC is committed to its membership of the international LERU and EUROLIFE alliances, which offer our researchers and students opportunities. LERU is an alliance between the twenty-three most prominent research universities in Europe. Through LERU, we are in a better position to join international consortia and take part in European tenders. It is easier for us to arrange foreign traineeships for our students and we can rest assured that the training provided will be of the very best quality. The LUMC is one of the initiators of EUROLIFE, a partnership of nine prominent European Life Sciences & Health knowledge institutions. Beyond Europe, we focus on China, Japan, Indonesia and Brazil, in consultation with Leiden University. We are seeking closer cooperation with the most prominent institutes in these countries. LUMC's research groups and researchers are naturally also active in numerous other international partnerships and countries. This should stay as it is, but as an institution we will focus mainly on our target partners and countries.

## OBJECTIVES DEFINED IN CHAPTER 4

- The LUMC is demonstrably helping to increase regional health awareness.
- The LUMC is working with the faculties of Mathematics and Natural Sciences, Social Sciences and Governance & Global Affairs of Leiden University to develop a solid joint research and education agenda.
- The LUMC works with the LBSP on all ten ##subject areas.
- There are close links between the research agendas of Leiden University, the Cities of Leiden and The Hague, LUMC-Campus The Hague, the Province of Zuid-Holland and the LUMC.
- The foresight study undertaken with HMC has shown how the two organisations can cooperate more closely on substance in the longer term and what form that cooperation should take.
- The LUMC is building a sustainable academic relationship with Erasmus MC in specified areas.
- The LUMC is developing a sustainable relationship with the NKI-AVL in oncological research in mutually complementary areas.





## 5 Cooperation in a flexible organisation

We need the input of every single employee to achieve our ambitions. The LUMC is a friendly and welcoming organisation that views patients, their families, students and employees first and foremost as people, and where warm, compassionate and committed professionals work together to attain the very highest standards of care, research and teaching and are proud of their achievements. That is our idea of hospitality. As an employer, the LUMC offers both individuals and teams opportunities to improve. To do this, we need a top-calibre, flexible organisation, because our environment increasingly requires us to make rapid transitions. Our aim is to do so in an organisation known for its quality and efficiency. The quality we deliver must never be open to debate. This applies equally to our core tasks and the support for those core tasks within our organisation.

### 5.1 Culture and leadership

The LUMC has an impact on the lives of people and on society. All our employees seek to make a positive contribution based on their individual areas of expertise. This works best within a safe and motivating organisational culture, a high-trust culture. The factors that determine the LUMC's culture are our core values: personal, connecting and enquiring. All our employees make a personal contribution to the whole: by welcoming assessment, by having an open and cooperative attitude, and by initiating improvements. Our organisation is people-centred, encourages mutual trust and gives everyone the opportunity to improve their individual performance, adding value to every employee. Our new core values are meant to enhance and incentivize our organisational culture.

To achieve our strategic ambitions in a rapidly changing environment, we also need a flexible, high-value organisation that is not afraid to take risks. We must be able to respond effectively when opportunities arise in our own environment or as a result of developments worldwide. Every single employee makes a personal contribution by undertaking initiatives and being open to new opportunities. At organisational level, our scope for action is determined by cooperation between our departments, divisions and directorates, by our open attitude, and by our common interests. At management level, we will improve internal coordination and try to expedite joint decision-making on inter-divisional matters. To boost our capacity for change, we will introduce a new approach for inter-departmental projects that clearly identifies the task, timeline, necessary facilities and a project coordinator who has enough time to complete the project successfully.





Our LUMC-wide leadership programme supports managers in their tasks and in accomplishing agreed objectives while allowing them to develop their talents at the same time. We have also developed a programme teaching operational managers and professors a wide range of management styles, so they can respond effectively in a variety of situations. The purpose of these programmes is to create a positive organisational climate that encourages team members to do their very best. This will increase the effectiveness of individual employees and the scope of action of the organisation as a whole.

In its role as employer, the LUMC adheres to Leiden University's inclusiveness policy. This entails equal opportunities for all those who aim to help the LUMC achieve its ambitions, irrespective of gender, cultural background, sexual orientation or physical constraints. In cooperation with Employee Insurance Agency UWV and re-integration agency DZB Leiden, we have developed a successful participation helpdesk offering people who are disadvantaged in the labour market job opportunities at the LUMC – a role model for other initiatives.

## 5.2 Strategic talent management

The LUMC is very ambitious as an organisation. As a result, we need talented people. Even more than in the past, our organisation must focus on encouraging and retaining talented employees and on recruiting talented people from outside. Strategic talent management is the responsibility of every department, together with the divisions and the board. It starts with talent scouting, both internally and externally, and then making sure that people end up in the right job, followed by firm agreements about their career aspirations. In key positions, this means a well-defined tenure track policy, including a strategy for promotion, outflow and succession.

To grow and develop, talent requires space and a sense of personal responsibility, in keeping with our organisation's objectives. Talent development calls for a joint effort on the part of the employee and his/her supervisor. The employee has to be prepared to accept responsibility for his/her own development, while the supervisor must take an interest in the employee's potential and be prepared to invest in him/her. The LUMC intends to increase internal job mobility in the next few years. By changing jobs within the organisation, employees will be given more opportunities to develop their talents and thus remain with the organisation. Occasionally – where possible – this will mean moving to a new location. To accomplish our organisation's objectives, employees must be deployed in places where their talents and skills can be utilised to best advantage.



## Sustainability 2030: climate-neutral and more circular

The LUMC attaches enormous value to corporate social responsibility and sustainability. We aim to minimise our carbon footprint by saving energy and reviewing mobility. We also wish to contribute to a circular economy in which all waste becomes raw material for new products. Our interest in the circular economy starts with our purchasing policy. The LUMC purchases regional and sustainable food products where possible, prioritises sustainability when purchasing uniforms and bath linen, and only serves coffee and cocoa that has been produced in a socially responsible way. We also emphasise green procurement when purchasing other items.

### Waste

A hospital that employs thousands of people produces a huge amount of waste. There is plenty of room for improvement. The LUMC wants to reduce the amount of waste it produces by a significant margin and recycle at least half. We have issued a European tender encompassing these ambitious environmental objectives. The waste management company that is ultimately selected will help us to think of ways to reduce the amount of waste we produce ('waste prevention') and determine the best system for waste separation at source. When it comes to innovative waste processing, the LUMC is already in the vanguard; for example, we have a composting machine that converts up to 500 litres of kitchen and restaurant waste into usable compost every day.

### Energy

The LUMC is committed to achieving further energy savings over the next few years. Improved efficiency can easily set off the expected growth in energy consumption. LUMC employees can also contribute to sustainability, and reduce the organisation's carbon footprint, by cycling to work instead of taking the car. The LUMC has initiated the 'Sustainable kilometres' project in Greater Leiden.

After attaining a bronze Environmental Thermometer certification from the Healthcare Sector Environmental Platform, the LUMC aims to earn a silver certification in the next few years.



The LUMC is and wishes to remain an attractive employer for all its employees. All our employees will be given the opportunity to extend or fine-tune their skills, either in their own profession or in a new area. We will improve these opportunities over the next few years, e.g. by promoting internal mobility between departments and divisions. It is important to allow for employees' personal choices and private lives, to encourage them to be flexible, and to support them in their careers. Sustainability also means investing in our employees so that they can make a long-term contribution to our organisation.

### 5.3 Smart working

Processes and procedures are there to help our employees do their work as well as possible, but that is not always how it turns out in practice. We have a long-cherished desire to 'get the basics right': to eliminate superfluous procedures, simplify complex processes as far as possible and automate recurring procedures. We want more efficient meetings that result in more effective decision-making, in short: smart working. Smart working is not an objective set in stone, because work processes in and around the LUMC change continually, e.g. due to technological advances. Smart working requires unwavering awareness and cooperation on the part of line management and directorates. The Executive Board, division managers and directors will work together to establish which LUMC-wide organisational processes are in need of improvement. Together they will identify the aims, targets and priorities. We will then launch our multi-year programme 'Getting the Basics Right' and move forward steadily, one step at a time. We will be strict – or stricter – about monitoring the results, including making activities quantifiable. When targets change, we will discontinue projects in consultation with the Executive Board. This, too, is part and parcel of a flexible organisation. We will subject each project to critical examination and determine whether it is actually generating the desired level of added value. A flexible organisation also means boosting our capacity for mutual learning. When in-house pilots produce successful approaches, they will be shared without delay and can subsequently set the new standard within the LUMC and our academic medical network.

Efficiency is becoming a permanent factor in the work ethic of LUMC employees, a trend supported by the LEAN methodology. To the LUMC, efficiency means offering value-driven innovative care at an optimised cost within our own organisation and in our academic medical network. By optimising the flow of patients and innovating our logistical processes, we will support our employees in their work and help them use resources effectively and efficiently. The LEAN methodology has become an integral part of our daily patient care routine in recent years. This broadly supported method has already resulted in many measurable changes and improvements in quality and value, for instance in the Emergency Admissions department and in patient logistics. We are using our experience with LEAN to develop the Qmentum quality system, in business operations and VBHC.





#### 5.4 Renewal and investment

Every employee at the LUMC contributes to innovation, either by putting forward their own ideas or by noticing improvements elsewhere that could drive the LUMC's own innovative capacity. For instance, directorate employees are in close contact with colleagues at other UMCs, hospitals, enterprises and firms of consultants. They keep a close eye on developments in their profession and introduce innovations themselves. Directorates increasingly work together pro-actively. Any new investment in technology must be cost-effective and result in measurably better processes. In each instance of innovation, the LUMC considers whether it wants to play a leading role or be a 'fast follower'.

LUMC-wide topics such as big data, e-health, business intelligence and cloud solutions require a great deal of relevant expertise. We will work to embed this expertise in our line and staff organisation, investing in new skills and new people. We also require ongoing investment in IT, research facilities and accommodation, with efficiency gains in primary and support processes as the return on such investment.

Campuses lead to communities. The LUMC's strategic property plan has been incorporated into our long-term accommodation plan (LTHP) and will allow us to build a campus in and around the LUMC buildings. The guiding principle underpinning our strategic property plan is to facilitate the integration of research, patient care and teaching. With resources and space at a premium, smart choices are essential. We choose to concentrate tasks at the present LUMC locations and the Leiden Bio Science Park. We remain committed to flexibility, efficiency and sustainability. Our primary processes will be concentrated as much as possible in Building 1. The LUMC has prioritised the improvement of our educational facilities. Capital-intensive infrastructure (laboratories, facilities and equipment) will be concentrated and shared as much as possible. Functional ownership is the guiding principle here: users are involved in taking decisions. Flexible working concepts are applied as much as possible, based on the requirement that information must be available on demand.





## OBJECTIVES DEFINED IN CHAPTER 5

- The LUMC offers attractive and sustainable employment. We recognise and nourish existing talent, offering lifelong learning at all levels. We are successful at attracting and retaining new talents.
- The LUMC is a welcoming organisation that takes a personal approach and is committed to a sustainable and healthy environment.
- The LUMC is a flexible and learning organisation because it connects employees and allows them to work together.
- Cross-connections at the LUMC support inter-divisional results.
- The LUMC's proactive IT infrastructure allows us to optimise performance in all our core tasks.
- The LUMC's buildings and environs have been future-proofed to optimise performance in all our core tasks and to enhance job and learning satisfaction.
- The LUMC works efficiently to remain financially healthy and create scope for investment.




## CONCLUDING REMARKS

The next few years will be of vital importance for the long-term health of people and for the healthcare system. We are facing the enormous challenge of keeping healthcare accessible and affordable. Pressure on healthcare is increasing in our own region as well, and discrepancies in health and life expectancy between different population groups are likely to increase. The LUMC wishes to play a significant role in the foregoing. We want to make a difference for people.

We realise that, more than ever, it is our task to make the most of the public funds allocated to us. We feel that the best way to do this is by focusing on society's priorities and by working together, internally and with others, on innovation that generates added value for society, based on the solid foundations of our chosen innovation themes. We do this for our patients, for the care professionals and researchers that we train, and for the health of the present and future generations.

This strategy plan states our choices; at the same time, it provides a framework for choices that have yet to be made. Together we will dedicate ourselves to our work in the coming years. We will succeed in achieving our ambitions by cooperating with all our colleagues. With confidence in our employees and in our organisation, we can promise that the LUMC will bring about translating innovations: from science to health.

### *Translating Innovations: from science to health*



We want translating innovations: from science to health for patients here and elsewhere in the world. Top researchers in our Radiology department are working on the revolutionary idea of replacing the complex circuits of MRI scanners with plasma: charged gas, the same as in fluorescent tube lighting. The result should be a better-quality screen at relatively low cost, improving the scans produced with mobile scanners in less prosperous countries. This is how we put social outreach into practice.

## Abbreviations

AIOS	Trainee specialists
CHDR	Center for Human Drug Research
ERNs	European Reference Networks
Eurolife	Network of European universities in life sciences
FWN	Faculty of Mathematics and Natural Sciences
FSW	Faculty of Social Sciences
GGD	Municipal Health Services
GMP	Good Manufacturing Practice
GRP	Good Research Practice
hDMT	Institute for human organ and Disease Model Technologies
HMC	Haaglanden Medical Center
LACDR	Leiden Academic Center for Drug Research
LBSP	Leiden Bio Science Park
LERU	League of European Research Universities
MOOCs	Massive Online Open Course
NFU	Netherlands Federation of University Medical Centres
NKI-AVL	Netherlands Cancer Institute - Antoni van Leeuwenhoek
OOR	Regional Partnership on Training and Education
TFAs	Technological Focus Areas
TRF	Tertiary Referral Care
TTO	Technology Transfer Office
UMC	University Medical Center
VBHC	Value-Based Healthcare
WHO	World Health Organization

For more information on the LUMC's 2018-2023 strategy, see [strategie.lumc.nl](https://strategie.lumc.nl).

For literature consulted, scan this QR code.

### Colophon

Text	Pieter van Megchelen	Leiden University Medical Center Albinusdreef 2
Design	Engelen & de Vrind	P.O. Box 9600
Photography	John Bakker Fotografie	2300 RC Leiden
Printing	Duocore	<a href="https://www.lumc.nl">www.lumc.nl</a>
Print run	5.000	

© LUMC 2018

## Literature consulted

- Barker, Richard (2010), 2030 - The Future of Medicine, Avoiding a Medical Meltdown
- Campus NL 'Investeren in de toekomst', VNSU Dec. 2016
- Dijck, José van and Wim van Saarloos (2017), The Dutch Polder Model in Science and Research
- Dutch Association of Medical Specialists (2017), Vision document: Medical Specialist 2025 – Ambition, trust, cooperation
- Health Council of the Netherlands (2016), Research that makes you better. A new orientation for UMC research
- IESE and Accenture (2016), Hospital of the Future – A new role for leading hospitals in Europe
- KNMG (2015) 'Stimulans voor interne kwaliteitsverbetering van de geneeskundige vervolgoopleidingen (Scherpbier 2.0)'
- National Plan Open Science (2017)
- Dutch National Research Agenda (2015)
- NFU (2014), Positioning Memo on UMCs
- NFU (2016), 'Sustainable Health' Research Agenda
- NFU (2017), NFU-visie kwaliteit 2017-2020 'Meerwaarde voor patiënt'
- Ministry of Education, Culture and Science (2014), 2025 – Vision for Science, Choices for the future
- Porter, M.E. and E.O Teisberg (2006), 'Redefining Health Care: Creating Value-Based Competition on Results'
- Rathenau Instituut (2010), *Focus and Mass in Scientific Research: The Dutch Research Portfolio in an International Perspective*
- Top Sector Life Sciences & Health (2017), Knowledge and Innovation Agenda 2018-2021, Health and Care
- Delft University of Technology (Campus research team) (2016), Campus NL. Investing in the future
- Leiden University (2015), Institutional Plan 2015-2020: Freedom to Excel
- Dutch Association for Innovative Medicines (2017), Medicines Agenda 2017-2021 – Tailor-made treatment
- VSNU (2015), *Goedemorgen professor – visie op studeren in een nieuwe tijd*
- VSNU (2016), The Digital Society
- Ministry of Health, Welfare and Sport and National Institute for Public Health and the Environment (2017), *Trendscenario Volksgezondheid Toekomst Verkenning* (version late 2017)



**TRANSLATING  
INNOVATIONS  
> FROM SCIENCE  
TO HEALTH**