



CAPITAL INVESTMENT FOR HEALTH

Case studies from Europe

Bernd Rechel
Jonathan Erskine
Barrie Dowdeswell
Stephen Wright
Martin McKee

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The European Observatory on Health Systems and Policies supports and promotes evidence-based health policy-making through comprehensive and rigorous analysis of health systems in Europe. It brings together a wide range of policy-makers, academics and practitioners to analyse trends in health reform, drawing on experience from across Europe to illuminate policy issues.

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Contents

About the authors	vii
Foreword	xi
Acknowledgements	xiii
List of abbreviations	xv
List of tables, figures and boxes	xvii
Chapter 1 Introduction	1
<i>Barrie Dowdeswell, Bernd Rechel, Stephen Wright, Jonathan Erskine, Martin McKee</i>	
Chapter 2 The Alzira model: Hospital de la Ribera, Valencia, Spain	11
<i>Carlos Trescoli Serrano, Manuel Marin Ferrer, Alberto de Rosa Torner</i>	
Chapter 3 Coxa Hospital, Tampere, Finland	27
<i>Barrie Dowdeswell, Erkki Vauramo</i>	
Chapter 4 The John Paul II Hospital in Krakow, Poland, and the use of European Union grant funds	41
<i>Mieczysław Pasowicz, Agnieszka Latocha-Chaber, Marcin Kautsch, Karolina Durajczyk, Zyta Turek</i>	
Chapter 5 The New Karolinska Solna Hospital, Stockholm, Sweden	57
<i>Barrie Dowdeswell, Birgitta Thellman Beck, Erik Gjötterberg</i>	
Chapter 6 Martini Teaching Hospital, Groningen, Netherlands	75
<i>Jack GAM Thiadens, Rutger J Kriek, Gerrit H Afink, Arnold CM Burger, Nico J Oosterom</i>	
Chapter 7 Strategic planning of health facilities in Northern Ireland	89
<i>John Cole</i>	

vi Capital investment for health

Chapter 8 Orbis Medical Park, Sittard, Netherlands <i>Henny van Laarhoven, Jonathan Erskine</i>	111
Chapter 9 The Private Finance Initiative in the English health sector <i>Anneloes Blanken, Geert Dewulf, Mirjam Bult-Spiering</i>	123
Chapter 10 Rhön-Klinikum Group, Germany <i>Barrie Dowdeswell</i>	143
Chapter 11 St Olav's Hospital, Trondheim, Norway <i>Arve-Olav Solumsmo, Ragnhild Aslaksen</i>	159
Chapter 12 Strategic asset planning: An integrated regional health care system, Tuscany, Italy <i>Jonathan Erskine, Mario Romeri, Simona Agger, Dario Rosini</i>	173
Index	186

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Foreword

The European Observatory on Health Systems and Policies supports and promotes evidence-based health policy-making through comprehensive and rigorous analysis. Its collaborator in this two-part study (the European Health Property Network) is a network of government agencies dedicated to understanding and advising on the role of the estate in health care. My own organization – the Dutch Centre for Health Assets (part of TNO, the Dutch national research and development agency) – is a partner within the European Centre for Health Assets and Architecture, which has taken on the research functions of the European Health Property Network and shares responsibility for bringing this study to a conclusion.

When decision-makers in the European health sector are faced with issues of capital investment, there are few internationally-comparative information sources to which they can turn. This volume of case studies and the accompanying volume analysing key themes and issues (edited by Rechel, Wright, Edwards, Dowdeswell and McKee and published in 2009 as *Investing in hospitals of the future*) attempt to start filling this gap. Like siblings, the two books share similarities in gestation and upbringing – and yet they do look different. They both start from an awareness of the importance and complexity of the subject of appropriate investment in capital assets in health. This one does so by reviewing examples of evidence in action, whereas the other tries to tease out systematic and generalizable conclusions from both the case studies and other pieces of evidence.

While the work represented in this volume commenced several years ago, at the time of writing decision-makers are faced with an even more complex environment. The current economic crisis, certainly the worst since the Second World War, is making capital harder to obtain but it is simultaneously pressurizing health systems to do more with less whilst also fundamentally changing ways of operating. We cannot carry on as we used to; and, like the river in the Chinese aphorism, the hospital will certainly not be the same tomorrow. This volume

of case studies gives pointers for how to react, and in some cases how not to, in an economic situation which makes appropriate investment more, rather than less, important, even if judgement on it is more difficult.

Both the European Observatory and the European Health Property Network wish to bring real-world evidence into play, in this case in the realm of appropriate investment in health facilities – mostly, but not always, in “the hospital”. Case studies are one way of achieving this. The case studies are rather varied – seven individual projects, two health systems, one corporate investor and one financing approach. They cover nine separate countries across Europe. The case study approach is of course a subject in its own right. No matter what the field of study, there are never “average” cases – all somehow are actively selected as examples, if not exemplars. But case study analysis is certainly useful for the generation of knowledge, and there were indeed a number of surprises, if only of emphasis. These surprises – as well as the confirmation of the expected whenever it occurred – fed into the thematic book and could therefore be set into a broader context.

The main findings of this work are the critical nature of systematized care processes; the importance of the “people factor” (involvement of health professionals in decision-making, and the role of inspired leadership); the steadily-growing role of “marketization” in health care (including public–private partnerships); the tension behind deciding on the proper setting of care and the need to look at “whole-system” perspectives; and the unsolved question of measuring the true capacity of a hospital.

Churchill famously suggested “We shape our buildings, and forever afterwards our buildings shape us”. This book is offered to the reader in the hope that the shaping (from both sides) will ultimately be more successful.

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This book accompanies an in-depth analysis of key issues of health capital investment and planning, published separately as *Investing in hospitals of the future*. The project benefited from two workshops that were held in Brussels and London. We appreciate the contributions of those who participated in these workshops. In addition to the authors of this and the companion volume, these included Tit Albrecht, Juan Copovi-Mena, Enrico Davoli, Christiaan Decoster, Jani Dernic, Stephen Dunn, Josep Figueras, David Hastie, David Helms, Andras Javor, Lenka Medin, Asmund Myrborstad, Miklos Szocksa and Pontus Werlinder. We would also like to express our gratitude to Sue Gammerman and Caroline White for their help in organizing the workshops.

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The book reflects data available in February 2009.

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List of abbreviations

ASL	Local Health Authority (Italy)
CEE	Central and eastern Europe
CEO	Chief executive officer
CISNS	Interterritorial Council of the National Health System (Spain)
CPI	Consumer price index
CT	Computed tomography
DAC	Development Assistance Committee
DBC	Diagnosis and Treatment Combination
DHSSPS	Department of Health, Social Services and Public Safety (Northern Ireland)
DRG	Diagnosis-related group
EAP	Primary Care Team (Spain)
ECHAA	European Centre for Health Assets and Architecture
EPF	Electronic Patient File
EPJ	Electronic Patient Journal
ERDF	European Regional Development Fund
ESTAV	Organizations for the technical/administrative services of Wide Areas
eTEN	Deploying Trans-European e-Services for All programme
EU	European Union
EU15	Member States belonging to the EU before May 2004
EuHPN	European Health Property Network
GDP	Gross domestic product
G-DRG	German diagnosis-related group
GNP	Gross national product
GP	General practitioner
HIV	Human immunodeficiency virus
ICATS	Integrated Clinical Assessment and Treatment Services
ICT	Information and communication technology
IFD	Industrial, flexible and demountable (design)
IPPR	Institute for Public Policy Research (United Kingdom)
IROP	Integrated Regional Operational Programme
KI-SCC	Karolinska Institute - Stockholm county council
MBA	Master of Business Administration
MCC	Medical Care Continuity project
MRI	Magnetic resonance imaging

MRSA	Methicillin-resistant Staphylococcus aureus
MVZ	Medical Care Centres (Germany)
NAO	National Audit Office (United Kingdom)
NHS	National Health Service (United Kingdom), National Health System (Spain)
OECD	Organisation for Economic Co-operation and Development
PACS	Picture Archiving and Communications System
PbR	Payment by Results
PFI	Private Finance Initiative
PPP	Purchasing power parity
PSC	Public Sector Comparator
RIBA	Royal Institute of British Architects
RIS	Radiology Information System (Italy)
SPV	Special-Purpose Vehicle
SSN	National Health Service (Italy)
TQM	Total Quality Management
ULSS	Local Health and Social Unit (Italy)
UTE	Temporary Union of Companies (Spain)
VAT	Value-added tax
WAN	Wide area network
WHO	World Health Organization

List of tables, figures and boxes

Tables

Table 1.1	Case studies	4
Table 2.1	Annual capitation fee in Health Department 11, 2003–2008	18
Table 2.2	Hospital de la Ribera clinical performance, 2003–2007	23
Table 3.1	Key economic indicators, 2003–2007	36
Table 9.1	Financial consequences of design and service flexibility on the unitary charge	132
Table 9.2	Minor works in the first four years of the Norfolk and Norwich University Hospitals	136

Figures

Fig. 2.1	Spain's autonomous communities	12
Fig. 2.2	Alzira model capitation system	16
Fig. 2.3	Basic principles of the Alzira model	16
Fig. 3.1	The Tampere region (Pirkanmaa) in Finland	29
Fig. 4.1	Number of diagnostic services in John Paul II Hospital, 2002–2008	45
Fig. 4.2	Number of procedures and operations in John Paul II Hospital, 2002–2008	45
Fig. 4.3	Number of inpatients in John Paul II Hospital, 2002–2008	47
Fig. 4.4	Number of outpatient consultations in John Paul II Hospital, 2002–2008	48
Fig. 4.5	Proportion of the hospital's overall income from private health care, 2004–2008	49

Fig. 5.1	Location of the New Karolinska Solna	65
Fig. 5.2	Conceptual model of the New Karolinska Solna	66
Fig. 5.3	Anticipated patient flow chart for the New Karolinska Solna	67
Fig. 5.4	The scope of the private–public partnership	68
Fig. 5.5	Public–private partnership governance structure	68
Fig. 5.6	Main construction projects in the Norra station area	70
Fig. 6.1	Sketches of building “hop-scotch” on the Van Swieten site, Groningen	77
Fig. 6.2	Converting wards to different functions	80
Fig. 7.1	An integrated services model	98
Fig. 7.2	Location of Level 2 facilities (Community Health Centres)	102
Fig. 7.3	Location of Level 3 facilities (Local Hospitals)	103
Fig. 7.4	Location of Level 4 facilities (Acute Hospitals)	104
Fig. 7.5	Horizontal and vertical integration of Level 2 facilities	105
Fig. 8.1	Layout of patient rooms at the new Maasland Hospital	119
Fig. 9.1	The scale of the Private Finance Initiative in the English National Health Service	125
Fig. 10.1	Beds in general hospitals in West Germany according to ownership, 1991–2004	146
Fig. 10.2	Beds in general hospitals in East Germany according to ownership, 1991–2004	146
Fig. 11.1	Floor distribution	165
Fig. 11.2	The wards at St Olav’s Hospital before redevelopment	169
Fig. 11.3	Organization of <i>sengetun</i> in the generic centre wards	170
 <i>Boxes</i>		
Box 2.1	Development of the Alzira model	17
Box 7.1	Key conclusions of the review of the Health Service in Northern Ireland	94
Box 7.2	The Hollywood Arches Community Health Centre	105
Box 7.3	The Grove Health and Well-being Centre	107

Chapter 1

Introduction

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Martin McKee*

Ensuring sustainable health capital investment

This volume comprises 11 case studies from across Europe illustrating different aspects of capital investment. It offers policy-makers, planners, architects, financiers and managers practical illustrations of how health services can be translated into capital asset solutions. This book accompanies an in-depth analysis of key issues of health capital investment and planning, *Investing in hospitals of the future*, published separately (Rechel et al. 2009).

Although the case studies come from a number of different European countries and – at first sight – appear diverse in range and scale, core drivers of change and the concepts guiding the projects are remarkably consistent. Key players in the health sector across Europe face many of the same challenges and opportunities in investing in capital: the demographic and epidemiological transitions associated with an ageing population, advances in medical technologies and pharmaceuticals, rising public expectations, persistent health inequalities, and – at the time of writing – a rapidly deteriorating economic outlook.

In the face of upward pressure on health expenditure as a percentage of gross domestic product (GDP), there is increasing recognition of the need to improve the efficiency and effectiveness of health systems (OECD 2008a). The challenge is to reconcile health needs, public and professional expectations, and available resources. Here, capital is of crucial importance, as it determines to a large degree how health care resources are spent, by shaping health service priorities, as well as delivery systems and structures.

What are the main characteristics of successful capital investment projects? The Development Assistance Committee (DAC) at the Organisation for Economic Co-operation and Development (OECD) has established five criteria for evaluating development assistance: relevance, efficiency, effectiveness, impact

and sustainability. These five evaluation criteria have been adopted by all major development agencies and are explained in more detail here (OECD 2008b).

- **Relevance:** the extent to which the aid activity is suited to the priorities and policies of the target group, recipient and donor.
- **Efficiency:** this measures the outputs – qualitative and quantitative – in relation to the inputs.
- **Effectiveness:** a measure of the extent to which an aid activity attains its objectives.
- **Impact:** the positive and negative changes produced by a development intervention, directly or indirectly, intended or unintended.
- **Sustainability:** this is concerned with measuring whether the benefits of an activity are likely to continue after donor funding has been withdrawn. Projects need to be environmentally as well as financially sustainable.

The same five criteria can be applied to areas outside the remit of development assistance, for example to evaluate the success of capital investment projects in the health sector. They have the benefit of drawing attention to the long-term societal benefits that capital investment projects should yield. Far too often, project success is measured within the framework of short-term tactical outcomes, such as delivering new health facilities on budget and on time. In some instances, such as the Private Finance Initiative (PFI) in the United Kingdom, these short-term considerations have been the main selling point for the procurement model used. However, when it is recognized that the initial capital costs of a hospital equate to only its operational running costs for 2–3 years, it becomes obvious that the functioning of health facilities over their lifetime deserves much more attention. This implies the need for health facilities to be able to respond to changing health care needs and medical technologies, something that should be envisaged early in the conceptual stage.

A major challenge in designing hospitals – or indeed any large-scale investment project – to be sustainable in the long term is the long time periods involved in planning, financing, construction and operation. The interval between concept and commissioning of major hospitals can range from 5 to 10 years, while several more years are needed to construct the hospital. This can mean that many hospitals, when beginning to operate, do not meet the current (or future) health needs of their population.

Furthermore, health care services, shaped by technological advances, increasing patient expectations and innovative care models, are changing much more rapidly than the health facilities from which they are provided. Often, the planning of capital investment projects continues to involve only incremental changes, with a focus on measures such as bed numbers or hospital activity

data, delaying or stifling innovation. The resulting asymmetry, between rapid changes in what is needed to deliver optimal care and incremental changes in the facilities from which it is delivered, poses a major challenge to the long-term sustainability and effectiveness of hospitals.

Methods and case selection

The case studies described in this volume form part of a major study on capital investment in the health sector conducted by the European Observatory on Health Systems and Policies and the European Health Property Network (EuHPN)/European Centre for Health Assets and Architecture (ECHAA). The study had two main components: the series of case studies presented here, and an in-depth analysis of key issues of health capital investment and planning, which is provided in the companion volume (Rechel et al. 2009).

The selection of case studies began with a review of the academic and grey literature on hospital planning and design, supplemented by interviews with key informants and professional associations, as well as Internet searches. Two principles guided the final selection of case studies. First, they should offer examples of innovative approaches in capital investment in the health sector, such as flexible design, public–private partnerships, a focus on clinical pathways, integrated regional planning and integration of models of care into design. With this aim, several cases were included that are regarded by professionals in Europe as landmark developments. The second principle in selecting the case studies was that they should reflect the diversity of health systems in Europe, not only in terms of different funding arrangements, but also with regard to different levels of decentralization and overall economic development. Case studies were drawn from the following nine countries in Europe: Finland, Germany, Italy, Netherlands, Norway, Poland, Spain, Sweden and United Kingdom (Table 1.1).

Experience from across Europe

The case studies provide a variety of perspectives on current challenges to health capital investment and ways of trying to meet those challenges now and in the future. Northern Ireland and Tuscany are examples of regional capital planning. Health care is one of the areas devolved to the Northern Ireland administration by the United Kingdom Government. Northern Ireland has embarked on an ambitious capital investment programme, expected to amount to approximately to £4.5 billion (€5 billion). In contrast to the National Health Service (NHS) in England, which has relied exclusively on the PFI as a way of

Table 1.1 *Case studies*

Case study	Country
Orbis Medical Park and Martini Teaching Hospital, Groningen	Netherlands
Trondheim University Hospital	Norway
Karolinska Hospital	Sweden
Coxa Hospital	Finland
Rhön-Klinikum Group	Germany
John Paul II Hospital	Poland
Alzira model, Hospital de la Ribera	Spain
Regional planning, Tuscany	Italy
Regional planning, Northern Ireland and PFI, England	United Kingdom

financing new hospital projects, in Northern Ireland this form of public–private partnership was only used as an adjunct for certain elements of the investment programme. Another feature distinguishing Northern Ireland from England is that the Department of Health, Social Services and Public Safety (DHSSPS) is responsible for the organization and delivery of both health and social services, while in England, the Department of Health is only responsible for health, with social services provided by local government. Tuscany is one of Italy’s 19 regions, to which the organization, funding and delivery of health services has been devolved in successive stages of decentralization. Three *Aree Vaste* (Wide Areas) have been established, each comprising several municipalities, for the purpose of planning health care services and investment. Both Northern Ireland and Tuscany have moved away from a hospital-centred form of regional planning towards one that integrates primary and community health services and encompasses the whole spectrum of health care services (along with social services in Northern Ireland).

St Olav’s Hospital in Trondheim, Norway and the John Paul II Hospital in Krakow, Poland are examples of acute hospitals that are to some degree “conventional”. Both were the result of “waiting in the queue” for public capital funding, rather than emerging from an integrated system of capital planning encompassing all levels of health care. The John Paul II Hospital is one of the few hospitals among the new European Union (EU) Member States from central and eastern Europe (CEE) that, by 2008, had also taken advantage of EU Structural Funds for major capital investment. St Olav’s Hospital in Trondheim, on the other hand, was financed from central government grant funds. In both cases, capital was essentially a “free” good and did not need to be justified by means of a rigorous economic business case. While this could raise some questions about each hospital’s long-term economic viability, both display

innovative elements of interest. The John Paul II Hospital has placed particular emphasis on modern technology and e-medicine, while the St Olav's Hospital, following extensive consultations, has embraced a design on a human scale (architecture that has been designed explicitly with the needs and constraints of humans in mind) that is focused on patients and staff and heavily influenced by national cultural norms.

Rhön Klinikum, Germany and Coxa Hospital, Finland are examples of private sector involvement in capital investment. Rhön Klinikum is a publicly listed commercial company. The public and private sectors hold shares in the Coxa Hospital, thus endowing it with characteristics of a public–private partnership. While both companies are subject to public sector regulation and interact extensively with the public sector, both have also taken advantage of opportunities to enter the European market for hospital care. Interestingly, both companies have emphasized systematized models of care and extensive involvement of health professionals in decision-making.

The Orbis and Groningen hospitals in the Netherlands illustrate how hospitals are attempting to adapt to an increasingly competitive market environment. Market competition has become a feature of the Dutch health sector, and hospitals in the Netherlands are now being paid to an increasing degree on the basis of competitive tariffs negotiated between hospital organizations and insurers. Groningen places particular emphasis on the future adaptability of the building, based on flexible design features. Orbis aims to improve the effectiveness of its workforce through better designed health facilities, linked to process systematization and segmentation of services. Both are anticipating the movement of some services from hospitals to community settings.

The Alzira model in the Valencia region of Spain is quite unique, in that it started life as a green-field development of an acute care hospital through a public–private franchise, but then moved towards providing all levels of care for the population in its area, funded through a capitation model; this can be roughly compared to a Health Management Organization structure in the United States. Soon after the hospital began operating, it had become clear that it needed to collaborate with the primary care sector. By establishing a model in which both primary and hospital care are managed by a private consortium, Alzira avoided the fate of the first generation of public–private partnership hospitals in Australia in the early 1990s that failed to operate at a profit, in part because they lacked the possibility of rebalancing service delivery between hospital and primary care (Senate Community Affairs Committee 2000).

The New Karolinska Solna Hospital in Stockholm, Sweden, is expected to become a landmark project. With costs at over €1.4 billion, it is among the

largest capital investment schemes in Europe's health sector. The project forms part of a broader urban development programme. It aims to strengthen links between specialist services, research and teaching and is embedded in a wider reform of hospital services in Stockholm county. As the new hospital is only scheduled to open in 2015, it is too early to judge whether it will be able to achieve its goals. However, some innovative features are already apparent, such as its focus on environmental sustainability, endeavouring to keep the design concept open as long as possible, with a preliminary and a final design competition.

Finally, an analysis of two hospital projects financed through the PFI in the United Kingdom (forming part of a more comprehensive study on hospitals built through the PFI in the United Kingdom and Australia) illustrates how this financing instrument has worked in practice in terms of allocating risks and influencing the flexibility of newly built hospitals. The United Kingdom hospital building programme financed through the PFI has been the largest in Europe, with a government target set in 1997 of building 100 new hospitals by 2010. It seems that the PFI was a critical factor in the initiation of this building programme and the United Kingdom Government – through its “Partnerships UK” agency, for example – has promoted this form of public–private partnership as a model for other countries. Indeed, many other countries in Europe and elsewhere have examined this form of financing. However, the PFI has been highly controversial, not only on economic grounds (Gaffney et al. 1999) but also with regard to whether it has resulted in hospitals that can respond flexibly to changing requirements (McKee, Edwards & Atun 2006).

Common themes

As mentioned earlier, despite the apparent diversity of the case studies included in this volume, there are several remarkably consistent themes. In terms of the demand for health services, the care needs of ageing populations, changing models of care to better manage chronic diseases, and advances in medical technologies may result in upward pressures on health care expenditure, while there are also persisting inequalities in health status and access to health services that need to be addressed. Some European governments have tended to embrace the belief that the introduction of market competition into the health sector might deliver the required innovations and improvements in terms of health care provision. Other governments are opting for a publicly led approach and are redefining priorities, structures and systems that seek to enable health systems to move beyond a hospital-centric view and towards system-wide and

integrated provision of health care services. The case studies are drawn from countries adopting both of these approaches.

In terms of the supply of health care services, there is a trend towards using systematized care pathways as a means of characterizing the provision of health care services, including their linkage and integration with capital investment. Care pathways aim to describe health care services for specified disease syndromes and, ideally, encapsulate measurable inputs and outcomes. They provide a possible basis for translating demographic and epidemiological trends into concepts that can be used for planning health capital investment. Furthermore, they offer a means of engaging with clinicians while simultaneously providing levers for economic control. Care pathways are likely to have greatest impact on health capital investment when they are applied across care settings and not only to hospitals, and when they are backed by appropriate systems of resource allocation (Hindle, Dowdeswell & Yasbeck 2004).

Some of the case studies, such as the Coxa or Orbis hospitals, place a particular focus on care pathways. It might be no coincidence that these are hospitals that are most exposed to the risks of a wider market. This seems to force them to pay more attention to long-term sustainability and effectiveness, and to look for ways to design facilities to maximize performance in the long term, even if this means higher initial costs. These two hospitals have also emphasized engagement of the clinical workforce, which has facilitated necessary cultural and managerial change. It is too early, however, to draw conclusions on whether policies, such as those pursued in the Netherlands, that remove the public safety net for hospitals needing capital investment will be successful in the long term. It is also unclear whether they can be translated to hospital systems in other countries.

Some market models themselves shut out the benefits available from whole systems coordination. The PFI provides such an example. This form of public–private partnership was originally devised to generate investment in infrastructure projects, such as roads or bridges that have simple and relatively predictable demands and require limited operational maintenance. Health care is much more complex, characterized by rapid change, high recurrent costs, unpredictable horizons and the need for continuing reinvestment. Nevertheless, the United Kingdom Government decided to use this financing mechanism to launch a hospital building programme, principally because of the accounting convenience of the debt accrued remaining off balance (that is, not showing as part of national debt), at least when the scheme was conceived (Atun & McKee 2005). Such developments, coinciding with a greater emphasis on market mechanisms in the provision of care, may act as a barrier

to collaboration between facilities offering complementary services to a defined population, leading to fragmentation and duplication. More generally, it can be asked whether paying hospital services through tariffs such as diagnosis-related groups (DRGs) encourages or discourages cross-cutting care pathways from being developed.

The case studies also highlight the need for comprehensive systems of capacity planning and for the use of new measures of hospital capacity. Some countries still use the obsolete concept of bed numbers as a basis for hospital planning, but others are making use of measures derived from systematized care pathways, or at least more closely linked to actual capacity than “the bed”. In three cases (Coxa, Rhön Klinikum and Orbis) the hospitals have been designed around care pathways, with particular attention being paid to work process systematization that allows patients to flow smoothly through the system. However, this is a methodology that is still in its infancy, and more work is needed to develop a reliable and robust characterization of hospital capacity other than that based on bed numbers.

Finally, the case studies demonstrate the need for linking the operation of hospitals with flexible financing models. The time periods for renewing medical technologies and buildings are becoming shorter and issues of the life-cycle effectiveness and economic sustainability of hospitals are being recognized as more important. Those hospital projects that have sought to design more adaptable buildings and services have also tended to turn to more adaptable capital financing models, such as flexible commercial banking loan products. In the case of Alzira, for example, the switch from an acute hospital-based model of service provision to a population-based one involved a refinancing deal. Such a change might have been much more difficult within other systems of funding, whether state-based or under a PFI deal, with up to 40-year leasehold-type contracts.

The challenge ahead

Some caveats are necessary when drawing conclusions from the case studies presented in this volume. By necessity, the sample of projects selected for inclusion was small. This means that it may not be easy to generalize the findings and transfer them to other hospital projects in Europe or elsewhere, and we may have missed out on innovative projects that would have merited mention. Rather than aiming for a comprehensive overview, we still hope that the indicative findings and experiences presented here will be of help to those involved in other hospital projects. The reader is, however, referred to the

companion volume, which includes many more examples of specific aspects of hospital planning and design from across the world (Rechel et al. 2009).

A second caveat relates to the data on which the case studies are based. Many have been written by professionals actively involved in the projects, and sometimes in an executive function. Others have drawn on information provided by the hospitals themselves or made available in the public domain. Although the chapters were carefully reviewed and extensively discussed with the authors, it is often the case that different observers may draw different conclusions. However, it was felt that the insights of those actively involved in the projects outweighed any risk of bias. In passing, however, it should also be noted that the authors were unable to draw on a body of evidence on the effectiveness of hospital design. This should surely be a priority for research funding agencies.

The most important challenge in compiling the case studies was that, for most of them, it is still too early to judge whether they will be successes or failures. This was a necessary drawback involved in seeking innovative projects at the cutting edge of contemporary developments. Some of them are still at the early conceptual stage, and others have not been operating long enough to allow any conclusions to be drawn on their long-term efficiency and effectiveness. Many of the projects are still in what might be described as their “tactical” phase and their performance against the five evaluation criteria set out in the beginning of this chapter will only become apparent later. The conclusions that can be drawn so far are therefore provisional and need to be revisited in the future.

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Chapter 2

The Alzira model: Hospital de la Ribera, Valencia, Spain

Carlos Trescoli Serrano, Manuel Marin Ferrer, Alberto de Rosa Torner

National context

The primary responsibility for health care delivery in Spain's National Health System (NHS) has been devolved in recent years to the country's 17 regions or "autonomous communities" (*Comunidades Autónomas*) (Fig. 2.1). Using funds generated primarily from taxation (by means of a complex process combining retention of differing shares – according to source – of locally raised taxes, allocations of national tax revenues, and an interregional equalization mechanism), each autonomous community must ensure that it has the capacity to provide adequate care for its population. It does so within a national legislative framework and according to policies developed by the Ministry of Health and Social Policy in Madrid which, in the 2003 Cohesion and Quality Act, has defined a guaranteed benefits package and specifies minimum levels of expenditure on health. The autonomous communities have some freedom, subject to nationally fixed thresholds, to raise additional revenue from their regional taxes. The Ministry of Health and Social Policy is responsible for international relations, pharmaceutical policy, and undergraduate and postgraduate medical education. The Ministry also has a supervisory role, publishing benchmarking reports comparing regional performance and highlighting best practice. An Interterritorial Council of the NHS (CISNS) – composed of representatives of the autonomous communities and central Government – promotes the cohesion of the overall system (Durán, Lara & van Waveren 2006).

Fig. 2.1 *Spain's autonomous communities*

Source: Wikimedia Commons 2008.

Spain has one of the lowest levels of health expenditure in western Europe. According to World Health Organization (WHO) estimates, in 2005 Spain spent a total of US\$ 2242 (purchasing power parity, PPP) per capita, compared to an average of US\$ PPP 2882 in the Member States belonging to the European Union (EU) before May 2004 (EU15) (WHO Regional Office for Europe 2009). Total health care expenditure in the same year amounted to an estimated 8.2% of gross domestic product (GDP) (compared to an EU15 average of 9.6%). Public expenditure was also comparatively low, accounting for an estimated 71.4% of total health expenditure, compared to an EU15 average of 76.8% (WHO Regional Office for Europe 2009).

The role of the regions

Each autonomous community is divided into health areas and zones, and the regions are required to compile detailed “health maps” setting out what services will be provided within their territory as part of their responsibility for planning. The health *areas*, which are responsible for the management of facilities, benefits and health service programmes within their territories, should cover a population of no fewer than 200 000 and no more than 250 000 inhabitants.

The health *zones*, the smallest organizational units, are usually organized around a single Primary Care Team (*Equipo de Atención Primaria*, EAP).

Most physicians are employed by the public sector and receive fixed salaries, and most health staff have a status similar to that of civil servants. In recent years there have been reported shortages of medical staff, particularly affecting some hospital specialties. This has coincided with a steady flow of doctors from Spain to other European countries, particularly England, Sweden and Portugal, where salaries are higher. The basic salary for public sector physicians is regulated by the national Government, although regions have the capacity to vary some components, leading to considerable regional variations (López-Valcárcel, Quintana & Socorro 2006).

Coverage of the population is now almost universal, reaching 99.8% in 2007 (from 81.7% in 1978). Social care services are also the responsibility of the regions, while home care services are managed at local (municipal) level. Long-term care services in Spain are poorly developed, reflecting the traditional view that this is the responsibility of the individual's family.

Health care provision and reforms

The 1986 General Health Care Act placed a high priority on the development of primary health care. A patient's first contact with the health system is the general practitioner (GP), who acts as a gatekeeper to secondary care. A major branch of the 1986 reform was a shift from primary care provided by part-time solo practitioners to primary health care teams working on a full-time salaried basis. By 2001, over 90% of the population in most autonomous communities had access to the new model. Yet, despite this focus on primary health care, hospitals have continued to dominate the health care landscape – and this in spite of the fact that in 2006 Spain had only 2.7 acute care hospital beds per 1000 population, which was at the lower end of the spectrum in western European terms (WHO Regional Office for Europe 2009).

In 2002 an estimated 39% of hospitals were publicly owned. The system for paying hospitals varies among autonomous communities. Traditionally, hospital budgets have been reimbursed retrospectively, with no prior negotiation and no formal evaluation of what has been achieved (“soft” budget constraints). Since the late 1980s, however, several communities have examined methods of contracting with hospitals, specifying services to be provided in return for agreed budgets. The payment mechanisms have varied but include, in some cases, prospective payments based on diagnosis-related groups (DRGs). Alongside the hospital system, there is an extensive network of outpatient ambulatory centres, in which some specialist teams from hospitals provide outpatient care.

The 1991 Abril Commission (Comisión 1991) criticized the lack of efficiency, flexibility and participation of medical staff in hospital management within the Spanish health system, and established a new legislative basis for the involvement of the private sector in the delivery of health care, subsequently enacted in 1994 and 1997. This legislation allows the private sector to deliver public health services as long as they remain free and provide universal and integrated care. The regional government remains responsible for defining the health services to be delivered, but different types of public–private partnerships were permitted, extending the potential role of the private sector beyond the traditional elements, such as co-payments for pharmaceuticals.

Situation in Valencia

The Valencia autonomous community is located on Spain's eastern coast (Fig. 2.1). According to the 2001 census, it had a population of 4 162 776 inhabitants, rising to 5 029 601 by 2008 (INE 2009). The *Conselleria de Sanitat*, Valencia's health ministry, has a budget of approximately €4 billion, which amounts to about 40% of the community's budget. It employs 45 000 people and runs more than 1000 health facilities. These numbers make the regional health ministry by far the biggest service delivery organization in Valencia. As a service organization, the *Conselleria de Sanitat* needs to coordinate and manage the delivery of quality health services as efficiently and flexibly as the private sector. However, the provision of care has often been found to be slow, bureaucratic and inefficient, reflecting constraints such as the application of civil service regulations to human resource management.

At the same time, health services must respond to changing needs, such as the challenges posed by a rising and increasingly multicultural population, with substantial immigration from Europe and Latin America, late urbanization (in European terms), an ageing population (Spain has one of the highest life expectancies in western Europe: 83.8 years for women and 77.1 years for men in 2005) (WHO Regional Office for Europe 2009), along with upward pressure on health expenditure as a result of factors such as new technology, a reduction in the working population, and rising public expectations.

These tensions, coupled with the new powers resulting from the legislation enacting the recommendations of the Abril Commission, led the Valencia community to explore alternative models of provision. Its proposals for the Hospital de la Ribera involved an innovative approach, henceforth known as the Alzira model, whereby public services would be managed privately.

Prior to 1999, the Health Department 11 in the Valencia Community – also called the “Ribera Department” – was one of the few without a local hospital,

despite a political commitment to build a hospital dating back to 1982. Local inhabitants seeking hospital treatment often had to travel more than 40 km to Valencia. To close this gap in health care provision, the regional government of Valencia looked at novel approaches to finance hospital services using private capital. Finally it issued a request for tenders to build and run a new public hospital that would provide all district hospital services for the population of the area.

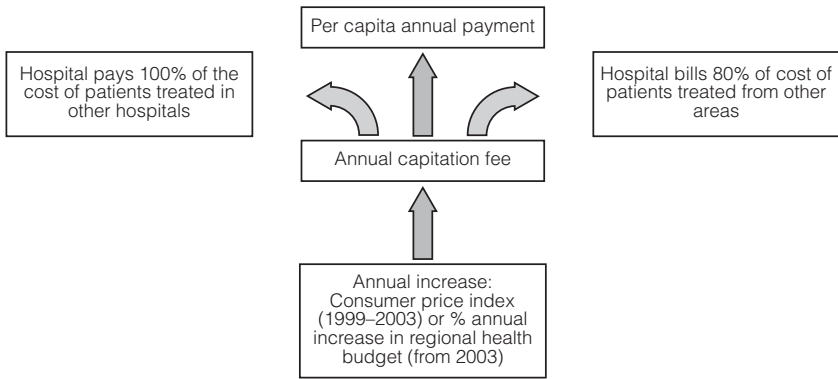
The resulting Hospital de La Ribera has become a Spanish pioneer of the public–private partnership model, according to which a private company is awarded a contract to build and run a public hospital. By taking responsibility for a population’s full-service hospital provision, the Alzira model differed from all previous versions of public–private partnership in the health sector. In the Spanish context, this is called an “administrative concession”, the “Alzira model”. The private company responsible for providing the medical care is *Union Temporal de Empresas-Ribera* (Temporary Union of Companies) (UTE-Ribera). This company was created by Adeslas, a Spanish private health insurance company (51%), the local building societies Bancaja and CAM (45%), and the construction company, Lubasa (4%). The hospital was built in Alzira and serves a catchment population of nearly 245 000 at the time of writing.

Since the establishment of the first (Alzira) concession model, other administrative concessions have been granted in Valencia: Torrevieja (2003), Denia (2004), Manises (2006) and Crevillent (2006). They now cover almost 20% of the population of the Valencia autonomous community. In Madrid, an administrative concession was created in 2005 in the form of the Valdemoro Hospital. The basic principles of the hospital development of the Alzira model are explained in Fig. 2.2 and Fig. 2.3. Its evolution, extending to non-hospital services, is shown in Box 2.1.

The Torrevieja administrative concession had a similar organizational structure to the Hospital de la Ribera – in fact, some of the hospital’s executive board were former Alzira directors.

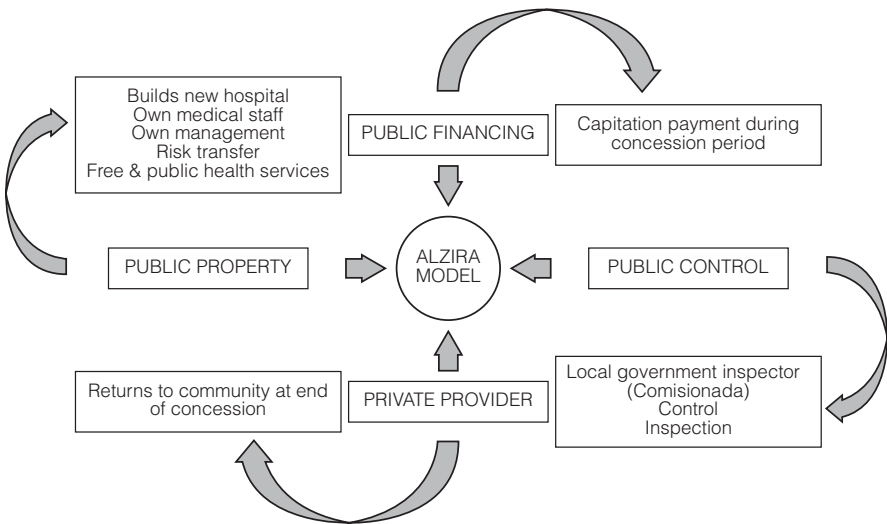
As shown in Box 2.1, in its initial phase, the Alzira model envisaged only the delivery of hospital care at the Hospital de la Ribera. However, it was soon realized that there were potential problems with cost shifting between primary and secondary care, and it was necessary to consider the overall health needs of the population. This coincided with recognition that the initial model was inadequately budgeted and faced financial difficulties. As a consequence, the Special-Purpose Vehicle (SPV) was refinanced, and a new organizational model was put in place in 2003, with the company assuming responsibility for delivering health care in both primary and secondary settings.

Fig. 2.2 *Alzira model capitation system*



Source: Hospital de la Ribera, unpublished material, 2008.

Fig. 2.3 *Basic principles of the Alzira model*



Source: Hospital de la Ribera, unpublished material, 2008.

From the beginning, there have been four main elements to the Alzira model: public financing, public control, public property (ownership of the estate), and private delivery and management (Fig. 2.3).

Public financing

The Alzira model is financed on a capitation basis by the local government. The Valencia government pays an annual fixed sum for each of the registered inhabitants of the Alzira area, all of whom have an electronic health card

Box 2.1 *Development of the Alzira model***Alzira Model I: 1999/2003**

Granted for 10 years, extendable to 15 years for the management of specialist medical care for the health field.

Capitation fee: €204 + consumer price index (CPI) (1999).

Building a new hospital: Hospital de la Ribera.

Private investment of €61 million.

“Money follows the patient”.

Alzira Model II: 2003/2018

Granted for 15 years, extendable to 20 years for the management of hospital and primary care in Health Department no. 11.

Capitation fee: €379 (€494 as of January 2006) + percentage of yearly increase in the health budget (in 2008: €572).

Private investment of €68 million during the concession.

“Money follows the patient”.

Source: Hospital de la Ribera, unpublished material, 2008.

(approximately 225 000 inhabitants in 1999; 245 000 in 2008). The number of individuals with electronic health cards, and therefore the number of inhabitants covered, is reviewed monthly. Since “money follows the patient”, the Valencia government can predict the annual cost of Health Department 11.

The revision of the administrative concession in 2003 sought to ensure that profits were shared between hospitals and the community. The hospital was allowed to retain profits up to 7.5% of turnover, with those above this limit being returned to the local government. This is seen as a means of ensuring financial sustainability for both parties. The annual increase in the capitation fee, for example, changed from being based on the consumer price index (CPI) to being linked to the annual increase in the Valencia autonomous community health budget.

The Hospital de la Ribera is responsible for all hospital care of patients registered in the health area, wherever they are treated. If patients are treated in hospitals elsewhere, the Hospital de la Ribera assumes 100% of the cost, based on the relevant DRG. Hospitals in other parts of the Valencia region do not, in contrast, lose money if local inhabitants go elsewhere. However, as a disincentive to the hospital using its capacity for patients from elsewhere, in

such cases a hospital is only reimbursed for 80% of the cost (priced per DRG) for each patient treated from another Health Department.

In January 2008 the annual per capita fee was €572 for each of the 245 000 inhabitants of the health area (Table 2.1). In return, the company must offer universal access to its wide range of services. In effect there is a transfer of risk, as the budget of the Valencia government is both predictable and limited. This is seen as a means to control local spending and make local government more transparent. The cost per inhabitant is about 20% below the average for the rest of the Valencia autonomous community, a level that was politically determined.

Table 2.1 Annual capitation fee (in €) in Health Department 11, 2003–2008

2003	2004	2005	2006	2007	2008
379.0	413.1	454.8	494.7	535.3	571.9

Source: Hospital de la Ribera, personal communication, 2008.

The hospital doctors and about half of the GPs who work within the Alzira model are employed by the operating company, rather than – as in other publicly managed hospitals – being public employees or civil servants. They are employed within a clinical directorate, organized by clinical coordinators who manage outpatient and inpatient activities, on-call duties, holidays and operating lists. The coordinators are also responsible for arranging the support services necessary to achieve the clinical and nonclinical objectives determined by each Medical Director. Together with the Medical Director, the coordinators represent the doctors' interests to the hospital board. The Hospital de la Ribera has a continuing medical education programme, overseen by a Medical Training Commission.

Medical salaries have a fixed and a variable component. For hospital doctors, the fixed component amounts to 80% and the variable component to 20%, while for GPs the split is 90% to 10%. The variable part of the earnings relates to on-call payments and incentives. Incentives (which are in the range of €6000–24 000 per year) are negotiated with the medical coordinator and linked to specified goals. Salaries are negotiated between the hospital's medical board and trade unions. In Spain, public sector wages for physicians vary according to region. The private salaries negotiated within the Alzira model tend to be above the Spanish average for public wages, when both the fixed and the variable component are taken into account.

In 2007, UTE-Ribera had 1832 employees, of which 1314 were directly employed by the managing company and the rest – 518 employees – were civil servants contracted by the Valencia Health Ministry.

Public control

The Alzira model is a public–private partnership in which, according to the terms of the administrative concession, the hospital has to meet targets set by the Valencia government. Targets (such as waiting times or immunization rates) have to be at least as high as those achieved by other Health Departments for the rest of Valencia’s citizens. The hospital has an incentive to maintain high standards to retain the loyalty of patients, as “money follows the patient”. Adherence to the terms of the concession is supervised by a new public figure – the “Commissioner”, who reports directly to Valencia’s Health Minister – whose role it is to ensure that the hospital is achieving the targets and objectives agreed with the Valencia government. The Commissioner’s duties include control and inspection of all medical activities and to ensure high quality of care. The Commissioner can also impose penalties if these agreements are not met.

Public property

The private consortium, UTE-Ribera – responsible for building the Hospital de la Ribera – is required to maintain its structures and equipment in good condition until the end of the concession, when they will revert to the Valencia Health Ministry. During the second period of the administrative concession, UTE-Ribera built a new and fully equipped Health Centre, Alzira II (€6 million investment), and has renovated other health centres and invested in new equipment. At the end of the administrative concession, UTE-Ribera is required to leave an up-to-date and functional complement of equipment.

At the beginning of the concession, the condition of all the premises transferred from the Health Department was audited and registered; when they are transferred back to the local government at the end of the concession they must be in at least the same condition. If not, the company must bring them up to standard. For this reason, UTE-Ribera accepted the necessity of making substantial investments during the concession period.

Hospital de la Ribera is a 301-bed hospital, offering a comprehensive range of services. There are 254 single rooms, 27 intensive care unit beds, 10 psychiatric beds and 10 neonatal cots. All of the single rooms have a companion bed, telephone, individual bathroom and television, although during crises, such as influenza epidemics, they may function under double occupancy.

The hospital building was designed according to local government guidelines. It has a similar structure to other hospitals built by local governments at that time and so does not include many innovative design elements. However, the function of the premises was seen as quite different from other, more traditional hospitals. Health professionals have noted a lack of nonclinical space in the hospital, as the hospital is small but has nevertheless seen a year-on-year increase in activity, with the result that more space has had to be devoted to clinical activity. Facilities maintenance of the hospital is outsourced, as is usual in public hospitals in Spain.

Private delivery/management

As noted earlier, during the period of the administrative concession, UTE is responsible for the provision of health care to the Ribera area within an annual budget calculated on a capitation basis. As is the case in the rest of Spain, health services are free at the point of use to all inhabitants of that Health Department. The company has adopted management concepts from the private sector, reflecting its view that public management of health care in Spain has been bureaucratic and inefficient and that a private company can achieve better results using its own medical staff and management tools.

The main policies adhered to within the Alzira model were patient orientated, including:

- free access to medical specialties, without – initially at least – any gatekeeping function by primary care (in order to achieve patient loyalty);
- free choice of medical specialists and hospitals;
- a wide range of outpatient and elective surgery time – from 08:00 to 21:00 (most Spanish public hospitals do not provide clinical services after 15:00);
- as patients have the option of going to other hospitals, Hospital de la Ribera seeks to ensure short waiting times (less than two weeks) in its outpatient department; less than 90 days for elective surgery and an efficient accident and emergency department.

At the beginning of the concession, it was very important to achieve patient loyalty, since the local population and their GPs were used to referral to teaching hospitals elsewhere in the community. To attract patients to the Hospital de la Ribera – given that UTE had to pay if/when patients of Health Department No. 11 received care in other hospitals – a free access policy was implemented.

This policy also attracted patients from other Health Departments with longer waiting lists, with the cost of their care being charged to the respective local government (80% of the DRG cost, as already mentioned). After seven years

of free access to specialist care, the system was changed to restore the role of GPs as gatekeepers to hospital care, although – surprisingly – there has been no major change in demand levels. Since 2005, medical specialists have held some clinics in general practices.

During the second phase of the administrative concession (since April 2003) the managerial concept changed, as UTE-Ribera assumed responsibility for all health care for the local population, rather than just managing a hospital. In this way, UTE has become an integrated health care organization.

This required new working methods. These included creating integrated medical processes (identifying the most appropriate diagnostic and therapeutic pathways); investment in additional diagnostic tools in primary care, complemented by direct access to radiology, endoscopy, pathology tests, and so on; and creation of a network of information systems, so that information could be shared by all medical professionals (integrated patient medical dossiers). Certain policies have been implemented to facilitate this integration, as detailed here.

- **Medical link:** A consultant physician is attached to each health centre, working with the same patients as the GP. This is designed to implement clinical guidelines with the local GPs, resolve medical problems in the health centre, and reduce the number of inappropriate hospital referrals.
- **Integrated primary care centres:** This seeks to enlarge some of the health centres with on-site X-ray services, accident and emergency departments, and medical specialist outpatient clinics. It is aimed to bring medical services closer to patients.
- **Integrated medical care pathways:** This aims to streamline the management of health problems, from primary prevention through to palliative care and including acute care, rehabilitation, secondary prevention and chronic care.
- **Integrated information systems:** Hospital de la Ribera was the first public hospital in Spain with a fully integrated computerized medical history system, including nursing and medical notes, tests and imaging. Since April 2003, a programme has been undertaken to partially integrate information systems in primary and secondary care. This will use a wide area network (WAN), operating with 750 workstations and over 1000 users. At the time of writing, doctors can access a patient's full medical history from any computer in the hospital. Patient data are entered directly by the medical and nursing staff, which provides first-hand information and helps to avoid misinterpretations or transcription mistakes. The system allows for total interaction between medical and administrative areas. For example, ordered items and inventories are updated according to clinical activity, and the clinical management programme can easily obtain reports of activity

by department or by unit of time. The information system enables faster responses by medical staff, improves communication between departments and enhances audit, financial forecasting and quality assessment.

During 2007 there was an income of more than €161 million. This came mainly from the capitation fee and the billing of medical services to patients who do not belong to Health Department 11. During the same period, there was an expenditure of more than €158 million, which included the cost of managing the whole Health Department, as well as all the investments carried out:

- building one new Health Centre and remodelling and updating others
- a new Haemodialysis Unit
- a new Interventional Radiology Unit
- a new Medical Physics Gamma Camera.

Overall, the company made a profit of more than €2 million (UTE Ribera Salud 2007).

All medical services provided in the period 2003–2007 are shown in Table 2.2. In 2007 there was a slight increase in medical activity as well as the severity of inpatient cases. More than 20 000 inpatients were treated in 2007, with a mean hospital stay of fewer than five days. The rate of surgical day cases stood at slightly more than 50%. Although there was a 2% increase in hospital emergency visits in 2007 compared to the previous year (with an admission rate of 13%), the number of emergency visits in primary care increased by 9% between 2006 and 2007.

Strategies to improve outpatient care

From the beginning, the hospital had computerized medical records covering all clinical episodes, including outpatient, inpatient and accident and emergency visits. A Picture Archiving and Communications System (PACS) module is integrated with the computerized medical record, as well as an administrative module, a supplies-and-purchasing module, and an on-call duty rota module. However, the original system was found not to meet the hospital's needs and had to undergo significant redevelopment; at the time of writing, little is left from the original system. The changes were introduced at the request of medical professionals.

Since 2004 the local government has been developing computerized medical records for primary care which will operate across all Health Departments. The goal is to create an interface between both systems, making primary care and hospital medical records accessible to both GPs and hospital doctors. The integrated medical record is seen as a success and, so far, no serious

Table 2.2 *Hospital de la Ribera clinical performance, 2003–2007*

	2003	2004	2005	2006	2007
Inpatient Care					
No. of inpatient admissions	19 414	19 564	20 526	20 943	21 900
No. of elective admissions	5 900	5 888	6 239	5 921	5 981
No. of deliveries	2 212	2 499	2 581	2 588	2 746
Mean hospital stay	4.78	4.66	4.61	4.54	4.72
Mean Severity Index	1.602	1.617	1.624	1.667	1.719
Surgical Care					
No. of surgical interventions	19 743	19 608	20 026	19 520	20 060
No. of day-case surgery cases	6 723	6 984	7 319	7 290	7 294
Emergency Care					
No. of hospital visits	125 480	118 668	116 085	105 297	107 743
No. of visits to health centres	-	155 244	206 305	225 099	248 748
Outpatient Care					
No. of outpatient visits	517 027	520 787	545 960	583 226	590 405
No. of path' lab tests	3 658 677	3 823 582	3 957 302	4 140 320	4 269 355

Source: Hospital de la Ribera, personal communication, 2008.

breaches of data protection have arisen. Health professionals have found it to be beneficial to their work.

Conclusions

Although the Alzira model has not been subject to a formal evaluation, it is viewed positively by patients, staff, the central administration (*Consejería de Sanidad*), and the private consortium (UTE). There are many limitations on patient satisfaction surveys, with problems exacerbated by the fact that this hospital served an area where there had been no previous facilities, so the population had to travel considerable distances. However, polling has found that the vast majority of patients (consistently more than 90%) are happy with the service received and would choose the hospital again if they needed treatment. Interestingly, around 80% of those surveyed had no knowledge of the type of hospital management in place.

This management style is seen as offering important advantages for employees. Medical doctors can manage their own time within the limits imposed by the hospital, and create and develop clinical units. The presence of continuing medical education and of a research committee facilitates the education and

progression of physicians. The system of incentives financially rewards the activity and efficiency of individual doctors.

The public administration (*Consejería de Sanidad de Valencia*) benefits from the Alzira model, since it did not have to spend the resources for the initial investment (€68 million) to build a new hospital. The prevailing accounting system allows it to avoid a significant increase in local public debt, as the public–private partnership is considered to be off balance for the public sector, as mentioned earlier, although this is essentially a technicality since future costs will still be encountered. The administrative concession also permits more reliable public expenditure forecasting. Furthermore, it is expected that the costs will be at least 20% lower than in other health areas. The “indirect management” seems to lead to better use of public resources, more efficiency, an increased volume of activities, better service provision, and a higher number of citizens satisfied with the government performance.

Finally, UTE-Ribera benefits from the public–private partnership along with the public administration, as it is profitable. The company has developed the know-how required to successfully run a large general public hospital, and hopes that this partnership could be extended to other health areas.

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Web links

Hospital de la Ribera and Health Department 11: <http://www.ribera10.com>

Generalitat Valenciana: <http://www.ribergva.es>

Conselleria Sanitat Valencia Community: <http://www.san.gva.es>

Instituto Nacional Estadística: <http://www.ine.es>

Chapter 3

Coxa Hospital, Tampere, Finland

Barrie Dowdeswell, Erkki Vauramo

Introduction

The Finnish health care system is characterized by tax-based funding, direct public provision of most services and a high degree of decentralization. Health care is organized at the level of the municipality, of which in 2008 there were 415, most with less than 5000 residents (the range is from 250 to 560 000 inhabitants). Municipalities are responsible for health promotion and prevention, medical care, medical rehabilitation and dental care. Decisions on the planning and organization of health care are made by the municipal health committee (sometimes merged with the social services committee), the municipal council and the municipal executive board (Vuorenkoski 2008). Since the 1970s there has been an increased focus on primary and community care.

In view of the small size of many municipalities, they have been brought together into 20 hospital districts responsible for providing and coordinating specialized care within their area. The hospital districts are federations, with political power residing in the constituent municipalities, which appoint the board of the hospital district and have voting rights in proportion to their populations. In 1997 a new administrative tier, the province, was created, although in this case it is a branch of central Government. Finland is divided into five provinces (as well as the Åland Islands, an autonomous Swedish-speaking archipelago which lies between Finland and Sweden). The provinces act in an advisory and supportive role, seeking to ensure congruence of local policies with national objectives; they are responsible for the approval of capital investment plans and supervise specialized health care (Vuorenkoski 2008).

Hospitals are mostly owned by one of the municipalities within a hospital district, and the municipalities within each district negotiate the provision and

pricing of hospital services annually with each other. There is an equalization mechanism within hospital districts to spread the risk of high-cost patients between the municipalities (Vuorenkoski 2008).

The ratio of acute care hospital beds per 100 000 population declined from 434 in 1990 to 234 in 2007, which compared to a European Union (EU) average of 395 in 2006 (WHO Regional Office for Europe 2009). The average length of stay in acute care hospitals declined from 7 days in 1990 to 4 days in 2007, much lower than the EU average of 6.5 days in 2006 (WHO Regional Office for Europe 2009). As elsewhere, reductions in length of stay reflect the increased efficiency of clinical management, achieved through the introduction of new medical technologies, the development of day surgery and the increasing substitution of community for institutionalized care (Vuorenkoski 2008).

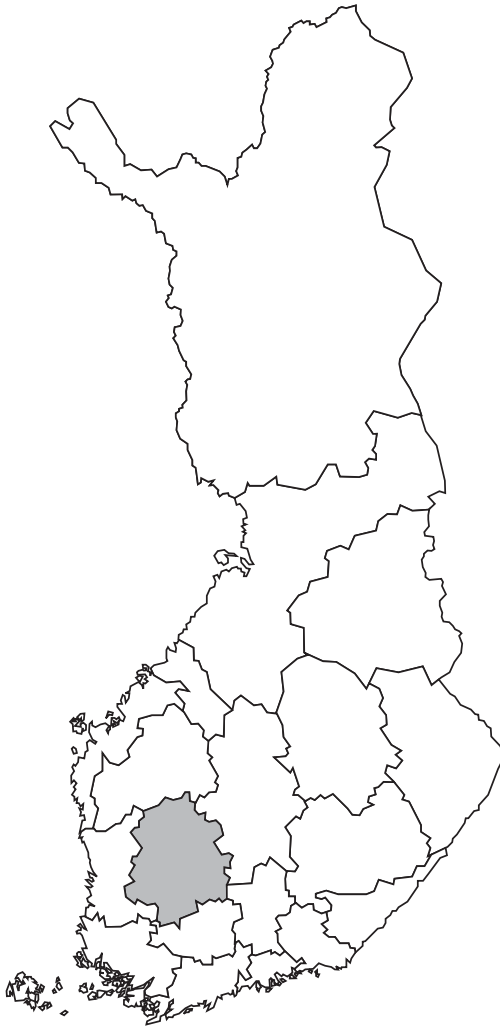
Reforms implemented in 1993 transferred responsibility for payment of hospitals to the municipalities, with subventions determined according to the services used by their inhabitants. Although the districts have used a variety of payment mechanisms, there has been an increased use of diagnostic-related groups (DRGs) (Vuorenkoski 2008).

Hospital physicians and most doctors in municipal health centres are salaried employees. They usually draw a basic monthly salary and receive additional remuneration for time on call. General practitioners (GPs) are paid a combination of a basic salary (approximately 60%), a capitation payment (20%), fee-for-service payment (15%) and local allowances (5%) (Vuorenkoski 2008).

The Coxa Hospital for Joint Replacement is located in Tampere (see Fig. 3.1), the third largest city in Finland, with a population of over 200 000 inhabitants but serving almost 450 000 inhabitants in the Pirkanmaa (Tampere) region (with 28 municipalities), as well as providing a national referral service for particularly complex procedures. Coxa is a hospital that specializes in endoprosthetic surgery (insertion of prostheses that fit inside the body, such as replacement bones and joints). The hospital operates as a limited company owned by diverse public and private interests. The company was established in February 2001.

Like the Diagnostic and Treatment Centres in the English National Health Service (NHS), the Coxa Hospital is a public–private partnership providing specialist services and is designed to meet patient demands for faster access to elective surgery. However, in contrast to the English model, the Coxa Hospital is based on a strong component of transparent public ownership and has close links to its former parent hospital.

Fig. 3.1 *The Tampere region (Pirkanmaa) in Finland*



Source: Wikipedia 2008.

Context and catalysts

An important trigger for change in health care provision is when traditional health organizations fail to meet patients' needs or when new health needs evolve. In the case of the Coxa Hospital, several factors inspired its development. In the 1980s the management of Pirkanmaa hospital district had started to invest in management and business training, with the aim of increasing its clinical and research capability. As part of this process, the district fully embraced Total Quality Management (TQM) as a fundamental value. By 2005, over 1500

staff had been trained in TQM. Pirkanmaa hospital district had also widened its sphere of activities by establishing the Laboratory and Pharmacy Public Utility (“Laboratory Centre”) of the Pirkanmaa hospital district (an outsourced public utility facility not included in this case study) prior to the Coxa Hospital development.

Major reasons for this environment of innovation were that Pirkanmaa hospital district, supported by its two universities, University of Tampere and Tampere University of Technology, had a large skill base among its nearly 7000 employees, and a long tradition of making bold decisions and pursuing innovation-based change, such as the establishment of the Laboratory Centre mentioned earlier. In addition, managers of business units within hospitals attached to the universities were required to hold Master of Business Administration (MBA) degrees or be willing to study for them. This helped to create the expectation and momentum for change (Kivisaari, Saranummi & Väyrynen 2004).

A major catalyst emerged in the 1990s, when a national study of endoprosthetic surgery revealed problems of quality (Puolakka et al. 2001; Lehto, Jämsen & Rissanen 2005). The study recommended that services should be concentrated in fewer and more specialized provider units. Furthermore, the study projected that there would be a need for a doubling of hip replacements between 1997 and 2015 as a consequence of an ageing population. Two key messages of relevance to the Pirkanmaa hospital district emerged directly from this national report. First, while like other hospital districts it had invested in improving quality, clinical standards in Finland as a whole were judged to be inadequate. Second, there was a potentially growing market for facilities specializing in joint replacement surgery. A further stimulus for change was provided by new government legislation that encouraged municipalities to purchase more procedures from the private sector in order to reduce waiting times in the public sector. These significant public pressures opened a window of opportunity for the Pirkanmaa hospital district.

Creating the concept

Initially, the Pirkanmaa hospital district sought to establish a new organization for endoprosthetic surgery in joint venture with Orton, a small privately owned hospital in Helsinki specializing in orthopaedics. However, Orton declined the offer. Pirkanmaa hospital district then commissioned an external consultancy firm, Finnmedi, to review the possible options. This proved an important step in the process of creating a new concept, which later on can be identified as the “Coxa concept”. Finnmedi was regarded as independent, and its recommendations were seen as constructive and not partial to the vested local

interests of any of the provider organizations. The Finnmedi study argued that, by concentrating services and introducing new models of care, capacity could be significantly enhanced, costs reduced by one third, and quality improved.

The subsequent development of the Coxa concept illustrates important lessons for large-scale capital investment projects. The most important of these was the appointment as chief executive officer (CEO) of Matti Lehto (a former clinician and orthopaedic surgeon at Tampere University Hospital and at the time of writing the Medical Director of the Pirkanmaa hospital district) who established certain managerial principles, drawing on the existing corporate culture of the Pirkanmaa hospital district. The new Coxa model was an opportunity to apply this knowledge. These principles were:

- creating care pathways that spanned the hospital district;
- systematization of work processes;
- focusing on staff motivation by delegating ownership of the process to employees;
- incorporating the principles of lean management;
- integration of these approaches to achieve advantages of scale.

In practice, for endoprosthetic surgery, this meant:

- withdrawing services from five district hospitals and concentrating them at the new Coxa Hospital;
- agreeing on integrated and systemized care pathways, involving GPs and other local orthopaedic specialists in a network of care, with Coxa focusing on operative procedures and pre-admission and post-operative rehabilitation undertaken in the primary care sector, close to the patients' homes;
- guaranteeing a quality and cost package that was efficient enough to release funds back into the health system for other uses.

The early phase of the Coxa Hospital has features in common with the findings of the “Concept” research project in Norway (www.concept.ntnu.no) which highlighted “quality-at-entry” as being one of the most important qualifications for the success of major capital projects. The notion of quality-at-entry can be articulated via the five well-known “evaluation” factors for project success: efficiency, effectiveness, relevance, impact and sustainability (see Chapter 4 on concept planning by Knut Samset and Barrie Dowdeswell, in the accompanying volume (Rechel et al. 2009)). The Coxa concept sought to achieve all the criteria listed here.

- Greater efficiency was informed by the Finnmedi study and pursued through implementation of care pathways and resource redistribution.
- Greater effectiveness was pursued through systemization of care processes.

- Pursuit of relevance was guided by the projections of orthopaedic health care needs identified in the national study.
- Impact was expected as a consequence of greater capacity, easier access and better outcomes. Although political imperatives on waiting lists provided momentum for delivering speedier access, it was also realized that excessive waiting times can result in a substantial deterioration of the patient's condition, as well as evidently an interim poor quality of life. Politics were seen to be important, but not the principal driver for improvements.
- The quest for sustainability was based on pursuit of strategic value across the district system, rather than short-term tactical positioning of individual facilities or actors within it.

The Coxa team also avoided the dangers of a limited project scope through the systematic study of technical and managerial alternatives. In order to assist delivery of quality-at-entry, they consulted extensively with all stakeholders. Apart from two technical areas of support (described in the sections that follow), the Pirkanmaa hospital district was able to realize the benefits of earlier long-term investment in the development of management capacity.

Change management

One of the key players commented that “it is not possible to outsource change management, only to enhance it by accessing appropriate technical expertise when needed”. The Coxa team recognized the need for systemic change in the way in which services were negotiated, organized and delivered. However, health care can be averse to change (Christensen, Bohmer & Kenagy 2000). More specifically, when clinicians make decisions about “best practice”, they are also making decisions about resource utilization and the operational organization of health care. “Best practice”, when unchallenged by transparent governance, can become rigid and encumber change. Traditional approaches to implementing systemized care processes, such as top-down orders or moral persuasion, rarely succeed and often result in clinicians refusing to participate (Degeling et al. 2003).

Furthermore, the changes proposed by the Coxa team would in some respects disenfranchise other hospitals, with which local municipalities had established close working relationships and a degree of mutual dependency. In the zero-sum game where health care operates within finite budgets, refocusing expenditure on endoprosthesis services at the Coxa Hospital meant that these resources could not be spent in local hospitals.

A key facilitating factor was the availability of quantitative data that illustrated costs and benefits. Pirkanmaa hospital district had amassed a considerable

amount of data on the results of its adoption of care pathways and, whilst these did not relate to any wider economic benefit, they validated the Finnmedi study and provided decision-makers within municipalities with additional leverage to promote and carry through mandates for change.

The Coxa team was mindful of the importance of consultations with key stakeholders. According to the former CEO of the Coxa team, Matti Lehto, the real breakthrough in changing mindsets and gaining comprehensive commitment to the project came not through formalized processes but through an intricate, delicate and time-consuming series of conversations, briefings, negotiations and persuasion undertaken away from the public spotlight. These processes prepared the ground for the publicly visible agreements with key stakeholders. This is a process often underestimated by strategists, planners and politicians, who are often driven by the need for quick tactical success rather than long-term sustainable strategic benefit. It is noteworthy that the politicians involved in the Coxa project stood back, only taking visible action where necessary to consolidate progress or open doorways.

The technical solutions

The technical solutions of the Coxa concept are innovative, but also reveal the part luck can play in such breakthrough projects. The business culture of the Pirkanmaa hospital district already had an open mind about outsourcing. The question therefore became not whether outsourcing would take place, but what form of organization, structure, capital financing and procurement route should be taken.

The Coxa vehicle

A range of options was considered to create the institution under which Coxa would operate. There were two principal ideas: a public utility or a limited company. The LAB (“Laboratory Centre”) concept (an existing model of outsourcing laboratory services established in Pirkanmaa) illustrated the viability of a successful public utility; that choice was informed by factors such as legislation, taxation, the status of professors and access to grants. On the other hand, Tampere city, the Finnmedi study, and internal consensus in the Pirkanmaa hospital district favoured establishment of an arms-length limited company.

Seen from the perspective of the hospital, there were compelling reasons for this option. Coxa would operate within Pirkanmaa hospital district, but with aspirations to sell services to other Finnish health districts, as well as across

Europe, for that matter. The independence associated with limited company status was seen as conferring a greater ability to adapt to changing market circumstances. Furthermore, Coxa Hospital would need to compete for health care workers, and a private status consequently allowed the freedom to set salary levels and to grant Coxa clinicians the right to treat their own private patients within the facility. Limited company status promised to free the hospital from the rigidities often ascribed to public institutions. It would no longer need to “queue” for public sector capital and to negotiate any constraints associated with public financing. However, the Coxa team also acknowledged the risks associated with limited company status. According to the former CEO, Matti Lehto,

... the main reason favouring that alternative [the limited company status] was the fact that as a public utility our profits would not come to our benefit, but, instead, it would go to this ‘Moloch’s mouth’ [referring to the predisposition of public services to always ask for more]. We were aware of Companies Act concerning a situation of something going wrong. But we decided to take the risk.

Negotiations commenced with potential stakeholders to create an adapted version of a limited company, which included the local municipalities and two local private Finnish hospitals (although only one, Orton, proceeded to be part of the limited company). By chance, a private sector German health care company, Wittgensteiner Kliniken AG, heard about the project. It indicated an interest in becoming a major shareholder with the express intention that Coxa would provide services to its German clientele. During the negotiation stage, Wittgensteiner was acquired by another German company, Fresenius, but this did not materially affect the proposal.

A limited company was duly created, as a public–private partnership. The public sector had a major shareholding, represented by Pirkanmaa hospital district and four municipalities. This contrasts with many other public–private partnership models, which are governed by contract agreements whereby a purely private sector vehicle provides public services under licence. Public influence over these models rests entirely in the original contract design and feasible periodic renegotiation. In Coxa, the corporate strategy is shaped by public and private interests and influence, with both represented on the board.

The shareholding was originally divided as follows: Pirkanmaa hospital district (35%), Tampere City (20%), Wittgensteiner Kliniken AG (20%), Orton Hospital (5%) and four Pirkanmaa municipalities (5% each). Coxa Ltd was officially established in February 2001.

Capital procurement

Advantage was taken of the freedoms available to limited companies during the capital financing and procurement stages. Although initial thought was given to leasing premises from Pirkanmaa hospital district, this was felt to be too restrictive. It was argued that there was long-term value in holding capital assets, particularly where such assets could be designed from the outset to deliver optimum synergy with work processes, at the time and also well into the future.

The chosen route was to tender (outsource) for a full turnkey design-and-build operation, with penalty clauses for any default in terms of time. Coxa's financial liability was limited to the agreed tender price. The tender process commenced in January 2001 with a 2-month lead time for return of tenders.

The Coxa team made considerable efforts to incorporate translation of service needs into design solutions. Architects tendering for the design contracts were provided with all of the hospital's proposed (systemized) care pathways, with an emphasis on current and anticipated service dynamics. The briefing was thus much more challenging and comprehensive than that which is usually observed in hospital projects. This resulted in very different interpretations of workplace synergy and adaptable design characteristics. The proposals received were reviewed internally by clinicians and nurses, and assessed technically by relevant experts from Tampere city. The successful design was produced by architect Pekka Koivula, and the construction awarded to Engel Ltd in March 2001. The project, developed on the Tampere University Hospital site, was completed on time and within cost constraints, and the hospital opened in September 2002.

A further feature of the project was the integration of information and communication technology (ICT) into the design and construction of the building, whereas in many cases, ICT considerations are often grafted in late, with predictable problems of fit and effectiveness. The ICT development was also outsourced. All other processes were handled internally, including financial forecasting and the development of the business case for raising capital. The capital was raised from the commercial banking sector. The collateral of future income streams was required as a guarantee, otherwise funding would not have been approved.

In summary, the key features of the technical and financial solutions for Coxa were:

- outsourcing of many aspects of the design and construction of the new hospital;

- minimal outsourcing of technical skills (apart from design and construction, and ICT);
- an innovative public–private partnership model with transparent public–private ownership and balanced influence at the board level;
- a turnkey design-and-build procurement process;
- an architectural concept built on the foundation of core (systemized) work practices, with the aim of ensuring life-cycle sustainability through adaptable design characteristics;
- independently sourced capital financing through a commercial bank;
- integrated ICT systems.

Coxa in operation

As the hospital opened in 2002, it is possible to make some tentative judgements about its initial performance thus far. Overall, Coxa exhibits many characteristics of success. Financially, the hospital seems to be secure (see Table 3.1).

Table 3.1 *Key economic indicators, 2003–2007*

	2003	2005	2006	2007
Turnover (million €)	12.7	21.3	29.5	25.0
Profit (€)	736 000	1 570 000	3 000 000	600 000

Source: Coxa Hospital 2008.

Clinical indicators are also promising, as detailed here.

- The number of endoprosthetic surgeries has increased from 1494 in 2003 to 2740 in 2007.
- Length of stay has been reduced. Patients attend hospital for review two weeks before the operation and most are operated upon on the day of arrival. The average length of stay is three days.
- A total of 90% of patients are transferred for rehabilitation to primary cared facilities and services.
- Hospital-acquired deep infection rates are exceptionally low: while the Finnish hospital average for this is 1–2%, the rate at Coxa Hospital is less than 0.1%, although it should be noted that this does not account for case-mix, as specialist orthopaedic hospitals in other countries also have much lower rates than general hospitals that admit unselected emergency cases.
- Coxa gives its patients a type of 10-year guarantee; if a revision operation is needed during this time, the patient (or the municipality) receives it at a 50% reduction in price.
- Coxa participated in the Best Workplaces in Finland survey and was ranked fourth among 75 participating organizations.

- STAKES (the Finnish government research agency for health care) has surveyed patient satisfaction in Finnish hospitals and Coxa has achieved exemplary ratings.
- Design synergy and effectiveness are illustrated by the fact that to prepare an operating theatre between sessions takes 19 minutes in Coxa, as compared to 1.5 hours when it was still a unit of Tampere University Hospital.

However, there have also been surprises and disappointments, as described here

- Coxa was startled to discover that legislation, clarified subsequent to the decision, required it to compete for business within Pirkanmaa hospital district – it has done so successfully against other competition, but this had not been anticipated. Coxa won based on quality, research and development, teaching and cost.
- Only 8% of Coxa's patients pay privately for their care (although this might also be seen as a success, since fewer individuals feel the need to seek private treatment).
- Although aiming to attract a wider national and European clientele base, Coxa sells 88% of all services to Pirkanmaa hospital district and has yet to penetrate the international market.
- Waiting times in Pirkanmaa hospital district had not changed dramatically up to 2005, despite legislation aiming to grant patients guarantees for faster access. However, a review of waiting times generated public pressure for action, resulting in greater uptake of services in 2007. Coxa's response to this was to build an extension to its original hospital building in 2006–2007, and at the time of writing Coxa has the capacity to carry out 3000–4000 endoprosthetic operations per year.

There have also been recent changes in shareholding. The international private health care market is rapidly configuring, with takeovers and consolidations between private hospitals. This has also affected Coxa. As mentioned above, Wittgensteiner AG was sold to another German company, Fresenius AG, which then stated that it had no ongoing interest in Coxa, as it did not at that time fit the business strategy of the company for expansion outside Germany. The relevant shares were subsequently sold in 2006 to Sitra, a Finnish state venture capital company with diverse interests (including health care). Sitra established Terveystaloy Oy, an investment venture capital fund with a mission to develop and reform health and social care services by taking ownership of companies that represent best practices in their field and are market leaders in their respective sectors. In addition to Sitra, investors in Terveystaloy Oy include funds, foundations and insurance companies. In August 2008, Coxa Ltd had the following shareholders: Pirkanmaa hospital district, Tampere

city, Terveysrahaisto Oy (a venture capital fund), the Invalid Foundation, the hospital districts of Vaasa, South-Ostrobothnia, Kanta-Häme and Päijät-Häme, and the cities of Valkeakoski, Vammala and Mänttä (Coxa Hospital 2008). This development is indicative of the appetite for innovative concepts and products that can be exploited for commercial gain. As a result, Coxa may have the potential to sell two types of product: its core clinical service, and its know-how in delivering more effective specialist services.

Conclusions

Coxa Hospital has made a successful transition from the public to the public-private sector, and has capitalized on decades of investment by Pirkanmaa hospital district in TQM, research innovation, and business and managerial skills. Coxa has delivered a facility that fits closely with its core services. The organizational model is also novel and is based on a unique partnership among a group of institutions, all with strong intertwined strategic interests: local government (municipalities), hospitals, universities and commercial interests.

Does this model offer lessons for elsewhere? Politicians and private organizations are attempting to cherry-pick apparent exemplars and to replicate them elsewhere. However, context is important and therefore caution is necessary.

The Coxa model contrasts with other examples where market forces have shaped provider systems and structures. In the United Kingdom, for example, a secondary market has opened up to trade in Private Finance Initiative (PFI) contracts. There is little intrinsic interest in health care on the part of the purchasers, who aim to exploit the payment stream within the PFI contract structures.

The experience of the Coxa Hospital illustrates the importance of focusing on quality and well-defined processes, and integrating those into patient pathways and facility design, as well as ensuring staff well-being. The Coxa experience suggests how this can be embedded in briefs and tenders for new health care facilities. It will be interesting to observe whether Sitra, the venture capital shareholders in Coxa, or other similar operators throughout Europe are patient enough to consider all these factors when rolling out the model, or whether the interest of generating short-term returns on their investment will prevail. Evidence from the PFI experience in the United Kingdom suggests that commercial interests predominate where the investors have little intrinsic subscription to health care values.

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Web link

Concept research project in Norway: <http://www.concept.ntnu.no>

Chapter 4

The John Paul II Hospital in Krakow, Poland, and the use of European Union grant funds

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Introduction

This case study describes the experience of capital investment in one of the new European Union (EU) Member States from central and eastern Europe (CEE). The John Paul II Hospital in Krakow, Poland, has undertaken significant investments in recent years, partly with the help of EU funds. While the hospital has attracted widespread recognition of its achievements, a number of important challenges remain and are discussed here. These include the lack of an overall national health policy framework for capital investment and the cumbersome nature of EU Structural Funds procedures.

Background ¹

The major health issues facing the Polish population are similar to those in other European countries. They include population ageing, as well as an increasing number of disabilities and lifestyle-related diseases. Since 1989, the country's health system has seen successive waves of reform.² At the time of

¹ This section draws extensively on Whitfield, Kautsch & Klich (2000), in particular the chapter on *Health and health care – universality and particularity*.

² Some material in the *Background* section has been adapted from Kuszewski & Gericke (2005).

writing, mandatory social health insurance contributions constitute the main source of health financing. Other sources of revenue include out-of-pocket payments, private insurance schemes, and government funding for highly specialized services. The social health insurance scheme is administered by a National Health Fund, a non-profit-making body that, in 2003, replaced a decentralized system of 17 sickness funds. Out-of-pocket payments, both formal and informal, are mainly paid for ambulatory services provided outside of the social insurance scheme, and for pharmaceuticals and medical devices. In 2006, 30.1% of total health care expenditure came from private payments (WHO Regional Office for Europe 2009).

Responsibility for the management and financing of the health system is shared at the time of writing between the Ministry of Health, the National Health Fund, and the “territorial self-government administrations” at the level of provinces (*voivodships*), counties (*powiats*) and municipalities (*gminas*). Since 1989 the Ministry of Health has developed into a regulatory body that is intended to set standards and establish frameworks for major capital investments, medical education and health policy.

The National Health Fund does not own any health care facilities or organizations, but negotiates and concludes contracts with providers for the supply of health services, through both national and regional offices. Since 1999 each of the territorial self-government administrations has had health authorities responsible for general planning and strategy, identification of population health needs, health promotion, and management of publicly owned health facilities. Territorial self-government administrations (in particular at the levels of provinces and counties) are also owners (so-called “governing bodies”) of the majority of health care units in public hands (Kuszeowski & Gericke 2005).

As a result of the reforms initiated after 1989, Poland has experienced significant improvements in health care management, most notably a reduced average length of hospital stay to 6.4 days in 2006, compared to 9.0 in the enlarged EU (WHO Regional Office for Europe 2009), and an increased emphasis on health education and promotion. The number of acute hospital beds per 100 000 population declined from 606 in 1989 to 410 in 2006, which was only slightly above the EU average of 395 per 100 000 population in the same year (WHO Regional Office for Europe 2009). Remaining challenges include ensuring equitable access to health care and sustainable financing of the publicly owned health system (Kuszeowski & Gericke 2005).

A general move towards decentralized management of health services, largely abandoning the earlier system of central planning, has strongly influenced the Polish health system. Following the economic upswing in the early 1990s,

modern medical technologies have been introduced into many health care institutions. Advanced technologies were first introduced into university hospitals, followed rapidly by provincial hospitals.

One of the most important pieces of new legislation was the Health Care Institutions Act of 1991. This Act facilitated a radical shift in the financial and organizational arrangements of all health care institutions, and was instrumental in introducing the idea of the family physician. Outpatient specialized care is provided by private practices and hospitals. Reforms from the early 1990s onwards have also introduced regulation of procurement (affecting the purchasing function and the use of all public funds), of pharmaceuticals, and of the medical profession.

The 1993 regulation on contracting increased the scope of managerial autonomy as applied to medical services. The first contracts, although still on a very limited scale, were signed in 1994 with dental technicians, dentists and emergency care services, by the physician-in-chief in Suwalki province. As the number of physicians able and willing to sign contracts grew (strongly influenced by the development of family medicine and independent practitioner services), this created a pressure on public purchasers (at that time, the institution of the province physicians) to begin contracting with them and create a market for medical services.

The Polish health system has faced a continuous debate about hospital expenditure. Although there is an expectation that hospitals will improve their efficiency and work within their allocated resources, experience has shown that the Government has been prepared to write off hospital debts. This is seen as counterproductive, as it produced perverse incentives (“moral hazard”), effectively creating the expectation that hospitals would operate in excess of their income.

The health care delivery system in Poland is, in some ways, still shaped by the country’s communist past. Primary care in Poland has never been strongly developed and still does not play the role it does in most Western health systems (Kuszewski & Gericke 2005).

At the time of writing, hospitals continue to be treated in many respects as social care facilities. Since there is no distinction between acute and long-term beds, many patients with long-term chronic conditions are kept inappropriately in expensive acute facilities. This problem is rooted in the reimbursement mechanism, which is based on infrastructure, regardless of activity. To a certain extent, hospitals still receive the same income for beds with low-dependency patients, as they do for beds with high-dependency patients requiring expensive investigations and treatments. When the hospital reimbursement system was

changed in 1999 with the introduction of the Common Health Insurance Act, hospitals admitted low-dependency patients to fulfil or even exceed contract activity obligations (defined as the number of patients), which allowed them to increase their revenue. Prior to 1999, hospitals were paid according to the number of bed days; after 1999 they were paid per admitted patient. Attempts to separate care facilities for low-dependency patients (such as day care or home care) have fallen foul of difficulties in the reimbursement system from both the provinces (before 1999) and – at the time of writing – the National Health Fund. Specifically, the problems in the reimbursement system concern a lack of interest in calculating correctly the cost of services. There is also an institutional reluctance to move low-dependency patients out of the acute hospital environment – which would inevitably result in some hospitals becoming home care institutions – coupled with a failure to increase payment levels for high-dependency patients. There continues to be a shortage of chronic and palliative care facilities.

At the same time, the Polish economy has been among the fastest-growing in Europe, and gross domestic product (GDP) per capita has increased substantially. This has resulted in an increased availability of funds for health services. The most important new source of funds available in the health sector in recent years has been EU pre-accession and regional fund programmes.

The John Paul II Hospital

The John Paul II Hospital is located in Krakow, the capital of the Małopolska province. It is a province-level hospital with some university wards, and responsibilities including highly specialized care, teaching and research. The profile of the hospital aims to reflect the needs of the population across the province, and is designed to ensure specialist medical care of the highest quality, in particular with regard to cardiovascular, respiratory and infectious diseases. In 2008 the hospital had 526 beds across 13 wards (including 4 clinical wards). Over 20 000 patients are admitted annually and over 80 000 outpatient consultations take place per year (see Fig. 4.3 and Fig. 4.4).

Each year the hospital provides approximately:

- 8000 procedures in interventional cardiology
- 2500 open-heart operations
- 1300 thoracic procedures and operations
- 1000 cardiac pacemakers and defibrillators
- 800 000 laboratory tests.

Fig. 4.1 *Number of diagnostic services in John Paul II Hospital, 2002–2008*

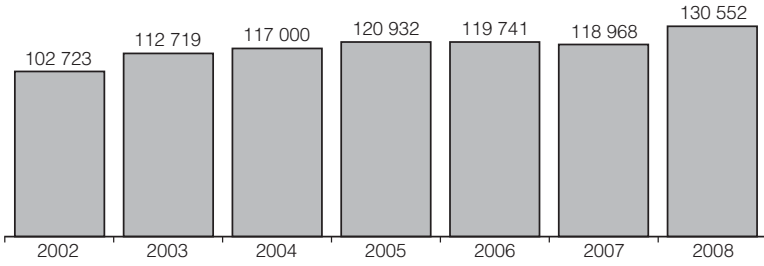
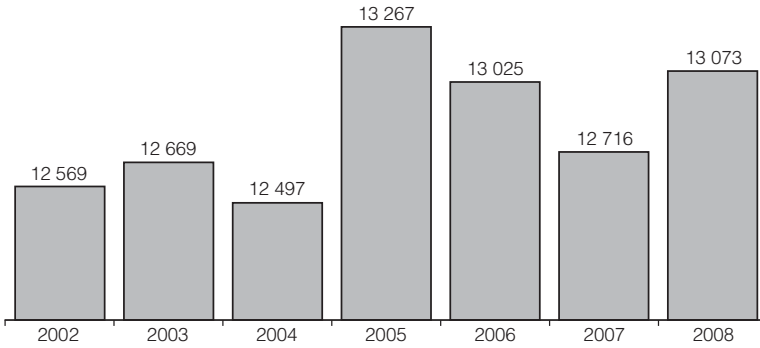


Fig. 4.2 *Number of procedures and operations in John Paul II Hospital, 2002–2008*



The present and planned future configuration of the hospital is designed to extend the range of medical services and to assure continued treatment through the modernization of existing facilities as well as, if necessary, the construction of new ones.

Construction of the original hospital, called at that time a “Municipal Institute of Health”, within a tuberculosis sanatorium, was completed in 1917. Evolving patient needs and a changing health system have prompted an updated vision, with an emphasis on innovative, preventative treatments, and new technologies that can be used to develop programmes of care for children, young people and adults, including education, prevention, early diagnosis, up-to-date treatment, and scientific research.

The hospital’s administration and clinical management envisage implementing a holistic concept of health, to include not only the traditional range of hospital services but also – for example – a gym and swimming pool, health-promotion programmes, and education on diet and exercise. The long-term goal is to create a technologically advanced health care facility, incorporating new medical and

technical solutions and collaboration with leading medical centres in Europe. Achieving such goals requires both development of research infrastructure and technology transfer. At the time of writing, the John Paul II Hospital is recognized as a unique institution in Poland. Its state-of-the-art technology, including a broad range of diagnostic imaging modalities, allows it to provide a diagnostic and therapeutic continuum, particularly in its specialty area of cardiac diseases.

As a tertiary hospital, the John Paul II Hospital admits patients who have been referred from physicians working in primary or secondary care, although in emergency cases a referral is not required. Changes that came into effect with the introduction of the National Health Fund allow patients to be admitted from any part of the country.

Decisions concerning the operation of the hospital are made independently by the hospital chief executive officer (CEO), although the CEO may delegate some of her/his responsibilities to deputy directors. Financial and investment decisions are approved by the Non-Executive Board, an advisory body, which (by law) is appointed by the owner of the hospital (the Małopolska province government). The hospital CEO reports to the provincial government.

In 2007 the hospital employed 1473 individuals, including 259 physicians, 568 nurses and 357 paramedical staff. The hospital has prioritized investment in the quality of care provided by its staff and was certified to ISO 9001:2000 standard for quality management of inpatient and outpatient treatment, care, diagnosis and rehabilitation in 2004.

The John Paul II Hospital in relation to primary and community care

As already noted, the Polish health system remains focused on hospital capacity and, despite some recent advances, primary care is still underdeveloped. However, the John Paul II Hospital has developed outreach activities in the areas of health promotion and disease prevention. An example is its participation in the Małopolska Programme for Prevention and Treatment of Cardiovascular Diseases 2007–2013, funded by the provincial government. The hospital's educational work also includes the programme "Health education and cardiovascular and respiratory prevention in young people", carried out by the Centre for Diagnosis, Prevention and Telemedicine in cooperation with Krakow municipality and local schools. Because smoking cessation programmes play an important role in the prevention of cardiovascular disease, the hospital has, in a similar vein, implemented the preventive programme "Prevention of nicotine consumption – comprehensive treatment of nicotine abusers".

Looking ahead, the hospital also plans to develop a centre (“Help & Hope”) for health-promotion activities, which is envisaged to provide training programmes for health educators and the population of the province. These plans have been already approved and funds secured.

The John Paul II Hospital belongs to the Polish Network of Health Promoting Hospitals, established in 1992, comprising over 120 hospitals. Participating hospitals commit themselves to implementing activities in the following five areas:

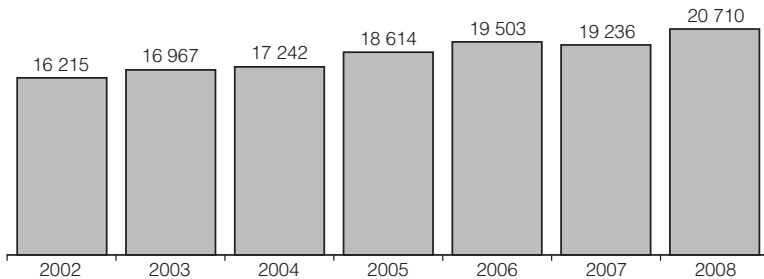
- health promotion
- health education activities
- health and nutrition
- anti-tobacco and anti-alcohol activities
- collaboration with local communities and governments in health-related projects.

Activity levels

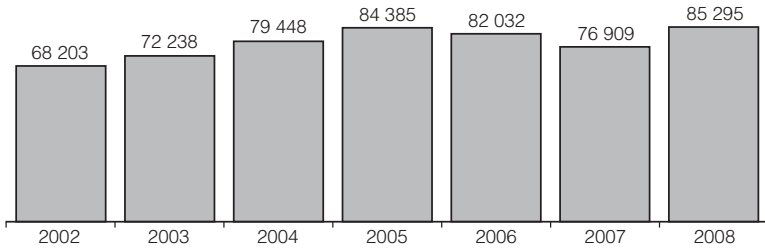
The number of inpatients in the hospital has been increasing (Fig. 4.3), for several reasons. Apart from an ageing population and better awareness of – and access to – modern medical technologies, the mechanisms for purchasing health services have been particularly important. Payment mechanisms of the National Health Fund provide an incentive for health care providers to maximize inpatient treatment and decrease the number of outpatient services.

In response, the hospital has expanded its range of programmes, both for inpatients and outpatients. Implementation of projects co-funded by the EU has resulted in major alterations of the hospital structure, enabling new modalities of diagnosis and treatment. These projects and the health-promoting activities of the hospital are believed to have improved the quality, scope and availability

Fig. 4.3 *Number of inpatients in John Paul II Hospital, 2002–2008*



Source: Authors' own compilation.

Fig. 4.4 *Number of outpatient consultations in John Paul II Hospital, 2002–2008*

Source: Authors' own compilation.

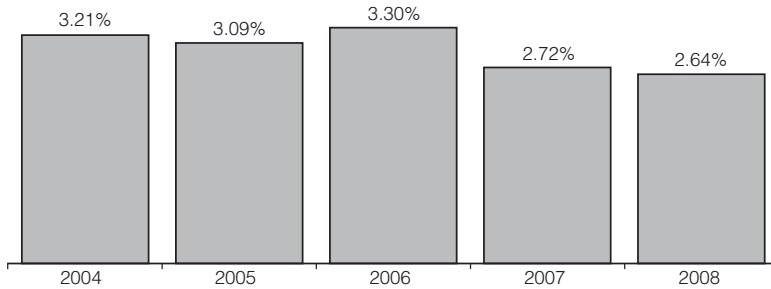
of medical services, shortened waiting lists and increased the number of admissions. While the hospital had introduced changes and innovative medical technologies in the past, these efforts have been strengthened through accession to the EU.

While its community outreach programmes are expected to bring long-term benefits, they do not affect waiting lists for medical services in the short term. Because primary care, health promotion and preventative medicine have never been government priorities, there is little incentive for public purchasers to invest adequately in improved primary care measures.

Funding of services

Prior to the major reform of health financing in the late 1990s, the hospital – as was the case with all other publicly owned health care providers – was financed from the state budget. All funds, including both current expenditure and capital investment, came from the same public source. The switch from a tax-based budgetary system to a health insurance model changed this. The hospital is now an independent health care institution which provides medical services on the basis of contracts with the National Health Fund. Health care services include inpatient care, outpatient consultation, diagnostic services, rehabilitation, prevention, some highly specialized procedures, home oxygen therapy and medical transport.

Individuals covered by the compulsory health insurance system are entitled to free hospital or outpatient treatment and diagnostic tests if they have a referral from a physician who has signed a contract with the National Health Fund. Highly specialized diagnostic tests (magnetic resonance imaging (MRI), computed tomography (CT) scanning, scintigraphy and angiography) are also performed following referral by a specialist or a hospital that has signed a contract with the National Health Fund. Highly specialized procedures, such as heart transplantation or operations requiring extracorporeal circulation, are

Fig. 4.5 *Proportion of the hospital's overall income from private health care, 2004–2008*

Source: Authors' own compilation.

Note: 2008 data are provisional.

financed from the central government budget on the basis of contracts with the Ministry of Health rather than the National Health Fund.

The hospital also carries out procedures on a private basis. Uninsured patients or those who do not have a referral cover the costs of treatment from their own resources or from voluntary insurance. Although the hospital seeks to expand its private health care, it still constitutes only a small proportion of the total budget (Fig. 4.5).

National, regional and local planning

The concept of central planning of health care attracted little support in post-communist Poland and has suffered from a lack of legislation that would make it possible to translate the Government's overall goals into tasks and programmes. This has jeopardized Poland's ability to access EU funds (see the following sections). The lack of consistent strategic policies at the national level concerning investments in the health sector has made it difficult for hospitals to carry out capital investment programmes. This can – to some degree – be overcome by regional authorities. Some regional authorities, including Małopolska province, have developed strategies that are adapted to their health needs. Furthermore, there has always been a strong health component in the overarching regional strategic development plan for Małopolska. The John Paul II Hospital has endeavoured to match its activities to regional health needs and to the regional strategic development plan, which has helped to attract the support of decision-makers and to raise substantial funds for development.

The strategic goal of the Małopolska health care programme is to improve the health and quality of life of the population of Małopolska province through modification of health-promoting factors, reduction of inequalities in health and in access to medical services, and improvement of the quality and efficacy of the regional health care system.

Capital investment funding

At the time of writing there are no legal restrictions on financing capital investments and the hospital uses various sources of funds, including those from the central and regional governments and the EU.

Central and regional government funding

Central government funds are available for capital investment in infrastructure and equipment needed for highly specialized care, based on annual contracts with the Ministry of Health. This includes heart and lung transplantation and other major cardiovascular procedures, undertaken within the framework of the National Programme for Prevention and Treatment of Cardiovascular Diseases. In addition, the Ministry of Health, via the government of Małopolska province, has supported the hospital's activities and facilities in relation to early diagnosis.

One of the main sources of funds for capital investment is the government of Małopolska province. The province owns the facility, and its capital investments must be approved by the regional parliament as part of the provincial budget. The most recent investments funded through this route amount to total costs of Zł 11.57 million (€3.13 million), with the hospital contributing Zł 2.23 million (€605 000) from its own funds. This investment contributed to:

- modernization and development of the thoracic surgery ward
- modernization of the hospital chapel
- development of an outpatient department and early diagnostic centre.

International funding

Support from EU programmes has been essential for the development of the hospital and, while most of the initiatives that have received financial support from the EU could have been undertaken with funds from other sources, they would have taken much longer to implement and would have been more limited in scope.

The hospital participates in the eTEN (Deploying Trans-European e-Services for All) programme. This EU programme helps to stimulate the deployment of innovative, trans-European e-services of social or economic interest. Within the eTEN programme, the hospital participates in the Medical Care Continuity (MCC) project, which is developing a new service for hospital-at-home care. This allows follow-up of oncology patients to take place at home, using the Internet and a call centre. Other partners in the project are in Belgium, France and Italy.

The hospital has also started a project entitled “Health incubator” (the investment module) within the framework of the Integrated Regional Operational Programme (EU Structural Fund support for socioeconomic development) to improve its competitive position by considerably enhancing the diagnostic capabilities of the hospital. The project consists of:

- upgrading the MRI scanner and purchasing state-of-the-art medical equipment, including, linear transducers, upgrade to Leonardo Circulation, nucleic acid detection module, open-magnet MRI scanner of medium field strength and digital densitometer;
- modernization and acquisition of equipment for digital imaging facilities to assure integrated and comprehensive image analysis and interpretation.

Aside from capital asset funding, the hospital collaborates with Health ClusterNET: a network of European regions supported by the INTERREG IIIC initiative (an EU-funded programme that helps Europe’s regions form partnerships to work together on common projects). It comprises 13 European regional partners collaborating to improve the contribution that health care sector spending – including capital asset investment – makes to regional development (Erskine, Dowdeswell & Watson 2006).

Using European Union Structural Funds

In broad terms, EU Structural Funds aim to promote economic and social cohesion, achieve the strategic objectives of employment policy, and facilitate structural reform in agriculture, rural development and fisheries, among other sectors. Health in general, and health capital investment in particular, have so far not been included specifically in the Structural Fund programmes. However, the programmes include explicit mention of “productive investment”, “infrastructure”, and “local development initiatives” (European Commission 2008). Numerous institutions across the EU, especially in the newer Member States, have made a strong case for co-financing investments in health infrastructure on the grounds that such projects help to improve access to health care, remove some of the inequalities between regions, and decrease population health inequalities among Member States. The John Paul II Hospital has been successful in applying for Structural Funds and in implementing co-financed projects. It is worth considering in some detail the process that institutions have to undergo to make a successful bid, and the advantages and disadvantages inherent in this process.

In common with similar procedures in other Member States, Polish health care institutions have to obtain approval by the Ministry of Health that their proposal is in line with the National Development Plan, and to check eligibility

with the European Commission's Operational Programmes before submitting any project for Structural Fund support. The next step is the preparation of the Programme Complement which sets out the strategy for realizing the goals defined in Operational Programmes. The Programme Complement within each priority area gives details of activities that can be funded, project selection criteria, final recipients, and how the programme will be monitored. The Programme Complement also describes the system of implementation, including the tasks to be performed by the institutions responsible for the management, implementation and monitoring of activities and the project selection criteria.

The preparation of the Programme Complement is time-consuming and a considerable drain on resources. Time and resources spent on preparation also have to be contrasted with the time that a project would take to be approved if it were funded solely from state funds or the private sector.

The call for proposals begins with a long, somewhat tedious process of preparing a grant application. The experience of the John Paul II Hospital is that the relevant EU web sites often contain only limited information, and much important information only comes to light during the actual practice of preparing a project proposal. It is true that assistance is generally available from the European Commission and in emergencies one can count on direct contact with the DG-Regio desk office to obtain clarification or explanation, but the lack of concrete information (for example, on reporting protocols for project progress) still hampers the detailed creation of a financeable project proposal.

For the beneficiary of EU Structural Funds, there is a long list of duties and responsibilities, including preparation of the proposal, forming relationships with other potential partners, assuming legal responsibility for the contract with the fund provider, establishing machinery for project management and monitoring, and setting up procedures for accountancy and information management.

It is worth noting that even once approved and under way, the contract for a project can be terminated if there are significant irregularities in the way the project is carried out (such as a breach of Community law; any act that has caused fiscal damage to the European Commission budget; any breach of regulations regarding EU funding or national public funding). Furthermore, if a contract is terminated, funds hitherto received must be returned.

Despite the administrative and fiduciary baggage that accompanies EU Structural Funds, the projects thus co-financed at the John Paul II Hospital have helped to achieve important goals, such as:

- installation of up-to-date technology in hospital wards;
- increased availability of comprehensive medical examinations;
- improvements to the overall quality of medical services;
- better research and development infrastructure;
- more and better communications (Internet services, promotional materials, facilitation of conferences and seminars);
- creation of databases and systems of data exchange.

Two examples of projects co-financed by the EU (within the framework of the Integrated Regional Operational Programme (IROP), one of seven operational programmes used in implementing the 2004–2006 National Development Plan/Community Support Framework that sets the national framework for the use of Structural Funds) are:

- digitization of the echocardiographic and mammographic system of the hospital (EU funding 75%; hospital funding 25%);
- the John Paul II Hospital – eHospital: Formation of a digital platform for medical data and teleconsultation (EU funding 75%; hospital funding 25%).

In recent years, the most important investments in the hospital – including the development and modernization of facilities and capital investment in equipment for wards and administration – have been completely or partially funded from EU sources, with contributions from hospital resources and other funds. Medical equipment was purchased either as part of separate purchasing projects or within the framework of major investments encompassing refurbishment and reconstruction.

Three recent examples are detailed here.

- The Centre for Diagnosis has been equipped with a modern digital mammography system and new echocardiography equipment within the Digitization of Echocardiography and Mammography Systems Project, co-financed by the IROP. The total cost of the project was Zł 2.9 million (€784 225), of which Zł 2.1 million (€572 111) was financed by the EU.
- The Centre for Diagnosis obtained an MRI scanner within the Health Incubator project (investment module). The total cost of the project was Zł 4.8 million (€1.3 million), including co-financing by the European Regional Development Fund (ERDF) of Zł 3.6 million (€965 560) and the central government budget of Zł 1.2 million (€321 840).
- A CT scanner was installed at the Centre for Diagnosis and Rehabilitation of Heart and Lung Diseases, Poland's and central Europe's first institution to introduce this equipment.

Although these expenditures seem modest by reference to programmes elsewhere, they are significant in terms of the investment otherwise made by the hospital during recent years, or that which would have been feasible in the same time frame from national, regional and the hospital's own resources.

The primary aim of these projects has been the improvement of medical services with the application of modern diagnostic and interventional techniques using state-of-the-art digital technology.

The experience gained and lessons learned during the implementation of the aforementioned projects enabled the hospital to be better prepared for the 2007–2013 programming period. It initiated two large-scale regional projects on emergency medicine and medical technology research, with total funding exceeding €35 million. Both projects were envisaged to be co-funded through EU Structural Funds.

Conclusions

The John Paul II Hospital in Krakow now provides up-to-date treatment that is unavailable in many other centres in Poland. The achievements of the hospital have been recognized by various organizations and the institution has won numerous awards and prizes. EU Structural Funds has been a valuable resource in achieving this progress but available funds so far fall significantly short of what is needed to meet current investment demands. Further, there have been problems, such as difficulty in absorbing Structural Funds, due to the limited time frame in which these funds are to be used. Finally, the absence of an explicit health policy at the national level, coupled with frequent changes of government, has produced instability. Since there are no clearly defined national goals, it is difficult for health care providers to rely on long-term support from the central State.

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Chapter 5

The New Karolinska Solna Hospital, Stockholm, Sweden

Barrie Dowdeswell, Birgitta Thellman Beck, Erik Gjötterberg

Introduction

This case study follows the early stages of the redevelopment of Karolinska University Hospital, Solna, Stockholm, one of the largest single-site hospital developments in Europe, with a value of over €1.4 billion. The development is being undertaken within the framework of a larger regeneration of the surrounding urban environment, the Norra Station (North Station) area of Stockholm. The New Karolinska Solna (*Nya Karolinska Solna*) Hospital is scheduled for completion in 2015. This chapter describes the development of the initial concept and the proposed procurement route.

Stockholm county council

Stockholm county council is the largest of 20 county councils in Sweden. Swedish county councils have primary responsibility for the delivery of health care, under the overall strategic direction of the national Ministry of Health and Social Affairs, within a framework negotiated between the Ministry and the Swedish Association of Local Authorities and Regions.

In Sweden, health care costs are equivalent to approximately 9% of gross national product (GNP), most of which comes from county taxes, with only a minor portion (about 15%) from central government revenue. The elected county assemblies have independent powers of taxation and, in Stockholm, the current county council tax rate is set at 12% of total personal taxable income. The county council has a workforce of 45 000 employees and serves 1.9 million

inhabitants. There has been an 11% growth in population since 1998, with a further anticipated rise of 11% between 2008 and 2017 (Stockholm County Council 2009).

The changing demands on health care in Sweden have many features in common with other European countries, such as an ageing population and an increase in chronic diseases, although Sweden does differ from many other parts of Europe in that the country's death rates from many common diseases are extremely low. As in other countries, the demographic and epidemiological changes are challenging the traditional hospital-centred model of health care. There is a trend towards more integrated and community-focused care, reshaping hospital systems and structures, and investing to a greater degree in innovation and knowledge diffusion.

Drivers of change

The rapid pace of change catalogued throughout this volume is especially relevant for academic medical centres, which must remain at the forefront of service innovation while providing dynamic research and learning environments. In 2000, Stockholm county council embarked on a detailed review to inform the redevelopment of its health care services (Thellman Beck, not dated). It concluded that there was a substantial overlap between acute hospitals in Stockholm county council's catchment area. The Karolinska Hospital Solna and Huddinge Hospital – both university hospitals close to one another – were especially affected, but there was also considerable overlap with services provided in other hospitals in the public and private sectors. This was a major concern, not least because all hospitals were competing for scarce resources and specialist expertise. The review also recognized the need for hospitals to adapt to changing circumstances, in particular the way in which technological developments were driving both increased specialization inside hospitals and offering scope to deliver more care outside the hospital setting. These developments were changing the role of the hospital from being the fulcrum of patient care to becoming just one of many players in the complete chain of care.

The analyses underpinning the review identified scope for greater efficiency. Among the 250 urgent and emergency care pathways they identified within acute hospitals, they estimated that underutilized and underperforming care lines (in part a result of service duplication) could waste up to SEK 500 000 (€46 337) per pathway, the average care pathway being valued at SEK 5 million (€460 000) (Thellman Beck, not dated).

The survey also highlighted a major paradox in modern health care: even as new medical technologies facilitate shorter lengths of stay and thereby improve the

cost–effectiveness of hospital resources, medical advances are also increasing the range of care available. This tends to be focused on people at either end of their lifespan – infants and elderly people – and generates additional demands for increasingly specialized services. Tertiary-level research-oriented hospitals are at the forefront of these developments. The review also emphasized the need for much better linkage between health care, research and education (Thellman Beck, not dated). Strengthening the links between research and specialist services was accorded high priority, to sustain the role of Karolinska Hospital Solna as a leading research institute. This acknowledged Karolinska’s role in research-driven innovation, but also identified the need for better knowledge dissemination, skills enhancement and continuing education. The challenge for Stockholm county was how to strengthen the role and reputation of its teaching hospitals in research and education, whilst at the same time reshaping services and structures to deliver integrated models of care that place greater emphasis on providing services as close to the patient’s home as possible.

The Stockholm county council service vision

In September 2004 Stockholm county council published its *3S Study* on the structure of medical care. The study included reports on paediatric care, laboratory medicine, and the facilities at the Karolinska Hospital site in Solna. The report proposed a reconfiguration of hospital provision.

The structure proposed is similar to that adopted by some other European health systems and encompasses the development of integrated care pathways, supported by appropriate funding mechanisms. Funding mechanisms are designed to shift the emphasis from hospital providers to care processes, in essence staffing processes instead of premises. This approach aims to improve quality and effectiveness, and to tackle inefficiencies identified during the previous county review. It also seeks to provide hospitals with greater clarity about their new roles. One idea is to shift much of the responsibility for coordination of care from the purchaser to the provider. The aim is to allow the purchaser to focus more on purchasing, as well as monitoring and measuring the effectiveness of disease management strategies, whilst the provider is required to promote cross-boundary coordination. By the end of 2008 this concept was only at a pilot stage and future progress is to be coordinated with changes in hospital configuration, including the redevelopment of Karolinska Solna.

The *3S Study* concluded that “there are functional and financial reasons for having only one university hospital in the county” (Stockholm County Council 2004). The two university hospitals, Karolinska Solna and Huddinge, were therefore merged on 1 January 2004 to become Karolinska University Hospital,

with joint management arrangements. The new management team was to develop Karolinska into an internationally competitive university hospital.

A core element involved ensuring that Karolinska University Hospital will have a more clearly defined role within Stockholm county, with a shift of some care (including some specialized functions) into the community, while other acute hospitals, primarily Sodersjukhuset, Danderyd Hospital, St Goran's Hospital, Norrtalje Hospital and Sodertalje Hospital will be redeveloped, remaining as acute care hospitals but working in closer cooperation with community health care and providing ambulance and paramedical support services. There will be a complementary development of specialist surgical, diagnostic and therapeutic centres. The greatest change in patient flow is envisaged at Karolinska Solna, where the number of visits to accident and emergency services is predicted to decline from 78 000 per year at the time of writing to fewer than 50 000, while the number of acute inpatient care episodes is predicted to decline by 7000 per year. This refocusing of care, together with a greater emphasis on more specialized outpatient and day care, is expected to reduce the number of inpatient beds required at Karolinska Solna to 600 (about 80–100 fewer than in 2008). Karolinska Huddinge will largely retain its patient volume and there will be some transfer of patients to three other large acute care hospitals: Sodesjukhuset, Danderyd and St Goran's. Approximately 100 new beds are to be created in the community health system by 2013, mainly for elderly and chronically ill patients.

The final question was why Karolinska Solna should be replaced rather than refurbished. The review of the current property stock of Karolinska Solna was unequivocal: the hospital was spread over 40 buildings, with weak connections and logistics. Furthermore, many buildings were old, outdated and unsuitable for the provision of modern hospital services. Redevelopment was also deemed to be too expensive, with an estimated cost of SEK 7 billion (€650 million) over 10 years (Stockholm County Council 2004), relative to the functionality of the refurbished site and by comparison with a new build.

A service, research and training partnership

Karolinska University Hospital is closely affiliated with Karolinska Institutet (Karolinska Institute), which is one of Europe's largest medical universities and also Sweden's largest centre for medical training and research. In 2007 the Institute had about 6000 full-time students and about 4000 full-time employees (Karolinska Institutet 2007).

Karolinska Institute comprises research centres in a range of medical areas. Research centres generally consist of several different research teams sharing

equipment and premises. Cooperation and information exchange among disciplines and between preclinical and clinical research groups is encouraged, as is close interaction with clinical practice and patients.

As Stockholm county council is responsible for the majority of health care services offered in the county, it is among Karolinska Institute's most important partners in education and research. Karolinska Institute and the Stockholm county council have joint responsibility for creating and supporting an integrated research infrastructure, and are working together to ensure that clinical research is aligned with the long-term needs of the health care sector. This alignment is hoped to reduce the time needed to translate new scientific discoveries into clinical practice.

Approximately half of the university's research activities take place in clinical settings, mainly at Karolinska University Hospital and other affiliated hospitals and primary care centres in the county. Most clinical professors at Karolinska Institute also work as senior physicians in hospitals.

Modern infrastructure (such as equipment and ICT, but also core facilities) is essential for research and education, but is becoming increasingly expensive. An Infrastructure Board has been established by the Karolinska Institute - Stockholm county council (KI-SCC) Leadership Group to assist with planning and prioritization. The Board is envisaged as a link between the New Karolinska Solna and the Karolinska Institute that can facilitate planning and implementation of the hospital project in a way that ensures synergies between the two organizations.

Developing the concept

In May 2005 the county council assembly adopted the *3S Study* as the basis for planning the New Karolinska Solna. It decided to undertake a preliminary design competition, with the winning entry to be adopted as the basis for the further development of the project. The competition encompassed the design of a new hospital building complex and new research laboratories, with the aim of linking the service, research and training roles of the hospital and strengthening its relationship with the Karolinska Institute. The values and vision of the future university hospital were incorporated in the call for submissions and described the new hospital as:

- integrated but independent
- changeable yet constant
- efficient but respectful and human
- a successful union of creativity, productivity and care.

The approach taken was a departure from the normal trajectory of project development in health care. Few, if any, major capital schemes of this scale in Europe have opted for a preliminary design competition. It placed greater emphasis on the benefits of good design and removed the inhibiting effects of single-stage tender processes on design innovation. Five international teams of architects participated from a short-list of 19 original applicants. The proposals were assessed anonymously by a jury, with representatives from the Stockholm county council, Karolinska University Hospital, Karolinska Institute, the City of Stockholm, Solna City, Locum AB, Academiska hus Stockholm AB and the Swedish Association of Architects. The jury was selected both to provide a balanced representation of interests and to build stakeholder relationships for subsequent phases of the project. The jury was unanimous in selecting “Forum Karolinska” created by White Arkitekter AB Stockholm, a decision that was approved by the county council in September 2006. The winning proposal was seen to have offered the best interpretation of the vision and a good basis for the further development of the project. The jury’s justification for the choice was as follows (Stockholm County Council 2006).

The Forum Karolinska proposal is of a simple, efficient and sustainable structural construction, excellent internal logistics, good internal environment, qualities of town architecture and an architectonic design concept which in total give conditions for development into a building of high class. Forum Karolinska is also a proposal that offers the sustainable main context that will be needed in continued work in developing the high-class research and teaching hospital that the competition envisages.

The accent on sustainability seems to have been a major factor in the selection process.

Following this decision, the winning proposal was developed into a project programme. The introduction to the project programme recognized that the rapidity and unpredictable nature of change will be a major factor influencing the final shape of the project. It avoided the “rush to build” often seen in failed capital investment projects. The project programme is instead “a draft programme which proposes main concepts, overall structures and solutions, interpretations, interiors and exterior environments and technical systems for the new hospital”. It is “a basis for continued work”. The project programme has two main aims: “to give an account of, and illustrate, the outline proposal for a new university hospital in Solna”, and “to constitute a steering document within the framework of the ongoing project” (Stockholm County Council 2006).

The statement of intent for the project sets out its main purpose (Stockholm County Council 2006):

- “The task of the new university hospital – New Karolinska, Solna – is to provide care, research and education on a large scale and of excellent quality.
- The new university hospital shall be the hub of a national and international competitive university medical system.
- It shall be a special hospital for the region, with emphasis on highly specialized care.
- The new university hospital shall assume a central role in the development of Stockholm region into a biomedical centre of force.”

This statement of intent reflects the intensely competitive environment in which international medical research and education operates. It also acknowledges the role ascribed to it by Stockholm county council within the overall service framework.

The programme avoided specifying the levels of activity of the New Karolinska Solna in terms of medical care, research and training. It proposed instead that these should be identified and implemented as late in the process as possible, with an envisaged date of 2010 for this work to be completed. One of the most important reasons for waiting before establishing activity levels and content is the rapid development of medical technologies. Highly specialized care today will not necessarily be highly specialized when the New Karolinska Solna is expected to commence activities in December 2015. Another reason for keeping options open was a possible government proposal for fewer or larger county councils, which may have consequences for Stockholm county council. There may also be changes within the county’s medical care structure, as well as unforeseen issues arising from the profiling of activities between the Solna and Huddinge sites.

The next stage in the development of the project was to identify the project goals more clearly. These were set out as follows (Stockholm County Council 2006):

- “Medical care, research and education shall be so integrated that they efficiently support the production and distribution of new knowledge as regards care of seriously sick and injured patients.
- The project shall create attractive, human environments with high architectural values, both within the hospital and in its immediate vicinity.
- The care processes shall be made efficient and utilization of resources optimized.
- As far as possible, the project shall work with general solutions that permit continuous development of the site.

- The hospital and its activities shall be given a prioritized and clear role in the city.
- The project shall work on the basis of a sustainability perspective at all levels.”

These project goals created the framework for the subsequent development of the project, as well as the procurement objectives and form of delivery.

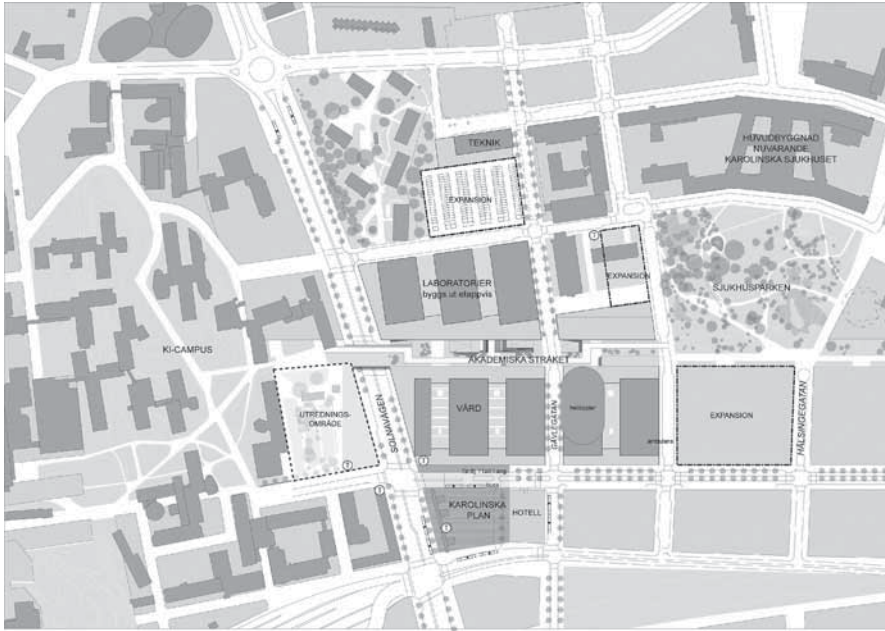
Design

The design concept will be further developed during the second stage of the procurement tendering process, but it is possible to describe key features of the preliminary design. The New Karolinska Solna is planned as a completely new building complex, not as extension of an existing hospital. Furthermore, it does not seek to replace an existing hospital in the sense of relocating previously existing functions into a new building. Instead, the new hospital is envisaged to encompass a new organization, new clinical and management (“lean”) concepts, and a new mission as a hub to the Stockholm health care system.

The strategic location of the hospital in the expanding district of Norra Station offers an opportunity to integrate the hospital with urban life, so that there is gain on both sides from the mutual exchange, an aim captured by the expression “the hospital in the city” (see Chapter 11 on the St Olav’s Hospital in Trondheim). The availability of good services, good communications and an urban feel are expected to make the hospital attractive and welcoming for personnel, patients and visitors. The design reflects this aim. It is based on a simple rectangular block structure, intended as a continuation of the expanding inner city. The hospital’s footprint consists of seven blocks, arranged according to the adjacent city structure.

An “academic mall” (*Akademiska stråket*), running from east to west, connects the hospital park and the existing Karolinska area with the campus of Karolinska Institute (see Fig. 5.1). On both sides of the academic mall, blocks are established for care and research respectively. The passage constitutes the green lung of the New Karolinska Solna, and in the intermediary zone between the buildings and this passage, an academic environment is created which binds together care, research and education.

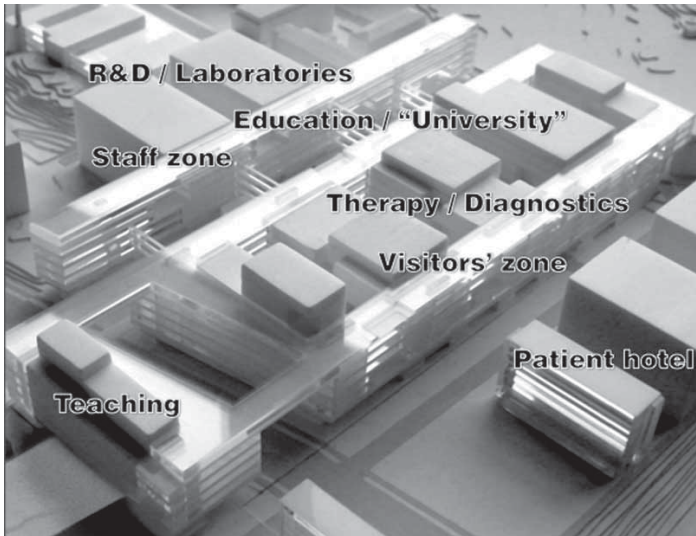
The patient has been placed at the centre of the design concept. There will be single rooms throughout, with en-suite toilet and shower facilities. Rooms are designed to ensure that care teams and visitors have sufficient space surrounding the patient. The use of acuity-adaptable rooms is envisaged, to improve patient well-being and safety, as well as operational flexibility. This concept relies

Fig. 5.1 Location of the New Karolinska Solna

Source: Nya Karolinska Solna 2008.

on smaller and more portable diagnostic and treatment technologies (such as hand-held ultrasound) and reduces the need for moving patients and for separate visitors' rooms. The preliminary design aims to improve patient flow, for example by segregating public zones from professional ones.

Two of the most important design principles are generality and flexibility. By establishing the New Karolinska Solna in the centre of the new district, surrounded by existing structures, the hospital site will be confined for the foreseeable future. This necessitates buildings that allow variation in use throughout their lifespan and are sustainable in the long term. During this early stage, the aim was to develop a building structure that allows flexibility in fulfilling care and research requirements. The principle of generality also facilitates future change. It seeks sustainability of buildings by avoiding an overspecialized design that may become obsolete very quickly. Adaptable areas have also been added, so as to be able to expand in the future, if necessary. For those functions that have specific requirements, but are not yet localized, areas have been reserved within the project programme, awaiting final decisions on the hospital. The project differs in these ways from most conventional capital investment projects in the health sector that rely on a competitively tendered project brief, followed by a single design stage that fixes concept and cost. The first design of the New Karolinska Solna is shown in Fig. 5.2.

Fig. 5.2 *Conceptual model of the New Karolinska Solna*

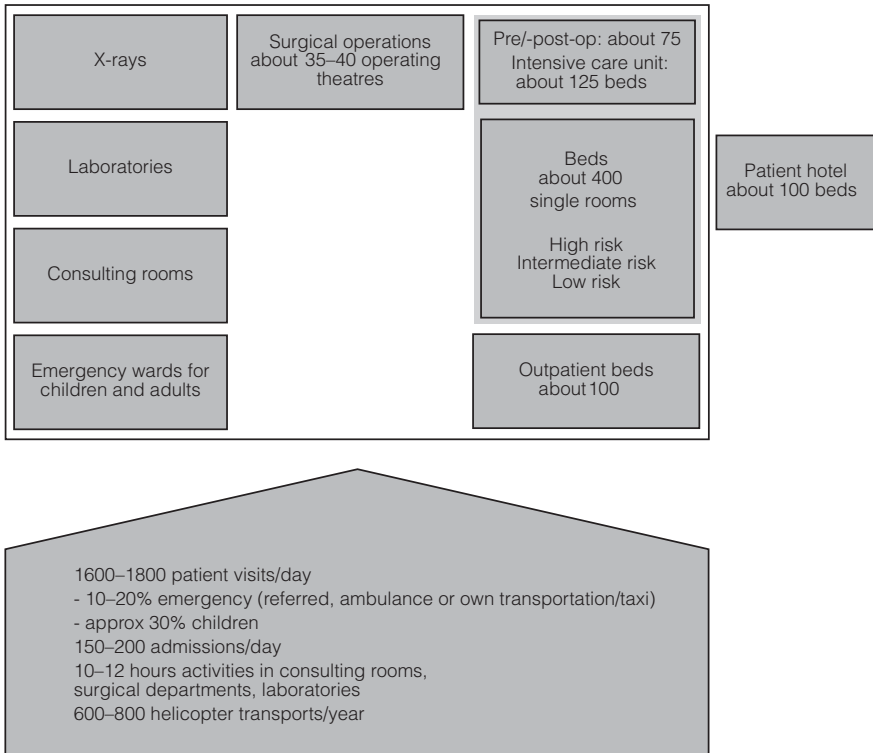
Source: Nya Karolinska Solna 2008.

The new hospital is estimated to provide services for over 500 000 outpatients per year, equivalent to about 1400 per day. Of the total of 600 inpatient beds, 10–15% will have an isolation capacity. While the New Karolinska Solna is envisaged to have fewer beds than the present Karolinska University Hospital Solna, it is hoped that its compact design and short communication routes will facilitate better utilization of capacity and thus improve overall productivity. The hospital is also planned to have 100 day-care places for patients not needing to stay overnight and an additional 100 beds in an adjacent patient hotel (see Fig. 5.3). Updates on bed configuration will be available by visiting the New Karolinska Solna web site.³

Procurement strategy and structure

In April 2008 the county assembly decided to proceed with construction of the New Karolinska Solna in line with the project programme outlined earlier. In June 2008 the decision was made by the assembly that the procurement model should be a public–private partnership. The assembly further agreed that investment expenditure should not exceed SEK 14.1 billion (€1.45 billion) for new buildings providing a total of up to 335 000 m² of space (including 40 000 m² in research laboratories), and that the new hospital should open in December 2015. This set the stage for the commencement of the final project phase, which was launched in October 2008. The county council invited interested parties to submit tenders for a contract to design, build, finance and

³ <http://www.nyakarolinskasolna.se>

Fig. 5.3 Anticipated patient flow chart for the New Karolinska Solna

Source: Nya Karolinska Solna 2008.

operate New Karolinska Solna (Fig. 5.4). There are important qualifications, as detailed here.

- Medical equipment and clinical services will not be included in the public–private partnership procurement.
- Most hard and soft facility management services, as well as the patient hotel and parking, are included in the public–private partnership (some are already outsourced).
- The contract period will be 30 years following financial closure.
- There will be a buy-back clause at the end of the contract.
- The compensation (payment for access) model will follow international practice for public–private partnership agreements within the health sector.
- The county council encourages innovation and life-cycle considerations and expects parties submitting tenders to present proposals regarding alternative and improved solutions, allowing the project programme to be further developed, in accordance with the stated project goals.

Fig. 5.4 The scope of the private–public partnership

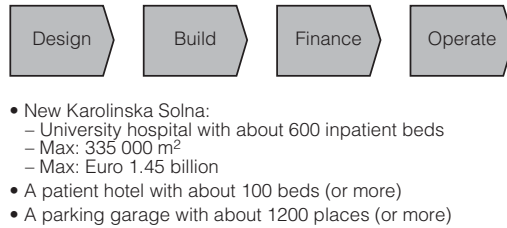
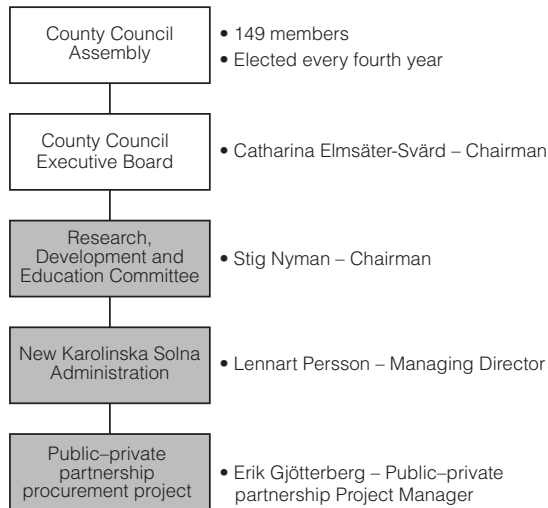


Fig. 5.5 Public–private partnership governance structure



The county council has formed a special administrative body – New Karolinska Solna Administration – to execute the project, including final design, procurement, construction and operation of the new hospital. The structure and accountability are shown in Fig. 5.5.

The principle of a “negotiated” public–private partnership process has been adopted, with the following three stages:

- stage 1: prequalification of bidders;
- stage 2: preparation of tender;
- stage 3: evaluation, negotiation, appointment of winning bidder, and signing of agreement.

The total time period for the procurement process (up to completion of stage 3) was expected to be 18 months, to be completed in April 2010.

The New Karolinska Solna is a pioneering project within the public sector in Sweden, not only with regard to the scope of the project, but also in terms of the procurement model, as it will be the first hospital in Sweden constructed through a public–private partnership. However, there are many risks. The New Karolinska Solna will form a central part of the Norra Station urban development area, which is situated in both Solna and Stockholm municipalities. Both municipalities adopted development plans in August 2008 to clear the way for implementation. The aim of the plans is to create conditions for an integrated city environment, with housing, offices, shops, research facilities and the new university hospital. The plan also envisages improvements in public transport to and from the area. The New Karolinska Solna is therefore located in an expanding area where there are a number of construction projects under way. This creates challenges of coordination and logistics between the various parties operating in this area. This will expose the project to risks, in terms of coordinating with:

- construction of the planned metro line;
- the changes to railway track configuration and the covering over of the Norra Station area;
- construction of a new access road tunnel;
- *Citybanan* (City line) – a railway tunnel beneath central Stockholm, under construction at the time of writing;
- development of part of the site for bioscience;
- integration with the plans for the campus of Karolinska Institute.

Figure 5.6 illustrates the various locations and linkages.

The rationale to adopt the model of a public–private partnership was guided by a belief that this would bring three potential benefits, as described here.

- Certainty of cost: the private sector is believed to have the necessary experience to deliver the project within the relevant cost boundaries; risks will be allocated to the party best able to manage the process and there will be advantages accruing from a long-term contract.
- Certainty to deliver: there are believed to be strong incentives for the private sector to deliver on time and the private sector is believed to have the relevant experience to accomplish this.
- Better value: is believed to derive from design innovation and life-cycle cost considerations embedded in the contract framework.

These are some of the benefits cited for most public–private partnerships, yet the adoption of this model elsewhere has been controversial and doubts have

Fig. 5.6 Main construction projects in the Norra station area



Source: Nya Karolinska Solna 2008.

been expressed about realization of these alleged benefits (McKee, Edwards & Atun 2006). For example, in the United Kingdom the Royal Institute of British Architects (RIBA) has expressed concern that, despite the Private Finance Initiative (PFI) (the United Kingdom equivalent of public-private partnerships) being used almost exclusively as the procurement model for the National Health Service (NHS) hospital building programme for over a decade, the PFI project design still falls short of expectation and potential (RIBA 2005).

In similar vein, a survey of hospital chief executive officers (CEOs) by the NHS Confederation in 2005 exposed concerns about lack of flexibility and the high

costs of subsequent adaptations of PFI buildings (NHS Confederation 2005) (see also Chapter 9 in this volume on the PFI in the English health sector).

The New Karolinska Solna seeks to address these key concerns. First, there has already been significant investment in terms of time and resources in stimulating good design, mainly through the preliminary design competition on new and imaginative ideas for the future of the New Karolinska Solna. Furthermore, the winning design is available as a template for further development and negotiation.

Second – and very importantly – bidders are required to address the issues of adaptability and flexibility explicitly. The brief to bidders states:

Central programme issues concern both the general applicability of the buildings, as well as their flexibility. The strategy is to design generally applicable buildings to enable the flexible utilization of premises, allowing the buildings to be adapted to future requirements and medical technology at low cost.

Furthermore, the county council “wishes to encourage innovation and life-cycle consideration and expects parties submitting tenders to present proposals regarding alternative and improved solutions”.

This represents a significant step forward from most current public–private partnerships that have emphasized low-cost building and maintenance solutions, with price as the principal decision criterion. Traditional public–private partnerships have also been confined by rigid contract structures that mitigate future flexibility and adaptability.

In all these respects the devil will be in the detail of the final contract structure, necessary to ensure these aims will be achieved. At this stage, this remains “work in progress”. However, it is interesting to note that the underlying principles are similar to the Smart PFI ideas proposed by RIBA (RIBA 2005).

The public–private partnership model adopted by the New Karolinska Solna does not include medical equipment as part of the public–private partnership, similar to most recent United Kingdom PFI models. Modern medical technology is developing rapidly, making it challenging and expensive to replace. Medical equipment is therefore a very risky element to incorporate into long-term, relatively fixed contracts and – if badly managed – can lead to economic instability for hospitals that have included this provision within their public–private partnerships. The New Karolinska Solna aims for a more dynamic approach to investment (and reinvestment) by retaining direct control of this volatile and expensive area of investment.

Conclusions

The New Karolinska Solna is still at a very early stage of development and it is not possible to judge at the time of writing whether it will achieve its ambitious goal of becoming a landmark development. So far, however, signs seem to be promising. It has emerged from a comprehensive assessment of future service need, resulting in a new hospital concept with an emphasis on long-term sustainability. Features which distinguish the New Karolinska Solna from many other capital investment projects in the health sector can be summarized as follows:

- a service vision based on integration that cuts across all health care levels, and the adoption of care pathways;
- a planning strategy which anticipates the emergence of significant changes in patient flows, resulting from new models of care that can respond to the changing demographic and epidemiological profiles and needs of the population;
- incentives for cross-boundary collaboration between providers;
- newly defined and complementary roles for the hospitals involved (including a merger to create a single university hospital on two sites), with the New Karolinska Solna as a specialist hub hospital;
- close integration of service delivery, research and training;
- significant capital investment to implement the strategic plan;
- significant investment in time and resources to create a progressive project plan for the New Karolinska Solna, to assure sustainability and long-term societal value;
- a project that runs in parallel to other commercial ventures as part of an urban development scheme;
- a public–private partnership model that aims to draw lessons from previous experience in Europe and to ensure that processes and structures do not compromise project goals and future care and research practice.

The New Karolinska Solna project confronts the key issues facing tomorrow's teaching hospitals, most notably the importance of investing in facilities that support continuing innovation and knowledge diffusion, and allow rapid advances in clinical technologies and models of care. These elements will be essential if university hospitals are to remain leading players in a highly competitive international arena. Time will tell whether the New Karolinska Solna will be able to achieve these aims.

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Web link

New Karolinska Solna: <http://www.nyakarolinskasolna.se>

Chapter 6

Martini Teaching Hospital, Groningen, Netherlands

*Jack GAM Thiadens, Rutger J Kriek, Gerrit H Afink, Arnold CM Burger,
Nico J Oosterom⁴*

Introduction

The Martini Hospital began its life in 1991 as a result of the merger of two medium-sized hospitals in Groningen: the Christian *Diakonessenhuis* and the Roman Catholic hospital. This case study describes the process by which the Martini Hospital realized its ambition, over many years of planning and through one major change of direction, of combining clinical, teaching and administrative functions in new facilities on a single site. It further explains why and how the hospital's management decided to adopt a highly innovative approach to the design of the new hospital buildings.

Throughout the process of designing a single-site hospital, the Martini Hospital has continued to be a general and teaching hospital serving the Groningen area, operating specialist services in neurosurgery and haemodialysis/peritoneal dialysis, and acting as a top reference centre for specialized burns care. The Martini Hospital's teaching functions are organized in collaboration with the Medical Faculty of the state university of Groningen (which supports the employment of around 50 junior doctors) and the University Medical Centre Groningen (which supplies assistant physicians-in-training to the hospital's specialist departments). The hospital also cooperates with the *Hanzehogeschool* and the *Noorderpoortcollege* (both institutes of higher education), so that nurses are able to incorporate on-the-job training into their programmes of study.

⁴ The authors would like to thank Henk te Selle (former project manager) and Johan Vijverberg (former Head of Cure Department, Netherlands Board of Health Care Institutions), and are grateful to Vrouwina A Thiadens-Kanon for the translation from Dutch.

The Martini Hospital admitted more than 46 000 patients in 2005 (one third of which as day cases) and treated more than 270 000 patients in its outpatient departments (Thiadens et al. 2007).

After the 1991 merger, the Martini Hospital continued to operate from two sites, known as Van Swieten and Van Ketwich, but planning for a single site began immediately and, after nine years of development, a draft plan was approved in November 2000. The new hospital was to be built in stages around the existing (then 20-year-old) building on the Van Swieten site, with the existing nursing wards at the core of the new complex. This plan meant that just 20 years after the opening of the new building, the older building would be 40 years old. As health planners in the Netherlands generally regard the lifespan of an acute hospital to be 40 years, this implied that the “heart” of the new hospital would be written off and demolished after a relatively short operational life.

The hospital’s Board of Directors had significant doubts about the viability of this plan and so asked the consulting firm AT Osborne to provide a second opinion. On the basis of AT Osborne’s review, which was completed in February 2001, the Board of Directors decided to abandon the original plan. A fundamental change of direction was undertaken, and a programme was embarked upon that would make use of a new concept in health facility infrastructure: “Industrial, flexible and demountable” (IFD) design.

The decision to start again with a radically different design approach came after years of preparation and “buy-in” to the original idea on the part of hospital staff, and resulted in consternation not only within the hospital itself, but also amongst many external agencies. Senior management needed to spend considerable time and energy to convince staff of the necessity of taking a different course, not least because the changes had to be implemented in a short period of time. However, from the start of the new project, the Netherlands Board of Health Care Institutions (an agency that at the time worked alongside health care organizations in the Netherlands in the planning, design, and financing of hospitals, clinics, nursing homes and other health facilities) realized that the proposed alternative offered new opportunities, and so gave its full support. Eventually, staff were persuaded of the merits of the new project, as the new plan offered a better fit with the developing vision of care and the choice of IFD design ensured that the original delivery date would be met. The new Martini Hospital opened in December 2007 and was officially opened by Queen Beatrix of the Netherlands on 12 December 2008.

This case study describes the key design elements used in the new Martini Teaching Hospital, along with how the model of care is supported by the physical infrastructure, some of the architectural innovations, and the financial implications of designing according to IFD principles.

The starting points for the design

The new plan for the Martini Teaching Hospital was based on three key elements: flexibility, logistical division of care processes, and future-proofing.

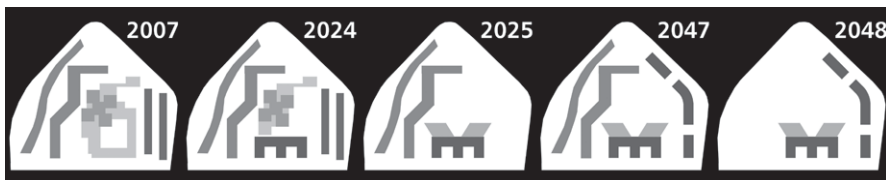
Flexibility

In recent decades it has become increasingly clear that the technical lifespan of health care buildings no longer corresponds to their functional lifespan. As medical technology, pharmaceutical advances and models of care develop, the picture of health care in, say, 20 years' time becomes ever more difficult to predict. The Martini Hospital's chief executive officer (CEO) wanted the hospital's construction plan to contribute to solving this conundrum as creatively as possible. Flexibility, adaptability and durability were therefore taken to be the starting point for the new plan. The hospital would have to be able to grow (or shrink) in response to the changing needs of its users and rapid changes in health care. The answer from the construction project team and the architect Arnold Burger seemed to lie in borrowing construction and design principles from industrial buildings – a sector with extensive experience of having to adapt quickly to changing circumstances.

As can be seen in Fig. 6.1, the new Martini Hospital plan took the ideas of flexibility and future-proofing very seriously. The 2007 sketch shows that the new buildings (covering approximately 58 000 m²) have been constructed to the left side of the existing hospital (covering 35 000 m²). Subsequent sketches show how the vision will develop to make optimum use of the available space over the coming 40 years. As buildings reach the end of their life-cycle they can be removed through a sophisticated architectural “hop-scotch”, while new structures can be constructed alongside.

The IFD principle has so far resulted in eight new building blocks, which are linked together like two chromosome pairs. By dividing the space into separate blocks, the plan allows for parts of the new building to be removed if they cease to be needed in the future.

Fig. 6.1 Sketches of building “hop-scotch” on the Van Swieten site, Groningen



Source: Architect Burger-Grunstra, Construction project team Martini Hospital, Project management AT Osborne, personal communication, 2008.

For six of the eight blocks, a fundamental choice has been to deviate from the standard width of a hospital building block. Instead of a deep-plan building block of 40 m x 25 m, a narrow block with dimensions of 60 m x 16 m was chosen. Apart from advantages gained in terms of the availability of 30% more daylight to patients and staff, this design also offers the future possibility of converting the building blocks into office or residential accommodation without major rebuilding. The central technical facilities, stairs and lifts are housed at the two junctions between the blocks.

Two building blocks have traditional hospital dimensions and accommodate the operating room complex, imaging facilities, delivery rooms and a nuclear medicine centre. These two building blocks make use of a different kind of flexibility: instead of having cabling and ducting routed through a central shaft, these have been placed in insulated pipes outside the façade. This maintains maximum adaptability of the internal space for any future rearrangements. Some of the generic space in these two building blocks might, for example, be converted to provide an extra operating theatre.

Flexibility was an integral consideration for both the exterior and the interior of the buildings. For example, the foundations were designed to accommodate extensions at one side of the façade of 2.4 m x 7.2 m – adding around 10% to the total surface area. Instead of using metal stud walls – which have the drawback that they cannot accommodate internal changes without demolition – the Martini Hospital employed a system wall (pre-fabricated walls constructed offsite), which can be replaced or removed without having to be demolished. These system walls provide a sound insulating value of 48 dB from architectural floor to architectural ceiling, which compares to 30 dB required from system walls in offices.

Because of the large degree of flexibility at more than one level of the overall design, the hospital is expected to be able to accommodate easily any changes in health care, resulting in an element of “future-proofing” (see subsection *Future-proofing* which follows). Its large-scale IFD design was recognized in 2002 by the award of “demonstration status” by the *Stuurgroep Experimenten Volkshuisvesting* (Steering Committee for Experiments in Public Housing) of the Ministry of Housing, Spatial Development and the Environment and the Ministry of Economy.

Logistics

The Martini Hospital has opted for a care model in which acute and elective care are treated separately, so that the logistics associated with these functions can be optimized. The concept of keeping elective care (approximately 85% of



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Careggi Hospital, Florence, Italy



© Coxa Hospital for Joint Replacement



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Hollywood Arches Community Health Centre, Belfast, Northern Ireland



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Martini Hospital, Groningen, Netherlands



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St Olav's Hospital, Trondheim, Norway

hospital care) free of the disruptions that can accompany acute (emergency) care has been translated into the design of the new buildings. This enabled those wards which strongly interact to be linked horizontally and/or vertically. In the case of high dependency, unplanned care, this concept is expressed through the emergency lift which makes a vertical connection between emergency care, the coronary care unit, high-tech imaging, intensive care, delivery rooms, the burns unit and operating rooms. Horizontally (located on the third floor), there is a functional coherence between the operating room complex, the intensive care unit and the burns unit. The incident room (the accident and emergency entry point) is connected to the third floor in a matrix structure by means of the emergency lift. The practical outcome of these arrangements for unplanned and emergency care is that the distance from the ambulance entrance to the entrance of the operation block is less than 30 metres.

Whereas the guiding principle for the emergency part of the hospital is the input of patients, for the elective part it is the output from operating theatres. With an ever-increasing volume of day cases, the key determinant of patient flow across the system is the speed at which a patient can be transferred from the operating theatre to day care, via as short a stay as possible in the recovery suite. This is carried out by linking the recovery rooms and the day care units physically together with an “overflow” area. As the supply of patients to the recovery unit increases, the overflow area is pressed into service; as the day proceeds, the recovery unit empties, but day care units become fuller and the overflow area relieves the pressure in the other direction.

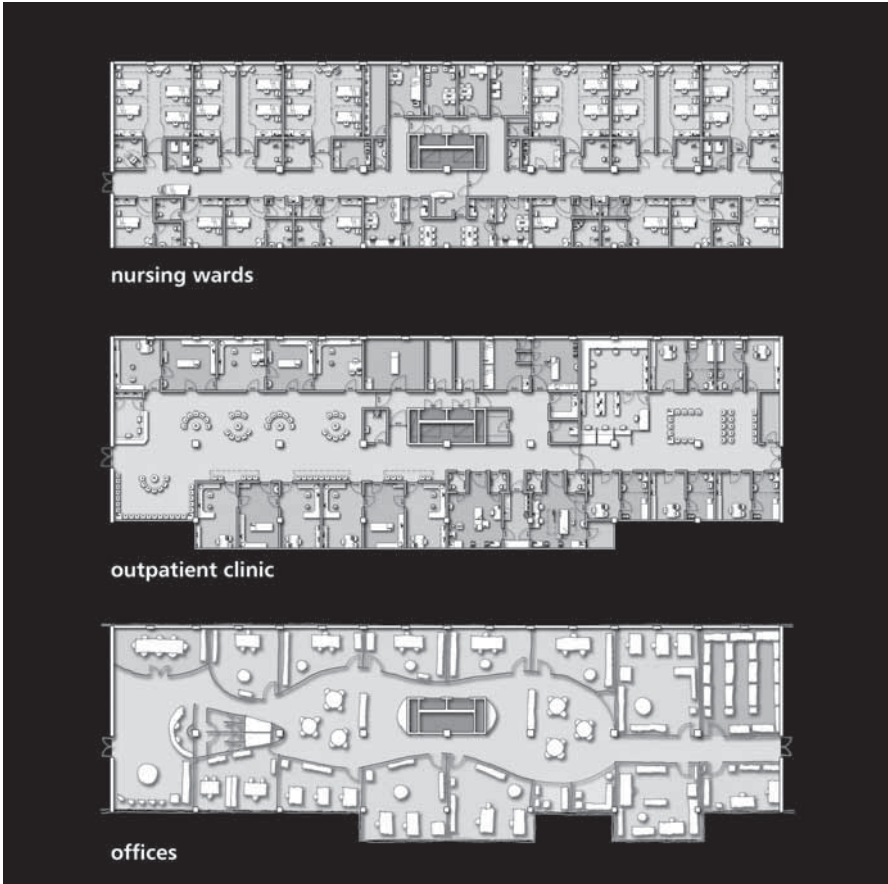
Wards are also clustered around themes, in the same locations in different building blocks. For example, all functions around woman and child health are on the second floor of the buildings, with the maternity ward on the second floor of building block A, the outpatient clinic for gynaecology and/or obstetrics and paediatrics on the same floor in building block E, and neonatology and neonatal intensive care on the second floor of building block G.

The outpatient departments are clustered in the buildings, so that those that form a unit or a theme are situated adjacent to each other. The idea here is that the patient can easily visit the outpatient departments she or he needs to go to in one hospital visit. In keeping with the Martini’s focus on the patient, the doctors have no private offices in the outpatient departments.

Future-proofing

The philosophy behind the new construction plan was to be able to offer a new flexible “future-proof” hospital which can adapt quicker, better and more economically to future changes in health care.

Fig. 6.2 *Converting wards to different functions*



Source: Architect Burger-Grunstra, unpublished plan, 2008. Reproduced with permission.

Six of the eight new building blocks have been constructed with standardized units. This uniformity ensures that, should needs change in the future, it is relatively easy to create an outpatient department in the space currently reserved for a ward, or to convert an existing outpatient department into an office (see Fig. 6.2). Disinvestment in physical infrastructure is a particular concern in hospital design, as care models change and the health market develops, and the uniformity of design opted for here allows maximum flexibility when confronted with the need to increase or decrease the number of beds. The ability to construct external extensions allows for those clinical functions which eventually demand greater amounts of space.

Standardizing wards also means that their functional use is not defined by their dimensions, nor by “belonging” to a specific department. The effect of this is that wards are themselves flexible: their size and configuration depends on the numbers in a particular patient category, rather than being predetermined by allocation to a particular specialty.

Except for the operating theatres, all spaces are supplied with a system wall that can be disassembled, which includes a built-in services shaft to provide electrical and data connections and medical gases. The shafts are themselves connected by means of a flexible line to a distributor sited above the false ceiling. These arrangements are designed to ensure that the current design allows future growth in the quantity of apparatus needed for patient care.

One of the major challenges in designing hospitals is the tension inherent in having to rely on the knowledge and opinions of health care professionals, who may find it difficult to form an accurate idea of future spatial needs. Communication between designers and clinicians is therefore vital. In the case of the new Martini Hospital it was essential – given the radical change to earlier plans – to have clarity and transparency in the overall concept and in communicating the new vision. The “simplicity” of design of the eight blocks was an advantage in this respect, as was the clear division – functional as well as clinical – between planned and unplanned care. The key to communication was to avoid the temptation to emphasize detail, but rather to hold high-level discussions about the overall structure and the place of each department within it.

As a caveat, it should be noted that a highly flexible construction plan also has negative side-effects. Although it confers the confidence that space can be rearranged as and when necessary, it also encourages the notion that users can request changes at any time. Clearly, this is not the case during the construction phase, since the building has to proceed according to an agreed plan and timetable, nor is it fully desirable during operational life.

Hospitals used to be seen as “real estate”, with no value except for their clinical functions but, for the Martini Hospital at least, this is no longer the case. The standardized space, corresponding to dimensions normally used for office accommodation, has resulted in property investors and developers having shown interest in the building’s potential value and marketability for other kinds of activities. The hospital therefore has a baseline value quite independent of its use as a therapeutic environment.

Therapeutic design

The health care system in the Netherlands is in transition towards a market-oriented structure, in which patients will be able to make a conscious choice regarding their preferred hospital. That choice will be based, in part, on medical reputation and expertise, but also on issues of accessibility, comfort and convenience; the new Martini Hospital has been designed to offer patients those “extras” that could attract them.

Creating a healing environment for patients, visitors and staff is key to a successful hospital. The designers of the new Martini Hospital identified eight essential elements in a healing environment, each of which they tried to address in the new hospital:

1. reduction of stress and insecurity;
2. exposure to daylight (including sunset and sunrise) and nature views;
3. noise reduction;
4. the ambient experience (colours and architectural features);
5. orientation and ease of finding one’s way;
6. patient safety;
7. family as a “partner”;
8. themes, such as nature, sport and art – all developed in cooperation with the Dutch Nature Trust, the Football club FC Groningen and the Groningen Museum.

The following sections give some illustrative examples of how these principles have been incorporated into the hospital’s design.

Reduction of stress and insecurity

Arrival at a hospital, even before reaching reception, can be a fraught experience, with common concerns including arriving on time, finding space to park and getting from A to B without making a mistake. Attention to these details can help patients to arrive relaxed and in a good frame of mind.

The new car park at the Martini Hospital has been designed to be a light-filled building with an easily identifiable entrance and exit, and with clear signage throughout. A pedestrian bridge, complete with art works, links the car park to the main reception area. For patients with mobility problems the hospital provides golf carts to make the journey easier, but patients arriving by car can also reach the main entrance via drop-off lanes. There is ample provision for public transport and bus stops are opposite the main entrance. Walking distances have been drastically reduced, compared with the arrangements at the old hospital buildings, and staff are available to accompany the patient around the building, if necessary.

Exposure to daylight (including sunset and sunrise) and views of nature

The new hospital provides 30% more daylight exposure compared with a traditional design and patient groups are placed within the hospital according to the progress of the sun across the sky. Cardiology patients, for example, who are often among the most depressed and concerned patients, are situated on the east side of the hospital, where they can see the sunrise and have maximum daylight exposure. On the western edge of the hospital, the architect has incorporated an extra low window, which maximizes the amount of light entering at the end of the day and which gives extra visual contact with the surroundings.

Noise reduction

Hospital environments can often harbour sources of noise which are disturbing or confusing for patients and staff. Reducing such disturbances to a minimum has a beneficial effect on patients, from treatment through to recovery. In the case of the new Martini Hospital the planners had to allow for a busy road running along the west of the site. To avoid traffic noise, the architectural design incorporated a “double skin” façade on this side. In the outpatients’ department, the system walls are reinforced to minimize noise, so as to avoid situations where patients can overhear conversations taking place in neighbouring consulting rooms.

The ambient experience (colours and architectural features)

The hospital makes use of a colour scheme designed by the Dutch colour designer and artist Peter Struycken. From the original palette of 48 colours, 18 were chosen by interior designer Bart Vos with the aim of promoting a calm, relaxed, harmonious environment. Struycken already had considerable experience of developing colour schemes for other institutions (including the Groningen Museum and the “De Schie” prison in Rotterdam). In the case of the Martini Hospital, the colour scheme has been translated into a practical application by the aforementioned interior designer.

Orientation

Patients and visitors value having a clear idea of where they are in a hospital, and how to get around. To achieve this, the buildings have fixed orientation points and a well-ordered structure to promote a sense of safety and confidence. However, most important are the differences in view everywhere in the building and especially on the main street connecting the two rising points. The shapes of the building, a zigzag and a curved form and the different materials of the

façades created different outer spaces. Clear signage and routing also make it easier for staff to direct patients and visitors, and these also help to ensure that people arrive on time for appointments. Furthermore, the Martini Hospital has made extensive use of art objects to identify the location of a number of building elements.

Patient safety

Patient safety on the wards is realized in various ways. A nursing ward within a building block consists of a total of 32 beds. There are eight 1-bed rooms (two of which have a positive pressure regime), four 2-bed rooms, and four 4-bed rooms. Although there has recently been a trend towards single-bed patient rooms in many European countries, in the Martini Hospital patients are assigned to rooms according to diagnosis. Where patients need additional protection from infection, or may be a source of infection, they will be nursed in a single-bed room. The planners of the Martini Hospital took the view that – for many patients undergoing relatively simple procedures – there is no such need and they are placed in 2-bed or 4-bed rooms. Furthermore, it was assumed that many patients appreciate a 4-bed environment from a social point of view and for security's sake. Moreover, the 1-bed hospital may require more staff. In the coming market-oriented system, it remains to be seen whether insurers will be willing to offer 1-bed rooms to their clients, but in that case a ward could be changed easily to incorporate single-bed rooms throughout.

All patient rooms are furnished with washing facilities sited to encourage staff to wash their hands before and after patient contact. The nursing station is situated centrally on the wards, to ensure a good balance between safety – a short walking distance to the beds – and less travel distance for staff.

The operating theatres are equipped with a so-called 2T (two temperatures) plenum. This plenum of 2.80 m x 2.80 m offers room not only to place the patient and the surgeon in a clean area, but also the nurse and the tables with sterile instruments. Being able to place all sterile instruments under the plenum is an advanced design and, because the plenum consists of two different temperature zones, it is possible to create an optimum laminar down-flow.

The Martini Hospital also accommodates a burns unit, divided into two parts: high-dependency/intensive care and medium-dependency/outpatient care. The high-dependency unit is linked to the emergency lift in order to have as short a distance as possible from the ambulance to the ward. In the burns unit there is an operating room especially for burns patients. Patients in intensive care rooms in the burns unit can go to the operating theatre for an operation while staying within the closed ward.

Family as “partner”

A patient’s recovery is not only defined by their treatment and the environment in which it is provided, but also by the commitment of family and friends. In most hospitals, little space is available for patients to spend private time with their family. The new Martini Hospital aimed to address this situation by various means. Patients, together with family or friends, can – weather permitting – retire to the healing garden, or can take a walk through the Piccardthof nature area situated close to the hospital grounds. This wheelchair-friendly walk has been developed together with the Dutch Nature Trust. A skybox, offered by the FC Groningen premier league football club, has been created on the fifth floor in the new hospital, so that supporters of the local football team (FC Groningen) can watch matches. This creates entertainment and enables spontaneous encounters with other people.

Nature, art and sport

In 2004 the Netherlands’ Health Council, a national advisory body, published a report entitled *Nature and Health: the influence of nature on social, mental and physical well-being*. The report concluded that access to views of the natural world is beneficial to patients who are recovering after an operation. This view strongly influenced the decision to incorporate a garden within the Martini Hospital site and to make it possible for ambulatory patients to explore a nature walk near the hospital grounds.

Art is also an important element in the new Martini Hospital. The curator of the Groningen Museum has developed an art plan for the facility, with some permanent objects and statues in the building, as well as temporary exhibitions of local artists in the main corridors. Even lifts will have art works on display. Art is used for enjoyment, as well as orientation.

The hospital cooperates closely with the local premier league football club, FC Groningen, in providing public spaces for patients and visitors to watch sporting events together, as already mentioned. Football players also regularly visit the hospital’s paediatric wards and the burns unit, to provide a distraction for – amongst others – the younger patients.

Energy

The new Martini Hospital’s construction plan envisages it being one of the most energy-efficient hospitals in the Netherlands. The existing buildings have been renovated to save an estimated 40–45% of the energy previously utilized.

The Martini Hospital's new buildings are among the three hospitals in the Netherlands with the best energy performance. This is achieved by a system of geothermal storage and the building's double skin façade. The building-related energy consumption of the new Martini Hospital, at about 650 MJ/m² of primary energy, is 18% below the national energy performance requirement. The process-related energy efficiency is expected to be at a similar level.

Discussion

When considering the future value of investments in capital assets it is usual to include an estimate of their economic, technical and functional lifespan. Experience in the hospital sector indicates that the economic and technical lifespan is often not the key issue – infrastructure and installations may continue to be technically sound and have a financial value, but new functional requirements may require them to be replaced or radically altered. This consideration is the prime reason for adopting IFD at the new Martini Hospital, so that the buildings – and the assets within them – can continue to meet functional requirements for much longer than facilities constructed using traditional techniques. IFD is essentially seen as a means of overcoming the gap in expectation – that tends to widen over time – between the existing structure and new medical demands, as technology, models of care and workforce training develop. The aim has been to construct a hospital that will continue to meet user needs far into the future.

Since 2005 the Netherlands has seen a major restructuring of the system of financing hospital treatment and of the procedures involved in health capital investments. While patient accommodation costs used to be “assumed” in the fees for care (paid by the health insurance funds), the system now adopted requires hospital administrations to account fully for the costs and risks inherent in property developments. It still remains the case that new hospital buildings can only be constructed after obtaining permission from national authorities, but the costs of the capital investment are then built into the fees received for providing care (Maarse & Normand 2009; Bjørberg & Verweij 2009).

The restructuring of the health financing system is ongoing, but at its heart is the use of Diagnosis and Treatment Combinations (*Diagnose Behandeling Combinaties*, DBCs). DBCs are comparable with the diagnosis-related group (DRG) system, although there are some significant differences; most notably, that DBCs are coded by a medical specialist at the end of the treatment, whereas DRGs are assigned by nonmedical specialists. The cost of capital (including interest payments, write-offs, maintenance and renovations) is included in the DBC, which means that capital investment in hospitals is now a higher-

risk activity than was previously the case in the Netherlands. Since a large percentage of DBC values can be negotiated with the insurance funds, and the capital component is part of the DBC, it follows that hospitals have to pay much closer attention to the cost of capital. If yearly turnover drops and fixed costs remain static, it may become difficult to finance the capital investment element of the DBC.

Conclusions

Hospitals in the Netherlands have to take much greater care in deciding why, when and how to invest in capital assets. The once-popular desire to build as big as possible has to give way to a realization that buildings have to be optimized to meet the organization's needs, which will correspond to the number of procedures (treatments, operations, and so on) that a building can accommodate on an annual basis. Here lies the risk element for the new Martini Hospital: on the one hand, it now has a marketable building which can respond flexibly to future changes in demand and can be put to other uses if necessary; on the other hand, the large capital investment means that it has relatively high annual costs compared with a building where the initial investment has been largely written off.

Other questions remain for the future. It is not yet clear if the Government will really allow hospital organizations to assume the full risk associated with decisions regarding capital asset investments, or whether it will continue to have some hand in decision-making. Now that hospitals are able to compete with each other in terms of fees charged for care – including a component related to capital investment – how will the insurance funds value the services that hospitals can provide? Assuming relative equality of patient outcomes, will they choose quality of surroundings and the “patient experience”, or will lowest cost be the prime factor in deciding where to place contracts? The answers to questions such as these will have a significant impact on the viability of the new Martini Hospital, and will shape the future direction of the hospital's services.

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Chapter 7

Strategic planning of health facilities in Northern Ireland

John Cole

Introduction

This case study describes the planning response to a strategic review of health provision in Northern Ireland, focusing on the location and type of health and social care facilities required. The strategic planning policy discussed here has evolved and been refined over a number of years and a number of changes in administration. Given the rate of change in the demand for and the delivery of health services, it is the subject of regular review to ensure its ongoing appropriateness and effectiveness.

The need for a vision

There is now almost universal recognition of the contribution that the creation of healing environments (through high-quality architectural design) can make to improving patients' experiences and outcomes. Investment in high-quality public infrastructure, such as health buildings, can also play a crucial role in the regeneration, development or maintenance of communities and neighbourhoods. The objective of achieving high-quality environments is increasingly seen as a fundamental requirement for all health facilities. However, this case study argues that it must be achieved within a wider strategic planning context. It is essential in planning health facilities that the locations, forms, clinical profiles and capacities of individual facilities are based on their combined contribution to the achievement of a clearly articulated model of care designed to optimize health outcomes.

The physical life and use of the buildings that are currently being procured will extend over many changes in health policy, practice, technological advances, demographic trends, epidemiological developments and public expectations. Those responsible for the strategic planning of health facilities must – as far as possible – plan for changing requirements and policy developments in both the short and longer terms. To do this, there is a need for the articulation of a vision for the future. There are two planning horizons to consider, as detailed here.

- Meeting clearly defined specific planning requirements for the short to mid-term, based on reasonable statistical analysis and projections of service changes and relatively well conceived emerging models of care spanning 5–10 years. Unfortunately, even this shorter time horizon is frequently not properly addressed, with a significant number of developments looking backwards rather than forwards for their models of care and tending to replicate current design solutions that are already outdated in terms of location, form, layout and capacity.
- Meeting more generic planning requirements for the mid- to longer term through flexible design solutions based on much less firm knowledge and greater assumptions about the future patterns of health care provision. This is much more difficult to achieve and is rarely carried out well.

Health facility planners must take a view as to how to achieve sufficient flexibility and adaptability in health facilities to cope with changing need and practice in the delivery of health services, and possibly with options for alternative uses other than health in the longer term. One train of thought is that it will be impossible to deal with the rate of change predicted and that a “throw-away” approach should be adopted by building less expensive, short-life, disposable buildings. There are a number of concerns about this as a possible strategy:

- the quality of environment it would be possible to provide with this approach;
- the fact that short-term temporary buildings often remain for much longer than their intended life due to funding issues;
- the fact that supposedly short-life buildings often cost nearly as much to build as permanent facilities;
- the major conflict between this approach and the importance of sustainable development.

However this issue is approached, it is clear that there is a need for a properly developed strategy if the longer-term benefits of current capital development proposals are to be maximized. In order to produce such a strategy, it is necessary to set out very clearly two interdependent visions.

The first of these, the service vision, is the key building block in establishing the need and the models of care to meet that need. Without a clear articulation of the service vision, any further development of strategic capital planning is impossible. The second requirement is a design vision which should demonstrate the principles of the design response to the service need, including the ability to cope with the uncertainty as to how that need will change over time.

The service vision should establish:

- an agreed service model reflecting projected changes in demography, epidemiology, demand, models of care, clinical practice, technology, service development, political thinking and consumer expectations;
- a strategic capital development programme fully reflecting this model and aiming to provide an integrated range of facilities, including the right combination and quantification of services in the right locations in order to meet best the health needs of the population served;
- a carefully developed review process to ensure that the service vision remains current and is revised as necessary to reflect ongoing developments in service demand and delivery during construction and operating life.

The design vision should establish:

- generic and specific functional and quality objectives that recognize the major contribution – measured in terms of improved outcomes in health and well-being – that design can play by creating healing environments;
- a strategy to facilitate in-built flexibility in terms of change of demand and use for health-related purposes and – where practical – for possible conversion to non-health uses over time;
- design principles to ensure that health facilities as far as possible contribute to the quality of the wider built environment and enhance and enrich wider community engagement and development;
- a focus on whole-life rather than just initial capital costs, whilst ensuring the delivery of the required quality of design and the contribution to wider environmental, social and economic sustainability.

Strategic rationalization in Northern Ireland

Northern Ireland has a population of approximately 1.7 million, of whom almost 50% live within 40 minutes' travelling time of Belfast, the capital. Recent pressures on the health service in Northern Ireland are similar to those in many other areas of western Europe. Health services in Northern Ireland have been facing:

- an ever-increasing demand for services;

- a major surge in the number of emergency admissions, leading to postponement of elective work;
- delayed discharges from acute hospitals due to insufficient community places for transfer or rehabilitation;
- a large number of hospital beds occupied by patients with chronic diseases, including (but not limited to) the elderly, who tend to be admitted periodically to stabilize their condition;
- significant waiting lists for general practitioner (GP) referrals for hospital outpatient appointments, diagnostics, and elective surgery or other treatments;
- difficulty in clinical and nursing staff recruitment, including with respect to European Union (EU) directives on working time;
- high-quality complex care becoming increasingly unsustainable in smaller hospitals;
- ageing capital stock;
- overcrowded accident and emergency departments, frequently due to patients self-referring;
- incomplete integration of primary and acute sectors and services;
- the vast majority of available capital investment focused on the acute sector to the disadvantage of the community sector;
- pressures on affordability.

These difficulties – in terms of either inadequate capacity or ineffective use of available capacity – are significant, although the level of hospital-bed provision in Northern Ireland is comparatively high relative to the size of the population.

The Department of Health, Social Services and Public Safety (DHSSPS) has overall responsibility for the organization and delivery of health and social services in Northern Ireland. One significant advantage of the system in this context, compared with that employed in the rest of the United Kingdom, is that both health services and social services fall under the auspices of this single body.

The old model

Approximately 98% of health and social services facilities are directly funded and owned by the public sector. Until April 2007 these services were provided by 17 Health and Social Services Trusts (service provider organizations) consisting of:

- 6 Acute Hospitals Trusts
- 6 Community Trusts
- 5 Combined Acute and Community Trusts.

The Trusts, as agencies of the DHSSPS, cooperated with one another in providing services, but otherwise operated as separate public sector organizations, each

with its own individual business remit and objectives. This organizational model – in which a significant majority of Trusts were responsible for the provision of either (but not both) acute or primary and community care – did not optimize the integration of these services. Within the acute or combined Trusts were 18 hospitals, each providing a range of acute services, but with significant variations in size, clinical expertise, quality of facilities and levels of clinical activity. The majority of referrals to hospital, other than self-referrals through accident and emergency departments, are made by GPs, who are usually based in relatively small local health centres or privately owned premises. Highly specialized services are mostly provided from the two largest teaching hospitals, both located in Belfast.

Voluntary sector community-based organizations play a significant role in the provision of a range of support services. These are usually grant-aided by the National Health Service (NHS).

As described in the following section, a major restructuring of Trusts, as part of a greater rationalization exercise, was implemented in April 2007 to assist in delivering the new strategy.

The new model

A series of reviews of the health service in Northern Ireland over recent years concluded that there was a need for significant change in both the current organizational structures and service configurations. In this context, there have been separate reviews of primary care services, acute services and the overarching 20-year strategy for health care in the whole region, but the key document that links the new service model with the capital investment programme is entitled *Delivering better services: Modernizing hospitals and reforming structures* (DHSSPS 2002). Here it was recognized that there was a need to reconsider seriously the concept of the stand-alone acute hospital as the main provider of clinical and related services. It was argued that the strategic capital development programme should no longer focus predominantly on the acute sector, but rather should seek to create an integrated continuum of facilities, from home care through to primary, community, sub-acute/step-down and acute facilities, all supported by structured networks (Box 7.1).

An emerging consensus on the future delivery of services had two main strands: enhanced services within the community and concentration of complex services.

Box 7.1 *Key conclusions of the review of the health service in Northern Ireland*

- “Patient care is best seen as a system in which the acute episode is an event in an unfolding and ideally seamless pattern of care”.
- “We were attracted by the concept of a virtual hospital, or a hospital without walls”.
- “Part of the objective is to keep people out of acute hospitals who should not or need not be there”.
- “The day of the stand-alone institution attempting to do everything from its own resources, acting in isolation from the wider system is already gone”.

Source: DHSSPS 2002.

Development of enhanced services within the community

The first of these, and the more significant, is the decentralization of less-specialized activities away from the larger acute centres towards community-based facilities. One of the key drivers for this is the desire to improve accessibility to earlier diagnosis and preventative therapies, thus reducing the need for hospitalization.

It is intended that many people will be able to attend a community-based health centre for outpatient appointments and a range of diagnostic tests and treatments, which until the time of writing have only been available at acute hospitals and for which waiting times can be considerable. This will involve the transfer of a significant number of outreach services from hospitals to community facilities. This approach is facilitated by the rapid advances in information and communication technology (ICT) and data transfer, as well as by the interest of an increasing number of primary care GPs in developing greater skills in specific specialist services to be delivered outside of the hospital setting. These currently include specialties such as orthopaedics, diabetes and dermatology.

It is also increasingly recognized that much of the pressure being experienced in acute hospitals is generated by the significant proportion of beds occupied by patients with chronic diseases who are repeatedly admitted to hospital to stabilize their condition after it has become unmanageable. Trials of new processes – including technology-based home-monitoring systems – have demonstrated significant benefits, both in terms of quality of life and overall cost of health resources, of bringing a new focus to chronic disease management in community facilities, thus preventing inappropriate hospital referrals and these recurrent admissions.

Additionally, a focus on the importance of personal responsibility for health and well-being has emphasized the contribution of interventions not specific to health, which can be provided within community facilities. These aim to improve lifestyle, physical fitness and diet; to provide education and information on the management of chronic diseases and other conditions, including access to community-based support groups; and to support members of the community in managing stress-generating issues such as financial, housing and employment problems which can directly or indirectly lead to health problems.

It was also recognized that many of the current community services were being provided in a disjointed way from a wide range of locations and facilities, thereby both reducing patient accessibility and inhibiting the benefits that can be achieved when multidisciplinary services cooperate to provide a fully integrated package of services with the patient as the core focus.

These analyses have identified the need for new models of care, as well as the importance of fundamentally reviewing patient pathways throughout the entire system, and have reinforced the need for new types of community health facilities aimed at bringing an improved integrating mechanism to the delivery of services.

An important element of the response to these issues by the health reform programme has been the development of an initiative called ICATS (Integrated Clinical Assessment and Treatment Services), which has redesigned the way in which services are accessed. ICATS seeks to ensure that, in future, patients are referred to the most appropriate step in the care pathway. These services will be provided by integrated multidisciplinary teams of health service professionals – including GPs with special interests, specialist nurses and allied health professionals – working in a variety of primary, community and secondary care settings. For those patients who are assessed as needing to see a hospital specialist, they will do so after having had all necessary diagnostic tests completed. The principles of the ICATS approach have been incorporated into the overall commissioning process and the initiative is being implemented across an increasing range of specialties.

Based on a detailed and comprehensive region-wide planning exercise, the decision was made to develop 42 new community health centres located at population centres throughout Northern Ireland to act as a significant catalyst for this major reform in the model of service provision. A primary objective in the creation of these centres is to facilitate as seamless cooperation as possible between the primary, community and acute sectors through a system designed around the patient experience, focusing on health promotion and illness prevention and enabling earlier access to diagnosis and any necessary interventions.

As a further system response to the need for a more integrated model of care across the sectors, in April 2007 the number of Trusts was reduced from 17 to 5 and each of these 5 Trusts was made responsible for provision of the full continuum of health and social services within its geographical area, rather than focusing solely on either secondary or primary and community care. Their remit also includes mental health and learning disability, which are also seen as key elements of the service reform.

The centralization of complex services

The second issue on which consensus has been reached is the greater centralization – from local general hospitals to acute centres or to regional centres of excellence – of those services that, due to their complexity, require specialized skills and expertise that cannot easily or affordably be replicated in local hospitals. One important factor driving this process has been the difficulty in attracting specialists to smaller hospitals that do not have the critical mass of demand in some of these specialties, or the necessary quality of facilities to support the maintenance or development of the highest level of expertise. These factors have led to concerns about the quality of patient care and patient safety in these smaller hospitals.

Related to this, there has also been considerable growth in the number of sub-specialties which have the potential to deliver improved patient outcomes and which can only be supported in larger acute hospitals or regional centres with the required highly specialized expertise and the necessary critical mass of demand. Patient outcomes in other complex specialties, such as oncology, have been centralized to benefit from the creation of “regional centres of excellence”.

It was also concluded that full specialist-led accident and emergency services, with the necessary range of support, could not be maintained effectively at smaller hospitals and should only be located at a reduced number of acute hospitals. A key criterion in the process of determining the final locations of those hospitals to be designated as “acute” was that patients should have a maximum travel time of one hour from anywhere in Northern Ireland to an acute facility with full accident and emergency services.

Smaller local hospitals will be reconfigured in terms of clinical profile and physical form to play an important role in the delivery of services, as an integral part of a network with the larger acute hospitals. As such, they will:

- provide step-down beds for those patients requiring further inpatient care or rehabilitation after having completed the acute phase of their treatment in the acute hospital;
- provide the opportunity for intermediate care beds and GP-managed beds;

- provide outpatient services, day surgery, diagnostics and ambulatory care;
- form part of an integrated clinical network with acute and primary care, providing a wide range of services close to their local population.

It has also been recognized that there are benefits to be gained from the greater concentration of a range of surgical procedures and related services, for which local accessibility is not the dominant factor. These benefits include improved patient outcomes, economies of scale and increased rates of throughput. This has led to the proposal to develop a number of “protected elective centres”, to which people would be prepared to travel further in return for shorter waiting times and the assurance of centres of excellence in terms of staff, equipment and facilities.

Redesigned levels of health facilities

In implementing the new strategy for delivering services it is important to recognize that the location, number and form of facilities was only one of four distinct strands of the process of redesigning the total system. The four strands were:

- establishing new models of care
- re-engineering the workforce
- optimizing the contribution of developments in ICT
- redesigning the physical facilities.⁵

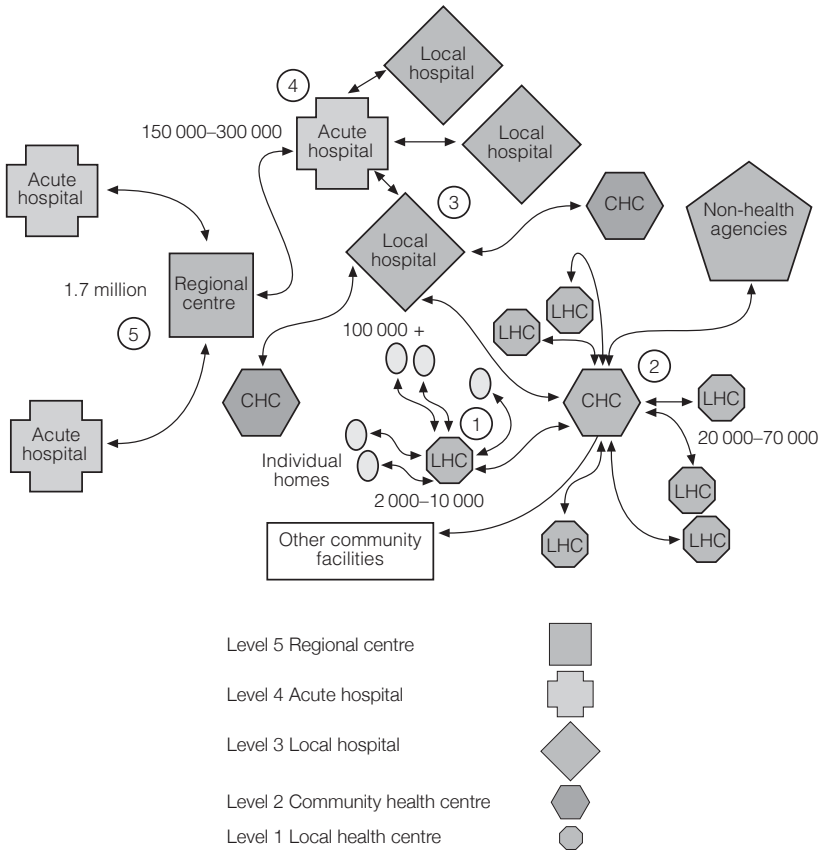
The key elements of the redesigned system are:

- the five Health and Social Care Trusts, geographically based, each providing a full continuum of health and social care services to their local population;
- the designation or development of regional centres as the sole providers of a range of tertiary services that will benefit from centralization;
- the reduction in the number of general hospitals providing the full range of acute services from 18 to 10;
- the redevelopment of seven of the remaining nine hospitals as new non-acute step-down facilities with a focus on their local communities and the ability to provide a wider range of intermediate care services;
- the creation of 42 new one-stop community health centres (without bed accommodation) with the key objective of preventing unnecessary hospitalization.

The local hospitals will facilitate earlier discharge from the acute hospitals and reduce current levels of “bed-blocking” by patients at a stage in their treatment at which they need rehabilitative rather than acute care. They will also provide a link between the 42 new one-stop community facilities and the 10 acute

⁵ The substantial capital expenditure on the building programme is being met from public sources and public-private partnership structures, and the issues behind these funding pathways are not discussed here.

Fig. 7.1 *An integrated services model*



Source: DHSSPS 2002.

hospitals. The proposed model for Northern Ireland is shown in Fig. 7.1, indicating the five levels of facility on which the current Strategic Development Plan is based.

It is intended that all levels will be linked by clinical technology and ICT networks and will have clearly established protocols for patient access to – and pathways through – the entire system. The range of services to be delivered at each level is not rigidly fixed; rather, the system has been designed with some flexibility around a set of agreed principles. The local application of the model varies to reflect local circumstances and needs, as well as in recognition of the differences between urban and rural areas. This includes consideration of criteria such as travel distances, accessibility and scarcity of some groups of key

staff or highly specialized equipment. However, individual examples of any one type of facility will generally include similar combinations of services in line with the model of care. The typical range of services intended to be provided at each level is set out in the subsections that follow.

Level 1: Local health centres (new construction cost range: £1–5 million)

- General practices
- Non-complex diagnostic testing
- Basic treatments and nurse-care
- A limited range of therapies

Level 2: Community health centres (construction cost range: £5–15 million)

- Out-of-hours GP service
- Outpatient clinics
- Minor procedures
- Non-complex imaging and diagnostics
- Children's services
- Physiotherapy
- Speech therapy
- Podiatry
- Dental services
- Social services
- Mental health services
- Multidisciplinary outreach teams
- Voluntary sector
- Community facilities
- Pharmacy

Level 1 facilities will frequently be incorporated into Level 2 facilities.

Level 3: Local hospitals (construction cost range: £40–70 million)

- Urgent Care Centre (as opposed to full accident and emergency care)
- Ambulatory care centre
- Full diagnostics including radiological services
- Day procedures/day surgery unit (Level 3 facilities can be designated to act as “protected elective centres”)
- Step-down, rehabilitation and GP beds
- Mental health unit
- Support services

Level 4: Acute hospitals (construction cost range: £200–300 million)

Full range of standard acute hospital services, including:

- specialist-led accident and emergency care
- critical care department
- acute medical and surgical departments
- paediatrics
- outpatient department
- radiology.

Specialist cancer units, linked to the regional cancer centre, are included in four of the nine (Level 4) acute hospitals. The capacity of wards and other departments in the acute hospitals is adjusted to reflect outreach to and the new roles of the 9 local hospitals and 48 community health centres.

Level 5: Regional centres of excellence (cost varies)

These centres are designated for the most complex specialties that cannot practically or affordably be replicated for a population of only 1.7 million. At the time of writing, “centres of excellence” have been established for a range of regional services, including for example cancer, orthopaedics, acquired brain injury, cardiac surgery and neurosurgery.

These centres of excellence are generally (but not always) co-located with a Level 4 acute hospital.

Final location and size of facilities

A primary objective of this new model of care is to improve accessibility to the public of high-quality and timely services. The co-location of Level 1 and Level 2 facilities has been encouraged within the model, particularly in areas of high population density, where travel distances are more likely to be acceptable for access to GPs. Where sites for Level 3 and/or Level 4 facilities are already located at natural population centres with good access to public transport, there are potential benefits in co-locating Level 1 and Level 2 facilities, whilst ensuring the retention of their separate identities and organizational structures. Where such co-location is proposed, the resultant arrangement has come to be referred to as “a health village”.

The specific location of individual facilities has been determined by a number of key factors, including:

- the core principles within the Regional Health Strategy
- urban or rural setting

- size of the local population
- epidemiology
- travel times and distances
- critical mass for staff
- critical mass for specialist equipment
- state and location of current facilities
- improved accessibility, reduced waiting times and reduced hospital admissions
- affordability.

Formal business cases have been completed with the cooperation and input of policy-makers, local health commissioners, service providers and practitioners in order to identify across Northern Ireland the type, location and size of all facilities required to deliver the agreed above-mentioned service model. The following figures (Fig. 7.2, Fig. 7.3 and Fig. 7.4) show the locations that were finally agreed upon and the number of all Level 2, 3 and 4 facilities within the regional plan, as well as the population density. As there are many Level 1 facilities, these are not shown.

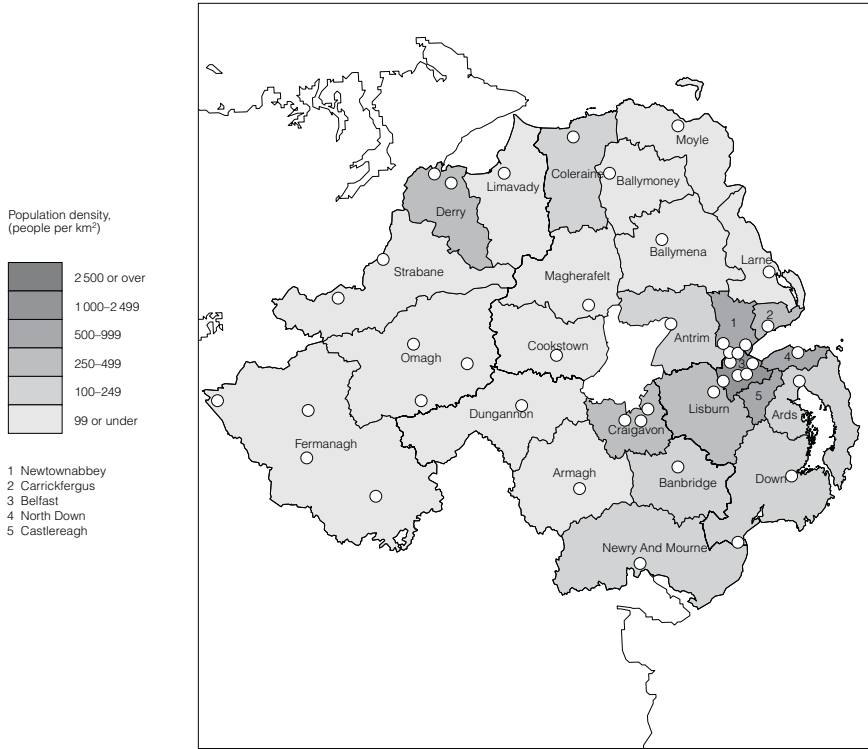
Through the mandatory public consultation process that forms part of the development of new policies of this type there has been significant public engagement regarding the new integrated services model and the location and types of facilities. Although the rationale for service redesign has been widely accepted, there have been a small number of significant objections to the relocation of services and/or to the idea of varying the range of services provided at some of the health facilities. In two cases, objections proceeded to full judicial review, before the preferred strategy was confirmed as the way forward.

A number of the projects at all levels have already been completed and more are either under construction or in design or procurement stages at the time of writing. The remaining projects have been brought together to create a regional capital investment programme of approximately £4.5 billion (€5 billion) for phased delivery of the projects by the late 2010s. There is a regular, ongoing review process, updating both the relative prioritization of the projects within the programme and the detailed service content of each of the projects, to ensure that they reflect the latest strategic developments prior to commencement of project procurement.

The key role of the Community Health Centre

As already mentioned, it has been proposed to construct approximately 42 Level 2 facilities (Community Health Centres) across Northern Ireland. These projects are seen as key facilitators: first, in enabling the transition of appropriate

Fig. 7.2 Location of Level 2 facilities (Community Health Centres) in relation to population density in 2006

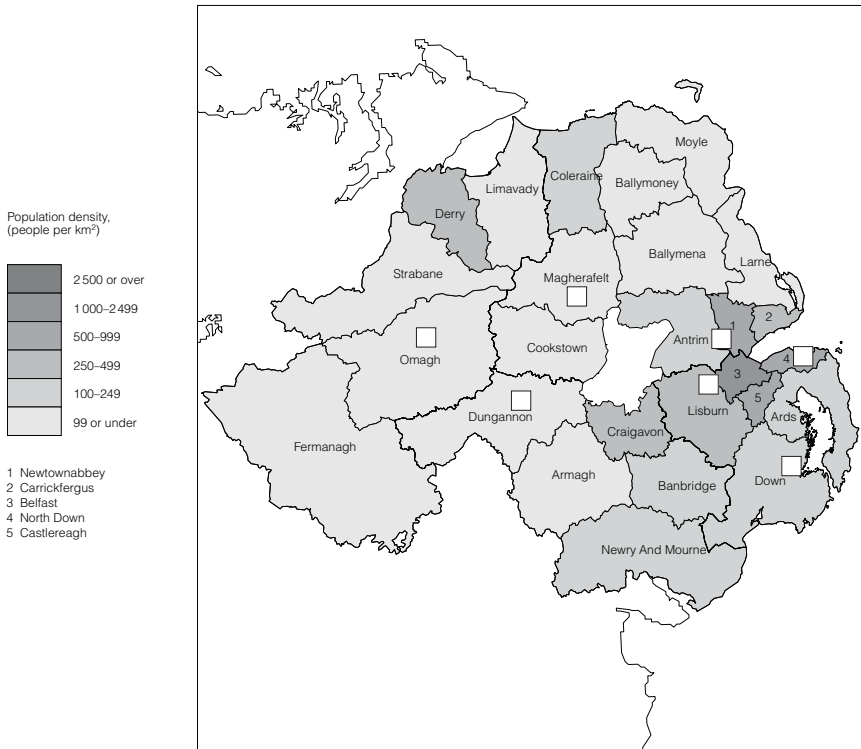


Source: DHSSPS 2002. Reproduced with permission.

services from secondary to community care with a focus on health promotion, illness prevention and earlier diagnosis and intervention; and second, in bringing together and integrating in a single facility the majority of community services that are currently dispersed both physically and operationally. In so doing, they act as a vertically integrating mechanism for the five levels, most importantly between the primary and acute sectors (see Fig. 7.5). They also act as a horizontally integrating mechanism providing a natural interface for cooperative working between health and social services as well as a range of other agencies providing public services which directly or indirectly impact on the health and well-being of the local community.

The sites for these projects have been chosen to optimize public accessibility by locating them whenever possible in the centre of communities, close to transport and shopping hubs. Both the population served and the size of the facility varies to reflect local circumstances.

Fig. 7.3 Location of Level 3 facilities (Local Hospitals) in relation to population density in 2006



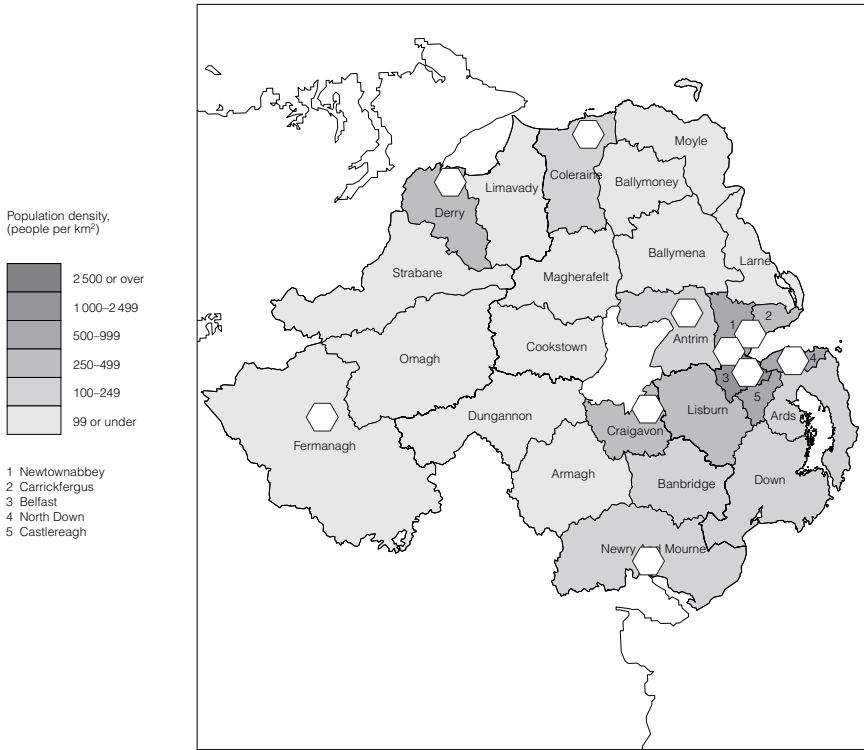
Source: DHSSPS 2002. Reproduced with permission.

Designing for flexibility

It is intended that the design of the overall programme will, as far as possible, facilitate changes in capacity, models of care, practice and technology, as well as optimizing the benefits of the initial capital investment over a longer lifetime.

One of the conceptual ideas that has been considered in relation to the new model of care is that of “reconstructing the hospital”, with the objective of creating a form of development on acute care sites that will allow greater flexibility of use, but also create greater accessibility by health professionals from outside the hospital and by members of the public. This will tend to encourage a design based on linked pavilion structures with clearly articulated elements looking towards the community outside hospital, rather than deeper planned monolithic blocks looking inwards to reinforce the stand-alone nature of traditional hospital institutions. In this way, it is intended to create communities of health provision, integrated where appropriate with other public amenities

Fig. 7.4 Location of Level 4 facilities (Acute Hospitals) in relation to population density in 2006



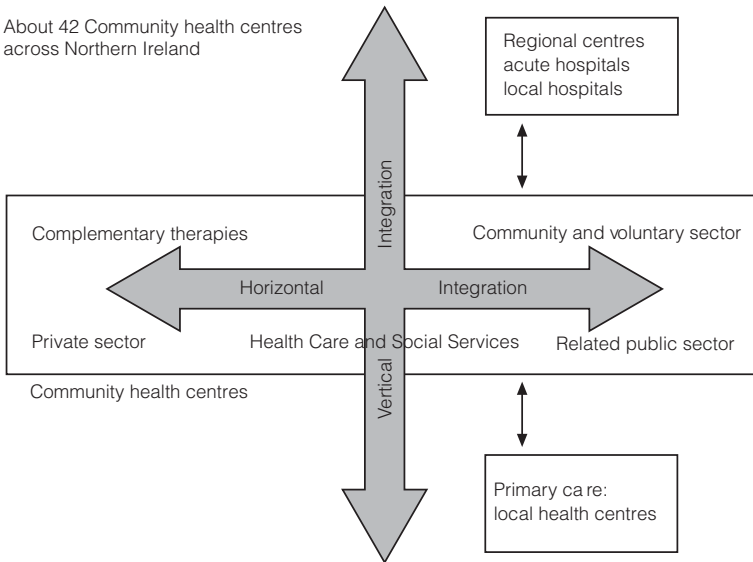
Source: DHSSPS 2002. Reproduced with permission.

and compatible private sector developments, with the potential of creating further synergies and efficiencies.

Design layouts will, where practical, incorporate space for additional pavilions to enable the phased construction of new facilities before demolishing or changing the use of existing blocks.

One further mechanism already used on several of these projects to optimize future flexibility and to facilitate change is the insertion of “soft” space (for example, office or educational accommodation that can be relatively easily relocated) beside complex areas, such as those for critical care or imaging, that are likely to expand in the future and would be very expensive to move.

In considering the design of the new facilities, there is a new focus – where appropriate and practical – on greater standardization of elements of accommodation between the various levels and between buildings of the same type, such as through the standardized design of consulting suites which

Fig. 7.5 Horizontal and vertical integration of Level 2 facilities

Source: DHSSPS 2002.

Box 7.2 *The Hollywood Arches Community Health Centre*

The first of the 42 facilities to come into operation was the Hollywood Arches Community Health Centre in East Belfast. This is one of three centres located in the south-east of the city and one of seven such centres planned to serve the greater Belfast area (five of the seven were complete and two were under construction at the end of 2008). The three multidisciplinary facilities serving the south-east of the city will replace more than 40 different buildings, which were widely scattered across this part of the city and many of which only provided a single type of service, such as physiotherapy. As a result, service users frequently had to make a series of journeys to access the various elements of their treatment package. The capital investment required to develop these new centres has been largely met by the income generated from the sale of more than 40 buildings, which were no longer needed.

The Hollywood Arches facility serves a population of approximately 70 000 and combines Level 1 and Level 2 services. A total of 23 general practitioners (GPs) are based in the building, together with a comprehensive range of community health and social services, including speech therapy, podiatry, dental services, physiotherapy, minor procedures and children's services.

The new model of care has been implemented with the introduction of multidisciplinary teams which work collaboratively to provide one-stop patient-centred services both in the facility and outside of it in the community.

Box 7.2 *cont'd*

A number of GPs with special interests provide services which previously were only available in hospital settings. An example of this is the orthopaedic triage service, which has resulted in a reduction of approximately 75% in the number of patients being referred to hospital for orthopaedic conditions. A further range of services is offered by specialists from the acute sector, providing outreach outpatient clinics in the facility. These services are provided in what has been designated the "Clinical Zone".

The Citizens' Advice Bureau – a voluntary organization helping people with financial, legal, consumer, housing or employment problems – has a permanent base in the building and works in collaboration with the health and social services to provide advice and support to the local population. Other community groups make use of accommodation in the building.

The new building, in keeping with the overall strategic direction, has been located at a hub for shopping and public transport, making health and social services as visible and accessible as possible.

Another key strategic objective in the development of the project was to achieve a high standard of design, so as to create a healing and uplifting environment for patients and staff. Good space standards; plenty of natural daylight, colour and texture; easy way-finding; and high quality materials, fittings and furniture are all essential elements of the approach adopted.

A further key aspect of the design approach, in line with the Health Department's policy for all health buildings in Northern Ireland, was the inclusion of integrated art throughout the project. Several of the artists commissioned to work with the design team actively involved members of the local community and schools in their work, thus helping to promote the desired positive engagement with and sense of ownership by the community.

This building has recently won the 2006 overall United Kingdom "Best Primary or Community Health Building" award, the 2006 overall United Kingdom award for "Best Use of Art in a Health Building" and a 2006 "Royal Institute of British Architects Design award". It has been widely praised by both users and staff and has attracted considerably acclaim for its innovations in service and facility design.

meet the needs of doctors, whether in a hospital, community or local surgery environment and irrespective of specialty.

The overall design vision also seeks to establish structural grids and external treatment modules that facilitate the grouping or subdivision of internal spaces to facilitate a wide range of health uses and options for change to non-health use over time.

Box 7.3 *The Grove Health and Well-being Centre*

One of the most interesting Level 2 projects, located in the North Belfast area, is the Grove Project, a scheme that fully integrates in a single development:

- a Community Health Centre (Level 1 and Level 2)
- a day centre for the elderly
- a major civic leisure and fitness centre
- a public library and resource centre
- a private sector retail pharmacy.

In addition to carrying out their primary functions, the separate elements of the Grove development have been designed to offer a wide range of synergistic opportunities, including:

- the use of the swimming pool, intended primarily for leisure use for hydrotherapy sessions;
- the use of the general exercise areas and fitness suites for physiotherapy sessions;
- the use of the games areas in the leisure centre as a day amenity for users of the day centre for the elderly, particularly at times of the day during which there is lower demand from the general public;
- the ability of the library to function as a resource centre to assist in providing healthy living information to the public, as well as providing access to information on illness management, support networks and employment, housing, and financial and educational issues;
- use of shared accommodation by voluntary community groups;
- joint use by all of a central café, reception area and other ancillary accommodation.

This is an example of central and local government bodies working cooperatively in an area of the city with high levels of deprivation, to bring a shared focus on improving the health and well-being of the local community, whilst also making a major contribution to the regeneration of this locality. A further public sector body, the Department of Social Development, has contributed additional funding for the environmental improvement of the immediate area surrounding the new centre. The project was started in early 2008 and – in large part as a result of its innovative combination of services – emulated the success of the East Belfast Holywood Arches project by winning the 2008 overall United Kingdom award for “Best Community Health Building”.

This facility, in its combination of elements, is a physical demonstration of the central roles to be played by exercise and information as key enablers in the new DHSSPS strategy for improving the health of the people of Northern Ireland.

Conclusions

The future Northern Ireland health model aims to focus on health promotion and illness prevention, with improved accessibility of diagnostics and earlier interventions delivered in communities closer to where people live. The model envisages a major emphasis on better management of chronic disease, with the objective of improving quality of life and preventing unnecessary hospitalization. A comprehensive range of health services and related advice will be available at new centres located close to natural shopping and public transport hubs and – where possible – integrated with other services that impact on health, such as leisure and fitness services, information and library services, and voluntary and community services. The corollary of this movement of the more general services from acute centres to community facilities is the proposal to centralize more complex specialties in a smaller number of acute hospitals and “centres of excellence” and to create a number of “protected elective centres” that will provide improved access to quality-assured high-volume procedures. All elements of this system will be fully integrated by the use of clearly defined patient pathways and protocols (such as ICATS), structured clinical networks, and significant investment in the latest clinical and information technology.

In the case of Northern Ireland, the scale of capital investment – up to £4.5 billion (€5 billion) over 10 years – is considerable and this means that the programme might not be easily replicable elsewhere. However, a considerable financial contribution has been generated from the sale of the outdated health facility sites. In addition, the provision of the new facilities has obviated the need for considerable and expensive backlog maintenance of these older facilities. The anticipated decrease in hospitalizations is also expected to generate additional recurrent cost savings.

The programme is still in its early stages and it is too early to judge whether all the envisaged objectives and benefits will be achieved. This applies in particular to the ultimate aim of bringing about a fundamental reform in the model for the provision of health and social services, with the objective of improving the quality of health and well-being enjoyed by the people of Northern Ireland. Signs so far, however, are encouraging. The programme promises the development of new, flexible and exciting – yet sensitively planned – building forms that will create true healing environments, enrich the experience of service users and staff, and enhance the quality of the environment for the communities in which they are located.

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Chapter 8

Orbis Medical Park, Sittard, Netherlands

Henny van Laarhoven, Jonathan Erskine⁶

Background

The health system in the Netherlands has traditionally differed from those of many other European countries in that most hospitals (approximately 90%) have developed as semi-public, non-profit-making institutions, although public university hospitals also play an important role. Recent developments have included increasing decentralization of hospital services and greater involvement of medical specialists in hospital management. The gatekeepers to the Dutch health care system are family physicians, who place great emphasis on treatment, wherever possible, in local community practices. The outcome of this approach is low rates of referral and prescription. The number of acute care hospital beds per 100 000 population – at 340 in 2007 – was lower than the European Union (EU) average of 395 in 2006 (WHO Regional Office for Europe 2009).

For some time, hospitals have received payments from social health insurance funds on the basis of diagnosis-related group (DRG) tariffs, set by the Government's Board for Health Care Tariffs. In 2006, however, this system changed, with the introduction of competitive tariffs negotiated between hospital organizations and insurers. This is a rolling programme, which saw approximately 80% of DRGs set on a competitive basis by 2008. This change is predicted to drive major changes in the relations between insurers and health care providers.

The Dutch health system has been characterized by lengthy public debate and incremental reform. Until 2006 three “compartments” of social insurance existed in the Dutch health system:

⁶ The authors are indebted to Jan de Leede, author of *Lean+ at Orbis: How patient-centred care and attractive workplaces require standardized health care processes*, written for the SALTSA European Hospital Network.

- a national insurance scheme for “exceptional medical expenses”, including long-term care;
- a second compartment with two different regulatory schemes – compulsory sickness funds for people below a certain income and a mostly voluntary private health insurance;
- voluntary supplementary health insurance.

A move to a more market-oriented health care environment called for “regulated competition” (Exter et al. 2004). On 1 January 2006 the Government of the Netherlands started to implement a series of reforms intended to introduce market competition into the health insurance system, while preserving the principles of equity and access to health care through a closely defined regulatory system. Residents of the Netherlands are now obliged to purchase at least a basic health plan, as defined by the Government, but they can freely choose between health insurers, which now include both non-profit-making mutual funds and private profit-making funds. Insurers have to provide a flat rate premium for each health plan, with no variation allowed on grounds of age or gender. Further, they can choose which providers to deal with and what kinds of care they will contract for from different providers.

Health care providers in the Netherlands, whether the established non-profit-making hospital groups or (now permitted) new profit-making private sector organizations, now find themselves in the position of having to attract insurers as customers. Efficiency and quality of care so far appear to be the principal drivers in maintaining and improving competitive advantage.

The Orbis Medical Park

Orbis Medisch en Zorgconcern (Orbis Medical and Healthcare Group), established in the year 2000, provides health care services to the Sittard/Geleen region in the province of Limburg in the southern Netherlands. At the time of writing the organization runs a central hospital (Maasland) and a number of centres, including ones for psychogeriatric care, nursing of the elderly, and somatic care. The hospital serves a population in the Netherlands of approximately 200 000 people. One of the region’s key characteristics is that it has a rapidly ageing population, with an increase in the average age of the population at approximately twice the rate of the Netherlands as a whole. The region is geographically close to three major teaching hospitals in Belgium, in Germany and in nearby Holland (another region of the Netherlands) – an area where there is a long tradition of close cooperation between health facilities in the three countries. Orbis estimates that 5–10% of its patients have previously used these other hospitals, mainly for diagnostic and imaging services but also for treatment.

Faced with the newly competitive environment in the Dutch hospital sector and with the particular needs of the surrounding population, Orbis is transforming the health care services it offers to the Sittard/Geleen region. At the heart of this development is the new Maasland Hospital, which is the main focus of this case study. However, the Medical Park is intended to offer a wider mix of services, including acute care, rehabilitation, nursing care, mental health services, a variety of diagnostic facilities, and retail outlets offering therapeutic products and services. The central hospital is an embodiment of the anticipated changes in capital planning, service design, managerial techniques, and clinical outcomes, but it is only one component of the overall vision. The old hospital had 420 clinical beds and 73 day-care beds; the new Maasland Hospital, which opened on 31 January 2009, has 320 clinical beds and 90 day-care beds.

The total capital investment in the new Orbis Medical Park is envisaged to be €360 million. This is approximately 15% more than would normally be projected for a project of this size, largely due to the extra costs in designing and building an adaptable patient environment and in developing fully integrated information and communication technology (ICT) systems. Orbis, however, expects that the greater efficiencies provided by systematized work processes will make it possible to meet the commitments built into the business plan, in terms of return on investment, and at the time of writing Orbis reports that they are on target towards meeting these commitments.

The central vision

Orbis has made the systematization of work processes the core principle of its model. This applies equally to clinical care, ICT, logistics, financial systems, human resources, architecture and strategic asset planning. As a rule of thumb, Orbis considers that 80% of any process can be made routine. This is believed to reduce the overall administrative burden and to give professionals more freedom to apply their knowledge and skills to addressing the challenges of the remaining 20%. Patient outcomes can be improved and average length of stay reduced. The 80/20 principle has already been applied to some degree in the existing hospital, through the adoption of care pathways and a comprehensive electronic patient record system.

Systematization is not an end in itself, but a means to achieve a number of organizational objectives. These are:

- running health care services as a dynamic business by managing the risks inherent in an increasingly competitive market and by embracing sustainable change;

- a patient-centred approach;
- creating a total chain of care that not only encompasses diagnosis, treatment and rehabilitation, but also links with the primary sector and to other third-party providers of care and services;
- developing an integrated philosophy that influences the physical infrastructure, the processes and methods of clinical and administrative work, the ICT, and the logistics of the operation.

Systematized care processes contribute to each of the above objectives by ensuring transparency of clinical decision-making (transparent to clinicians, managers and patients), by allowing hospital management a clear view of the degree of financial and clinical variance (and hence risk) associated with medical procedures, and by embedding intelligent use of medical data in the services that support treatment programmes.

The business model

As outlined earlier, Orbis is facing increasing pressures to improve efficiency and quality of care. Efficiency has improved since 2002 with the introduction of care pathways. Following the above-mentioned 80/20 principle, care pathways are expected to ensure that fewer errors are made and that clinicians have more time and resources to care for those patients who fall outside standardized care processes. While this should be of benefit to patients, the adoption of care pathways integrated with a bespoke ICT system also has a business orientation: to treat more patients with fewer staff. Orbis expects to run the new hospital with 175 fewer staff (including nurses, managers and administrative staff) than the current hospital, although most will be redeployed in other care centres within the Medical Park or in businesses providing services to the wider medical establishment. Growth in “business” (that is, the number of patients treated) is running at 2–3% per annum at the time of writing.

In line with the patient-focused objectives of the organization, Orbis also intends to strip away some of the functions that are traditionally associated with running a hospital. Departments dealing with logistics, distribution, and human resources, for example, will be placed outside the core business. This reduces staff numbers, but it is also intended to stimulate innovation. The objective is to set up these functions as businesses in their own right, so that they can provide services to other health care organizations in the region and thus benefit from economies of scale.

For the business model to work, it is important that the chain of patient care does not begin and end at the doors of the hospital. As already mentioned, Orbis envisages operating the Medical Park with centres for rehabilitation,

mental health and nursing care, so that patients can be treated for ailments that fall outside the traditional scope of the acute care hospital. The final stage of the Medical Park will see the integration of a retail wing for medically related businesses, which may include podiatrists, optometrists, pharmacies, an educational centre for nurses, and therapeutic or complementary medical practitioners.

In common with most major health asset projects in the Netherlands, the Maasland Hospital and Medical Park is being financed through borrowing funds from a bank, and not (as would be the case in some other countries) through central treasury funds. The innovative elements in the Orbis business plan might appear to produce a higher risk element than in business plans for similar sized projects with more “traditional” scope and – initially – Orbis had difficulty in finding a financial institution willing to provide capital for investment. However, Orbis argues that other health care organizations are running a greater risk by failing to anticipate the coming changes in the Dutch health care landscape. Orbis also believes that its incremental approach to change management (such as the phased introduction of care pathway principles and the introduction of new ICT prior to the move to the new hospital building) is instrumental in allowing for course correction as the project unfolds and makes the business plan robust and manageable. The accuracy of the risk assessment embodied in the business plan will only be known post hoc, once the new hospital is completed, the associated care centres are in operation and new work processes and practices have had time to bed down.

Procurement

Having obtained financial backing, Orbis procured the design of the new Maasland Hospital and Medical Park by inviting tenders from interested architectural firms. Five companies showed interest and all of them were visited by the board. The eventual winner was an architectural firm with no previous experience of building health care facilities but with considerable experience of creating commercial environments that support new work processes and innovation in business practice. Project management and construction were awarded to a separate firm.

Managing change, managing risks

The Orbis project has been driven forward by the strong, committed leadership from the board, which now consists of just two individuals. They have recognized that there are considerable risks involved in trying to anticipate changes in the

Dutch health system. Orbis characterizes these risks as follows:

- other health care providers may “get there first” and take away market share; private clinics, for example, have become more visible in marketing their services;
- inability to reduce staffing levels in line with projections is a potential problem, which would increase operational costs and lower productivity gains;
- failure to change the work culture in the various health care facilities could emerge, with the risk that staff do not accept new ways of working or do not change their attitudes towards patients.

Orbis has approached risk management by following some overarching principles. First, it advocates a stepwise, incremental method of introducing change, coupled with acceptance that no solution is perfect. This is another application of the 80/20 philosophy: making determined efforts to get 80% of the required changes in place, and then concentrating on coping with the 20% that prove more intractable. As an example, Orbis cites the introduction of its integrated ICT system. This operates in the existing hospital building, without the advantages to be gained from the planned, specialized workstations in the new facility. The ICT system has been created as a bespoke application in collaboration with a third-party supplier. It is not part of a national or international system and does not yet allow for comprehensive links with family physicians. The system tracks patients from admission to discharge and obliges clinicians to follow systematized care pathways. One resulting advantage is that staff are now trained in its use and have become familiar with the required procedures, so that this element of transition to the new hospital environment will not come as a shock. The key benefit of the ICT system, however, is that the administrative and clinical management of Orbis can already obtain up-to-date information for use in patient profiling, clinical audit, clinical management and financial forecasting.

A second risk management principle has been to learn lessons from other sectors. Orbis believes that a patient-focused health provider must have front-line staff who know how to greet the public, how to handle miscommunications and complaints, and how to ensure that patients are treated with dignity. To ensure that reception staff are able to meet these requirements, Orbis arranged for them to be retrained by a college for hotel and tourism services. In similar vein, Orbis has studied the process control mechanisms of other industrial sectors and sought to adapt the most successful principles to clinical work.

Orbis has remained candid in its approach to dealing with the difficulties of adapting and altering the ingrained working practices of staff. Doctors, nurses, medical managers and administrators are highly trained people who have

acquired their skills often over many years. Learned behaviours are not easily amenable to change. Even at the time of writing, with the new hospital nearing completion and with care pathways in use for some years, it is not uncommon for staff to express doubts and to be fearful of losing professional autonomy.

Orbis sought to adopt an incremental approach to change, keeping staff fully informed and involving health professionals in management decisions. Orbis maintains a medical board, a staff committee and a patient board, each of which has a role in reviewing the progress of the project and identifying any upcoming problems. Furthermore, the management team has set up a number of working groups, each involved in designing a particular aspect of the new hospital, including the physical layout, future working processes and application of ICT. The working groups comprise representatives of hospital management, the consultancy company and the hospital “domains” (roughly equivalent to medical departments). In turn, the domains are run by a manager and staff who represent physicians, nurses, planners and specialists in logistics and ICT. They are tasked with analysing the performance of the domain, reviewing patient outcomes and satisfaction, and ensuring that professional standards are maintained. The systematization of care and the use of an electronic patient record system are intended to facilitate the adoption of common language by the disparate professionals involved, helping them to make full use of readily available audit data.

Orbis reports that, even with the above-mentioned systems in place, the large-scale changes that are under way in both the physical environment and working practices can adversely affect staff morale from time to time. It is one thing to be involved in the planning phase of a project such as this, but quite another to find oneself coping with the reality of change. However, the current strategy at Orbis is to maintain a continuous programme of explanation and reassurance, and to integrate the key objectives (patient-centred operation, integrated care, systematization of work processes) into the clinical training programmes that all staff undertake. Orbis has not carried out a “before-and-after” culture change survey, but the managerial experience suggests that persuading staff to accept a radically different way of working cannot be achieved without the support of senior clinicians and the recognition that changes are driven primarily by a desire to improve patient outcomes and population health.

In overall terms, Orbis has identified three key factors that go a long way towards ensuring the success of a project of this kind:

- strong, determined leadership at board level
- commitment from physicians who are opinion leaders, including medical managers
- a carefully arranged balance of inputs from the organization’s departments.

Patient-centred care

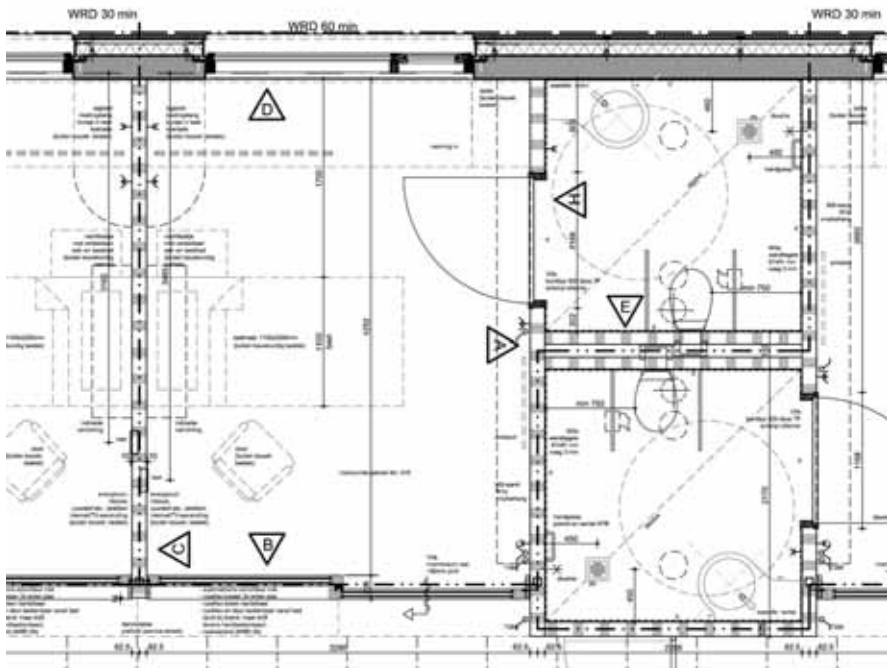
The Orbis philosophy is that, just as successful businesses focus on the needs of customers and clients, so health care organizations should concentrate on meeting the individual needs of patients. As a corollary, Orbis considers that a therapeutic environment is one where the patient feels valued and is treated with respect. To this end – and quite apart from paying attention to the people skills of employees – Orbis recognizes that systematization helps to orient patients and visitors, and to make their experience more pleasant. First, patients realize that staff understand the whole process of care, not just the portion for which they are directly responsible. This is hoped to engender trust and confidence in the institution and in the treatment or advice being given. Second, Orbis has requested a standardized “front office” environment, so that the physical design of reception and waiting areas is similar throughout the hospital and other care centres, signage conforms to a common standard, and forms and paperwork have a unified design.

To match the business-oriented approach of the hospital, staff are encouraged to refer to patients as “guests”, to emphasize that they are temporary residents of the building. In the near future, Orbis plans to hand more control over to the patients by allowing them to book appointments themselves and to have access to certain parts of their electronic patient record.

Patient-centred care extends to the design of the inpatient environment. The intention is to provide only multiple-acuity rooms for single occupancy, without any multi-bedded wards or bays. Orbis interprets the available evidence as showing that single rooms provide greater privacy for patients, more clinical flexibility in managing patient throughput, and shorter lengths of stay. The new Maasland Hospital’s design includes space for patients to have a family member stay with them while they recover (Fig. 8.1). Orbis terms this the “coach” concept and envisages actively encouraging patients to be accompanied during their stay, so that they can be emotionally and physically supported at all times.

Patient-centred care depends on effective management of the whole trajectory of care, from the initial contact with the family physician, through treatment and rehabilitation, to possible involvement of social services, advice and support from therapists, or placement in a nursing home. The Medical Park is designed to make these links transparent and efficient, and envisaged ICT connections with general practices are expected to strengthen links between primary and secondary care. At the time of writing Orbis is in the process of offering free software and training to local general practices, so that family doctors will have real-time access to the Maasland Hospital’s electronic patient record system,

Fig. 8.1 *Layout of patient rooms at the new Maasland Hospital*



Source: Bonnema architecten Holland, unpublished plan, 2008. Reproduced with permission.

including diagnostic and imaging data. A seamless interface between primary and secondary care is likely to the benefit of patients, but it also represents a competitive advantage over those hospitals which have yet to implement anything similar.

At the macro level, patient-centred care also involves careful analysis of current and future patient profiles. To this end, Orbis engages in demographic and epidemiological studies and translates these data into both capacity and production models. Modelling is also used for anticipating the outcomes of new medical procedures or technologies, for example by analysing the effects of changing part of a care pathway from inpatient treatment to day cases.

Patients have been encouraged to be part of the changes taking place. Orbis involved patient representatives at the design phase of the new hospital buildings and the Medical Park as a whole. The comments and suggestions received from patients were incorporated wherever possible into the final design. The patient

board continues to have a strong influence on decisions over the care services provided.

The electronic patient record

The electronic patient record is an essential component of achieving the vision for the new Maasland Hospital and Medical Park. The electronic patient record system can be considered as the backbone of the whole undertaking.

While certain components of an electronic patient record are bound to be common across different health care institutions or even countries, Orbis opted to create a bespoke software application in partnership with a third-party supplier. In doing so, Orbis has effectively set its own standards and has had to learn from mistakes along the way. The result, however, is that the Maasland Hospital is one of only a small number of hospitals in the Netherlands that are making full use of an electronic patient record system. What does this mean for patients and staff?

The electronic patient record is designed to oblige staff – nurses, physicians, managers – to follow care pathway principles. It is the only place where patient data can be recorded, and it thus discourages repetition of information and idiosyncratic or erroneous recording of treatments, prescriptions and patient records. The advantages, as reported by Orbis, are described here.

- Staff know where the patient is in the care pathway, and thus know what others have done thus far and what they should therefore be doing now.
- Managers can conduct clinical or financial audits at the touch of a button. They can see fluctuations and trends in case mix, compare financial forecasts with actual budget expenditure, and analyse deviations from expectations.
- Patients will soon be able to consult parts of their electronic patient record, to remind themselves of advice or to look up treatment records.

For managers in particular, the electronic patient record offers accounting benefits, since it allows easy access to information on case mix, patient profiles, pharmaceutical use and inventory control. While it is notoriously difficult to persuade organizations to adopt the practices or tools developed elsewhere, Orbis has found that its electronic patient record application has been of interest to other health care institutions. The system has not yet been developed to the point where it can interface with a patient “smart card”, although this is being discussed at the time of writing. Decisions will clearly need to be made regarding what information can be recorded on the smart card, and to what extent it will be able to be used in conjunction with other health information systems at national or European levels.

Future work processes

Orbis emphasizes that the systematization of health care within a medical model does not mean that patients receive undifferentiated or “one-size-fits-all” treatment, nor that clinical staff are expected to carry out their work without any further considerations. Rather, systematization can be a means of encouraging best clinical practice, embracing and managing change, identifying and analysing variation in patient outcomes, and ensuring that clinicians can devote appropriate time to the more challenging cases. The Orbis Medical Park is intended to operate through the adoption of new ways of working, largely based on the principles of systematized health care. There are some central pillars that constitute the basis of the new work processes.

First, the Maasland Hospital has adopted a patient-centred approach, which is reflected in its design according to work processes. This is intended to prevent delays or repetition of effort, with the patient empowered to make decisions about her/his care, and medical specialists expected to move to visit the patient, rather than vice versa. Second, physical facilities are standardized wherever possible. Consultation rooms are for use by different specialties and no domain “owns” any particular space. In general, each consultation room is identical in terms of equipment and ICT facilities. There are some exceptions to this rule (such as in ophthalmology), where specialized equipment must be available, but in general Orbis has attempted to keep such exceptions to the minimum. Third, the hospital is planned with explicit “front” and “back” offices, linked by a knowledge and expertise centre in which the professionals can hold meetings, carry out research, and catch up on administrative work. Finally, the new hospital building is also designed to separate the various logistic flows, so that medical personnel and patients enter from different areas, and movement of goods is kept apart from both.

The new Maasland hospital: work processes reflected in design

The Orbis project management team is determined that the new Maasland Hospital, sited close to the existing complex of buildings, will be a physical embodiment of the principles outlined in the preceding sections. The aim is to achieve this by means of the following endeavours.

- Public spaces, which are intended to humanize the interaction between patients (“guests”) and front office hospital staff and to provide as “nonclinical” an environment as possible.

- Standardized design in outpatient consultation rooms and inpatient bedrooms. These spaces will have the same equipment and the same amount of floor space; they will not be “owned” by any one medical specialty.
- Separation of flows of patients, staff and goods. The new hospital’s design keeps the delivery of medical and nonmedical goods apart from the movement of patients and staff. Patients and staff come through different entrances, and staff move to visit the patient, rather than vice versa.
- Computing services designed to encourage use of the electronic patient record system. Although the system is already in near total operation, Orbis’s management considers that it will realize its true potential only once staff have an opportunity to work with equipment, which is sited exactly where it can be best put to use (such as in nursing stations and reception areas).
- A hospital that concentrates on its core business, so that certain services (such as rehabilitation) can take place in surrounding care centres, while others (such as diagnostics) can develop to serve other health care organizations in the surrounding area.

To achieve these aims, Orbis is taking a calculated risk. While there are cost advantages in building standardized work spaces and patient rooms, other aspects – such as bespoke software applications, staff retraining and a shift to a new way of working – are relatively expensive.

Conclusions

In the short term, the success of the Orbis Medical Park project, when considered in terms of sustainability, will depend on achieving the desired reductions in staffing levels. However, over a longer time period, it will depend on continued commitment to change on the part of clinical staff and managers, and on the ability to “stay ahead of the game” in the face of an increasingly competitive health care environment in the Netherlands.

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Chapter 9

The Private Finance Initiative in the English health sector

Anneloes Blanken, Geert Dewulf, Mirjam Bult-Spiering

Introduction

Traditionally, most governments in Europe have been responsible for providing a wide and diverse range of health infrastructure and services, and in particular the largest capital investments, such as hospitals. This is gradually changing and many governments are deregulating and privatizing public health service delivery. Many European Union (EU) Member States are at least studying the feasibility of developing public–private partnerships as a means of generating more “Value for Money” (a technical term used to assess whether or not an organization has obtained the maximum benefit from the goods and services it acquires and/or provides, with the resources available to it and compared to alternatives). The United Kingdom has been engaged in this process since 1992, using a mechanism termed the Private Finance Initiative (PFI).

Although the PFI model has been used for some time to procure the more straightforward (in terms of construction and, particularly, operation) capital investments in a variety of sectors, it has only more recently been used to procure more complex products, such as hospitals and schools. Its supporters see it as a means to overcome financing and other bottlenecks associated with traditional provision, and to engage private sector disciplines. This form of procurement of health facilities and related services involves the public authority transferring the design, construction, operation and financing of the infrastructure asset to a private organization (Bult-Spiering & Dewulf 2006), in return purchasing the ongoing services (usually accommodation). Under the PFI, the private organization, the so-called “concessionaire”, finances the project and has full

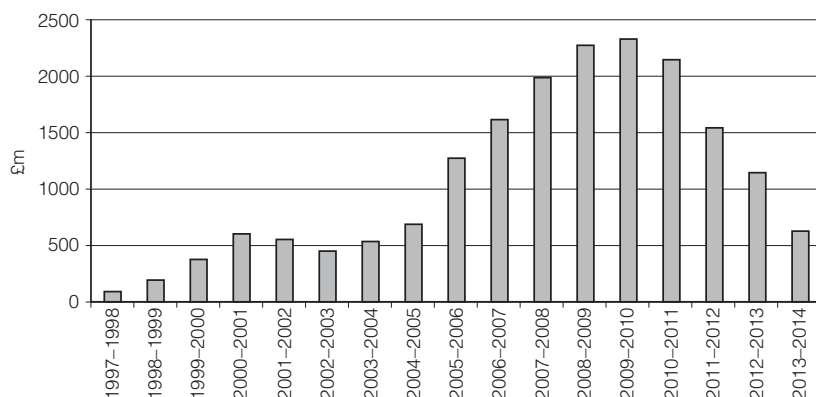
responsibility for its operations and maintenance (although not, in the United Kingdom hospital model, the provision of clinical services, which remains the responsibility of the National Health Service (NHS)). Another characteristic of PFI is the long-term duration of the contract – typically 30 years – designed to allow the concessionaire to reap the rewards of its investment. Business Cases play a vital role in justifying PFI and other public–private financing projects. The Outline Business Case provides the basis for a decision on whether to proceed to tendering and preparation of a Full Business Case.

This case study begins by describing briefly the history of PFI in the United Kingdom and the factors that led to its adoption. We then analyse the impact of PFI on Value for Money – focusing on the transfer of risks and the scope for flexibility in the face of changing circumstances – and explore in depth two examples of PFI in England: the Darent Valley Hospital and the Norfolk and Norwich University Hospitals. We conclude with some remarks about the design and service flexibility afforded by PFI.

Private Finance Initiative in the English health sector

Before 1997, PFI contracts in England were mainly applied to economic infrastructure, such as in the transport sector. In areas such as health care and education, the complexity involved delayed deals, while, more generally, the bidding procedures were widely criticized as costly and time-consuming (Winch 2000). Most importantly, the financiers of such deals were not confident that the operational legal framework then in force provided the certainty they needed. There was much uncertainty about the legality of NHS Trusts entering into PFI concession contracts, given the distinctly ambiguous legal nature of the “contracts” that Trusts entered into with the Health Authorities, who were the purchasers of services (although termed “contracts”, the relevant legislation stated that they were not enforceable in a court) and concerns as to which organizations would cover debt charges if the Trusts became insolvent. This changed after the Labour Party was elected to Government in the 1997 general elections: bidding procedures for PFI were overhauled and legislation was introduced to clarify the status of the Trusts. PFI deals to procure hospitals then moved ahead rapidly, not least because the incoming government made it clear that this was the only means available to raise capital for what was by now a substantial legacy of long-term underinvestment. As Gaffney et al. (1999) noted, PFI was “the only game in town”⁷ for Hospital Trusts wishing to access capital for large-scale hospital rebuilding and replacement.

⁷ This term is now commonly used by all involved in concessions in the United Kingdom to suggest that it is the only means of guaranteeing the provision of major property-based services (Broadbent et al. 2005).

Fig. 9.1 *The scale of the PFI in the English NHS*

Source: Barlow 2006.

In 1997 the first wave proceeding to financial agreement concerned 14 PFI hospital projects, worth an estimated £1.3 billion. Initially, more projects were submitted for approval, but a decision was made to limit the number of projects. The NHS is by far the leading exponent of the PFI in England. It has embarked on the largest hospital building programme in the history of the NHS, with over 139 hospital building projects approved between 1997 and November 2008.⁸ In contrast, between 1980 and 1997, only seven major health projects had been realized (Gaffney & Pollock 1999). Fig. 9.1 provides an overview of the scale of PFI in the English health system.

The PFI is not, however, limited to hospital procurement and is being used to deliver other health-related capital projects (homes for the elderly, staff accommodation, office blocks, community hospitals, primary health care schemes), services (energy management schemes, information and communication technology (ICT) systems, catering, integrated management systems, radio control systems) and equipment (generators, boiler plants, magnetic resonance imaging (MRI) devices). PFI health facility provision includes new build, conversions, redevelopment, site rationalization, centralization and modernization (Akintoye & Chinyio 2005), although – because of the intrinsic uncertainties in redeveloping existing sites – contractors have sought, where possible, to pursue new builds. Between 1997 and 2006, 87% of English hospital projects were delivered through PFI (Hellowell & Pollock 2007).

⁸ See Hellowell & Pollock (2006) and, for the latest update, refer to the HM Treasury web site (http://www.hm-treasury.gov.uk/ppp_pfi_stats.htm, accessed 10 February 2009).

The impact of the PFI on risks and flexibility

As already mentioned, PFI schemes were launched in order to generate Value for Money. What did this mean in terms of transfer of risk and flexibility? PFI contracts are typically signed for periods of 30 years, so it is important to take a long-term perspective. Once created, hospitals are difficult to change, whether in terms of geography, culture (as they often face entrenched professional attitudes), or scope (the conditions treated in them) (Thompson & McKee 2004). Despite the complexities surrounding capital investments in hospitals, there is growing recognition of the need for continuing investment, in view of technological developments and changing demands for hospital services (Thompson & McKee 2004).

Demand is very sensitive to variations in the hospital's catchment population, including demographic changes and migration patterns. The dynamic context of hospitals makes demand difficult to predict, both in terms of quantity and type of use. Furthermore, medical technologies have advanced rapidly since the 1970s, with a far-reaching impact on demand for clinical services. Developments in medical technology have dramatically improved productivity and substantially increased hospital capacity for treating patients and providing interventions. Similar progress, possibly at even faster rates, can be anticipated in the future.

Government policy in the health sector can also affect the demand for clinical services. For instance, the United Kingdom Government recently committed itself to increasing the volume of elective work undertaken in the independent sector, which may result in a reduction of ambulatory and short-stay activities at "public" hospitals. The Institute for Public Policy Research (IPPR) (IPPR 2001) enumerates a number of policy changes in health care that have an effect on demand, including the move towards bringing care closer to home; the emphasis on linking professionals and specialists in networks that cut across health institutions and provide integrated pathways of care for patients; and an evolving relationship between district general hospitals, regional centres, community hospitals and primary care providers.

As a result of these factors, the pattern of hospital activity may change dramatically over the lifespan of a hospital. The long contract period of a PFI makes asset flexibility just as important. Hospitals need to win short-term contracts with the authorities commissioning health care to ensure that they will be funded for the services they offer. Almost all Hospital Trusts are thus only certain of their income on a short-term basis, and cannot anticipate what their income will be in 20–30 years' time (Froud 2003). This is in stark contrast with the long-term nature of PFI contracts, and makes the transfer of risk even

more hazardous (and thus, contractors will rarely take any serious demand risk – that lies with the Trust concerned).

So far, there are only a few studies that have researched the potential effects of the resulting lack of flexibility. One consequence might be hospital facilities gradually becoming unsuitable functionally. Ensuring that hospitals created today can retain their relevance and value in the future is a profound challenge. Although providing health care goes beyond the physical asset, it is the starting point in the delivery of sustainable and high-quality clinical services at the right place and the right time. This means that the design of hospitals should be sufficiently flexible to meet new requirements. This is especially the case for changing levels of demand.

Second, restricted flexibility can result from locked-in provision. Lonsdale (2005) notes the dangers facing Trusts with a PFI being “locked in” to a Special-Purpose Vehicle (SPV; a company created solely for a particular financial transaction) over the duration of the contract. The concept of lock-in, introduced by Williamson (1975), refers to a situation in which the awarding authority must persevere with the private sector partner even if the relationship is not progressing well, or if the private sector partner is threatening to increase the agreed prices. This may make it difficult to initiate quality improvements and introduces the possibility that a service provider can get away with minimal performance delivery, rather than striving for continuous improvement (Lonsdale 2005).⁹ As with conventional outsourcing of service delivery, the awarding authority is able to propose additions, changes and reductions to the ancillary services or the building provided by the SPV. However, in concession arrangements, most adjustments to services or buildings require changes in contract terms and pricing. There is a risk that the financial penalties associated with minimal contract changes or changes in service become so great that the needed changes are not pursued (that is, because such a contract will have high transaction costs).

Flexibility is at the core of ensuring true Value for Money. Hospital design should provide an optimal fit with clinical requirements both now and in the future. However, in the case of hospital PFI projects, there is a fundamental tension between the desire for contractual certainty and the unpredictability of future service requirement. While both the Trust and the private partner must agree on an appropriate allocation of risk and a management system *ex ante*, adequate contractual provisions are also needed to accommodate future change. It is in the interests of the Trust to retain the freedom to plan clinical processes

⁹ Contractually, incentives are asymmetrical – it is easy for the concessionaire to define in the contract and capture cost savings, but hard to define long-term quality improvements from the authority’s perspective.

and to adapt these to changing demand. The provisions of PFI arrangements should therefore include mechanisms that offer necessary flexibility.

Little research has been carried out on the actual flexibility offered by typical PFI arrangements, although various commentators have expressed concern as to whether they do provide the flexibility needed to secure high-quality facilities and services in the future. The King's Fund (an independent foundation focusing on health services in London) argues that the PFI is in danger of becoming a white elephant, lacking the flexibility needed to keep up with changing policies and technological progress (Imison, Naylor & Maybin 2008). We explore the degree to which PFI arrangements allow for flexibility in practice by examining two projects: Darent Valley Hospital and Norfolk and Norwich University Hospital.

Darent Valley Hospital

Planning the hospital

The new hospital was to replace services previously provided on three relatively old sites, which were all in need of major maintenance and which, as a consequence of their dispersion, resulted in poor use of resources. Over a period of 25 years, the Dartford and Gravesham NHS Trust had made several attempts to find resources to build a new hospital, but all these attempts were unsuccessful (Broadbent, Gill & Laughlin 2005). As the public sector procurement route was perceived as unrealistic, due to a lack of available NHS funding, a PFI project was seen as the only feasible alternative. The PFI option was approved in 1997, and Darent Valley Hospital became the first PFI hospital contract awarded within the first wave of hospital concessions. Apart from the Gravesend Community Hospital, it is the only hospital within the Dartford and Gravesham Trust.

The Trust started paying for the hospital in September 2000, when the hospital became fully operational. The total capital costs in 1997 were estimated at £94 million. The PFI planning process enabled the hospital to be built in 44 months, which is particularly fast for this type of hospital project in the United Kingdom (although the length of the project preparation phase in PFI contracts means that the total interval from conception to operation is similar to that with the conventional route). The Trust estimated that being able to make early use of the hospital – two months before it was obliged to make payments – produced a benefit of around £2 million. The constructor, the subcontracting company Carillon, made a loss on the medical and engineering work and only broke even on the project as a whole (NAO 2005a).

As this was the first PFI hospital project in England and best practice on contractual terms had not yet been established, both parties had to develop and negotiate the terms of how flexibility should be incorporated into the contract. Design flexibility was a significant issue from the beginning of the project. A major concern related to the capacity of the new hospital. At the time the “Outline Business Case” was developed, the West Kent Health Authority,¹⁰ which was the principal purchaser of the Trust’s clinical services, had only recently been formed (in 1994) and had not yet developed a detailed strategy for health services in the area. It was only after the decision to pursue PFI procurement had been made in 1997 that the health authority finalized its strategy for the area. Its view was that, taking into account the cost and demand for services, the new hospital should not have more than 400 inpatient beds (NAO 1999). The available capacity in the Trust’s area before the implementation of the PFI project was more than 500 beds (Gaffney & Pollock 1999). However, the Primary Care Trusts in the immediate environment of the hospital were of the opinion that the proposed bed numbers were insufficient. The general practitioners (GPs) in the area had supported the need for a new hospital, but raised concerns about its likely capacity. Almost 60% considered the size of the new hospital to be inadequate. They expressed concerns that there would not be enough beds in the new hospital even when it opened and certainly not if – as was expected – the local population increased over the duration of the contract (NAO 1999).

Operational outcomes

During the first six years of the hospital’s operations (2000–2006), several changes occurred within and beyond the hospital. First, the demand for clinical services increased. For example, the demand for accident and emergency services in the hospital grew by 15% per year between 2002 and 2006 (NAO 2006). In part this was attributed to changes in the arrangements for out-of-hours services provided by GPs; during contract renegotiations, they had been able to give up the responsibility for providing 24-hour access to care. This contributed to an increase in waiting lists. Second, a “Payment by Results” (PbR) tariff policy was introduced throughout England in 2005, which had consequences for the financial flexibility of the Trust.

After the hospital became operational, the design appeared to be flexible in practice. Several adaptations have been made since the hospital opened in 2000. These adaptations were mainly intended to deal with the capacity pressures resulting from increased demand. From the very beginning of the operational

¹⁰ West Kent Health Authority and East Kent Health Authority merged on 1 April 2002 to create the Kent and Medway Strategic Health Authority. NHS South East Coast was formed on 1 July 2006 following the merger of Kent and Medway Strategic Health Authority with Surrey and Sussex Strategic Health Authority.

stage, intermediate care in particular struggled to cope with the effects of the reduction in bed numbers compared with the pre-PFI situation, as other local health facilities had not been developed sufficiently to cope with the reduction in hospital beds. An increased demand for clinical services further increased capacity pressures.

Due to these pressures, the Trust added two small wings to the accident and emergency unit. Another adaptation was the conversion of an internal courtyard into clinical rooms as an extension to a day-care unit. It involved complicated construction, erecting a scaffold over the exterior of the 3-storey building to gain access to the courtyard. The conversion was completed without major disruption to the Trust's activities. The contractor was again Carillion, completing the conversion in October 2004.

In 2004 the hospital also started to build a new Treatment Centre. This expansion involved the provision of another 40 beds and the ability to treat 3400 extra patients per year. The construction and subsequent maintenance services were arranged by the SPV as a contract variation. The SPV awarded the construction work to Carillion after independent surveyors assessed that the costs proposed by the SPV were reasonable.

A further building project concerned the implementation of a mental health assessment centre for elderly people and a renal dialysis unit in 2004, which brought the total number of beds in the hospital to 460. The West Kent NHS and Social Care Trust and the King's College Hospital NHS Trust use these facilities to provide corresponding services. The construction was carried out by Carillion, following competitive tendering. The capital cost involved was estimated at £5 million (€5.5 million). Under the terms of the PFI contract, the Trust was required to be contractually liable to the SPV for the cost of this work as a contract variation within the PFI contract, since the work was being carried out on the Trust's site. The Trust's unitary charge (the annual sum allocated to the private sector operator in a PFI contract as a payment for services), however, did not increase, since the work was funded by the Trusts providing the services in the mental health assessment centre and the renal dialysis unit. The SPV therefore recovers the cost from these two Trusts, although any maintenance services that these Trusts may require are initially charged to the Dartford and Gravesham Trust under the PFI contract.

The number of inpatient beds was further increased with the opening of a new Heart Centre in January 2007. In 2004 the Strategic Health Authority approved the Business Case for this centre but required an additional funding source. The cost was estimated at £4.4 million (€4.8 million). The Department of Health National Heart Team agreed to allocate £3 million (€3.3 million),

and the Strategic Health Authority and the Trust each provided 50% of the balance (DGT 2005). A temporary facility was used to enable people to be treated locally during the construction phase. Carillion, cooperating with the Trust in designing the Heart Centre, also undertook the construction work. There was to be a “leaseback” to the Trust and the SPV would accept the life-cycle responsibility for the Centre.

In 2001 the Trust decided to assume control of the SPV’s responsibility for the infrastructure of the hospital’s ICT network in view of its lack of confidence in the timing of work and the skills of the network staff. The removal of the ICT contract resulted in a decrease in the unitary charge by £2.2 million (€2.4 million) annually (NAO 2005a), although the penalty cost of terminating the ICT component of the contract was not disclosed. A recurrent concern among researchers has been the refusal of Trusts to disclose information on PFI costs when requested under Freedom of Information legislation, citing commercial confidence. Hence, it has been very difficult to ascertain the scale of transaction costs.

In October 2006, Darent Valley became the first PFI hospital to “market test” its ancillary services, that is, to expose them to competition from external providers.¹¹ In accordance with contract provisions, the testing concerned all ancillary services transferred to the SPV. The testing was done by the SPV as a benchmarking exercise over a period of 12 months. The annual cost of services before market testing was £5.1 million (€5.6 million) and, as a result of the benchmarking exercise, this was reduced by 2.4% (NAO 2007).

The reduction in service price was partly attributable to changes in operational requirements since the contract was let. During market testing, the Trust decided that office cleaning standards could be met within a reduced cleaning regime, and that it was not necessary to have two dedicated porters for the operating theatres (Roumeliotis 2007). The contract has been adapted accordingly. Further, the Trust made the decision, as part of its clinical strategy, to close a number of beds at the time of the benchmarking exercise and this also contributed to the decrease in service costs.

Yet, notwithstanding these savings, the unitary PFI charge in the operational phase has been higher than originally estimated. This price inflation is mainly a consequence of implementing the (already described) necessary changes to the building and to service provision. The financial consequences for the unitary charge¹² are shown in Table 9.1.

¹¹ In PFI, the main contract has a duration of 25 years or more (originally 28 years for Darent Valley), but some of the Facilities Management contracts are set from the start at a much lower term (5 years for Darent Valley) and thus “market testing” is pursued, with the original contractor subject to replacement if competitors are cheaper.

¹² The unitary charge is the annual amount paid to the private sector operator of the hospital.

Table 9.1 *Financial consequences of design and service flexibility on the unitary charge**

	2000/ 2001	2001/ 2002	2002/ 2003	2003/ 2004	2004/ 2005	2005/ 2006
Charges for capital works, minor works and additional works**	0	0.2	0.2	0.4**	0.9	n/a
Charges for additional facility management services	0.1	0.3	0.2	0.2	n/a	n/a

Source: NAO 2005a.

Notes: * Increase of unitary charge measured in GBP million; ** This includes payments for the building works on the accident and emergency extension, the staff common room, and the day care pre-assessment unit.

This increased unitary charge has contributed to the Trust running an operational deficit in recent years. In its annual reports, the Trust also attributed the deficit to the impact of increases in activity, losses of funding, and higher-than-expected costs arising from running the hospital, although the first two seem mutually contradictory in a system in which – at least in theory – money follows patients, and the third element is precisely what the PFI model is intended to overcome. The consequence of the high unitary charge means that, within the current PbR tariffs, the Trust needs to perform better than the NHS average to recover its relatively high capital costs, as the PbR tariffs are based on the national average cost of inpatient or day care for patients with similar diagnoses.

In response, the Trust sought a refinancing deal, whereby it would accept additional risks in return for lower payments (recalling that a primary objective of the PFI model is to transfer risks to the private contractor). The main element was to extend the duration of the contract from 28 to 35 years, which brought the contract more into line with other PFI deals in the health sector.

Norfolk and Norwich University Hospitals

Planning the hospitals

Given that the existing two hospital buildings within the Norfolk and Norwich Trust were old, worn out, and their backlog maintenance (maintenance that is necessary to prevent the deterioration of an asset or its function but which has not been carried out) was in excess of £20 million (€21 million), there was urgent need for a modernized hospital facility by the late 1990s. Rationalization of the two sites was not an option, as there was no room for expansion and both sites were deemed unsuitable for development. As it was extremely difficult to obtain Treasury capital for a new hospital, a PFI contract was considered and appeared to offer Value for Money using “Public Sector Comparator” (PSC) benchmarking (a measure that is intended to assess what it would cost the

public sector to provide the outputs it is requesting from the private sector, although it has been heavily criticized on methodological grounds). After 16 years of planning for the new hospital, a Final Business Case was signed in 1998. The selected SPV developed a new hospital on an out-of-town greenfield site. It subcontracted the design and construction, which was realized using a fixed price and time contract. The main hospital was completed in August 2001 (five months ahead of schedule), with completion of an extension in October 2002. The minimum contract period, including the construction phase, had initially been set at 34 years.

The strategy used to predict activity levels was relatively conservative. When the Trust had to project the demand for clinical activities within the new hospital, a fall in the inpatient case-load during the first operational phase of the project was assumed. This was based on “deaths and discharges” as an output indicator, rather than “finished consultant episodes”, which is more commonly used to project clinical demand. The Outline Business Case was developed on the basis of expected demand, based on the number of admissions in 1994. However, admissions across all specialties rose by 4.1% annually during the period from Outline Business Case to Final Business Case (1998), and day-case admissions rose by more than 14% per year in this period. The projected number of discharges and deaths expected in 2003–2004 had already been exceeded in 1996–1997. The Trust therefore had to revise its clinical demand estimates, and increased bed numbers to 809 during the tendering phase. However, even this new number was based on a conservative prediction of future demand levels and envisaged maximum bed occupancy. The Trust had to increase the capacity still further, as demand for clinical services appeared to be growing during the construction phase, and the Trust prepared a second Business Case for an additional 144 beds (Pollock et al. 1999). The repeated use of conservative planning strategies provides little confidence that new facility is appropriately sized and sufficiently flexible for future use.

The building was designed to be internally adaptable and to accommodate further sizeable increases in bed numbers, ambulatory care and clinical support services. Strategically placed “soft spaces” should allow future internal and external expansion. The master plan also identifies potential sites for research institutes, a nursing school, staff accommodation and other facilities. Flexibility exists in so far as the internal structure is adaptable without major structural works. The functionality goal in the design was to be able to meet the functional requirements set out by the Trust and to demonstrate that the hospital could be expanded to cater for future clinical need. Further, in the vicinity of the hospital, there are 60 acres of land which are earmarked for future health care use and could be used for the provision of clinical services.

According to the Trust, the design of the hospital is far more flexible than that of its former hospitals. The hospital is designed in such a way that it can grow and adapt to the changing needs of the local community. Several strategies are in place to accommodate design flexibility. These include the physical structure of the hospital, which is composed of three zones (outpatient, inpatient and diagnostic/treatment services). The clinical services cross these zones in order to integrate physically all functions within a particular service. Furthermore, the hospital is built around generic wards which almost any specialty could occupy. The majority of the wards have the same layout, with the exception of the paediatric and maternity wards. This facilitates the transfer between specialist divisions.

The Trust had considered and rejected several of the more obvious modular systems, such as large panel exterior wall systems and partitioning systems that could be disassembled. Most of these were not deemed to deliver Value for Money over the lifespan of the building. The project did, however, benefit from the highly repetitive structural systems in the wards, which made construction more efficient. The fact that certain parts of the main mechanical distribution system were prefabricated offsite and installed as modular elements also benefited the construction and flexibility of the facility.

The Trust believes that it would be able to function, even if there were a 20% reduction in the number of inpatients, by closing down parts of the hospital, scaling down maintenance services and renting out redundant areas. Any financial advantages from changes in performance or service delivery should contractually flow to partners, the Trust and the SPV.

The ancillary Facility Management services integrated in the contract cover catering, domestic services, porter services, security, laundry services, waste disposal, and grounds maintenance. The charges for these services are renegotiated every 5–7 years during a market-testing procedure. The SPV proposed that savings as a result of market testing will be shared, with the Trust receiving the first 2.5% of savings, the Trust and the SPV sharing the next 2.5% of savings equally, and any remaining savings accruing to the Trust. Relevant service fees would be adjusted accordingly. If market testing leads to cost increases rather than savings, these would be borne entirely by the SPV.

The operational phase

After the letting of the concession, several changes have occurred within the hospital's environment. First, the demand for clinical services in the area grew faster than was planned. Second, at the beginning of 2004 the Trust changed from an NHS Trust to a NHS University Trust, as a consequence of the opening

of a new medical school, which meant that even more facilities would be needed at the hospital. Third, the PbR policy was introduced throughout England, and other policy documents concerning concession arrangements were adapted according to new insights and policies, such as the introduction of a clause that refinancing gains should be shared between the awarding authority and the SPV on a 50/50 basis.

Despite the aspiration to have an adaptable design, flexibility has been limited in practice by the high occupancy rate of the hospital. The facility was designed for an 85% occupation rate, but in 2006 it was already running at over 90% occupancy. Since the hospital's opening in 2001, the need for clinical services has steadily grown. The PFI scheme had already changed from 791 to 809 beds prior to the start of construction and expanded again to 953 beds later in the operational phase. An extension was approved in July 2000 (a year before the opening of the hospital), adding a second phase to the PFI project. This extension was developed at the front of the hospital and completed in January 2003. The extension was funded through increases in activity payments and was relatively easily accommodated by the building design.

The steady increase in the demand for clinical services has required further adaptations. An extension of two semi-permanent portacabins was added to accommodate administration and management offices. These were not planned for in the original hospital specifications, but offered a solution at a later stage. As capacity pressures are likely to increase further in the future, the portacabins are now considered to be a permanent provision. The space freed up by these portacabins within the hospital itself is partly used for wards. From the Trust's perspective, having a clinical facility separate from the main building is less desirable than placing offices outside the hospital. It is also cheaper, because the clinical infrastructure is already in place within the hospital itself.

All the contract variations, including the second Business Case for an expansion of bed capacity, took place in a non-competitive situation. As building works were under way, inviting competitors was not a feasible strategy, because inviting other bidders would have delayed the completion of the hospital. The Trust therefore took steps to ensure, through benchmarking, that the new prices proposed by the SPV for implementing the second Business Case were reasonable. The Trust's professional advisers benchmarked and reviewed – in a technical capacity – the proposed capital costs.

Aside from the variations already described, some other design changes have been executed in the operational phase. The number of minor works is set out in Table 9.2. All these design variations were requested and the capital costs paid for by the Trust.

Table 9.2 *Minor works in the first four years of the Norfolk and Norwich University Hospital*

	Number of minor works	Total cost of works	
Year 1	963	£997 000	(€1 096 000)
Year 2	665	£238 000	(€262 000)
Year 3	744	£300 000	(€330 000)
Year 4	467	£96 000)	(€106 000)
Total minor works	2 839	£1 631 000	(€1 794 000)

Source: Fenton 2005 (unpublished presentation).

The recent expansion to 989 beds means that much of the design overspill capacity is already exhausted, and that there is limited scope for further change. According to the Trust, however, the hospital will grow rather than shrink in the future, as critical care demand is expected to increase. The utilities and their infrastructure are adaptable to meet this increase, but the agreed overcapacity has already been exceeded, and a variation of the contract is needed in order to implement such upgrades. Towards the end of 2005, the first ward refurbishments were executed. Each refurbishment took approximately eight weeks and involved testing of all systems, redecoration and some new flooring, plus a deep clean of all fixtures and fittings. In some cases the Trust proposed additions to the design, but these were refused by the SPV on economic grounds or because of their implications for the operational processes in the hospital.

The SPV must maintain the building for the period of the contract, which created the incentive to design a flexible building. The functionality demand was to be able to meet the requirements set out by the Trust and its agents, and to demonstrate that the hospital could be expanded to cater for future clinical need. To a large extent, this demand has been met, as illustrated by the fact that new facilities have already been built.

Thus far, the mechanism has worked, and enabled the few minor service changes that have been required. In 2006 the first market testing took place, with procedures commenced in March 2005, as the testing had to be completed before the fifth anniversary of the hospital becoming operational. The first round applied to all ancillary services. The annual cost of these services at the time of market testing was £9.8 million (€10.8 million). Tendering was selected as the testing method, and the incumbent service provider was awarded the contract to execute the ancillary services for the next 5-year period. There were initially 16 expressions of interest by suppliers; after checks, these were reduced to 6, and then to 3 for the final stages of the market testing. Within the market testing process, the annual cost estimated was reduced by 2.2%. The National Audit Office (NAO) commented favourably on the result of the benchmarking exercise (NAO 2007). Any increase in the price of ancillary services in the

market-testing procedure was limited by a contract clause. However, it is unknown what additional price the Trust paid in the original PFI deal to include this price cap, which serves as a further reminder of the secrecy surrounding these contracts.

In the original contract, ICT works were also transferred to the SPV. However, in 2005, it was decided to move these back to the Trust. At the time of writing the ICT services are provided under separate contractual arrangements. Again, the termination cost has not been disclosed to the public.

According to Edwards et al. (2004), operating the hospital above the desired capacity level (believed to be approximately 85%) had financial consequences: service levels had fallen, waiting lists were becoming longer, and local Primary Care Trusts sent patients elsewhere, meaning that income for the Trust has fallen. Furthermore, costs rose sharply, because of additional PFI payments when activity rises above the contractual norm. It could thus be concluded that the PFI has the potential to destabilize the Trust financially.

The actual unitary charge compared well with the expected unitary charge at the time the Final Business Case was developed, but rose in out-turn (output) due to variations in the contract. In the design and operational phase, the main changes were related to the requested additional bed capacity, which resulted in an increase in the unitary charge of £2.8 million annually (€3.1 million). The additional 144 beds requested during construction and implemented by means of adding a second stage to the PFI project resulted in a further yearly increase in the unitary charge of £3.4 million (€3.7 million). The refinancing arrangements in 2003, on the other hand, decreased this charge by £3.6 million (€4 million). The removal of the ICT contract decreased the unitary charge by a further £2.2 million (€2.4 million). All the other contract variations in the period between the Final Business Case and 2005 led to a total unitary charge increase of £1.8 million (€2 million) (NAO 2005b).¹³

Together, these changes placed the Trust in a deteriorating financial position. To ease its plight it received payments from the Department of Health under a “smoothing mechanism” initiative starting in 2003–2004, which aimed to address the growing financial problems of PFI schemes. However, when the PbR policy was implemented, policy-makers questioned the appropriateness of smoothing mechanisms for PFI deals from earlier years. In 2003 the Department of Health’s Finance and Investment Sub-Committee advised that central revenue support for PFI schemes could not be justified in the long term and, in principle, should stop immediately. However, Parliament agreed with the Strategic Health Authorities that the mechanism should be phased out over

¹³ March 2005 prices.

a number of years to give Trusts time to adjust. Funding was due to cease in 2006–2007 (Committee of Public Accounts 2006).

The refinancing in December 2003 provided an opportunity for the SPV to extract a gain of £115.5 million (€127 million) in net present value terms by renegotiating the terms of its debt. This arose because – having successfully delivered the new hospital and therefore having placed most of the risk behind it – the SPV was able to obtain better financing terms than were available when the Final Business Case was signed. It also took advantage of a reduction in general interest rates since 1998 and the opportunities offered by issuing bonds which were at that time cheaper than the original bank lending (NAO 2005b). In common with other PFI deals from earlier years, the contract terms had placed no obligation on the SPV to share any refinancing gains – a situation that was highly criticized by a parliamentary committee, among others. A subsequent agreement by the SPV stated that the Trust would receive 10% of the refinancing gains, to share with the Trust refinancing gains on the debt that funded the second Business Case. However, in accordance with the “voluntary code” for sharing refinancing gains on PFI deals from earlier years, which the Treasury had negotiated with the private sector in 2002, the SPV gave approximately 29% of its total refinancing gain to the Trust.

The Trust took on new risks following the refinancing. To improve the affordability of the project, it agreed to extend the minimum contract period by five years (from 30 years post-construction to 35 years), in return for a reduction in its annual payments of £1.8 million (€2 million) over the initial minimum contract period, and an extra £100 000 (€110 000) per year as a share of the refinancing benefit. By agreeing to extend the minimum period of the contract by five years (to 2037), the Trust was accepting the risk that it would be committed to paying for services under the contract over a longer period. It should be noted that when this project was initially benchmarked against the PSC, the project only appeared to give Value for Money because the annual unitary charge would fall sharply after the initial contract period of 30 years. This effect is reduced as a result of the refinancing exercise, as the usage fee remains the same over the whole lifetime of the contract. In refinancing the deal, the Trust also accepted the risk of greater liability in the event of early contract termination. It now has to pay up to £257 million (€283 million) extra if it chooses to terminate the concession arrangement early. The Trust is, however, of the opinion that early contract termination is unlikely and that the refinancing delivers Value for Money.

Conclusions

In this case study, Value for Money in PFI-financed hospital projects in England has been interpreted in terms of their flexibility to accommodate changing demands for clinical services, rather than the specific PFI technical comparison with a PSC. Value for Money related to the demand–risk relationship is essential in long-term arrangements, as advances in clinical practice and changes in the needs of the local population make it difficult to predict what type of hospital(s) will be required in the future.

In the two projects discussed in this chapter, it appears that design flexibility is constrained by the low capacity initially agreed for the hospitals. The hospital concessions were based on conservative estimates of future clinical demand, which was necessary if they were to appear to be affordable. In the Norfolk and Norwich Hospital, the capacity was already insufficient when the facility opened. In the early operational phase, it had to move some of its administration and management offices outside the hospital facility to make room for the provision of clinical services.

It seems that overcrowded hospitals have been favoured in PFI projects, due to an incentive system that rewarded the maximum use of facilities, but they clearly also have negative impacts. One such drawback is that overcrowded hospitals facilitate the spread of hospital-acquired infections, such as methicillin-resistant *Staphylococcus aureus* (MRSA) or the *Norovirus* (NHS Estates 2005). Setting low capacity levels in order to obtain a hospital facility running at full capacity appears futile, as overcrowding is associated with new risks and costs.

It further appears that hardly any emphasis is placed on mechanisms that allow future changes in hospital configuration. The absence of provisions to change the use of the facility over time implies that the ability to adapt the design of the hospital is limited.

Where there has been a design variation within the contract, this was mainly due to changes initiated by the Trust rather than the private partner. Most of the variations were due to new factors affecting the Trust's needs, which arose after the contract was awarded. Private partners are not incentivized to initiate design variations, as they do not reap any rewards from these. It further appears that there is a potential mutual dependency between design and service flexibility and financial flexibility. Design and service variations mostly result in a price increase for the Trust. Based on the analysis of the two PFI hospital projects discussed in this case study, it seems that PFI arrangements have implied major restrictions to design, service and financial flexibility.

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Chapter 10

Rhön-Klinikum Group, Germany

Barrie Dowdeswell

Company profile

Rhön-Klinikum AG is one of the leading private hospital groups operating in Germany. It is growing at a remarkable rate, in particular in comparison with the private sector in other countries. Germany is witnessing a rapid expansion of privately owned hospitals, with other key players, such as Fresenius, competing for primacy. In 2003 the private health sector accounted for 9.4% of acute hospital beds in Germany (Busse & Riesberg 2005).

Rhön-Klinikum aims to acquire, own and operate hospitals – primarily acute hospitals – across Germany. Hospitals purchased by Rhön-Klinikum become privately owned and operated in the legal form of limited liability or joint-stock companies. The core ethos of the company is based on patient-centred quality of care, and this aspiration is seen as the route to growth. According to the company, the cost pressure on market participants in the hospital sector in Germany is intensifying and it considers that inefficient hospitals and facilities will increasingly be unable to cope with that pressure. In the context of limited financial resources in the sector, Rhön-Klinikum expects that the number of public hospital owners that might wish to sell hospitals will continue to rise (Rhön-Klinikum 2008a). Rhön-Klinikum has grown from a single spa business in 1974 to 46 hospitals across 35 sites and 9 German *Länder* (federal states) by 2008. The company is now responsible for the provision of 15 000 beds, or almost 3% of the (over) 500 000 that exist in the whole of Germany. A major step forward for the company, and a landmark in the German health system, was the purchase of a whole university hospital (95% of the shares), Gießen-Marburg, in 2006. Previously, Rhön-Klinikum had focused on acquiring small to medium-sized hospitals, with an average of approximately 300 beds.

The expected turnover for Rhön-Klinikum in 2007 was over €2 billion, with a profit of €100 million. The acquisition route to growth that Rhön-Klinikum has taken has accelerated markedly in recent years. Externally, the company is seen as a business enterprise that purchases failing hospitals and then applies astute business principles to deliver future fiscal growth (Business Week 2009). As Rhön-Klinikum purchases state hospitals – complete with their operating licence within the *Krankenhausplan* (hospital plan) of the federal state concerned, which requires them to provide the hospital services outlined in the *Krankenhausplan* – it is difficult to segment the market explicitly to gain advantage over public hospitals. To better understand the performance of Rhön-Klinikum and its status in the marketplace, it is necessary to understand the environment in which it operates.

The German health system

Three key developments in the German health system are affecting the hospital sector at the time of writing. The first is a change in funding mechanisms. Germany has been moving from a charging system based on payments per patient day to a cost-per-case system. A 5-year transition phase for the new flat rate remuneration system started in 2003, based on activity measured in terms of diagnosis-related groups (DRGs). This is expected to galvanize hospitals – whether public or private – into placing more emphasis on performance and productivity. In Germany, the average length of stay in acute care hospitals, at 7.9 days in 2006, was significantly longer than the European Union (EU) average of 6.5 days (WHO Regional Office for Europe 2009).

A second development is the enactment of legislation that breaks down the former demarcation between primary and secondary care, whereby medical specialists (other than those in university hospitals) worked in either one sector or other. Legislators are hoping that integrated care systems will deliver significant improvements in quality and cost. Hospitals could be faced with marked downward trends in hospitalization rates in favour of community-based services, a trend that can be observed throughout Europe. Most of the larger private hospital chains in Germany, including Rhön-Klinikum, are positioning themselves to take advantage of this shift through various forms of diversification. The public status of state hospitals is seen by some as inhibiting such developments, with central bureaucracies perceived as slowing down decision-making.

A third element, and one which seems to work in favour of privatization, is the parlous financial state of some German hospitals. This is to a large extent linked to the difficult financial situation of most public authorities in Germany, which

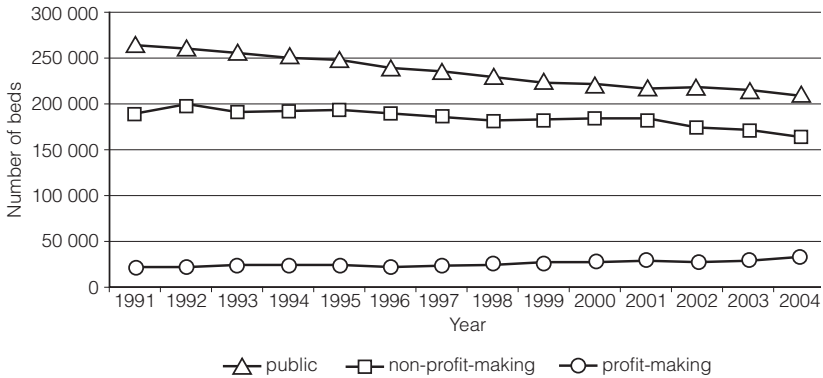
often have to deal with considerable debts and high budget deficits. At the end of 2005 the total public debt of all German municipalities reached €83.8 billion, while there was a public deficit of €2.3 billion. The financial situation of the German *Länder* was even worse, with a total debt of €468.2 billion and an annual budget deficit of €24.1 billion (Schulten 2006).

It is worth commenting further on the changing tariff payment system. The German Federal Government decided on a fundamental change to the hospital financing system in the year 2000, with the introduction of a German diagnosis-related group (G-DRG) system, which was mainly based on the existing Australian DRG system (Busse & Riesberg 2005). The introduction of the DRG system started in 2003 and – after a transitional period – is planned to be fully operational from 2009 onwards. The basic notion of the DRG system is that every case should be reimbursed by a uniform flat rate determined by a DRG, irrespective of the actual treatment and the corresponding costs of an individual hospital. It is widely expected that the full introduction of the DRG system will further promote the ongoing restructuring process of the German hospital sector (Schulten 2006). A study by the Allianz Group Economic Research Department (Hess 2005) estimated that by 2020 the number of hospital and hospital beds will have dropped by 20%. According to a recent study by McKinsey, about one third of all German hospitals will not be able to operate without incurring financial deficits under the conditions of the new DRG system (McKinsey 2006). Considering this, McKinsey anticipated a further restructuring in the German hospital sector, including the closure of hospitals, mergers and further privatizations.

The trend towards privatization shows significant variations between eastern and western Germany, with greater increases in privatization in the eastern part of the country, albeit from a lower starting point. The former German Democratic Republic had just 600 beds in private ownership in 1991; by 2004 that figure had increased to 22 000. In contrast, western Germany saw a growth rate of the number of hospital beds in private ownership of only 4% over the same period (Fig. 10.1 and Fig. 10.2).

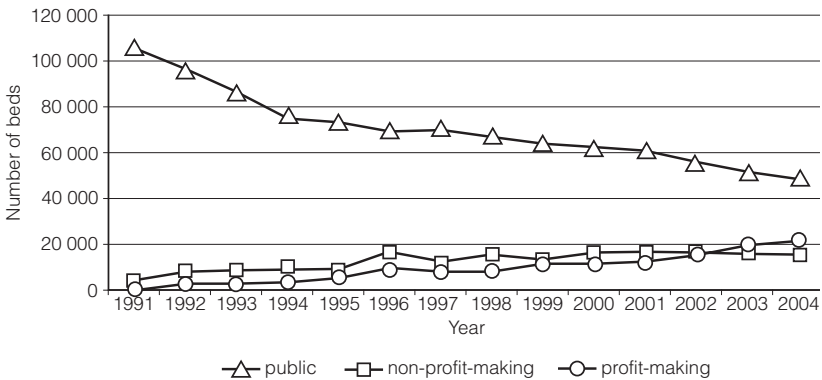
A major feature of the west German hospital system has been the lack of investment in public hospital infrastructure in recent decades, although this contrasts strongly with the major rebuilding programme in east Germany that was associated with the country's reunification. The backlog maintenance (maintenance that is necessary to prevent the deterioration of an asset or its function but which has not been carried out) deficit of hospitals has been estimated to exceed €50 billion, rising on average by €4 billion each year (Schulten 2006). It is difficult to see how – with the transfer to the DRG funding system – hospitals will bridge this gap, particularly now that the *Länder*

Fig. 10.1 Beds in general hospitals in Western Germany according to ownership, 1991–2004



Source: Wörz & Busse 2008.

Fig. 10.2 Beds in general hospitals in Eastern Germany according to ownership, 1991–2004



Source: Wörz & Busse 2008.

are increasingly considering the corporate finance market as a potential source of capital. It is believed that few public hospitals would pass the risk-assessment criteria set by the commercial banking sector, at least not without significant changes in operational focus and effectiveness – issues that have so far received inadequate attention.

For these reasons, some commentators consider that there will be an accelerated increase in privatization, with companies such as Rhön-Klinikum both pioneering the way forward and using their position as market leaders to influence policy change. Rhön-Klinikum has been preparing for these developments by, for example, seeking to prepare its workforce for changes in the remuneration system, linking performance to rewards and introducing new concepts of work process systemization. The section that follows reviews the strategies it has pursued that relate to capital investment.

Capital-related corporate strategy

Rhön-Klinikum has developed a corporate acquisition strategy based on the notion of (market) “sustainability”. In order to achieve sustainable growth, the company aims for “steadily rising revenues and earnings” (Rhön-Klinikum 2005). Rhön-Klinikum accepts that organic growth will be slow, and has therefore set its sights on “external growth on the back of hospital takeovers to the tune of 10% to 20% p.a. [per annum] and a targeted market share of 8% to 10% where no two group facilities are more than 100 km apart” (Rhön-Klinikum 2005). The company is pursuing comprehensive market coverage in order to achieve synergies from generalized health care delivery. Rhön-Klinikum assumes that public hospitals will increasingly be willing to be taken over, rather than having to attempt hostile takeovers. Consistent with the findings of the McKinsey study referred to in the previous section on the German health system, the company sees external growth as driven almost exclusively by constraints on investment in public hospitals, as well as by mounting pressures on earnings. However, while there have been significant year-on-year increases in the numbers of willing sellers from the public sector, it seems that competition amongst potential buyers has lessened, in view of concerns about high debt levels and the perceived limited scope for turnaround of many public hospitals. Rhön-Klinikum has an unambiguous position with regard to takeovers. It posits that “quality ranks above quantity, potential takeover candidates must fit in with our own service spectrum and plans, and be able to contribute to optimizing these”. The proclaimed benefit to those who accept these preconditions is “investment-driven improvement in patient care” (Rhön-Klinikum 2004).

Structural and professional change imposed from above on the predominantly clinical and nursing workforce is particularly difficult within health systems (Degeling et al. 2003). This seems to have been recognized by Rhön-Klinikum; it has developed ideas about what it describes as a “New Professional Model for Doctors”. Wolfgang Pföhler, Chairman of the Board, described this as follows (Pföhler 2007):

It is about entrusting doctors with those tasks that are commensurate with their skills and knowledge. In future we do not see one single, but several ideal types of doctors whose work is performed on a functional and disciplinary basis and oriented towards the needs of patients. These are the specialists for highly differentiated individual functions, consulting specialists for issuing second opinions, systems managers and personal consulting physicians.

This awareness shows similarities with the principles adopted by the Coxa Hospital in Finland and the Sittard hospital in the Netherlands (see the relevant case studies within this volume) that have both focused heavily on involving

clinicians and nurses in collaborative and radical change management. Rhön-Klinikum is able to employ its clinical workforce directly (hospital clinicians in both the public and the private sectors are salaried employees of the hospitals), but also sets its own remuneration levels and offers additional reward systems and – in addition – all employees are shareholders. An important principle of Rhön-Klinikum is that it is horizontally structured. The hospitals take the form of legally independent corporations and have their own registered office(s) at their facility sites.

One year in the acquisition life of Rhön-Klinikum illustrates the extraordinary pace of growth. In 2005 the company purchased 7 hospitals (or hospital groups) across 10 sites, comprising 3200 beds, at a total purchase price of €110 million. These hospitals generated revenues of €317 million and a profit of €2.9 million. This example illustrates that Rhön-Klinikum is to a large extent driven by acquisition. The consolidated income statement for the financial year 2005 noted that “revenues posted a 35% rise to €1415.8 million, with external growth accounting for roughly 95% and organic growth for roughly 5% of this gain” (Rhön-Klinikum 2005). This emphasis on acquisitions may in part explain how the very high capital investment rates are sustained, but it may also expose the company to a high level of risk, should acquisition-led growth decline. Year-on-year, Rhön-Klinikum has pursued a frenetic business pace, raising the crucial question of whether the scale and complexity of purchases has impaired corporate effectiveness.

Capital and service effectiveness

Rhön-Klinikum claims that the secrets of its apparent success are “motivated employees, patient-focused process optimization and development of suitable clinical structures through high initial investments and ongoing renewal and capital expenditure” (Rhön-Klinikum 2005). Elsewhere, Rhön-Klinikum describes raising hospital productivity and quality through process-oriented organizational structures, in order to compensate for a shrinking per-case income associated with the DRG funding system, to fund investments, and to catch up with medical progress through rationalizing inpatient care provision. Furthermore, in the future, Rhön-Klinikum plans to “be organizing the production chain beyond the accustomed territory of our hospitals” (Rhön-Klinikum 2005), moving into the integrated health care market. These statements illustrate the company’s strategy of work process systemization, aligned with design synergies derived from high levels of capital investment in modern facilities. These are not new ideas (Gray, Colebatch & Degeling 2008), but Rhön-Klinikum hopes to be more adept than other private hospitals in

Germany at achieving high levels of return on its investments. How is this done?

Design standardization

Rhön-Klinikum paid attention from the outset to optimizing the design of its hospitals. As early as 1977 the company started to convert its original spa accommodation, based on apartments, into new-style patient units, as it moved into the acute hospital care sector. The patient unit comprised two rooms with two beds each. The two rooms were separated by a common living space, with an interconnecting bathroom unit linking both rooms. These patient units were designed to achieve maximum work flexibility functioning both as bedrooms and treatment rooms and were a major departure from existing hospital standards using single rooms, multi-bed bays or wards. This has remained largely unchanged in the years since then. As a result of using standard hospital design formulae, the company can avoid the costs associated with different architectural ideas for different sites and those of design tendering. Rhön-Klinikum retains the services of only two external firms of architects which have long-standing relationships with the company and clearly understand the company's ethos and systemization strategy.

Another distinctive feature of Rhön-Klinikum hospitals is the separation of "hot floor" technologies from patient units. However, this feature only functions where working practices have been highly systematized and where there are well-developed multidisciplinary teams. A key consideration is the manner in which patients flow through the system. As is now common in hospitals in many countries, Rhön-Klinikum aims to apply principles from outside the health sector to hospitals, such as lean management principles originating from the car industry. It seeks to disaggregate all elements of the care process and to reassemble them in a way that makes work processes more efficient. The task then remains to ensure an adequate provision of employees.

Rhön-Klinikum has sought to create responsive workforces in all its hospitals that are prepared to embrace multidisciplinary working. The flow process is quite simple in terms of design and implementation and Rhön-Klinikum is happy to describe it as an "industrial process". The process is based on a multi-stage care concept. Wards are categorized according to treatment intensity, based on the degree of support required by patients, into four levels: high, intermediate, normal and low need (the latter being rehabilitation care). Patients (after diagnosis and initial treatment) are assigned to the ward level most appropriate to their condition; there are no demarcated departments, such as medicine or surgery. Patients move through different levels according to their changing condition. The levels of technical equipment and staffing

are high in intensive and intermediate care units and lower in normal and rehabilitation wards. Resources and processes are focused around patients, not clinicians. Both clinicians and patients are mobile within the system. A review of the corporate strategy drawn from recent annual reports suggests that Rhön-Klinikum believes that most public hospitals have insufficient intensive care facilities, but also that the policy of separating them (usually by medical discipline) throughout hospital buildings creates bottlenecks in treatment and care.

Whilst the company follows a standardized approach in its facilities, it also allows some local latitude, which it terms “subsidiarity”. Clinical pathways are defined and operated by each of the subsidiary hospitals. All patients follow predictive care pathway-based models of care. This helps with certification or recertification, where there is a marked shift in service volumes to outpatient care or where a newly acquired hospital moves to an interdisciplinary model of care. The company claims not to have corporate standardized pathways but it makes all generic pathways available to its subsidiary hospitals, so that each site can benchmark its own standards and adapt them where necessary.

Rhön-Klinikum attributes its proclaimed high productivity and low unit cost to effective systemization of work, allocation of staff in response to patient needs, and standardized design concepts linked to its work process model. However, this has led some commentators to suggest that patients feel like “sausages in a machine”, given the emphasis on flow processes. Rhön-Klinikum, however, routinely collects and publishes indicators on quality of care and clinical outcomes. These results are also fed into an internal process of quality improvement and external quality assurance programmes, although it is difficult to make direct comparisons of clinical outcomes with public hospitals.

The technical dimensions of capital investment

Rhön-Klinikum is one of the leaders in the German hospital system in terms of the investment or reinvestment rates for its hospitals. High, cost-effective productivity depends on its flow model which in turn is based on a specific design concept. Newly acquired hospitals will usually be of conventional design, and high initial levels of capital investment will be required to renovate premises for conversion to the Rhön-Klinikum model. The company in fact commits itself to high levels of investment when negotiating with prospective sellers such as municipalities. Rhön-Klinikum usually provides significant levels of capital finance from its own funds. In 2003, 76% of capital invested was financed in this manner (Rhön-Klinikum 2003). This policy continued in the following year. The *Annual Report 2004* stated (Rhön-Klinikum 2004):

That meant the company waives its right to state capital grants, without passing on the costs in the form of higher nursing rates. Under the Hospital Financing Act, KHG, only nursing rates to the level of comparable facilities are allowable. From the outset, then, this means that operative costs had to be 20–30% lower than comparable public hospitals in order to cover depreciation and interest on capital employed – which in the case of comparable hospitals corresponded to their subsidy advantage.

In an effort to keep pace with changing circumstances, Rhön-Klinikum hospitals are reportedly given a “thoroughgoing renewal every 12.5 years” (Rhön-Klinikum 2004). Furthermore, investment costs for a new 300-bed hospital can reach €50 million, requiring refinancing over a 15- to 20-year period (Pfähler 2007). It may be argued that the ability to service the cost of this high level of capital investment is to some extent dependent on the turnaround strategy of the corporation (moving hospitals from deficit into surplus), where new acquisitions seem to represent the major growth element in strengthening the balance sheet. This might not be a problem during a period of rapid expansion, but at some stage the expansion might slow down, perhaps when state legislators lower the ceiling on DRG payments.

Rhön-Klinikum follows a standardized depreciation method for all its hospitals. Land is not depreciated at all, buildings by straight-line methods over 33.33 years, machinery and equipment over 5–15 years, and other plant and technology over 3–12 years. There is a ruthless approach to buildings and technologies paying their way. Rhön-Klinikum invests heavily in clinical technologies. A few years ago, a computed tomography (CT) scanner produced one image per second, while new generation dual scanners produce 400 images per second. The potential benefits include less irradiation, better quality, earlier diagnosis, and faster throughput. With respect to the latter, a new dual CT scanner will cost over €2 million. Taken at straight-line depreciation over five years, 500 patients per year will yield a cost of €800 per patient. If throughput is increased to 2000 patients per year, unit cost fall by 75% to €200 per patient. In these circumstances, Rhön-Klinikum favours disposing of relatively new – but outdated – units, in favour of increasing productivity, including by extending hours of routine availability, in some instances approaching 24-hour cover.

The Rhön-Klinikum model of self-financed capital provision has raised many questions, as it contrasts with the situation in some other European countries to adopt public–private partnerships, such as the United Kingdom version, the Private Finance Initiative (PFI). According to Wolfgang Pföhler, there are three major problems with a public–private partnership (Pfähler 2007):

1. “PPP [public–private partnership] only solves the State’s liquidity problem, and that only temporarily, since through – possibly excessive – payments of rent, the payment obligations for new buildings subject to interest (and compound interest) are merely put off into the future and can turn out to be a debt trap for the State.
2. PPP does nothing to improve the hospital’s profitability. An unprofitable hospital will remain unprofitable as long as its processes are not optimized.
3. Whoever forgoes the know-how and competence of hospital experts when building a hospital will find it nearly impossible to bring down its operating costs.”

According to Pföhler, public–private partnerships do not address the insufficient profitability of many public hospitals because the core medical processes are not tackled. He comments that public–private partnerships are “nothing but a passing fashion” (Pföhler 2007). Rhön-Klinikum thus seeks to improve the interdependence of workforce and capital as a means of generating more cost-effective health services of higher quality.

Key strategies and decisions

Three new strategies can be identified in the approach taken by Rhön-Klinikum. These are the creation of teleportal clinics and medical centres; the introduction of electronic patient records; and the purchase, in 2006, of the first university hospital in Germany by a private health care organization.

Teleportal clinics and medical centres

One of the major problems facing small isolated hospitals is sustaining their clinical and financial viability. New teleradiology, information and communication technology (ICT), and other digitally based technologies have dramatically changed this situation. Rhön-Klinikum has commenced the rapid development and roll-out of “teleportal clinics”. Teleportal clinics are facilities providing basic care which are linked to acute hospitals with more extensive staffing and equipment. Patients attending these teleportals are directed to where they will receive optimal treatment from appropriately trained clinicians and nurses. The teleportal clinic organizes patient-oriented processes between hospitals using the latest telematics, in particular teleradiology. By the end of 2005 Rhön-Klinikum had established two such clinics, Dippoldiswade in the federal state of Saxony and Stolzenau in Lower Saxony. Initial experience suggests that only every fourth patient attending teleportal clinics has to be referred on to more comprehensively equipped hospitals in the Rhön-Klinikum chain.

More clinics are planned or under construction, including in Hammelburg, Wittengen and Miltenberg.

Once adequately evaluated, these examples may provide precedents that could be adapted by some of the newer EU Member States that are engaged in redesign of their hospital systems. Teleportals are a way of breathing new life into isolated local hospitals that might otherwise close on staffing or safety grounds. They promise to expand the range of care available close to where citizens live.

The use of teleportals reinforces Rhön-Klinikum's dictum of cost–efficiency and improved quality of care: teleportal clinics cost less, but telematic-based links help sustain clinical quality. This echoes models being adopted by many other organizations. The use of teleportal principles underpins the “nearby-care” model adopted in the Skane region in Sweden and is also being introduced by remote rural regions in Finland (such as in Lapland) and in Spain (in Galicia). These models are seen as a means of reconfiguring community acute hospitals and creating a central regional hub, interlinked with a network that looks very similar to the Rhön-Klinikum teleportal clinic model.

Parallel to this development, Rhön-Klinikum is installing Medical Care Centres (*Medizinische Versorgungszentren*, MVZs) in its hospitals. These are outpatient facilities similar to primary care medical practices. In Germany, they are subject to legislative constraints; they must, for example, cover at least two specialist areas and employ at least two physicians registered with the compulsory health insurance funds. The centres are established by Rhön-Klinikum by purchasing the medical registrations of physicians in their own practices and integrating them into Rhön-Klinikum's medical centre network. From January 2007, amendments to health legislation have allowed hospital operators to deploy hospital physicians in outpatient facilities, such as the new MVZs. This legislative change will reduce the gap between primary and secondary care, with the aim of moving towards vertical (as well as horizontal) coverage within the health care system.

Rhön-Klinikum has increased the number of the company's MVZs from 8 in 2006 to 18 by 2008. This increasing focus on outpatient care had contributed over €100 million to corporate earnings by 2007, with a year-on-year growth of 9%. Benefits are also expected in terms of economies of scale. The company extends the internal hospital pathway to cover the whole health system – a move that mirrors the trend towards integrated pathways that can be observed across Europe, as other health systems also aim to overcome barriers between primary and secondary care. These developments will change the demand for acute hospital services. Here, Rhön-Klinikum's capability of financing capital

investment from its own resources means that it can respond quickly, should hospital refinements be necessary, which is a definite benefit over public–private hospital financing models.

Electronic patient records

The potential benefits of integrated electronic patient records are widely accepted, even if practical experiences in many countries have so far been much less encouraging. They can overcome the problem of patients moving faster than paper. Rhön-Klinikum believes that the Electronic Patient File (EPF) will revolutionize the future of health care provision (Pfähler 2007):

Our vision for the EPF looks like this: we want to further develop EPF into a self-learning system that assists doctors in their diagnosis and therapy decisions. They will be able to take decisions on a much broader information basis than today. Here is where the learning effect of the system lies: in its database. Amazon has gathered a lot of information about the reading behaviour of its customers. Through intelligent linking of the data the system is able to provide readers with information exactly tailored to them. This is exactly the idea we want to apply in the realm of medicine: in future medical databases will be able to gather immense data on patients and use this information to routinely and independently look for meaningful correlations. This is good for the well-being and quality of life of our patients, and at the same time lowers costs.

Establishing patient profiles in Rhön-Klinikum's catchment areas is therefore seen as offering significant potential clinical benefits. However, the profiles are also relevant to capital investment, as they may permit more detailed and accurate demand forecasting. This may also overcome the weaknesses of some existing planning systems that are confronted with the challenge of translating generalized epidemiological and demographic trends into a language useful to capital planners. Just as supermarket customer loyalty cards are said to be now a critical factor in capital decision-making by most leading supermarket chains, Rhön-Klinikum may demonstrate how information can be generated that informs strategic capital investment decisions in the health care environment.

The plan for implementation is well under way. In one of the largest European private electronic patient record deals to date, Rhön-Klinikum and Siemens have agreed to implement up to one million web-based electronic patient records per year for the customers of Rhön-Klinikum's medical facilities. The whole project covers at least 46 Rhön-Klinikum hospitals, as well as a number of outpatient clinics and general practitioners (GPs). In announcing the contract, Dietmar Pawlik – member of Rhön-Klinikum's board of directors – commented: "We have agreed not to talk about the project volume in public, but in the end it is

a very attractive deal, for Rhön running costs are expected to be less than one million euros per year” (E-Health Europe 2007). He went on to comment that “Rhön hospitals are currently in charge of about 550 000 in-house patients annually. If the integrated EPR [electronic patient record] attracts an additional one thousand patients a year, Rhön will have an additional turnover of 2.7 million euros. This makes up for a rather quick return of investment” (E-Health Europe 2007). He made it clear that he was talking about years rather than a whole decade.

University hospitals: first steps

The purchase by Rhön-Klinikum of the public university hospital Gießen-Marburg was symbolic for the company on two levels. Although it is one of the leaders in the private market for general acute hospitals, if Rhön-Klinikum had pretensions to be the leader in the private hospital market in Germany, and later perhaps a European player, its status was impaired by not operating in the field of medical education. Furthermore, university hospitals are seen by some as offering scope for expansion of private health care. Out of the further 34 university hospitals in Germany, approximately two thirds are running deficits (Tuffs 2006). It was against this background that the State Minister of Hesse announced the sale of the university hospital Gießen-Marburg (the result of a recent merger of two separate university hospitals), with the handover taking place in 2006. The purchase price was €112 million, with the federal state retaining a 5% share to safeguard academic teaching and to influence the direction of research. The two university hospitals had a backlog maintenance deficit of €200 million. Rhön-Klinikum has announced its intention to invest €370 million across the two sites. Although there were widespread concerns about the impact of the takeover on teaching and research, medical directors in the hospitals perceived the takeover as an opportunity to enhance clinical and scientific standards. There are indications that other *Länder* are planning to follow suit, most notably Bavaria, where there seem to be indications that the university hospital – owned by the Technical University Munich – will be put up for sale.

By the end of 2006 Rhön-Klinikum had reduced the annual overspend of Gießen-Marburg from €17 million to €7 million. After moving to a break-even point in mid-2007, the company consolidated progress in the second half of the year and, overall, the hospital generated a profit of €1.1 million in 2007 (Rhön-Klinikum 2008b), despite the fact that the company invested over €50 million to overcome backlog maintenance needs.

Conclusions

Rhön-Klinikum has embarked on rapid expansion in Germany's private hospital sector, through its corporate strategy of sustained acquisition, high capital spending, design standardization, and development of efficient patient flow processes. At the heart of its approach to health care delivery is the evolution of a 2-tier integrated care model for both outpatient and inpatient care. This will demand ongoing and significant levels of capitalization. It remains to be seen whether the company will be able to sustain its rapid level of growth in the context of the new DRG system, the new regulatory environment and the economic crisis transpiring at the time of writing.

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Chapter 11

St Olav's Hospital, Trondheim, Norway

Arve-Olav Solumsmo, Ragnhild Aslaksen

Background: the health system in Norway

Responsibility for health care in Norway lies within three tiers of government: the central Government, four regional health authorities and the local municipalities. The decades since the Second World War have seen a decentralization of administrative and financial responsibility for health, in an attempt to strike the right balance between policy-making and legislative powers of the central Government and the need for local accountability and priority setting.

At the time of writing, the Norwegian Parliament and the Ministry of Health and Care Services are responsible for regulation, legislation and national-level policy development. Provision of specialized or secondary care, including inpatient, outpatient and psychiatric services, is overseen by four regional health authorities, which also have responsibility for radiology, laboratory and paramedical services. These bodies are responsible for the financing and planning of specialized health care on behalf of the central Government, but actual service delivery is carried out by so-called “health enterprises”, which are in effect state-owned companies. In 2006 there were 31 health enterprises comprising more than 80 hospitals.

The Norwegian municipalities (of which there are 430) are responsible for funding and providing primary care and social care and for the management of chronic illness (long-term care). The municipalities have a great deal of autonomy in these areas and are, for example, free to decide on many of their own administrative arrangements (Johnsen 2006).

Approximately 85% of health care financing comes from the public purse, via municipal, county (there are 19 counties in Norway) and national taxes.

The remaining 15% of health care funding comes from out-of-pocket expenses, chiefly for general practitioner (GP) visits, ambulatory care and some diagnostic tests and pharmaceuticals. However, there is a ceiling on the total amount of out-of-pocket expenses payable in any one year, with any difference usually met by the mandatory National Insurance Scheme (Johnsen 2006).

Hospitals in Norway

In recent years, and in common with many other health systems across Europe, Norway's hospitals have seen reductions both in bed numbers (with a decline from 378 acute care hospital beds per 100 000 population in 1990 to 284 per 100 000 in 2007) and in the average length of stay (declining from 7.4 days in acute care hospitals in 1990 to 5.0 days in 2007) (WHO Regional Office for Europe 2009). Pressures on hospital services are broadly in line with those experienced in other European countries: an ageing population, an increased incidence of chronic illness and a need to accommodate advances in medical technology, coupled with the political determination to see increased efficiency and cost-containment. Although the Norwegian population's health status compares very favourably with that of other European countries and the country enjoys one of the highest standards of living in the world, the hospital sector has struggled to manage the gap between resource availability and patient demand (Bratlid 2006). Effects of this anomaly have included long waiting lists and, in some cases, difficulties in providing certain services.

The Norwegian hospital reform of 2002, which effectively passed control of hospitals to the central Government (via the "health enterprises" controlled by the regional health authorities), meant that hospitals are now run by independent management boards, and local politicians no longer have direct control over hospital investments. There is some evidence that this has resulted in improvements in the level of senior managerial skills (Johnsen 2006). The length of waiting lists has also been reduced in recent years, but this may be partly due to other changes in policy, such as encouraging more use of day-case and outpatient clinics.

Norway witnessed significant periods of hospital infrastructure development in the 1950s and 1970s, and the State has therefore had to make important decisions recently concerning refurbishment and/or renewal of secondary and tertiary care facilities. A number of hospitals were built or expanded in the 1980s and 1990s (such as the Haukeland university hospital in Bergen or the university hospital of northern Norway in Tromsø), but for the most part these were designed to accommodate traditional service models based around the professional silos of the medical establishment (Valen & Larssen 2006), and

not with a patient-focused health system as the first priority. A more recent trend in Norwegian hospital design has been a focus on the patient as a client or customer, and this has been reflected in the organization of the physical space and the service model adopted by hospital organizations (such as the humanistic design of the *Rikshospitalet* in Oslo, which was opened in 2000). Another key feature of current thinking in Norway is the notion of adaptability, now seen as a vital element in “future-proofing” hospitals against changing technologies and models of care. This case study examines the rationale for the building of the new St Olav's Hospital in Trondheim, and how its organizational and physical design has responded to the pressures and influences already mentioned.

St Olav's Hospital: history and context

Together, the St Olav's Hospital and the university Faculty of Medicine comprise the university hospital in Trondheim. St Olav's is the main hospital for Helse Midt-Norge (the Central Norway region). It functions as a general and local hospital for the 200 000 inhabitants of Trondheim and provides specialized care for the 660 000 inhabitants of the surrounding counties of Sør-Trøndelag, Nord Trøndelag and Møre og Romsdal.

The new hospital project replaces a century-old facility on the same site on the Øya peninsula near downtown Trondheim. It is managed by Helsebygg Midt-Norge, an “established-for-purpose” division of the regional health authority for central Norway. The origins of this project date back to 1990, when planning started on refurbishing the existing hospital. As the results became available from studies to inform the planning process, it became apparent that it would be necessary to demolish most of the ageing and poorly maintained hospital buildings. An architectural competition was held in 1995, and parliamentary approval for planning and constructing a new hospital was granted in 1997.

Vision and goals

The overall vision for the development of St Olav's has been:

- to provide the best possible, patient-centred care
- to ensure the economic operation of the hospital, as well as effective logistics
- to integrate teaching and research.

These objectives have been encapsulated in the resolution of the Norwegian Parliament that approved building of “a state-of-the-art university hospital with a patient focus”. The development project has made a priority of finding flexible solutions to functional and organizational changes in the hospital, creating a

healing environment and integrating the hospital's architecture with the urban fabric of Trondheim.

Politically, Trondheim was the last regional hospital in Norway to receive a major capital allocation – it was seen as “Trondheim's turn”. Coupled with its emerging status as an independent medical school, local ambition saw the development as an opportunity to create a “real” university hospital and to be at the forefront of teaching and research. Patient focus was a key theme of the new hospital, but with a difference: the aim was to see things through the patient's eyes, just as the manufacturing industry attempts to see products and services from the customer's point of view.

Location

St Olav's Hospital, which has served Trondheim and the surrounding region for a century, is located close to the city's technical university and the historic centre. Enclosed by a curve on a river, the city centre has a block structure according to a city plan from 1681, with wide streets designed to prevent city-wide fires from spreading among the wooden buildings. The decision to retain the hospital in its existing position was based on cost-efficiency, availability of good public transportation and accessibility for patients and staff. The region has a poor public transport network in the suburbs and the countryside, and limited road and ferry connections, which means that a central location of the hospital was important. Finally, the site provides close proximity to the technical university. The local planning authorities were strongly supportive of retaining the existing central site.

Factors that seemed to speak against development at the existing site – emerging in discussions between hospital planners and employees since the early 1990s – comprised concerns over potential disruptions to hospital services during the construction phases and potentially major limitations to the functionality and future expansion of the hospital.

Development plan

The overall development plan for the new St Olav's Hospital combines the constraints of a brownfield site with the structure and possibilities of a greenfield site, through a “build–move–demolish” sequence. This is achievable because the urban block pattern makes it possible to build the new hospital in sections while the old hospital is still operational. The overall development has been divided into separate blocks, and construction took place in two main phases. On completion of Phase 1 of the new development – which began on an area

alongside the existing hospital – large elements of the hospital moved into the new buildings. The vacated buildings were then demolished, opening up the new building site for Phase 2.

Phase 1, completed in 2006, consists of:

- a neurosciences centre;
- a women and children's centre;
- a laboratory centre;
- a 110-room patient hotel (responding both to the needs of patients from the 660 km-wide mid-Norway region and the need to care for patients who do not require full hospital care);
- a supplies centre (technical infrastructure for the entire hospital).

The build–move–demolish process allows for a significant amount of flexibility, in so far as each centre is planned with an expansion (20% in each block) already in mind, which allows for changes at later stages. The project develops over time and free areas and green zones emerge last, when the old buildings are removed. One feature of this approach is that streets and gardens – incorporated into the overall hospital site – are completed before the newly completed buildings are fitted out internally. The master plan incorporates the reintroduction of the underlying urban street grid, which was interrupted by the previous mega-hospital (Helsebygg Midt-Norge 2008).

Phase 2 of the building programme, under construction during the period 2006–2013, includes the following clinical centres:

- a heart–lung centre with an emergency wing (anticipated opening in spring 2010);
- a mobility centre (orthopaedics) (anticipated opening in autumn 2009);
- a gastro centre (including cancer treatment; anticipated opening in summer 2009);
- a knowledge centre (including the medical library and main auditoriums; anticipated opening in summer 2013).

The plans for Phase 2 were developed and reviewed while Phase 1 was under way. Original estimates of the population profile and the patient base were revisited, and the planning horizon was extended to 2020. This information included updated hospital production data and was used to reassess the location and content of Phase 2 centres.

A major drawback of this development plan is that it takes nearly 14 years to complete the hospital. Furthermore, there is the considerable challenge of maintaining the hospital in a fully operational state while construction and technical changes take place.

Total project costs over the two phases are estimated to exceed NOK 12 billion (approximately €1.4 billion) for a fully equipped hospital. The total hospital area will be 223 000 m², including:

- Phase 1 centres spanning 100 000 m²
- a university and college allocation of 55 000 m²
- refurbished, existing hospital buildings covering 20 000 m².

Phase 1 is largely financed by the Norwegian Government, using the model that was in use at the start of the project, with funds available for an approved number of square metres. Phase 2 is financed by a new model, according to which the Government provides financing to cover base costs (60% of additional value of the hospital as a consequence of the increased capacity) and the rest is provided as a government loan to the regional health authority.

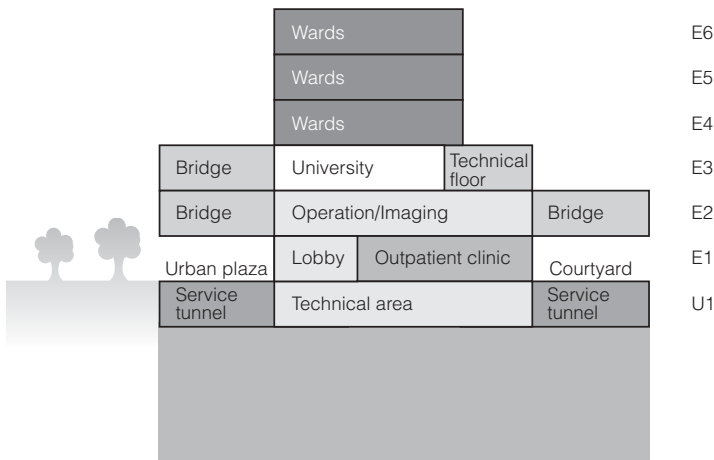
Integrating research and teaching with hospital care

The new hospital's internal layout and organization are focused on integrating its four key activities: patient care, educating patients and next of kin, research and teaching. The Faculty of Medicine at the Norwegian University of Science and Technology, and the Sør-Trøndelag College combined have approximately 500 employees and 1250 students, with 120 medical students admitted each year.

The Faculty of Medicine has had a complete medical curriculum since 1993. The programme is based on the problem-based learning concept, according to which students are divided into small working groups, each assisted by a faculty facilitator, and the basis of study is patient case histories (including study of biochemistry, physiology and anatomy). The students' final years emphasize clinical problem solving and the study of disease mechanisms with reference to real patients. The teaching process is built around the same organ systems of the human body that are reflected in the hospital's clinical centres.

In planning the new hospital, it was a paramount objective of the Faculty that the teaching areas – including laboratory work and teaching rooms for patient consultations and clinical examinations – should be integrated with the clinical departments. In terms of research facilities, there were two key principles:

- research laboratories should be close to the areas of clinical practice, in order to facilitate communication between clinicians and researchers and to promote translational research;
- technical equipment should not be subject to duplication, unless unavoidable for practical reasons.

Fig. 11.1 Floor distribution

Source: Team St. Olav, unpublished plan, 2009. Reproduced with permission.

In practice, communication between the three research groups involved in planning the first three centres was rather restricted. As a result, the organization of laboratory facilities and equipment is considered to be suboptimal. The lesson that has been drawn from this experience was that the four clinical centres in Phase 2 should be planned by a single group. This has enabled a better planning of research areas and teaching facilities in the different departments. Furthermore, the four centres in Phase 2 are physically linked. Research facilities are “sandwiched” between clinical treatment areas on the first and third floors, ensuring the best opportunities for translational research. The bridging of the buildings is also intended to facilitate the sharing of scientific equipment and knowledge (see Fig. 11.1).

A “medical part of town”: integrating the clinical centres in an urban block structure

The master plan of the new St Olav's Hospital was created by Frisk Architects (Niels Torp, Naarud Stokke Wiig and Pål Kavli), and based on the winning entry to the 1995 international competition. The hospital and university functions are divided into seven blocks, each comprising 20 000–40 000 m² and approximately 800 employees. The building scheme divides a large hospital into smaller units with regard to both physical environment and organization.

In architectural terms, this allows for the creation of more intimate structures and environments, each with its own identity. The buildings are narrow plan pavilions with six storeys or less, with a tunnel below ground level and second-

storey bridges that interconnect the buildings above street level. The public space between these units connects the hospital to the surrounding landscape, while the large central space provides access to all clinical centres. This model contrasts with the common approach of constructing a hospital building complex in a greenfield or suburban context. In Trondheim – for patients and staff – the “medical part of town” strengthens the role of the hospital as part of normal and everyday life.

During the development of the project so far, the urban block structure has shown itself to be flexible enough to be adapted to changes in organization and the building programme, without compromising the basic architectural and functional qualities that were part of the original vision for the hospital. By having a fixed pattern to work from, future hospital buildings can accommodate architectural variation without resulting in a chaotic or contradictory physical environment.

Healing environments

The urban block structure allows daylight into all parts of the hospital buildings, which benefits not only patients, but also staff, who are entitled by Norwegian legislation to have access to daylight for all permanent work places (used for four hours or more per day) (Helsebygg Midt-Norge 2008). Hence, all operating theatres *must* have windows. The design of the centres includes large entrance halls which link the tree-lined public streets to private hospital gardens, making orientation easier for patients and visitors. Public spaces are furnished with trees, shrubs and natural rock, and access to natural views and greenery is envisaged for all patient beds. The exterior and interior of the buildings make extensive use of natural materials. Norway has a long tradition of using wood as a building material and – to ensure a sense of “normality” for patients and staff alike – it is the chosen material for most furniture in patient areas, as well as for façades, floors, and wall panels in public areas.

The generic clinical centre

The original choice to divide the hospital’s functions into clinical centres was prompted by major organizational changes, making this project as much about development as about expansion, and reflecting the trend towards shorter hospital stays and more efficient use of resources.

Traditionally, secondary and tertiary care have been organized around the specialties of the medical profession. St Olav’s has adopted a different

paradigm: gathering patients with symptoms and diseases associated with the same organs in the same building. For example, the gastro centre is an internal medicine environment, including gastroenterology, gastric surgery, urology and nephrology – all specialties which require knowledge of the abdomen. This makes it possible to organize clinical activities around an abdominal clinic and a kidney and urinary tract clinic, cutting across the divide between medicine and surgery. A further consequence is that the hospital as a whole has reduced the number of departments from more than 60 in the early 1990s to fewer than 20. A major objective for the organ-centred development of the hospital was to concentrate medical services in smaller blocks around the patient, reducing both patient movement and the number of staff involved in patient care. The concentration of different medical services within a centre relies on interdisciplinary teamwork and the effective and efficient sharing of resources with other centres.

To ensure future flexibility and connectivity, the centres are designed around a set of general principles that govern the design of the building blocks and functional areas. These principles are collectively known as the “generic centre”. Clinical units are not tied to individual building blocks, but can be shared between blocks, according to patient demand and staff logistics. The clinical centres themselves are variations on the generic centre theme.

Connectivity is a key element of the generic centre. The centres are connected to each other by underground passages at basement level and by bridges crossing the “streets” at first-floor level. Technical and supply services are located in the basement, outpatient areas on the first floor, operating theatres and imaging on the second floor, technical services on the third floor, and inpatient care on the floors above. Each block reserves one corner of the building for offices, research laboratories and university functions. The university is integrated with most of the clinical areas.

All of the Phase 2 centres, and the Phase 1 neuro centre, are close variations on the theme of the generic centre. The women and children's centre does not follow the organ-based model and hence has a different arrangement for inpatient and outpatient care, which are located on the same floor. Gynaecology is located close to maternity units and neonatal care, which allows specialists to make frequent and timely checks on newborn babies and prevents a number of unnecessary transfers. Having all patients on the same level in the building has, however, created some problems. The hospital reports that staff complained about a lack of supporting rooms and are concerned that – if demand increases – it may be difficult to expand the service.

Including the patient's perspective

In Norway, the hospital planning process must involve extensive staff participation, and therefore more than 500 staff members have participated in the development of the new St Olav's Hospital. However, the project has been unique in its extensive use of patient participation. Approximately 140 patient organizations have formed a unified body through which they have contributed to structuring the project at all levels.

Involving patients in hospital planning has yielded some important benefits for the new hospital, both in the design of the patient areas and in prioritizing some areas that are important for patients, but may not be perceived as such by planners or staff. The patient perspective has been included early in the planning process, in designing the hospital, and during the construction phase. Patient involvement has resulted in much greater emphasis on privacy for patients and relatives, and a greater recognition of the importance of effective communication between patients and staff. A much improved situation for next of kin has been one pleasant side-effect. These requirements have resulted in the adoption of single rooms for patients throughout the hospital, and open-plan, unglazed reception areas and workstations. Single occupancy, while initially a "patients' rights" issue, also has potential economic benefits. Less space is required for treatment/consultation, there is less movement of beds, and there are some indications that hospital-acquired infection rates are reduced. In the new St Olav's Hospital, a team of specialists brings medical processes to each patient's room, rather than moving patients around the hospital (Helsebygg Midt-Norge 2008).

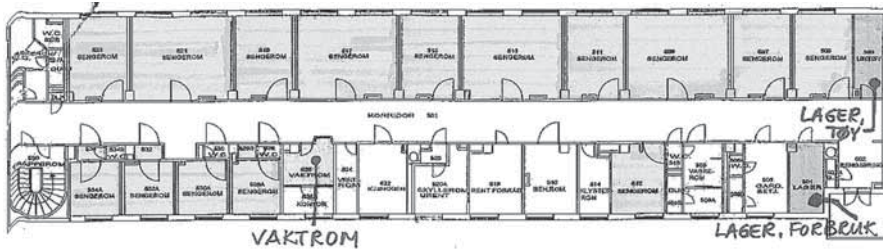
Patient involvement and participation, however, have not been without problems. Originally, the patients' organization shared responsibility for shaping the organization of the hospital but it became apparent that changes suggested by this "outside" body would generate serious opposition. The organization of clinical work is now the sole responsibility of the hospital authorities. In preparing for the move to new surroundings, most departments have concentrated on the logistics of this change, and have paid less attention to the more general development towards a more patient-driven organization.

***Sengetun*: an example of building layout and principles of development**

The "*sengetun*"¹⁴ (bed courtyards for non-intensive hospital care) design has

¹⁴ "*Sengetun*" means "bed courtyard" in Norwegian. The Old Norse and Saxon word "tun", meaning "fortified farm or enclosure", is found in English place names that end in "-ton" or "-ten", and in the modern English word "town". In Norwegian the word has come to mean the protected interior space in the middle of a circle of farm buildings, a design that allows both protection and easy access to all buildings with the least amount of walking.

Fig. 11.2 The wards at St Olav's Hospital before redevelopment



Source: Helsebygg Midt-Norge 2008.

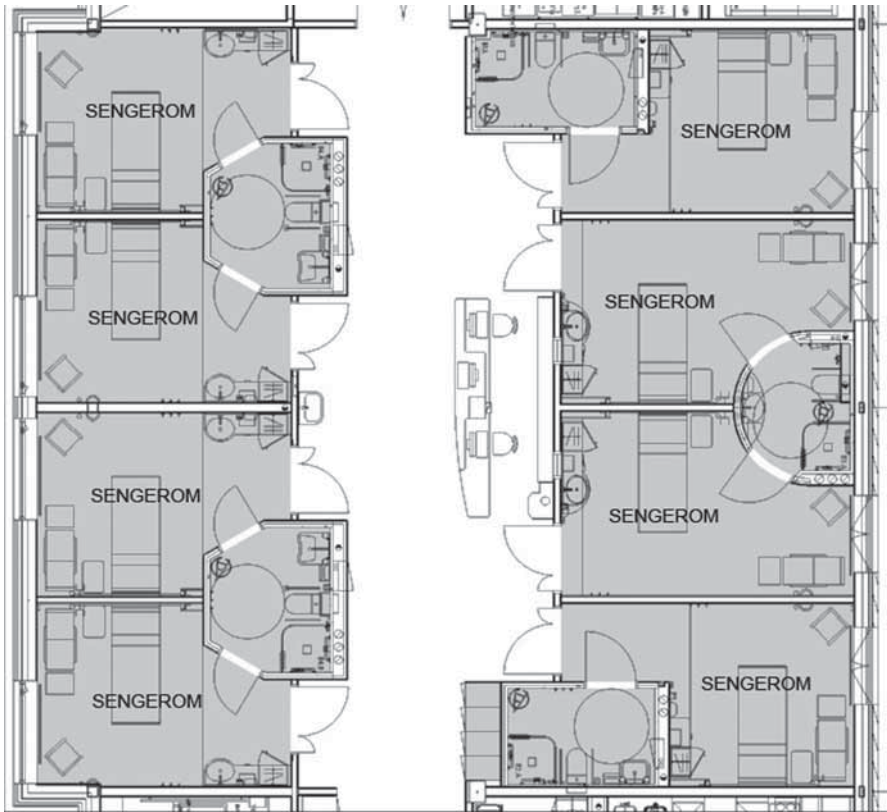
Notes: *Vaktrom*: Nursing station; *Lager*: Storage; *Tøy*: Linen; *Forbruk*: Consumables.

been adopted to minimize walking distance for nursing staff, but it also affords an opportunity to create surroundings that better suit the patient and improve communication and contact between patients and staff. Organizing the wards as *sengetun* “pearls on a string” combines the advantages of both a compact and linear building layout. A mock-up of this model was created as part of the hospital development project and evaluated by staff and patients.

The previous layout of the wards is shown in Fig. 11.2. It involved long distances between patients and supplies, generating traffic and increasing the number of staff needed. At the same time, staff were less accessible to patients. Multiple-occupancy rooms offered little patient privacy. The layout of the duty room did not function well as a meeting point and place for contact between patients, their families and staff.

The new layout creates a widened corridor around the workstation and 6–8 patient rooms – this is called a “*tun*” (Fig. 11.3). The workstation is an open, accessible space for contact between staff, patients and relatives. The patient rooms are grouped around stores of supplies and workstations and the *sengetun* are positioned with shared supporting rooms between them. *Sengetun* are not planned as stand-alone organizational units: to ensure a flexible and effective operation, each ward should have at least three *sengetun* in series, with visual contact between workstations. At night, staffing levels can be reduced to only one workstation unit.

In Phase 1, each *sengetun* has one isolation room and two of the patient rooms have direct visual contact with the workstation. The layout also includes a medication room and direct access to an “immediate-help lift”.

Fig. 11.3 Organization of *sengetun* in the generic centre wards

Source: Team St Olav, unpublished plan, 2009. Reproduced with permission.

Notes: *Sengetun*: “Bed courtyard”; *Sengerom*: bedroom.

The single room

So far, the experience of single-occupancy rooms in the St. Olav’s hospital has been almost entirely positive. Hospital data show no decrease in efficiency, and the potential for a better doctor–patient interface is evident, especially in the geriatric department.

As the single room offers a greater choice of entertainment, staff sometimes have to encourage patients to leave their rooms; this is not seen as added workload, but rather as requiring a readjustment of attitudes. The wards are calmer, and clinics have been able to reduce the number of staff needed at night. Cooperation between different *sengetun* on a ward is, however, an issue – there is a threshold for assisting other staff, which is partly based on competency (other patient types in another area) and partly on perceived distance (with other *sengetun* seen as another part of the ward). Future ward design may take this into account, perhaps by making one nurse workstation the “main” station for night-time use.

In the new design, the presence of the university is much less distracting, since patients no longer “disappear” for teaching purposes and nurses do not have to search for suitable rooms. The situation has also greatly improved for relatives and visitors.

Cost implications

The costs of the project have been questioned, and in comparison with the costs per square metre in many other European countries, they certainly appear high. St Olav's Hospital is estimated to cost approximately €1.4 billion for 223 000 m², (or roughly €6265 per m²). The cost is, however, comparable (adjusted for inflation) to other Norwegian hospitals recently completed, such as the *Rikshospitalet* and *Nye Abus* (€6490 per m²). It should also be noted that:

- construction prices in general are higher in northern European countries; according to a Eurostat survey, construction prices in Norway in 2007 were 55% higher than the average of the 27 European Union (EU) Member States, when adjusting for purchasing power parity (PPP) (Diaz Muriel 2008);
- these figures include all costs, that is, area infrastructure (streets), planning, building, installations, information and communication technology (ICT) infrastructure, furniture, medical equipment, value-added tax (VAT), and so on;
- the figures relate to the total footprint of the hospital site and other countries may calculate areas differently;
- the space includes university accommodation;
- the new hospital is being built on the site of existing structures, which adds to the cost and the length of time required for completion of the whole project;
- future flexibility has been a key consideration and this is associated with additional costs for materials and construction.

The total cost of the hospital is equal to approximately 2.1 times its annual operating budget. The total costs include approximately 18% for furniture and medical equipment. The total ICT infrastructure costs equal approximately 6% of the overall project costs, including infrastructure (network, storage, telephone, messaging, basic software) but not any application software (Electronic Patient Journal (EPJ), lab system, SAP or similar).

The hospital has estimated that the in-between state (one half new, one half old) is an operational situation which costs €12 million per year more than a “normal” year. In spite of this, the hospital's operating budget for 2006–2008

was €150 million per year lower than previously and the hospital operated in this period with 500 fewer staff positions and 150 fewer beds. Improved facilities for increased levels of day treatment and more outpatient visits have been contributing to this, but the main credit must go to management focus and improved inter-departmental cooperation.

Conclusions

St Olav's Hospital is a work in progress, not least because the second phase of construction is not due to end until 2013, but also because the hospital is being reorganized in terms of its functionality as well as its physical infrastructure.

By 2008 the Phase 1 of St Olav's Hospital was complete, and the Phase 2 was well under way. Thus far, the planners, clinicians, administrators and patients (who have been deeply involved in the design issues) have achieved most of their goals. They have integrated the research and teaching functions of the university with the clinical areas of the hospital. The unique characteristics of Trondheim's historic centre have been preserved and patients' requests have been addressed through the use of single rooms, the *sengetun* ward design, and attention to familiar materials and physical layouts.

Phase 1 of the project has resulted in some important lessons for the continued development of the hospital. The use of single rooms, for example, requires considerable retraining of staff and a different attitude to sharing duties. The need for multidisciplinary teamwork is also evident in the organization of the clinical centres and – while this has been accepted by many staff – such a major shift in traditional professional boundaries is no easy matter to overcome.

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Chapter 12

Strategic asset planning: An integrated regional health care system, Tuscany, Italy

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Introduction

Italy's Tuscany region has embarked on a major reconfiguration of its health care system, seeking to provide more appropriate and integrated services. This case study examines the rationale behind its approach and presents some of the consequences for infrastructure and processes. The most notable effect of this reconfiguration is the progressive conversion of small, local hospitals to provide other social and health care services, while larger hospitals are redefining their role, with an increased emphasis on acute care and physical accessibility.

The renewal of Tuscany's health care system encompasses the entire spectrum of health facilities, involving rebuilding and renovating hospitals and constructing new types of facilities to complement hospital services. The changes to the health system's physical infrastructure, reflecting changed assumptions about strategic asset planning, constitute the most visible aspects of the reconfiguration. However, the Tuscany regional authority, working with the municipal governments, has also made changes to working practices of medical and nonmedical staff. This has had implications for clinical training and education, for the organizational and administrative structures in health care organizations, for care pathway development and for the roles fulfilled by hospital specialists, nursing staff and family doctors.

Region-wide strategic planning of health services is taking place in many countries. What makes the Tuscan case particularly relevant is its holistic

approach. It seeks to create a fully integrated health and social care system with a clear definition of the links between the structure of public decision-making bodies, the model of service provision and its underlying principles, and the supporting physical infrastructure. In particular, there is a strong emphasis on the role of local administrations, enabling them to adapt the overall regional strategy according to the needs of their communities.

Another aspect of the Tuscan experience deserves attention. Preparatory analyses identified a need for territorial subdivisions that were larger than the existing ones. These new partitions are termed *Aree Vaste* (Wide Areas), and they have been adopted subsequently in strategic planning for other sectors, including waste management, natural resources (such as water), environmental interventions and public transport services. In this way, the territorial level that was considered most appropriate for strategic health and social care planning has become the reference for all regional strategic planning.

Decentralization of health services in Italy

The transformation of the regional health system in Tuscany builds on the national policy of decentralization that aims to give more power to authorities at the regional level. Italy's national health service, known as the *Servizio Sanitario Nazionale* (SSN), is based on the principles of universal coverage and equitable access and is largely financed through general taxation collected by central Government. Since its inception in 1978 it has undergone two major reforms. The first took place during the 1990s and generated a significant shift of responsibility for health system organization and provision of health services from municipal to regional authorities. This shift was accompanied by the expectation that regional authorities would rationalize the network of health service providers and adopt a more business-like model. The second crucial change was in October 2001, when Constitutional Law No. 3 was approved. This reshaped the roles of central Government, regions and municipalities in a more federalist way, by transferring decision-making power in specific areas – such as health – to the country's regions. As a consequence of changes introduced subsequently – in Article No. 117 – health care has become primarily a matter for regional legislation, while the national legislature is mainly concerned with the definition of fundamental principles and measures to guarantee in all regions a comparable level of quality in health care services.

As described by Giannoni (2006), there are now three administrative tiers in the Italian health system. The national Government is the guardian of the SSN's overarching objectives and principles, but responsibility for health care organization, provision and expenditure lies with the 19 regions and 2 special

provinces.¹⁵ Each region receives funds for health care from the national Government and also has the option to allocate its own resources to the health sector. The regions can set their own priorities for health service development, although there is still some control by the central Government as the release of funds for health infrastructure requires agreement on a master plan that demonstrates how the proposed use of funds meets regional needs. At municipal level, Local Health Authorities (*Aziende Sanitarie Locali*, or ASLs¹⁶) work directly with the regional health authority and decide on which mix of public or private health care organizations (including independently managed public sector hospitals) are best suited to provide health care to their populations. Family doctors (general practitioners, GPs) are self-employed and are paid on a capitation fee basis.

As the preceding section discusses, the decentralization of public services in Italy has a history stretching back to the 1980s. As identified by Østergren et al. (2006), a number of other European countries (including Norway, the Russian Federation and Spain) have – with varying degrees of success – put in place health policies that depend on the devolution of some or all administrative and fiscal powers to the regional or municipal level. The reasons given for decentralization usually include:

- a need to stimulate service improvement by removing the “dead hand” of central control;
- better use of local health intelligence (including health needs) to provide more personalized services;
- a desire to reduce health inequities, both among and within regions;
- an opportunity to achieve more appropriate resource allocation.

Giannoni (2006), Donatini et al. (2001), France and Taroni (2005) and Østergren et al. (2006) describe the specifics of Italy’s programme of health care decentralization in these terms, but also consider some other drivers. For example, while the reforms of the 1990s that gave rise to successive waves of decentralization were in part conceived to re-emphasize the commitment of the Italian State to principles of equity and freedom of choice, they were equally concerned with issues of cost-containment. There was a long tradition of budgetary overspending, with the central Government meeting the accumulated deficits at regular intervals. By coupling administrative responsibility for health care provision with the right to raise regional taxes, central Government sought to transfer the financial responsibility to the regions, at the same time hoping that services would become more responsive to the needs of citizens and that

¹⁵ The Italian Constitution confers on the provinces of Trento and Bolzano (both located in the Trentino Alto Adige region) a special status, similar to that of Italian regions.

¹⁶ Local Health Authority denominations change from region to region (ULSS, USL, AUSL, ASL etc.). In this text we use the acronym ‘ASL’ in general terms; others are introduced and defined as necessary.

regional administrators would find ways to drive forward efficiency savings. Furthermore, by passing the task of funding and organizing health services to Italy's 19 regions and 2 special provinces, successive national governments aimed to promote innovation and diversity, thus creating a national laboratory from which lessons could be learned. The regional administrations were encouraged to experiment with different models, including greater involvement of the private sector, some extension of patient co-payments, and use of integrated care models. The role of central Government in health care was foreseen as one of supervision: monitoring performance, ensuring that all regions provided a common "basket of care", and acting as "a steward for the coherence of the overall system" (Østergren et al. 2006).

While fundamental principles are set out in national legislation, central government and regional representatives are permanently engaged in a search for the best balance, both at national and local levels, between needs, resources and health-related results. This balance is mainly pursued by linking resources to a basic package of services to be provided to the population in each region; however, regional administrations can expand available services by using their own resources.

Most commentators underline the fact that there has been only partial success in decentralizing nearly all aspects of the Italian health care system. Some regions have used the opportunity to exercise control over planning and funding of their health systems with enthusiasm and brio, and have started to implement plans that envisage significant changes to service models, workforce training and estates development. The Emilia Romagna region, for example, is reorganizing hospitals by concentrating some services in specialist centres and strengthening primary care in municipalities, applying a "hub and spoke" model. The Veneto region has emphasized "concerted planning", that is, enhanced cooperation between the ASLs and municipal areas, with a view to greater integration of health and social services (known as ULSSs, or Local Health and Social Units). Other regions appear to have embraced the new environment with much more caution, or have simply failed to make significant improvements in health service delivery. The result is that the organization and quality of health care varies greatly from region to region, and between north and south Italy. Maio and Manzoli (2002) report a growing socioeconomic disparity among regions. Already in 1997, before the first decentralization measures had had an opportunity to bed down, a survey showed that patient satisfaction ratings ranged from 19% being "fairly" or "very" satisfied in Sicily to 53% in Emilia Romagna (Maio & Manzoli 2002). The authors argue that an increase in decentralization could undermine the guiding principle of equitable access in the SSN. Jappelli and Padula (2003) also found major regional variation in

satisfaction with medical assistance, nursing care and health facilities, with the highest satisfaction ratings in northern and central regions. The authors point out that average per capita health expenditure also varies significantly between regions.

Decentralization in Tuscany and the reorganization of health services

Tuscany is a relatively wealthy Italian region, with a mixed economy based on tourism, agriculture, and industrial production of petrochemicals, textiles and steel. It has a population of about 3.6 million inhabitants, spread throughout the region in villages, small to medium-sized towns, and a number of larger cities. There is a major conurbation around Florence and a smaller one which includes the coastal zone from Massa to Livorno. The geography of the region is dominated by hilly or mountainous terrain, except the plains of the Arno river valley. These location factors have been important in guiding the reorganization of health services.

Prior to the reforms enacted in the 1990s, Tuscany's health system was similar to that existing in other parts of the country. In particular, the region suffered from having a large number of small hospitals scattered throughout the territory, usually situated according to historical factors rather than being planned as part of a regional network. At the beginning of the 1990s, Tuscany had one hospital for every 37 000 inhabitants, and an average of fewer than 250 beds per hospital. In total, the region possessed over 23 000 hospital beds, equivalent to 6.4 beds per 1000 inhabitants. In addition, the health estate was ageing and often poorly maintained, with approximately 75% of hospitals having been built before 1920. The overall aim of the Tuscany health authority, once it achieved administrative control of the provision and planning of health services, was to overhaul radically this inherited burden, so that the region would have:

- one hospital for approximately every 90 000 inhabitants
- a total of 13 500 hospital beds (public and private)
- 3.8 beds per 1000 inhabitants
- 75% of hospitals built after 1990.

These were ambitious targets, but they were based on the conviction that the only way to prevent a rapid escalation of costs, as well as ensuring that the region's citizens would have access to high-quality care, was to redefine the principles of health care. These principles can be summarized as follows:

- reduce the need for hospitalization, through greater use of prevention programmes, primary care and community services;

- locate services closer to patients wherever possible, including more “at-home” treatment;
- place greater emphasis on education regarding health care for the population;
- simplify the region’s network of health care services;
- renew the region’s health care infrastructure;
- integrate health policy with other strategic policies at regional level, such as those for transport, communication and city planning.

The new principles were adopted following a lengthy reassessment of regional health care planning, which drew on national and international experience, as well as the considered views of clinicians and health planners in Tuscany. Long-term political commitment was also a necessary element, since the strategy was not intended to be a “quick fix”.

This new approach adopted an investment planning perspective that focused on three main goals:

1. rationalization and simplification of the hospital network
2. renewal of hospital facilities
3. rearrangement of facilities for outpatient treatments.

In this context, the main obstacle to be overcome appeared to be the scattering of small, ageing hospitals. However, by taking a long-term view and by ensuring that a coordinated set of local projects was endowed with adequate resources, this obstacle became the key to success.

In order to look beyond the traditional focus on services provided in the region’s municipalities, the newly adopted principles called for the division of the Tuscany region – for health care planning purposes – into three administrative groupings known as Wide Areas. These were regarded as the minimum operational units necessary for effective planning of services, in terms of population size, geographical homogeneity and resource allocation. Each Wide Area is intended to encompass the area within which residents should be able to meet the majority of their health needs. Each includes a university hospital and a collection of ASLs, which together share responsibility for the governance of the hospital network. In the Tuscany regional report on health care, covering the years from 2000 to 2002 (Agenzia Regionale di Sanità della Toscana 2003a), a detailed analysis of health-related regional mobility was presented. It showed that in those years, 91–96% of pathways followed by patients from the Tuscany region remained inside the Wide Area boundaries.

From a planning point of view, the Wide Area level ensures coherence between local political input, local needs and regional strategic goals. Hospital functions are also coordinated on a region-wide basis by a network that links the Wide

Areas. This network seeks to integrate single care events into comprehensive clinical pathways in order to avoid duplication of costs and reduce the burden on acute services.

The planning procedure starts at the level of “zones”, made up of several neighbouring municipalities, in which an assembly of mayors approves an integrated health and social plan. This plan takes account of annual programmes elaborated by ASLs and public university hospitals operating in the same zone, which also need the mayors’ approval. The role of the regions consists mostly of assessing these documents in terms of coherence with strategic regional planning guidelines, as defined by the 5-year integrated regional health and social care plan.

This integrated regional plan provides a general framework for the decisions of the Wide Area committees (composed of the general directors of all ASLs and the public university hospital in that area) as they elaborate a 3-year integrated plan to organize services to meet the needs of their residents. This approach has encouraged professional specialization and integration, and has supported projects (mainly Radiology Information System/Picture Archiving and Communications System (RIS-PACS), telemedicine and emergency management) that seek to strengthen links within the regional health care network.

All support functions (such as logistics, information and communication technology (ICT) supplies and personnel recruitment) have been grouped at Wide Area level within three *Enti per i Servizi Tecnico-Amministrativi di Area Vasta* (ESTAVs, Organizations for the technical/administrative services of Wide Areas). These organizations started operating at the beginning of 2003 and their main role is to purchase goods and services for the hospitals located in each Wide Area. Their principal achievements have been economies of scale, an increase in contractual power, reduction of personnel costs, standardization of care pathways used by physicians, and an increase in efficiency as a consequence of re-engineering processes.

The new hospital model

As a consequence of these innovations, Tuscany’s hospitals, whatever their size, had to accept a new role. They now exist to provide services only when absolutely necessary, and for the shortest time possible. In part, this became possible because of recent medical and surgical advances, which have allowed for the transformation of “traditional” hospital activities to day-case or outpatient appointments. However, the aim is not simply to save bed days or reduce costs. The new hospital model was developed as a result of a national survey that

identified 10 guiding principles for hospital treatment (Agenzia Regionale di Sanità della Toscana 2003b):

1. patient focus: thinking first of the needs of the patient and her/his family;
2. urbanization: coordinated with existing village, town and city structures;
3. solidarity: helping citizens to feel that they belong to their local environment;
4. organization: encouraging a sense of well-being through effective, efficient services;
5. integration: playing a full role in the network of medical and social services;
6. appropriateness: appropriate treatments and use of resources;
7. reliability: patient safety and security;
8. innovation: acquiring and using the latest diagnostic, therapeutic and technological solutions;
9. research focus: stimulating intellectual, clinical and medical advances;
10. training: encouraging a culture of professional advancement.

Since their adoption, these principles have resulted in major changes to the way that Tuscany's hospitals operate. As of 2006, for example, more than 50% of patient admissions were for day-case treatment; an enormous increase in comparison with the proportion of day-case patients seen in the mid-1990s, when it stood at 15% (Informazioni Statistiche Regione Toscana 2009). In 1994, 57% of health care expenditure was directed to hospital services. The goal in the late 1990s was to reach a target of 43% of the overall health budget, but by 2006, this target had been more than met, with just 41% of the budget being spent on secondary and tertiary care (including both public hospitals and those private hospitals operating under a specific agreement with the regional health system). In order to meet the challenges of providing a patient-centred environment, and to improve their productivity and efficiency, hospitals have also reorganized their internal processes and administrative arrangements. More than 600 care pathways are now in common use across the region, with the regional health authority playing an instrumental role in identifying and promoting best practice in each of the Wide Areas. Many hospitals are no longer organized along the lines of clinical specialties or departments; instead, the use of space and beds is determined by managers, while multidisciplinary teams of clinicians treat patients according to the level of care required.

In common with a number of health care organizations that have adopted lean management techniques, Tuscany's hospitals are now encouraged to think in terms of systems and process management. An example of this approach can be seen in the new Careggi Hospital in Florence, where clinical activities are performed in 10 clinical departments created on the basis of health needs.

In more than 95% of cases, patients entering the hospital will receive all health services they need inside the same department. The new health care environment has resulted in other innovative approaches to capital assets and working practices. For instance, some hospitals in Tuscany are now only open Monday to Friday. Here, the first part of the week is taken up with elective surgery and other planned treatments; the latter part of the week is devoted to recovery, so that patients are discharged before the weekend. Evaluation of this model is ongoing as part of a planned network of care (with accident and emergency and rehabilitation services available elsewhere).

Tuscany was also an early adopter of the “community hospital” model (Tedioli & Roti, not dated): small medical facilities intended to deliver intermediate care, chiefly for elderly patients who need observation and perhaps some treatment, but who do not need acute hospital care. By 2002 there were 11 community hospitals in operation, although they were mostly concentrated in a few parts of the region, where ASLs made the decision to make use of this care model. Some community hospitals are physically part of general hospitals, while others are housed in former outpatient care facilities, and a small number are part of a nursing home or a private hospital. The number of beds available in community hospitals is relatively small (only 148 in the year 2002), but they are an example of the changing balance of care in Tuscany’s health system, since the medical care of patients in these facilities is coordinated by local GPs. Community hospital staff normally consists of nurses and auxiliary personnel, with significant involvement by social workers. Because the patients in community hospitals are mainly elderly individuals – who often have complex needs and co-morbidities – the average length of stay is around 19 days; reasons for admission include rehabilitation, functional reactivation, stabilization of therapy, palliative care and social/respite care. Anecdotal evidence suggests that community hospitals, which were chiefly introduced to meet the needs of an ageing population, have responded fairly well to this challenge. However, it is not yet clear if the costs of this method of treating people with chronic conditions are truly competitive with other models and whether they deliver comparable standards of care.

Changing hospitals: investments, results and principal innovations

In order to meet its ambitious goals, Tuscany’s regional administration started planning and implementing changes to the hospital network during the 1990s. The most important swathe of investments took place up to 2001, and concerned both building new health-related facilities and renovating older

infrastructure.¹⁷ The necessary funds were raised at national level, but put to use at regional/local levels.

Because the Tuscany region was able to demonstrate a high degree of effectiveness in projecting, planning and implementing investments in the health sector during that period, it was given access to a significant amount of national financial funding (approximately €1200 million). At the same time, in order to allow implementation of investments while waiting for the actual transfer of national funds, approximately €800 million was invested directly by the region. At local level, the ASLs raised more funds (approximately €300 million) by selling all inherited property not intended for health-related activities. In total, investment from the early 1990s until 2001 amounted to more than €2300 million (Agenzia Regionale di Sanità della Toscana 2005). In subsequent years, further investments were financed and implemented at an average rate of €250 million per year, including both maintenance investments and the building of new facilities.

As a consequence of this major capital investment plan, the regional aims set during the early 1990s have been achieved – at the time of writing Tuscany has one hospital per approximately 86 600 inhabitants, which constitutes a total of 13 600 hospital beds (3.7 beds per 1000 inhabitants) and more than 75% hospitals were either built after 1990 or have been adequately renovated (Informazioni Statistiche Regione Toscana 2007).

The next steps concern building four new hospitals (Lucca, Massa Carrara, Prato and Pistoia). A project plan worth €422 million was approved in 2006 and funding was allocated. These four new hospitals are envisaged to share most of the features already implemented in other hospitals that have been renewed after 2000, including:

- an average of 400–450 beds;
- an average of 40 000–45 000 m²;
- a maximum of four above-ground floors;
- a horizontal, compact structure;
- a “quintuple body structure”, in which support services rooms lie at the centre of hallways, leading to bedrooms on both sides;
- clinical areas organized around the different levels of care to be provided;
- coherence with clinical guidelines;
- highly automated solutions.

Considering that nearly all of Tuscany’s hospital facilities used to date from the middle ages to the first half of the 20th century, the capital investment

¹⁷ Due to the various types of health facilities and their logistic closeness, it is very difficult to divide the part invested for hospital facilities from the part invested for other health facilities. However, there is no doubt that the former was clearly predominant.

in health assets with the aim of improving the quality and appropriateness of health infrastructure has been tremendous.

Clinical governance and demand management

Finding the right balance between hospital and community services depends as much on demand as on supply management. Tuscany's regional health authority has also taken the view that clinical governance is essential to ensure excellence of treatment at all levels, including health promotion and support for well-being, primary care, hospital services, rehabilitation and patient safety. Patients have to be convinced that they are receiving high-quality care in the right setting, if they are not to insist on hospital treatment in every circumstance.

To this end, Tuscany's system of clinical governance is firmly rooted at the local level, where clinician-led health councils and "management colleges" act as the point of reference for ASLs, municipalities and patient groups. These structures are mirrored at the regional level, where coordination is undertaken by regional health councils and specialist groups which manage issues such as clinical risk, patient safety and transplant procedures. A major role for all clinical governance groups is to reduce the number of unnecessary hospitalizations. In 2003 the rate of hospitalization stood at 182.5 per 1000 population per year, with the objective of decreasing this to 160 per 1000 within 5–7 years. This target has now been reached; the regional hospitalization rate stood at 164 per 1000 population in 2007. Clinical governance groups have looked, in particular, at more appropriate alternatives to hospitalization for post-acute care of the elderly, end-of-life care for the terminally ill, and treatment of HIV-positive patients. The institutions concerned with clinical governance also have an important role to play in setting standards for care services, criteria for accreditation (for example, in the private sector), and the overall rules by which the regional health system functions.

The challenge of finding the right balance between inpatient and outpatient services has been a particular concern for the Tuscan system, which has involved engaging local authority representatives in the analysis of needs, and the planning and reorganization of services. This approach has recently been institutionalized by the creation of several local agencies for management of health needs (*Società della Salute*), which comprise local municipalities and the respective local ASL. The focus of these agencies concerns institutional agreements on health and social care issues, integration of local policies and interventions (both health related and not) and optimal administration of resources by managing demand and promoting appropriate treatment.

In addition to the above-mentioned developments, the Tuscany region was early and enthusiastic in its adoption of the World Health Organization (WHO) project “Health-Promoting Hospitals” (Marchese et al. 2007), which seeks to re-orient hospitals as organizations that not only carry out specialized clinical work, but also have a wider role in public health. The Health Promoting Hospitals Network in Tuscany has the overall objectives of improving community confidence in the health system and educating the public about the appropriate use of hospital services while contributing to the well-being of patients, staff and local communities. Health-promoting hospital activities are coordinated across the Tuscany region and range from specific actions, such as the “smoke-free hospital” campaign, to promotion of cultural tolerance and a more welcoming environment for patients, families and staff.

Conclusions

Region-wide strategic planning of health services takes place in many countries, but often links between the principles of the service model, the supporting physical infrastructure, and the structure of the decision-making agencies are not as clearly defined and applied as in the case of Tuscany.

As in the Northern Ireland case study (see John Cole’s contribution in Chapter 7 of this volume), the changes that have taken place in Tuscany are part of an evolving process, but it would appear that shared concerns over an ageing population, increased costs and the need to focus on appropriate, safe treatment of individuals have led both regions to adopt similar approaches to the strategic planning of their regional health systems. In both cases, the fundamental drivers for change have been the necessity to reduce the need for hospitalization (particularly with regard to the elderly and patients with long-term conditions); a move towards more community-based treatment, as close to the patient’s home as possible; concentration of specialist services in a smaller number of acute hospitals; and an understanding that the previous health estate was not fit to serve population health needs in the 21st century.

Tuscany’s system for strategic planning of health services and infrastructure is based on a process that begins at the municipal level, where local needs and aspirations are aligned with strategic regional guidelines set at Wide Area level. This model embodies an ongoing dialogue between municipalities, groups of local representatives, Wide Area planners, and the regional health authority, and it contrasts with those regional planning models that are more rigorously “top-down” in their approach. The reconfiguration of services in Tuscany is still a work in progress, but the model in place at the time of writing has so far delivered major changes in the locus and nature of health and social care.

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Index

- acute hospitals, Northern Ireland 100, 104
- Alzira model 11–25
 - see also* Spain
 - advantages 23–4
 - capitation fees 16–18
 - clinical performance 22–3
 - investments 22
 - outpatient care 22–3
 - patient oriented policies 20–2
 - private delivery/management 20–2
 - public administration 24
 - public control 19
 - public financing 16–19
 - public-private partnerships 15–16
 - public property 19–20
 - salaries 18
 - web link 25
- ambient experience
 - design 83
 - Martini Hospital 83
- architects' proposals selection, New Karolinska Solna 62
- architectural integration, St Olav's Hospital 165–6, 168–71
- art/sport/nature
 - design 85
 - Martini Hospital 85
- ASLs *see* Local Health Authorities (*Aziende Sanitarie Locali*)
- bed numbers, capacity planning 8
- building layout, St Olav's Hospital 168–71
- business case
 - Norfolk and Norwich University Hospitals 133
 - PFI 133
- business model, Orbis Medical Park 114–15
- capacity planning, bed numbers 8
- capital effectiveness, Rhön-Klinikum Group 148–50
- capital investment, technical dimensions, Rhön-Klinikum Group 150–2
- capital investment funding, Poland 50
- capital investment projects, success characteristics 1–2
- capital procurement
 - Coxa Hospital 35–6
 - outsourcing 35–6
- capital-related corporate strategy, Rhön-Klinikum Group 147–8
- capitation fees, Alzira model 16–18
- care pathways 7
 - change management 32–3
 - Coxa Hospital 32–3
- case selection and methods 3
- central government funding, Poland 50
- centralization of complex services, Northern Ireland 96–7
- challenge ahead 8–9
- change drivers, Sweden 58–9
- change management
 - care pathways 32–3
 - Coxa Hospital 32–3
 - Orbis Medical Park 115–17
- clinical assessment
 - ICATS 95
 - integrating with treatment 95, 107
- clinical centre, generic, St Olav's Hospital 166–7
- clinical indicators, Coxa Hospital 36–7
- clinical performance, Alzira model 22–3
- common themes 6–8
- community care
 - John Paul II Hospital 46–7
 - Poland 43–4, 46–7
- Community Health Centres
 - Northern Ireland 99, 101–2, 105–7
 - role 101–2, 105–7
 - strategic planning 99, 101–2, 105–7
- community hospital model, Tuscany 181
- complex services, centralization, Northern Ireland 96–7
- connectivity
 - designing for 166–7
 - St Olav's Hospital 166–7
- contracting
 - Poland 43
 - regulation 43
- cost implications, St Olav's Hospital 171–2
- Coxa Hospital 27–39
 - see also* Finland
 - capital procurement 35–6
 - care pathways 32–3
 - catalysts 29–30
 - change management 32–3
 - clinical indicators 36–7
 - concept, creating the 30–2
 - context 29–30
 - Coxa model 30–2
 - Coxa vehicle 33–4
 - criteria 31–2
 - design-and-build turnkey operation 35–6
 - disappointments/surprises 37
 - economic indicators 36–7
 - evaluation criteria 31
 - ICT 35–6
 - lessons from 38
 - limited company vs public utility 33–4
 - managerial principles 31
 - in operation 36–8
 - outsourcing 35–6
 - public-private partnerships 33–4
 - public utility vs limited company 33–4
 - shareholding 37–8
 - success characteristics 36–7
 - surprises/disappointments 37
 - technical solutions 33–6
 - web link 39
- Darent Valley Hospital
 - flexibility 129–32
 - operational outcomes 129–32
 - PFI 128–32
 - planning 128–9
 - unitary charge 131–2
- daylight
 - design 83
 - Martini Hospital 83
- decentralization
 - health services, Italy 174–9
 - Poland 42–3
 - reasons 175
 - Tuscany 177–9
- Delivering better services: Modernizing hospitals and reforming structures*, Northern Ireland 93
- Department of Health, Social Services and Public Safety (DHSSPS)
 - Delivering better services: Modernizing hospitals and reforming structures* 93
 - Northern Ireland 92, 93

- depreciation method, Rhön-Klinikum Group 151
- design
- ambient experience 83
 - art/sport/nature 85
 - connectivity 166–7
 - daylight 83
 - energy 85–6
 - family as 'partner' 85
 - flexibility 166–7
 - flexibility design principle 65–6, 70–1
 - generality design principle 65–6
 - healing environment 82–5
 - IFD design 76–8
 - Martini Hospital 76–87
 - nature/art/sport 85
 - New Karolinska Solna 64–6
 - noise reduction 83
 - Orbis Medical Park 118–22
 - orientation 83–4
 - patient-centred care 118–22
 - patient safety 84
 - sport/nature/art 85
 - St Olav's Hospital 165–7
 - stress/insecurity reduction 82
 - therapeutic design 82–5
 - work processes 121–2
- design-and-build turnkey operation
- Coxa Hospital 35–6
 - outsourcing 35–6
- design standardization, Rhön-Klinikum Group 149–50
- design vision, strategic planning 91
- development assistance evaluation criteria 1–2
- development plan, St Olav's Hospital 162–4
- development principles
- sengetun* 168–71
 - St Olav's Hospital 168–71
- DHSSPS *see* Department of Health, Social Services and Public Safety
- diagnosis-related groups (DRGs), German health system 144, 145
- disappointments/surprises, Coxa Hospital 37
- DRGs *see* diagnosis-related groups
- economic indicators, Coxa Hospital 36–7
- effectiveness, development assistance evaluation criterion 2
- efficiency, development assistance evaluation criterion 2
- electronic patient records
- Orbis Medical Park 118–19, 120
 - Rhön-Klinikum Group 154–5
- energy
- design 85–6
 - Martini Hospital 85–6
- England
- cf.* Northern Ireland 3–4
 - PFI 3–4
 - regional planning 3–4
- eTEN (Deploying Trans-European e-Services for All) programme, Poland 50
- EU Structural Funds
- examples, project 53–4
 - Poland 51–4
 - Programme Complement 52
- evaluation criteria
- Coxa Hospital 31
 - development assistance 1–2
 - project success 31
- examples, project
- John Paul II Hospital 53–4
 - Poland 53–4
- expenditure *see* health expenditure; hospital expenditure
- experience from across Europe 3–6
- facilities (health), redesigned levels, Northern Ireland 97–100
- Facility Management services, PFI 134
- family as 'partner'
- design 85
 - Martini Hospital 85
- finance restructuring, Netherlands 86–7
- financing
- flexible 8
 - public financing, Alzira model 16–19
- financing/management responsibility, Poland 42
- financing system, German health system 144–6
- Finland 5, 27–39
- see also* Coxa Hospital
 - health care system 27–8
 - public-private partnerships 33–4
- flexibility
- Darent Valley Hospital 129–32
 - designing for 103–7, 166–7
 - Northern Ireland 103–7
 - PFI 126–8, 129–32
 - St Olav's Hospital 166–7
 - strategic planning 90
- flexibility design principle
- future-proofing design principle 79–81
 - IFD design 76–8
 - Martini Hospital 77–8
 - New Karolinska Solna 65–6, 70–1
- flexible financing 8
- flow processes, Rhön-Klinikum Group 149–50
- future-proofing design principle
- flexibility design principle 79–81
 - Martini Hospital 79–81
- future work processes, Orbis Medical Park 121
- generality design principle, New Karolinska Solna 65–6
- generic clinical centre, St Olav's Hospital 166–7
- Germany 5, 143–57
- see also* Rhön-Klinikum Group
 - DRGs 144, 145
 - eastern/western Germany 145–6
 - financing system 144–6
 - funding mechanisms 144
 - health system 144–6
 - hospital financial state 144–5
 - primary care/secondary care demarcation 144
 - privatization trend 145
 - public-private partnerships 151–2
 - university hospitals 155
- goals
- health services, Italy 178
 - investment planning perspective 178
 - John Paul II Hospital 52–3
 - St Olav's Hospital 161–2
- 'governing bodies', Poland 42
- government funding, Poland 50
- grants, EU Structural Funds 51–4
- healing environment
- Martini Hospital 82–5
 - St Olav's Hospital 166
 - therapeutic design 82–5
- Health Care Institutions Act (1991), Poland 43
- health care principles, Italy 177–8
- health care provision, Spain 13–14
- health care reform
- Poland 42
 - Spain 13–14
- Health ClusterNET
- John Paul II Hospital 51
 - Poland 51
- health expenditure
- Spain 12
 - statistics 12
- 'health incubator'
- John Paul II Hospital 51
 - Poland 51
- Health-Promoting Hospitals project
- Tuscany 184
 - WHO 184
- health systems
- Germany 144–6
 - Italy 174–9
 - Netherlands 111–12
 - Norway 159–60
- hospital capacity planning, bed numbers 8
- hospital design/development *see* New Karolinska Solna
- hospital expenditure, Poland 43
- hospital financial state, German health system 144–5
- hospital goals 52–3, 161–2
- hospitals as social care facilities
- John Paul II Hospital 46–7
 - Poland 43–4, 46–7
- hospitals, smaller local, Northern Ireland 96–7, 99, 103
- 'hot floor' technologies, Rhön-Klinikum Group 149
- ICATS *see* Integrated Clinical Assessment and Treatment Services
- ICT
- Coxa Hospital 35–6
 - Northern Ireland 94
 - Orbis Medical Park 116

- IFD design *see* industrial, flexible and demountable (IFD) design
 impact, development assistance evaluation criterion 2
 industrial, flexible and demountable (IFD) design 76–8
 Integrated Clinical Assessment and Treatment Services (ICATS),
 Northern Ireland 95, 107
 integrated regional health care system, Italy 173–85
 Integrated Regional Operational Programme
 John Paul II Hospital 51
 Poland 51
 integrating
 architecturally, St Olav's Hospital 165–6
 research and teaching, St Olav's Hospital 164–5
 international funding, Poland 50–1
 INTERREG IIIC initiative
 John Paul II Hospital 51
 Poland 51
 investment planning perspective
 goals 178
 Italy 178
 Italy
 ASLs 175–9
 community hospital model 181
 decentralization of health services 174–9
 goals, health services 178
 health care principles 177–8
 health system 174–9
 integrated regional health care system 173–85
 investment planning perspective 178
 new hospital model 179–81
 reorganization of health services 177–9
 strategic asset planning 173–85
 John Paul II Hospital 44–55
see also Poland
 activity levels 47–8
 community care 46–7
 examples, project 53–4
 funding of services 48–9
 goals 52–3
 Health ClusterNET 51
 'health incubator' 51
 Integrated Regional Operational Programme 51
 INTERREG IIIC initiative 51
 Polish Network of Health Promoting Hospitals 47
 primary care 46–7
 statistics 44–6, 47–9
 layout, building, St Olav's Hospital 168–71
 Lehto, Matti 31, 34
 limited company vs public utility, Coxa Hospital 33–4
 Local Health Authorities (*Aziende Sanitarie Locali*, ASLs), Italy 175–9
 local health centres, Northern Ireland 99, 103
 local hospitals, Northern Ireland 96–7, 99, 103
 local planning, Poland 49
 location of facilities, Northern Ireland 100–1
 logistics design principle, Martini Hospital 78–9
 MCC *see* Medical Care Continuity (MCC) project
 management/financing responsibility, Poland 42
 Martini Hospital 75–87
see also Netherlands
 ambient experience 83
 art/sport/nature 85
 daylight 83
 design 76–87
 energy 85–6
 family as 'partner' 85
 flexibility design principle 77–8
 future-proofing design principle 79–81
 healing environment 82–5
 IFD design 76–8
 logistics design principle 78–9
 nature/art/sport 85
 noise reduction 83
 orientation 83–4
 patient oriented policies 82–5
 patient safety 84
 sport/nature/art 85
 stress/insecurity reduction 82
 therapeutic design 82–5
 Medical Care Centres, Rhön-Klinikum Group 153–4
 Medical Care Continuity (MCC) project, Poland 50
Medizinische Versorgungszentren (MVZs), Rhön-Klinikum Group
 153–4
 methods and case selection 3
 multidisciplinary working, Rhön-Klinikum Group 149–50
 MVZs *see* *Medizinische Versorgungszentren*
 National Health Fund, Poland 42, 44
 national planning, Poland 49
 nature/art/sport
 design 85
 Martini Hospital 85
 Netherlands 5, 75–87, 111–22
see also Martini Hospital; Orbis Medical Park
 finance restructuring 86–7
 health system 111–12
 New Karolinska Solna 57–73
see also Sweden
 architects' proposals selection 62
 concept, developing the 61–4
 design 64–6
 flexibility design principle 65–6, 70–1
 generality design principle 65–6
 partnership, service/research/training 60–1
 procurement strategy/structure 66–71
 project program 62–4
 public-private partnerships 66–71
 risks 69
 web link 73
 New Professional Model for Doctors, Rhön-Klinikum Group 147
 noise reduction
 design 83
 Martini Hospital 83
 Norfolk and Norwich University Hospitals
 business case 133
 operational phase 134–8
 PFI 132–8
 planning 132–4
 Northern Ireland 89–109
 acute hospitals 100, 104
 centralization of complex services 96–7
 Community Health Centres 99, 101–2, 105–7
*Delivering better services: Modernizing hospitals and reforming
 structures* 93
 DHSSPS 92, 93
 cf. England 3–4
 facilities (health), redesigned levels 97–100
 flexibility, designing for 103–7
 hospitals, smaller local 96–7, 99, 103
 ICATS 95
 ICT 94
 local health centres 99
 local hospitals 99, 103
 location of facilities 100–1
 new model 93–7
 old model 92–3
 PFI 3–4
 'regional centres of excellence' 96, 100
 regional planning 3–4
 review conclusions 93–4
 services, development of enhanced 94–6
 size of facilities 100–1
 smaller local hospitals 96–7, 99, 103
 strategic planning 89–109
 strategic rationalization 91–2
 vision 89–91
 Norway 4–5, 159–72
see also St Olav's Hospital
 health system 159–60
 hospitals in 160–1
 patients' perspective 168
 operational outcomes
 Darent Valley Hospital 129–32
 PFI 129–32
 operational phase
 Norfolk and Norwich University Hospitals 134–8
 PFI 134–8
 Orbis Medical Park 111–22
see also Netherlands
 business model 114–15
 central vision 113–14
 change management 115–17
 design 118–22
 electronic patient records 118–19, 120
 future work processes 121
 ICT 116
 objectives 113–14
 overview 112–13

- patient-centred care 118–22
 - procurement 115
 - risk management 115–17
 - success characteristics 117
 - systematized care processes 113–14
 - work processes, design 121–2
- organization, design, St Olav's Hospital 166–7
- orientation
 - design 83–4
 - Martini Hospital 83–4
- outpatient care, Alzira model 22–3
- outsourcing
 - capital procurement 35–6
 - Coxa Hospital 35–6
 - design-and-build turnkey operation 35–6
- partnership, service/research/training, New Karolinska Solna 60–1
- patient-centred care
 - design 118–22
 - Orbis Medical Park 118–22
- patient oriented policies
 - Alzira model 20–2
 - Martini Hospital 82–5
- patient record, electronic, Orbis Medical Park 118–19, 120
- patient safety
 - design 84
 - Martini Hospital 84
- patients' perspective
 - Norway 168
 - St Olav's Hospital 168
- PFI *see* Private Finance Initiative
- Pföhler, Wolfgang 147, 151–2
- Rhön-Klinikum Group 154
- planning
 - see also* strategic asset planning; strategic planning
 - Darent Valley Hospital 128–9
 - development plan, St Olav's Hospital 162–4
 - national/regional/local 3–4, 49
 - Norfolk and Norwich University Hospitals 132–4
 - PFI 128–9, 132–4
 - Poland 49
- Poland 4–5, 44–55
 - see also* John Paul II Hospital
 - background 41–4
 - capital investment funding 50
 - community care 43–4, 46–7
 - contracting 43
 - decentralization 42–3
 - eTEN (Deploying Trans-European e-Services for All) programme 50
 - EU Structural Funds 51–4
 - examples, project 53–4
 - 'governing bodies' 42
 - government funding 50
 - Health Care Institutions Act (1991) 43
 - health care reform 42
 - Health ClusterNET 51
 - 'health incubator' 51
 - hospital expenditure 43
 - hospitals as social care facilities 43–4, 46–7
 - international funding 50–1
 - INTERREG IIIC initiative 51
 - local planning 49
 - management/financing responsibility 42
 - Medical Care Continuity (MCC) project 50
 - National Health Fund 42, 44
 - national planning 49
 - planning 49
 - Polish Network of Health Promoting Hospitals 47
 - primary care 43
 - project examples 53–4
 - regional planning 49
 - social health insurance scheme 41–2
- Polish Network of Health Promoting Hospitals, Poland 47
- primary care
 - John Paul II Hospital 46–7
 - Poland 43
- primary care/secondary care demarcation, German health system 144
- principles, health care, Italy 177–8
- private delivery/management, Alzira model 20–2
- Private Finance Initiative (PFI) 123–41
 - business case 133
 - Darent Valley Hospital 128–32
 - demand, clinical services 126–7
 - Facility Management services 134
 - flexibility 126–8, 129–32
 - history 124–5
 - impact 126–8
 - lessons from Coxa Hospital 38
 - 'lock-in', SPV 127
 - Norfolk and Norwich University Hospitals 132–8
 - operational outcomes 129–32
 - operational phase 134–8
 - planning 128–9, 132–4
 - PSC 132–3
 - risks 126–8, 138
 - scale 124–5
 - SPV 127, 135–8
 - unitary charge 131–2
 - United Kingdom 2, 3–4, 6, 7–8, 123–41
 - Value for Money 126–8
- private sector
 - see also* public-private partnerships
 - Spain 14
- privatization trend, German health system 145
- procurement, Orbis Medical Park 115
- procurement strategy/structure
 - New Karolinska Solna 66–71
 - public-private partnerships 66–71
- Programme Complement, EU Structural Funds 52
- project program, New Karolinska Solna 62–4
- provision, health care *see* health care provision
- PSC *see* Public Sector Comparator
- public administration, Alzira model 24
- public control, Alzira model 19
- public financing, Alzira model 16–19
- public-private partnerships
 - see also* Private Finance Initiative (PFI)
 - Alzira model 15–16
 - benefits 69–70
 - Coxa Hospital 33–4
 - Finland 33–4
 - Germany 151–2
 - New Karolinska Solna 66–71
 - procurement strategy/structure 66–71
 - Rhön-Klinikum Group 151–2
 - risks 69
 - Spain 14
 - Sweden 66–71
- public property, Alzira model 19–20
- Public Sector Comparator (PSC), PFI 132–3
- public utility vs limited company, Coxa Hospital 33–4
- reform, health care *see* health care reform
- 'regional centres of excellence', Northern Ireland 96, 100
- regional government funding, Poland 50
- regional health care system, integrated 173–85
- regional planning
 - England 3–4
 - Northern Ireland 3–4
 - Poland 49
- regions' roles, Spain 12–13
- regulation, contracting 43
- relevance, development assistance evaluation criterion 2
- reorganization of health services, Tuscany 177–9
- research/teaching integration, St Olav's Hospital 164–5
- research/training/service partnership, New Karolinska Solna 60–1
- Rhön-Klinikum Group 143–57
 - see also* Germany
 - acquisitions 148
 - capital effectiveness 148–50
 - capital investment, technical dimensions 150–2
 - capital-related corporate strategy 147–8
 - company profile 143–4
 - decisions 152–5
 - depreciation method 151
 - design standardization 149–50
 - electronic patient records 154–5
 - flow processes 149–50
 - 'hot floor' technologies 149
 - Medical Care Centres 153–4
 - multidisciplinary working 149–50
 - MVZs 153–4
 - New Professional Model for Doctors 147
 - Pföhler, Wolfgang 147, 151–2, 154
 - public-private partnerships 151–2
 - renewal 151
 - service effectiveness 148–50
 - strategies 152–5
 - subsidiarity 150

- Rhön-Klinikum Group (contd)
 - teleportal clinics 152–4
 - university hospitals 155
- risk management, Orbis Medical Park 115–17
- risks
 - New Karolinska Solna 69
 - PFI 126–8, 138
 - public-private partnerships 69
- safety, patient *see* patient safety
- salaries, Alzira model 18
- sengetum*
 - development principles 168–71
 - St Olav's Hospital 168–71
- service effectiveness, Rhön-Klinikum Group 148–50
- service/research/training partnership, New Karolinska Solna 60–1
- service vision, strategic planning 91
- shareholding, Coxa Hospital 37–8
- single-occupancy rooms, St Olav's Hospital 170–1
- size of facilities, Northern Ireland 100–1
- smaller local hospitals, Northern Ireland 96–7, 99, 103
- social care facilities, hospitals as 43–4, 46–7
- social health insurance scheme, Poland 41–2
- Spain 5, 11–25
 - see also* Alzira model
 - Alzira model 11–25
 - health care provision 13–14
 - health care reform 13–14
 - health expenditure 12
 - national context 11–12
 - private sector 14
 - public-private partnerships 14
 - regions' roles 12–13
 - Valencia situation 14–16
- Special-Purpose Vehicle (SPV), PFI 127, 135–8
- sport/nature/art
 - design 85
 - Martini Hospital 85
- SPV *see* Special-Purpose Vehicle
- St Olav's Hospital 159–72
 - see also* Norway
 - architectural integration 165–6, 168–71
 - building layout 168–71
 - clinical centre, generic 166–7
 - connectivity 166–7
 - context 161
 - cost implications 171–2
 - design 165–7
 - development plan 162–4
 - development principles 168–71
 - flexibility 166–7
 - generic clinical centre 166–7
 - goals 161–2
 - healing environment 166
 - history 161
 - integrating architecturally 165–6
 - integrating research and teaching 164–5
 - layout, building 168–71
 - location 162
 - organization, design 166–7
 - patients' perspective 168
 - research/teaching integration 164–5
 - sengetum* 168–71
 - single-occupancy rooms 170–1
 - vision 161–2
- statistics, health expenditure 12
- strategic asset planning 173–85
 - integrated regional health care system 173–85
 - Italy 173–85
- strategic planning
 - Community Health Centres 99, 101–2, 105–7
 - design vision 91
 - facilities (health), redesigned levels 97–100
 - flexibility 90
 - flexibility, designing for 103–7
 - location of facilities 100–1
 - new model 93–7
 - Northern Ireland 89–109
 - service vision 91
 - size of facilities 100–1
 - vision need 89–91
- strategic rationalization, Northern Ireland 91–2
- strategies, Rhön-Klinikum Group 152–5
- stress/insecurity reduction
 - design 82
 - Martini Hospital 82
- subsidiarity, Rhön-Klinikum Group 150
- success characteristics
 - capital investment projects 1–2
 - Coxa Hospital 36–7
 - evaluation criteria, project success 31
 - Orbis Medical Park 117
- surprises/disappointments, Coxa Hospital 37
- sustainability, development assistance evaluation criterion 2
- sustainable health capital insurance 1–3
- Sweden 5–6, 57–73
 - see also* New Karolinska Solna
 - change drivers 58–9
 - public-private partnerships 66–71
 - Stockholm county council 57–8
 - Stockholm county council, service vision 59–60
- systematized care processes, Orbis Medical Park 113–14
- technical solutions, Coxa Hospital 33–6
- teleportal clinics, Rhön-Klinikum Group 152–4
- therapeutic design
 - healing environment 82–5
 - Martini Hospital 82–5
- training/service/research partnership, New Karolinska Solna 60–1
- Tuscany
 - see also* Italy
 - clinical governance 183–4
 - community hospital model 181
 - decentralization 177–9
 - demand management 183–4
 - Health-Promoting Hospitals project 184
 - innovations, changing hospitals 181–3
 - investments, changing hospitals 181–3
 - new hospital model 179–81
 - reorganization of health services 177–9
 - results, changing hospitals 181–3
- unitary charge
 - Darent Valley Hospital 131–2
 - PFI 131–2
- United Kingdom, PFI 2, 3–4, 6, 7–8, 123–41
- university hospitals
 - Germany 155
 - Rhön-Klinikum Group 155
- Valencia situation, Spain 14–16
- Value for Money, PFI 126–8
- vision
 - design vision 91
 - Northern Ireland 89–91
 - planning horizons 90
 - service vision 91
 - St Olav's Hospital 161–2
 - strategic planning 89–91
- web links
 - Alzira model 25
 - Coxa Hospital 39
 - New Karolinska Solna 73
- WHO *see* World Health Organization
- work processes
 - design 121–2
 - Orbis Medical Park 121–2
- World Health Organization (WHO)
 - Health-Promoting Hospitals project 184

Capital investment in European health systems has to take account of an array of challenges and opportunities: the demographic and epidemiological transitions associated with an ageing population; advances in medical technologies and pharmaceuticals; rising public expectations; and persistent health inequalities.

This volume presents 11 case studies from across Europe and these offer a variety of perspectives on current issues relating to health capital investment and ways of trying to meet present challenges as well as those of the future. The case studies include the Orbis Medical Park, Sittard, and the Martini Hospital, Groningen (both in the Netherlands); the St Olav's Hospital in Trondheim (Norway); the New Karolinska Solna Hospital in Stockholm (Sweden); the Coxa Hospital in Tampere (Finland); the Rhön-Klinikum Group (Germany); the John Paul II Hospital in Krakow (Poland); the Alzira model in the Valencia region (Spain); regional planning in Northern Ireland and Tuscany (Italy); and the Private Finance Initiative (England).

This book offers policy-makers, planners, architects, financiers and managers practical illustrations of how health services can be translated into capital asset solutions and aims to expand the evidence base on how to improve the long-term sustainability of capital investment.

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