



EuHPN Workshop

One Problem, Many Solutions: how to make healthcare infrastructure deliver for society

Edited By: Sameedha Mahadkar, Grant Mills, Jonathan Erskine and Andrew Price

Stockholm, May 5-7, 2010



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One Problem, Many Solutions: how to make healthcare deliver for society

Edited By:
Sameedha Mahadkar, Grant Mills, Jonathan Erskine and Andrew D.F. Price

Health and Care Infrastructure Research and Innovation Centre (HaCIRIC),
Loughborough University; European Health Property Network, Durham University

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i. Foreword

The European Health Property Network is a not-for-profit trust, established in 2000, which brings together European government health estates departments and agencies, R&D organisations, academic centres and professional associations with interests in health facility planning, design, and financing. The network holds regular events for member organisations, and collaborates with a number of other organisations working in the same field. Members share knowledge and practice with each other through personal interaction and via the organisation's website, and on occasions they singly or collectively commission original research on topics of interest to them.

The most regular and important EuHPN event is the network's annual workshop, held each year in a different European city. Recent workshops have been held in Durham (England), Belfast (Northern Ireland), Paris (France), Budapest (Hungary), Oulu (Finland), Florence (Italy), Edinburgh (Scotland), Lisbon (Portugal) and Oslo (Norway). In 2010 the EuHPN Board accepted the kind invitation of Locum AB to host the workshop in Stockholm, Sweden, in collaboration with Karolinska Institutet. This report is a record of that event, which took place from 5th to 7th May, 2010. Readers should note that this report is not a 'proceedings'; that is, the text has been prepared by researchers who participated in the 2010 workshop, not by the speakers themselves. Speakers have reviewed the text, however, and have given permission to use their illustrations, diagrams, and other graphics.

The themes for EuHPN workshops vary from year to year, and tend to reflect trends that are emerging in health capital asset investment. Sometimes the emphasis may be on planning the health estate at local, regional, or national level; at other times members are more interested in the architecture and design of health buildings, or the financial mechanisms available to secure investment. For the 2010 workshop, the EuHPN Board determined that the theme should be '*Why healthcare infrastructure has to deliver for society*', and that the most appropriate way to approach this would be the contrast between the recent period of 'big bang' investment in health infrastructure, and the emerging sense that incremental development may be the way forward. Whichever approach is taken, health infrastructure ultimately has to serve the health needs of country populations, and has to respond to the demands of clinicians, managers, politicians and the public.

To examine the theme of 'big bang' versus 'incremental' development of the health estate, speakers were invited from a range of disciplines, organisations and countries, and were marshalled into a programme that had three main sub-themes:

- *Tools and methodologies*

What does the current crop of planning instruments tell us about how best to tackle the challenges of the health estate? Speakers presented their experiences of planning health facilities at local, national and international level, with emphasis on evidence-based methods for deciding what to build and where to build it.

- *From planning to realisation*

Having examined the demographic, epidemiological, financial and organisational contexts around provision of health facilities, what is the best way to move from the planning phase to a successful project? This section of the workshop introduced some practical case studies of individual hospital projects, regional reconfiguration of health care infrastructure, and the links between care pathway development and the built environment.

- *Challenges and opportunities*

The planning has been done; a project is underway – what are the barriers to implementation; how can we ensure a successful project? The closing session of the workshop looked at the importance of reflective,

iterative planning, the contribution of innovative procurement, and the difficulties of rebalancing care infrastructure in some countries.

The 2010 EuHPN workshop would not have been possible without the support of a number of organisations. Firstly, thanks are due to EuHPN member organisation Locum AB, the property management company owned by Stockholm County Council. Locum acted as hosts for the event, and their staff were unfailingly helpful during preparations and the workshop itself.

This year's workshop included a 200th anniversary celebration of the founding of Karolinska Institutet, which explored how that institution sees its developing role in cutting-edge medical and clinical research. Speakers from Sweden, Germany, UK and Netherlands discussed how medical and clinical research relates to the healthcare offered to patients at the New Karolinska Solna Hospital, and to the wider world. Many hospitals have important roles as education centres, and since these are costly to build and maintain, they need to show how their work will improve healthcare for patients and the population in general. Presentations during 'Karolinska Day' examined the importance of trans-national cooperation in research and education, how best to plan for hospital-based research facilities, and optimum designs to enhance teaching and learning in clinical settings.

Thanks are also due to two workshop sponsors. Bdpgrupe6, a leading Anglo-French architecture practice, has a long association with EuHPN and the annual workshop, and was welcomed back as a sponsor in Stockholm. This year saw another of Europe's leading architecture practices – White arkitekter AB – also become a workshop sponsor. The contributions of both sponsors, in providing speakers and practical support for the event, were extremely welcome.

EuHPN is also very grateful to Sameedha Mahadkar, Grant Mills and Professor Andrew Price of HaCIRIC Loughborough University, Department of Civil and Building Engineering. They have jointly prepared the great majority of the text in this report and have spent much time in selecting appropriate and relevant illustrations. HaCIRIC (www.haciric.org) is an EPSRC UK collaboration between Imperial College London and the universities of Loughborough, Reading and Salford. Its work focuses on the underlying built and technical infrastructure for healthcare, and the interaction between this infrastructure and change and innovation in care services. HaCIRIC is currently working with over 135 collaborators, including health and social care authorities, private sector companies and non-profit organisations in the UK and abroad.

Jonathan Erskine

Executive Director, European Health Property Network

ii. Summary

Jonathan Erskine, Executive Director, European Health Property Network; Researcher at the Centre for Public Policy and Health, Durham University

Even with the guidance of a single, overarching theme it is no easy matter to bring together a disparate group of people, comprising health planners and architects, health capital finance experts, health policy academics, and health facility professionals, and then expect a straight-forward narrative to emerge from their various presentations and discussions. In fact, thanks to input from the EuHPN board and pre-workshop conversations with the speakers and attendees, the 2010 Stockholm workshop enjoyed a remarkable degree of coherence.

John Cole, Chair of the European Health Property Network, set the scene in the workshop's opening session by posing a series of questions around the issue of 'big bang' versus incremental development of healthcare facilities. The following commentary follows these questions, and attempts to use them to find some emerging conclusions and observations from the workshop presentations.

Can we consolidate into fewer facilities?

Do we optimise the possibilities of reuse/renovation of existing accommodation before opting for new build?

These paired questions were at the heart of a number of workshop presentations.

Gunilla Hogbom (Managing Director, Locum AB), for example, outlined the drive towards more efficient use of health infrastructure in Stockholm County, better suited to the current and future demands of the Swedish healthcare system. As property management agents for Stockholm County Council, Locum has rationalised the health estate over the last 18 years, such that around SEK 7.4 billion of publicly owned property – including a large proportion of health property – has been sold. Locum's current projects are a mix of extensions, renovations to existing healthcare facilities, and some new structures. Göran Stiernstadt, MD for Healthcare Issues at the Swedish Municipalities and Counties Organisation, also noted the recent reduction in the number of full-scale emergency hospitals in Sweden from 13 to 7, as well as a significant trend towards home-based care. And even in the case of the New Karolinska Solna Hospital – a notable example of a 'big bang' development – Professor Lennart Persson commented on the project's aims to consolidate existing, outmoded buildings.

Agneta Philipson (Locum AB) tackled this question from a technical perspective. The Property Development Plans for the hospital facilities currently managed by Locum have been developed to look at the long-term sustainability of existing accommodation, with emphasis on looking ahead to future clinical and technical developments, and how healthcare buildings can be designed now to allow for maximum future adaptability. In some cases, the analysis phase of a Property Development Plan may indicate the need for significant investment in new construction (e.g. the Södertälje Hospital), whereas in other cases there is room for use of a refurbishment strategy.

The presentation on the *Momentum: pathways to healthcare* project (Carole Langrick, Ali Wilson) was evidence of how the various sectors of a local health economy can plan collectively to reconfigure the health estate. *Momentum* aims to make major changes to the way that health services are provided to people in North Tees, UK, and its central philosophy is to provide as much care as possible closer to home. This approach proposes a reduction, compared with existing provision, in the number of acute hospital beds, but balanced by an expanded primary, community and home care service. This service plan has required a fundamental reassessment of how best to use existing healthcare facilities, the planning of a new hospital (to replace existing buildings), and commitment to some new integrated care centres. One of the major barriers to

successful implementation of a reconfigured health estate has traditionally been the reluctance of different organisations (hospitals, family doctors, community services) to accept that planners should take a holistic view of the entire health economy in a locality, and that disinvestment – as well as investment – is a necessary part of the equation. In the case of *Momentum* there is evidence that this barrier has been at least partially overcome, and that clinicians and managers from different organisations have begun to act collectively and to see the bigger picture.

The same trend in thinking emerged from the presentation on regional planning in Italy (Simona Agger), which described a movement towards rationalisation of the number of smaller hospitals and greater provision of home care. As with *Momentum*, the tools available to Italian health planners now include detailed information on the expected outcomes of capital investment programmes, both in terms of population health and lifecycle costs. And in Norway, Marte Lauvsnes (SINTEF Health Research) described the growing movement to look again at older hospitals with a view to refurbishment and reconstruction, in contrast with the country's recent history of large-scale, new build hospitals. Planning tools and processes have latterly been developed to cope with the 'big bang' approach to hospital development, but it is now recognised that these have to be reviewed and re-thought in order to be relevant and useful for smaller scale projects, and to bring into the equation the same considerations of future flexibility and adaptability.

There was some interesting contrast here with the trends in France. Bertrand Bailleul (Forum Europeen; CEO, Hospital Saint Jean des Gresillons) described the enormous infrastructure investments that have been taking place over the last 10 to 15 years, both in hospital buildings and in supporting IT systems. Although the planning processes were intended to take account of priorities in terms of population health and clinical need, as well as financial viability, it was clear that there had been a lack of evaluation once projects were underway. The result has been that some hospital organisations had found themselves in financial difficulties.

Can we reduce energy usage?

Healthcare buildings generally consume very considerable quantities of energy, and when we take into account the energy costs involved in transporting staff, patients, equipment and supplies around the various elements of a healthcare system, we see that this sector contributes significantly to Europe's CO² output. Given the current financial constriction that many countries are now facing, it was interesting to note that few speakers directly addressed the issue of energy efficiency strategies. One exception was Barrie Dowdeswell (Research Director, European Centre for Healthcare Assets and Architecture, ECHAA), who gave a pan-European perspective on strategic health capital investment projects, and in doing so pointed out that the EU Commission's Europe 2020 agenda includes specific mention of policies that will promote a more resource efficient, greener and more competitive European economy. However, most of the speakers who presented planning tools and methodologies appeared to assume that these are 'policy neutral' i.e. a strategy or project plan that addresses the need to use less energy, or to use it more efficiently, will only emerge if those aims are specified in the input conditions. At one level this is of course true. Those who are charged with constructing or renovating health care buildings take their lead from guidelines and directives, and often work within very strict financial parameters. However, if European nations are to meet the objective of reducing CO² emissions through less wasteful use of hydrocarbons, it could be argued that this requirement should be built in – pre-installed – in the set of assumptions used by planners at all levels. At the very least, this consideration should perhaps carry more weight when considering whether to build new or to renovate and/or reconfigure existing structures.

The presentation on Low Carbon Healthcare Buildings (Angus Hunter, LCB team) certainly addressed two particular, linked aspects of the debate on energy use and CO² targets: procurement practice and innovation. Health infrastructure projects often begin with ambitious expectations of zero carbon or ultra-low carbon construction and maintenance, but somewhere between the initial concept and the final, built solution, these aims are often diminished in scope. Procurement procedures for health infrastructure are traditionally risk averse, and often bound by governmental guidelines and rules. In such circumstances it is not easy for health facility managers to persuade boards and the supply chain that carbon reduction measures should be given a

higher priority, and that truly innovative, forward-looking solutions should be part of a healthcare organisation's procurement strategy. The LCB presentation concluded that the EU Commission is aware of this barrier to better energy management and is actively promoting networks that will share best practice and help to convince procurers and suppliers that low carbon construction in the health sector can be more than rhetoric.

Reductions in hospital energy costs are often associated with technical solutions: more efficient heating and lighting systems, better insulation, etc. However, one workshop presentation (Gianluca Ghiselli, Asti Azienda Sanitaria Locale, Italy) provided evidence of what is possible by taking a more holistic approach. Asti hospital's PEH programme (Project, Economy, Health) has a major component which concentrates on the energy costs associated with food supply, by significantly increasing use of locally sourced food and involving patients in its production. This element of the PEH programme also aims to stimulate the local economy and provide social activities for the Asti community. This 'multiplier effect' was elaborated further in the presentation from Alan Hennessy (bdpgroupe6), which included a comparative analysis of the economic contribution of the healthcare sector to job creation and GDP.

Do we specify our buildings appropriate to their use?

Do we truly incorporate flexibility and appropriate standardisation or modularisation?

These linked questions are central to planning for health capital investment and infrastructure development. Recent reports on this area (e.g. 'Investing in hospitals of the future', 2009, WHO; *Systematisation of clinical care and health capital planning*, Dowdeswell B and Erskine J, in 'Changing Clinical Care, 2008, Radcliffe Publishing) have suggested that it is becoming increasingly difficult to ensure that health facilities avoid being constructed to support service models that are out-of-date as soon as the buildings are complete. In some cases this may be due to the financial mechanisms used to pay for health facilities (e.g. the restrictive nature of contracts with private finance consortia), in other circumstances planners and designers find it difficult to anticipate future trends in medical technology or clinical practice. The consequences of failing to provide a building that can adapt to changing health service needs can be expensive, not only in cost, but also in terms of the quality of healthcare provided.

In any case, methodologies that help to avoid or mitigate this pitfall – even partially – must be welcomed by policy makers, health facility managers and health service planners, and the workshop heard from a number of speakers who are using and developing just such tools. Anders Lövefors, for example, described the 'Concept Program' that is being used by Locum AB to plan projects for emergency care, acute care, maternity and surgical services, and imaging processes across a number of different hospital sites. In broad terms, the Concept Program obliges planners to look carefully at the lifespan of health facilities in terms of the service elements that they are expected to support, and to build in these considerations at an early stage in the design process. Jonathan Millman (Department of Health – Estates and Facilities, UK) and Ashley Clough (Parallel Interactive) presented a prototype tool – 'The Scheduler' – which explicitly links the costs of the spaces used in health buildings with the income generated by the activities that take place in them. This tool is being further developed to emphasise the possibilities of creating generic spaces that can be flexibly adapted to different clinical and medical uses, and to create a strategy for disinvestment in under-used or redundant facilities.

Grant Mills (Loughborough University, UK), Phil Astley (MARU, UK) and Gorän Lindahl (Chalmers University of Technology, Sweden) compared the master planning approaches in the UK and Sweden. This presentation took a more strategic view of health estates development, and concluded that open scenario planning – to anticipate future changes in clinical and service models – was still underused in both countries. In particular, there was a pressing need to pay more attention to the scale and distribution of health care facilities. The speakers commented that master planning in Sweden has traditionally tended to put more emphasis than in the UK on integration of health buildings with other elements of the social fabric. This was reinforced by Anna Montgomery (White Arkitekter, Sweden) who covered the development and use of standardised building units, but also the way in which Swedish planning often uses healthcare building projects to reinvigorate urban spaces.

Do we optimise procurement skills to reduce cost?

Compared with the development of upfront planning processes and high level strategy and vision for new healthcare buildings, procurement practice is relatively neglected by politicians and even by health system planners. Perhaps it is seen as something rather dull – a technical area that simply involves following rules and guidelines. In practice, however, procurement in the widest sense can have a very significant impact on the success of a healthcare building, as judged by whether it truly supports the clinical needs of a local population, and whether the building really can adapt to future demands.

If more healthcare organisations were willingly to critically examine risk, we might see different procurement decisions being taken, as illustrated by the case studies discussed in Barrie Dowdeswell's presentation. We might even see greater impact from Return on Investment (ROI) thinking, as outlined by Dr Arne Bjornberg (Health Consumer Powerhouse). Dr Bjornberg argued that most European healthcare organisations were poorly placed to understand the effects of not investing, and often saw this as a cost saving rather than an opportunity missed. Reduced costs may come from innovative, strategically aligned procurement, but rarely from refusal to adapt to changing service needs. In the particular case of capital investment costs, Rhonda Kerr (Rhonda Kerr Associates, Australia) raised the interesting example of Australia's recent decision to move towards funding based on outcomes rather than inputs, and to include a wide range of elements – comprising clinical services, imaging, pathology, pharmacy, ICU and patient hotel – in DRG payments.

Some final observations

The 2010 EuHPN workshop brought together a mix of healthcare planners, architects, academics, and capital investment experts from around a dozen different countries. The central theme -*Why healthcare infrastructure has to deliver for society* – now seems better chosen than ever, given the major reductions in public and private sector expenditure that are now being implemented across Europe. If healthcare organisations can't find a way to do more with less they will fail in their primary objective of improving healthcare and population health, since they all face mounting pressures from increased costs and squeezed revenues. In such circumstances, decisions about whether to build anew or to renovate, to invest or disinvest, and how to best match facilities to present and future need, are paramount. The summary of Professor Peter Frost's presentation on 'Design Dialogues' sums up the required direction of travel very well:

The key challenges in healthcare are to better capture and describe client and user needs in a complex environment and to support change and organisational innovation through facility planning.

The challenges mentioned in the above quotation are present in all countries, but in some they are certainly more acute. The Stockholm workshop concluded with an expert analysis of the barriers to successful rebalancing of Hungary's healthcare infrastructure, delivered by Dr Miklos Szocska (Health Service Management Training Centre, Semmelweis University, Budapest). Here was a clear example of public servants who know what is needed, but who have to face numerous inhibitors: political influence on resource allocation, the malign effects of informal payment systems, a dissatisfied healthcare workforce, and an inefficient and inequitable central system in charge of capital investment and master planning.

While Hungary's difficulties may be salutary, they are not unique, and they are reflected to a greater or lesser extent in many other European nations. It is for this reason that organisations such as the European Health Property Network (EuHPN), the Health and Care Infrastructure Research and Innovation Centre (HaCIRIC) and the European Centre for Healthcare Assets and Architecture (ECHAA) will continue to support the knowledge exchange and research that can at least help to illuminate the best way to ensure that healthcare infrastructure can deliver for society.

1. Tools and Methodologies for Planning - Introduction

1.1. Making Healthcare Infrastructure Deliver for Society

John Cole, Chair of the European Health Property Network (EuHPN) and Chief Executive of the Health Estates Investment Group, Northern Ireland initiated the workshop with some remarks on why healthcare infrastructure has to deliver for society.

Many governments are heavily indebted and there is reduced tax income due to the current recession. Within such an environment, it is difficult to secure the required capital to build and run new projects. The key issue is to determine how strategic planning can respond to these challenges. Is the current model of acute hospital centred services sustainable? How can health services deliver the most effective and affordable treatment and care? What are the costs involved in providing and maintaining the current hospital infrastructure? Is the physical footprint too big from an affordability perspective as well as from a sustainability perspective?

In response to these issues, health providers are considering solutions such as the centralisation of specialist services into fewer larger hospital facilities which function as centres of excellence, combined with the increased delivery of a range of less complex services in community settings that were only previously available in hospital settings. Improved connectivity between the sectors is critical to the success of this model and in particular there is a need to have better IT systems including integrated patient record systems. This model is intended to achieve earlier and less expensive diagnoses and interventions being carried out closer to home and the avoidance of unnecessary hospitalisation.

In light of the funding pressures and the ever evolving models of care there is a view that capital investment options should re-consider the appropriateness of large hospital developments which may not have the flexibility to respond to changing practice and funding issues. Modernisation, extension and/or reconfiguration of existing facilities may represent better value-for-money in the longer term. As part of an estate rationalisation process, planners need to consider the following issues:

- Can we consolidate into fewer facilities?
- Can we reduce energy usage?
- Do we optimise the possibilities of reuse/renovation of existing accommodation before opting for new build?
- Do we specify our buildings appropriate to their use?
- Do we truly incorporate flexibility and appropriate standardisation or modularisation?
- Do we optimise procurement skills to reduce cost?

The key trends in the location of services are depicted in Figure 1. There has been a movement of out-patient diagnostics and treatments from acute specialist to community settings, whereas complex specialities are seen moving toward centres of excellence.

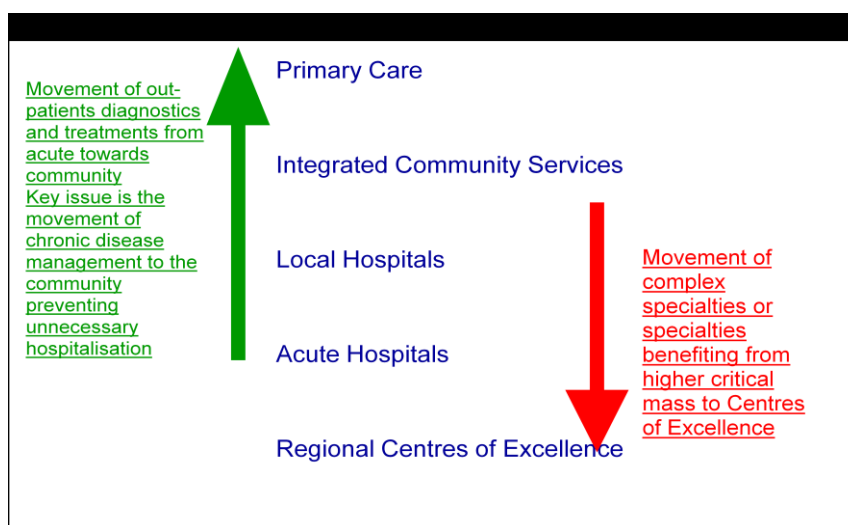


Figure 1. Location of Service Trends

Although the trend in recent years has been to provide nucleus hospitals, which provide the ‘big bang’ solutions; it is important to consider the affordability of such schemes. There has been some increasing reluctance on the part of PFI consortia and private companies to take on risks associated with large scale developments. Instead, perhaps there is a need to have smaller scale projects that are flexible, add value and are part of a larger coherent master plan. It is important to consider if an incremental phased model of smaller scale developments will facilitate more flexibility to cope with rapidly changing development needs; and the cost of compromise for moving from larger to smaller projects. Capital investment could act as the catalyst for change in the current environment, where we are entering the era of ‘small bang’.

1.2. Tools and Methods for Planning: Locum AB

Gunilla Högbom, Managing Director, Locum AB, Sweden.

This presentation began with a brief background to Stockholm’s healthcare demographics and elaborated on the Swedish healthcare system. Stockholm County Council serves 2 million inhabitants (21% of the Swedish population) and has 26 municipalities. This is paid for by the tax payer and had a revenue in 2009 of SEK 68 billion. Stockholm County Council employees 7,250, 000 doctor visits and 7,610,000 other visits (home care, district nurses, antenatal clinic, child health care clinic, physiotherapists etc.) and they provide some 6,000 beds.

Healthcare services are provided through an administration which purchases healthcare from different providers. These can be companies or other organisations owned and run by the county council or private companies. At the moment 30 % of the emergency services and 50 % of the community healthcare are provided by private companies.

Locum AB is one of Sweden’s larger property management companies with a property portfolio of about 2.1 million m² in the Stockholm region and is owned by Stockholm County Council. Major tenants include healthcare institutions in the Stockholm County. When the company was set up in the early 90’s to manage and develop the real estate portfolio each unit had its own management; but now it has professional integrated management of all properties. The graph below (Figure 2) shows the rental costs as a percentage of the overall healthcare costs from 1992 onwards. The rental costs have gradually declined from 18 % and are now fluctuating around 7%. Since 1992 Locum has sold properties worth SEK 7.4 billion along with development rights for about 5,000 new homes and around 1 million m² in total floor area. This was a profitable venture for both the county council and the tax payers. Currently, more healthcare is provided than 18 years ago on a smaller footprint. Locum’s organisation consists of 200 personnel. They have chosen not to

own their resources for technical management; instead they are procured by competitive tender in the open market. Their markets include community, emergency and university hospitals.

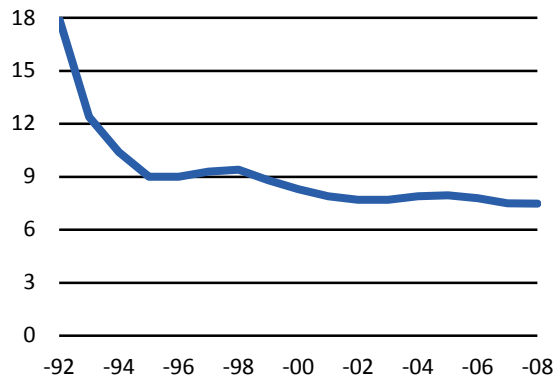


Figure 2. Rental Cost Since 1992

Locum’s project catalogue consists of projects at an estimated cost exceeding SEK 5 billion. The largest include: Emerges (Figure 3: an extension for Stockholm South General Hospital: operating suite, emergency department, maternity/obstetrics and sterilisation unit. It has a gross floor area of 35,000 sq meters), Danderyd (Figure 4: a new acute-care building for Danderyd Hospital. It has a gross floor area of 48,000 sq meters) , Innovation (Figure 5: a new building for surgical operations, intervention, academic research and business in collaboration with Karolinska University Hospital in Huddinge) and Helix (Figure 6: a new forensic psychiatry facility in Flemingsberg, with an investment of SEK 762 million and estimated completion in 2012).



Figure 3. Emergens Hospital



Figure 4. Danderyd Hospital



Figure 5. Innovationsplats (innovation site)



Figure 6. Helix

The following table depicts how the various Stockholm county council healthcare premises are utilised.

Type of tenant	Net floor area, thousands of m ²	Percentage	Rental income, SEK M
University hospitals	490	35	925
Emergency hospitals	294	21	484
Dental care	13	1	19
Other healthcare	241	17	425
Other county council activities	59	5	70
Total county council activities	1,097	79	1,923
Private emergency hospitals	44	3	83
Municipalities	29	2	49
Other healthcare	52	4	94
Other activities	53	4	69
Total other activities	178	13	295
Total rented	1,275	92	2,218
Vacant	106	8	
Other, unrentable	7	–	
Total Stockholm County Council Real Estate	1,388	100	

The following tables depict the Stockholm County Council Real Estate in brief.

Financial details, SEK M	2009	2008
Rental income	2,316	2,224
Operating profit before depreciation	1,258	1,348
Profit for the year	401	461
Property purchases	1,104	1,149
Property sales	70	217
Book value of properties	10,422	10,363
Cash flow	201	15

Property details	2009	2008
Number of properties and leaseholds owned	49	51
Total floor area, thousands of m ² , TFA*	2,102	2,100
Net floor area, thousands of m ² , NFA**	1,387	1,388
Vacant net floor area, thousands of m ² , NFA**	124	112
Occupancy rate, strategic properties, %	93	94
Occupancy rate, all properties, %	91	92

1.3. Sweden's Healthcare: Structure and Organisation

Göran Stiernstedt, Managing Director for healthcare issues, Swedish Municipalities and Counties Organisation

In Sweden, county councils are responsible for delivering healthcare as well as transport planning and regional development. 30-40% of the budget of a municipality is dedicated to social services and 70-80% includes education along with spatial planning, waste and refuse and other support services. About 15% of income tax is dedicated to healthcare; this is paid to the local councils and municipalities. A tax equalisation system exists to enable county councils and municipalities to have equal economic conditions for their activities, independent of income factors and structural factors that cannot be influenced. The Swedish healthcare system is characterised by an emphasis on equity and a comprehensive cover that accounts for the entire population. It is planned using quasi-market mechanisms with tendencies to decentralise (20 County Councils and 290 Municipalities). Key finance details include:

- Healthcare is publicly funded – 80 % local taxes, 17 % grants from the central government
- Patient fees comprise 3 % of the financing
- Private funded healthcare is less than 1%

Patient fees for GP visits are 100-150 SEK, these are higher for certain specialities. Care is free for children up to 20 years old and also for patients with chronic diseases. The maximum total annual cost per adult is 900 SEK. Patient's fees as part of total costs for prescription drugs are just above 20%. These prescription costs

vary depending on the accumulated costs of drugs, where patients can pay 10% to 50% of the costs in a 12 month period. Dental care has limited subsidisation. Private care providers are common at a primary level with contracts with the county councils (25%), although they are uncommon at a whole system level (only 10 %). Recently there has been a new change in the legislation which allows hospitals to establish businesses with private care providers within primary care, making it possible to mix public and private financing. It is also obligatory for the county council to allow for the same.

The key element of the Swedish health system is decentralisation, which serves as the main strategy for improvements, in combination with guidelines, benchmarking and support from national agencies. Further comparisons of outcomes and performance of the various counties within Sweden for medical results (MSRA) infections, breast cancer, stroke care, hip replacement, patient experience, time related availability and costs related with different treatments were also presented. It was noted that there has been a major reduction in full-scale emergency hospitals from 13 to 7 in Stockholm County Council. The average stay in hospitals has substantially reduced from 10 days to 4 days, and there has been a shift towards homecare. Although Sweden has the oldest population in comparison with EU 15, Norway and the USA; it also has the highest life expectancy of a baby boy born in 2005 (Source: OECD, 2007)¹. It also has good accessibility, in relation to number of treatment centres in proportion to population size (although there are long waiting times in elective care). Sweden has very good outcomes in terms of lowest infant mortality rate, “avoidable death” and “too early death”, and low mortality from cancer. It also has high medical quality with a low percentage of infections. The number of beds per 1000 citizens is the lowest for Sweden and the highest for Germany.

Following the presentation, there was a discussion around decision-making structures. In Sweden, quality standards and standardisation are the responsibility of the individual councils who have a high degree of self governance. According to Göran Stiernstadt there were no specific standards for room sizes; design is guided by building and construction industry regulations. The importance of reorganisation was also described to aid the Swedish health service to reach a higher degree of effectiveness. For Göran Stiernstadt one possible criticism of the decentralisation process was that 21 county councils provide hospital services for a small population (9 million). Although there are a number of statistics available for the county council-provided healthcare services, Göran Stiernstadt believed that there are few studies for municipal and local systems. This can prove to be a hindrance when evaluating services such as stroke care, where only 20% of patients are treated by county councils and the remainder are treated by municipalities. There were discussions around accessibility issues within UK and Sweden; the UK health system is often criticised for postcode availability of treatment. In practice this is also the case in Sweden, with accessibility differing regionally. Access is a problem across all health systems.

¹ OECD, (2007) Health at a Glance, OECD indicators, (editor’s reference).

2. Tools and Methodologies for Planning – parallel sessions A and B

2.1. The New Karolinska Solna University Hospital – The New Centre for Integrated Specialised Care, Research and Education

Professor Lennart Persson, Managing Director of the New Karolinska Solna Hospital.

This presentation outlined the principles of the new Karolinska Solna University Hospital design that had been commissioned by Stockholm County Council. For Lennart Persson the mission for the design was to provide a world class and high quality facility for healthcare, research and education. The new hospital would act as the central hub of a competitive health care system, a specialised tertiary care hospital for the region and would play a central role in the development of Stockholm as a leading life science cluster. Principally, the design was said to put the patient perspective first, to achieve patient integrity, patient safety and better comfort.

According to Lennart Persson there was a strong political drive and strong County Council leadership between 2001 and 2010 which drove the decision for a new hospital. The site was as large as a new town and it was spread out over some 40 buildings, with weak connections and logistics. There were several old facilities, which were unsuitable for future healthcare, and a number of buildings that were expensive to refurbish. Historically, patients used to be seen by one doctor only; however today healthcare delivery is often multi-disciplinary with many specialists involved in patient treatment. Forming these teams across buildings was difficult. The ambition was that this building project would be a catalyst for a change in healthcare and not just a building; however, this was perceived as very difficult to achieve. The product structure for the NKS project is described below (Figure 7).

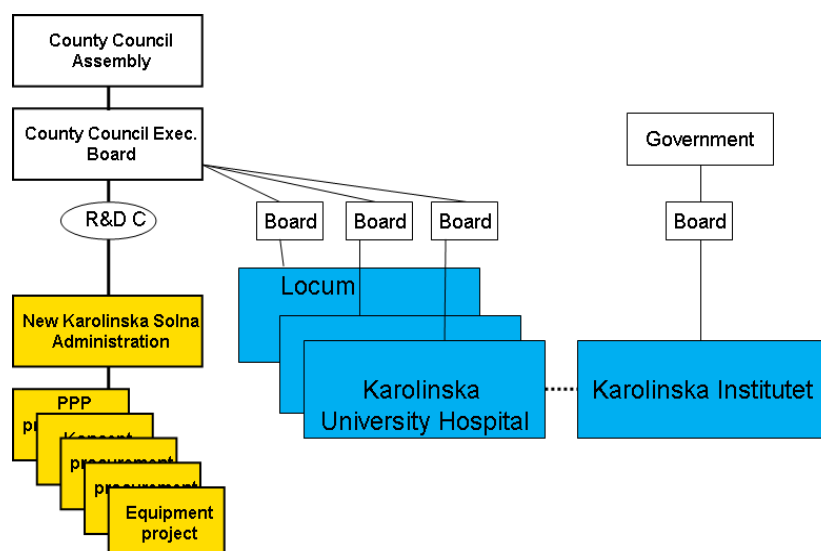


Figure 7. NKS Project Structure

The details of the scheme are:

- Gross total area: Max. 335 000 sq.m.
- Cost: Max. € 1.3 bn.

- Single rooms for all in-patients
- 180 ambulatory rooms
- Clinical laboratories
- Clinical research laboratories
- Teaching facilities
- 600 beds (125 ICU/high dependency care & 75 postop.)
- 100 day-care beds
- 100 rooms at adjacent patient-hotel

The principle of the approach to designing the hospital was:

- Construction or building
- Activities and medical content
- Thematic organisation

The NKS themes that were used to organise the building are shown in Figure 8. These include: Children, Cancer, Heart, Inflammation, Neurology, Restorative Medicine, Immunology, Image and Function, Proteomics/Genomics, Laboratories.



Figure 8. NKS Building Organisation Themes

The key was organisation around the patient, rather than the specialist. Other important elements were development of clinical pathways and logistics, and separation of acute and elective patient streams. The site has been designed around clusters of:

1. Research and education
2. Clinical spaces
3. Hotel areas

Historically Stockholm Karolinska transferred burns, stroke and children to other hospitals outside the region. The building has been designed around a thematic organisation as shown in Figure 9, rather than around specialists.

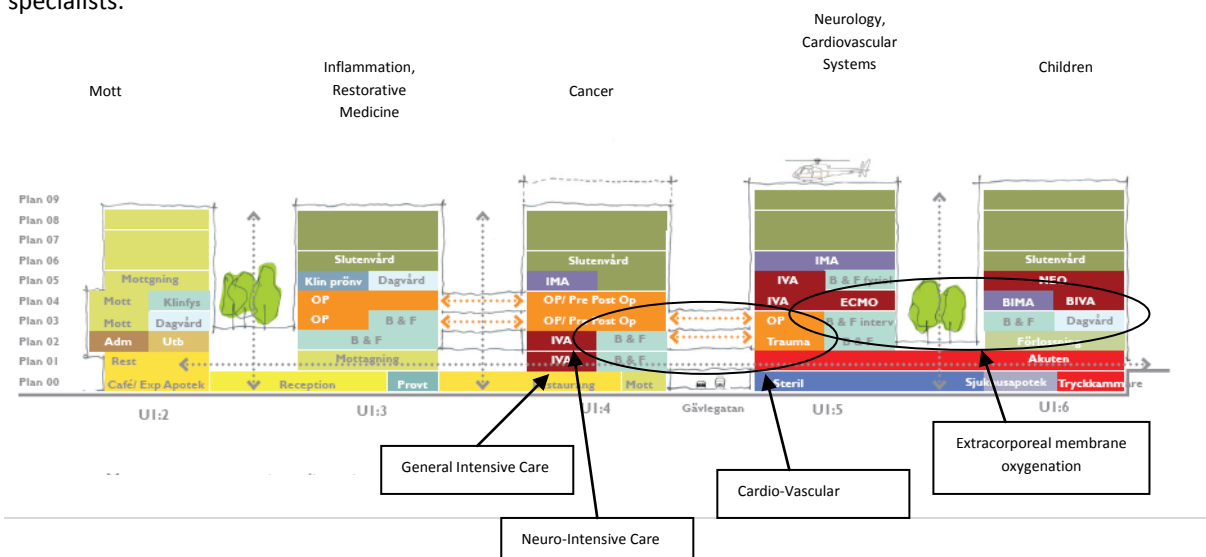


Figure 9. Zoned Building Elevation Layers

Elective and acute patient streams are separated as shown in Figure 10.

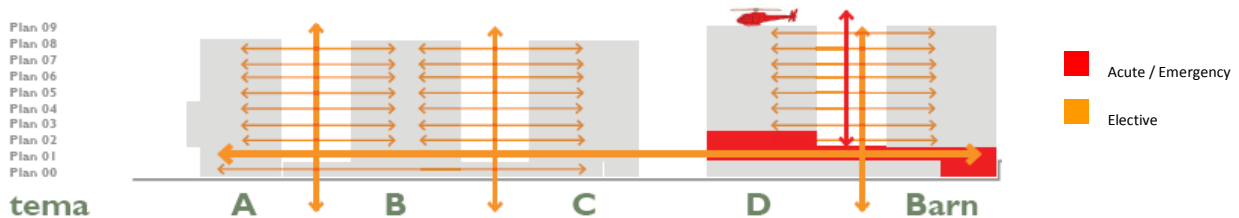


Figure 10. Separation of Elective and Acute Patient Streams

Acute care is operated 24/7, 365 days of the year. Therefore there was a need to concentrate “the Night Hospital” as shown in Figure 11.



Figure 11. Separation of the Night and Day Hospital

The building has also been designed around transport pathways for the staff and in bed transportation for patients. Specific transportation routes have been designed for trauma, stroke, acute heart and extracorporeal membrane oxygenation (ECMO) from acute emergency entrances and between Intensive Care and other diagnostic and imaging suits (such as X-ray). These routes are considerably different from those on the previous site that sometimes required patients to be transported 1.5 km from A&E. The design also incorporates flexibility in the positioning of the ground floor equipment and heavy technologies. With regards to departmental adjacencies, Neuro or Intensive Care and Cardio were designed to be close to Imaging. Trauma was organised for patient arrival by ambulance and air. An important distinction was made between wet and dry labs, because hygiene and cleaning are different for these. Within wet areas this can be 2 hourly cleaning, while for dry areas this can be 2 weekly. Research was carried out on the movement of staff by Chalmers University.

2.2. Master Planning in the 21st Century: NKS, Huddinge and Södertälje Hospital

Agneta Philipson, Architect and Property Developer, Locum AB.

This presentation concerned Locum’s Property Development Plan (PDP), and it addressed the questions: how can long term sustainable development in hospital facilities be achieved within the Stockholm County Council area, and what tools are available? It provided two case study examples: Karolinska University Hospital in Huddinge (the largest hospital managed by Locum) and Södertälje hospital - one of the smaller emergency care hospitals under Locum’s care.

Property Development Plans (PDP) are a means to achieve long-term overall strategy for the continued development of the hospital complex, guidelines for future changes and analysis of the possibilities and limitations of the hospital property. As such they should incorporate:

- Adaptability – ability to change layout, function and volume overtime - based on healthcare needs.
- Long-term effective structure – a structure with optimal conditions for communications, flows and functions.
- Efficient premises – premises that support and streamline care pathways.
- Design – strengthen the image of the hospital as a Medical Science Centre with specialised health care and integrated research and education.

In order to achieve this it was necessary to take a long-term approach (because of the lifespan of the buildings and infrastructure), a holistic approach (to not limit opportunities for other parts to grow), an efficient and general approach (to adapt to constantly changing needs) and a participative approach (to build understanding and embedding).

In a study of Södertälje Hospital in 2009 property analysis was used to understand the existing infrastructure in terms of its long-term suitability for healthcare. It looked at standards, technical infrastructure, adaptability to apply modern standards and a number of other factors. The outcome of the analysis was that only few buildings were suitable for emergency care, and they were in need of major investment (Figure 12). The results of the analysis further showed that there was a need for a high proportion of new construction, and some buildings would be suitable for long-term care once renovated. There was a need to leave or sell a number of unsuitable properties for other purposes. As part of this work, schematic principles, general activities and best working practices were established for wards and outpatient facilities and used to assess existing spaces for their change of potential use. In the following Preliminary Study for Södertälje Hospital a “Null Alternative” was also studied which only included the equipment and remodelling measures needed to achieve a somewhat functional condition. The result of that study showed that the “Null alternative’s” ‘patch and repair’ strategy does meet certain short-term needs, but is not a long-term strategic alternative

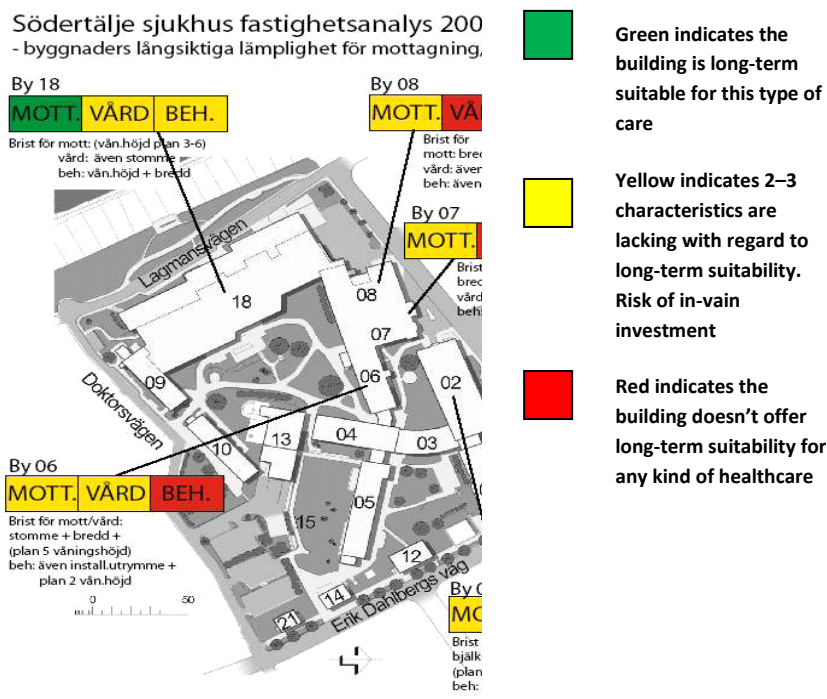


Figure 12. Property Development Traffic Light Plan

The Karolinska University Hospital at Huddinge is the largest hospital Locum manages and is also the other half of the New Karolinska University Hospital in Solna – the future New Karolinska, NKS. In the ongoing Property Development Plan for Karolinska Huddinge (424,000 m², 800 beds and 750,000 outpatients each year) the main goal is to try and reconcile different needs and interest in a long-term solution for the next 20-30 years. With an estimated population increase of 1-2% per year in the whole Stockholm area the need for new hospital beds could rise to roughly 800 beds in a maximum scenario for the Huddinge site. The PDP for Karolinska at Huddinge tries to ensure that the hospital's existent functional structure can be strengthened and developed. Due to the size and number of University Hospital buildings it is vital that there is good communications and separated flows for patients, beds and goods. The PDP goal is a sustainable hospital structure with a high degree of standardisation and generality with premises that support streamlined and cost-effective healthcare. During the next decade, the hospital structure should offer premises where outpatient care can be located on the periphery of the hospital to enable easy access for patients and integration with other services, research and private enterprises. The Property Development Plan for Karolinska Huddinge aims at providing a comprehensive standardised and adaptable structure that will be easy to modify for different needs and scenarios.

2.3. The Concept Program

Anders Lövefors, Architect and Property Developer, Locum AB.

Stockholm County Council and Locum are facing the challenge of developing buildings for emergency care units and operational suites for 3 different hospital sites. The Concept program is a tool used to plan these projects in order to make them successful. This program has been produced in collaboration with representatives from healthcare services and the New Karolinska Solna University Hospital. The key goals of the Concept Program are to develop buildings that:

- support healthcare processes and new logistics solutions
- improve patient security and privacy
- enhance working environment for staff
- have high architectural value

Sustainable concepts have been created for acute care, maternity, surgical, sterilisation and imaging processes areas. Based on these areas, a shell and core building has been created which includes general requirements concerning design, functionality and long term strategies. The Concept Program focuses on standardisation of processes, solutions and supporting functions. In order to deliver safer and more efficient healthcare, buildings require a high level of internal flexibility, activities to run and minimal disruption along with good linkage between activities. The following diagram (Figure 13) depicts the lifespan concept in which various parts of the building are divided according to the life cycle of individual elements. The longest lifespan of over 100 years is linked to the community; for example, access roads. Other elements with long lifespan, which also impose restrictions on the building, include facades, load bearing frames, lifts, stairs, and shafts. The third element of the building is that which is linked to activities with the shortest lifespan; for example, partition walls, suspended ceilings, installations and equipment. The Concept Program for shell and core building focuses on the elements with a longer lifespan.

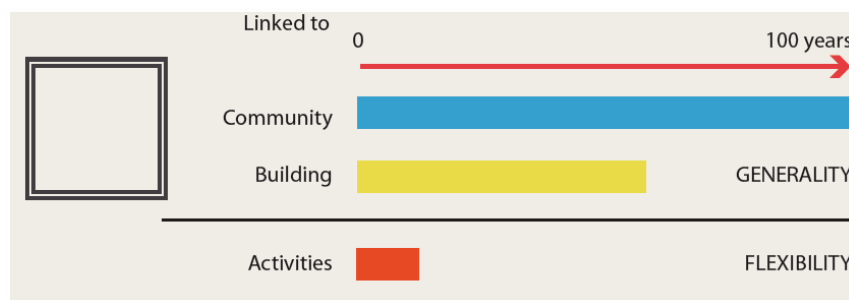


Figure 13. Lifespan Concept (Derived from illustration from White architects)

Buildings have to adapt to changing activities. There are two main schools of thought concerning healthcare facility building programmes:

- Let the prevailing demands of activities dictate the dimensions of the building.
- Aim for general properties that will allow space for unknown future technical or functional requirements.

From past experience, it can be seen that, over time, a series of disruptive conversions will take place in a healthcare building, and the need for a new building often arises before the old one is written off. Furthermore, when some activities are forced to move the linkage to other parts of the hospital is broken. Throughout this period (can be decades) the functionality is decreased. The Concept Programme is in part an attempt to mitigate these disruptions, by careful consideration of:

- General goals
- General design of building
- Design of frame and choice of module
- Design of installations
- Conversion
- Adaptation to existing conditions
- Engineering standards for construction building
- Installation

An example of these general properties is that the strategy for future conversion is included in the initial planning phase. Conversion issues inside and around the building, including conversion scenarios for converting the whole building or parts of it, planning for lifting of heavy medical equipment, and minimisation of disruptive effects of a conversion on adjacent buildings, are included in the strategy.

Figure 14 depicts the interpretation of the concept program. The requirements can be solved in alternative ways in new builds relative to those illustrated in the concept program. In concrete construction project, it is easier to see what solutions are best compared to the price, performance and risk.

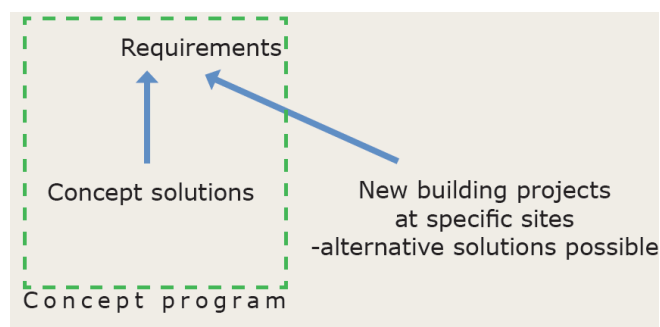


Figure 14. Concept Programme

The Concept Programme has been applied at the Södersjukhuset hospital, where it has contributed to a proposal that more likely will deliver efficient healthcare, with increased customer benefit and lower costs for the property owners.

2.4. One New Hospital per Decade: Is there a Swedish Way? A History of Planning Health Facilities

Anna Montgomery, White Architects, Sweden

This presentation described the Swedish tradition of standardisation approaches and provided examples of master plans from Sweden. The speaker also provided a brief background to White Architects, who are one of Scandinavia's leading architectural firms with 500 employees in Sweden and Denmark. 15-20% of their market share has always been in healthcare projects. Their expertise includes urban planning, landscaping, interior- and product design, project and environmental management and restoration. Anna Montgomery further explained the knowledge building exercises that function as a very active platform to explore innovative ideas sometimes in-house but more often with clients and users. They are currently engaged with Forum for Healthcare Building Research (Chalmers), Swecare, UIA-PHG (International Union of Architects - Public Health Group), and Sustainable Hospitals.

She also discussed the standardisation approaches in Sweden along with the social model responsible for it. SPRI were the older standards that were based on centralisation and decision making. These standards dealt with technical issues, disposition and details of room modules etc. In 1990, the decision making was decentralised to the county councils and SPRI was not adopted anymore. A new project 'konceptprogram' has been set up in Stockholm county council to revive some ideals from the 70's and resume a standardisation approach. She provided the following examples of Master Plans in Sweden.

By way of an example the University Hospital of Umea Master Plan combines research and education, healthcare and areas for development. The following Master Plan (Figure 15) depicts the relation to the surroundings, entrances and areas for development (light green squares). The main healthcare buildings are retained within this project. New buildings under construction include departments for paediatric, women's and children's care and cancer treatment and neonatal care.

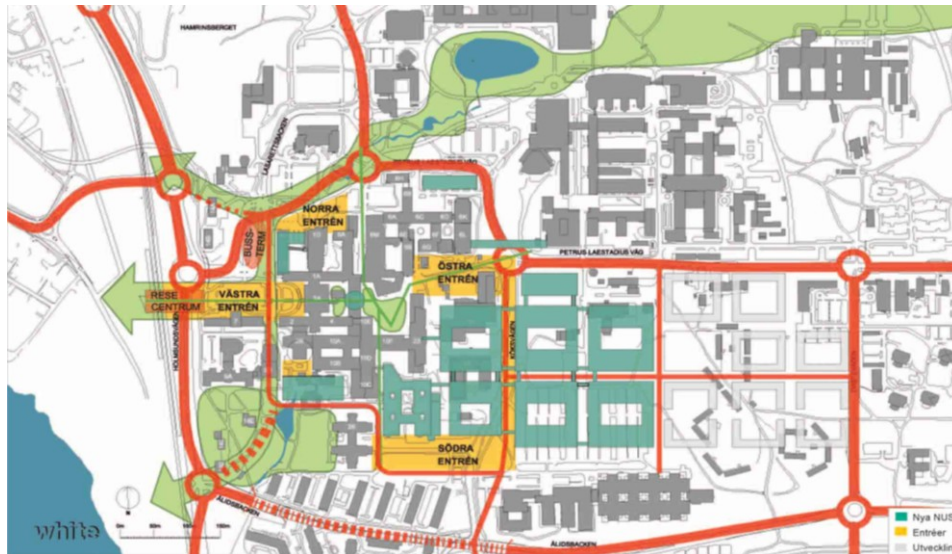
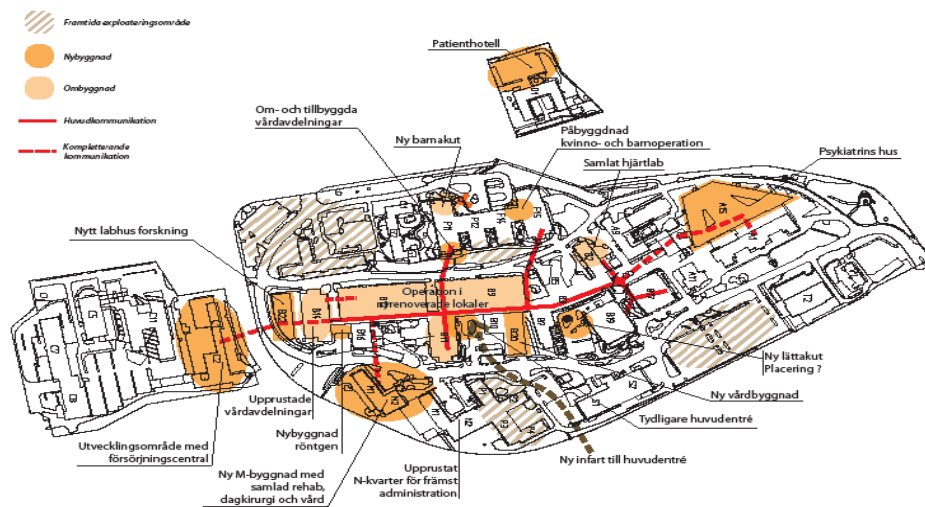


Figure 15. University Hospital of Umea Master Plan

In the following Uppsala University Hospital Master Plan (Figure 16) the light yellow parts depict areas of continuous improvements and dark yellow for areas of new buildings. The main logistics and flows are retained within the plan. A new psychiatry block is under construction, designed by Tengbom architects.



Akademiska sjukhuset Lokalförslingsplan december 2008 version 1 25

Figure 16. Uppsala University Hospital

In this Linköping University Hospital Master Plan they identified four levels of durability (Figure 17). These included: demolition as soon as possible to utilisation of buildings for at least 20 years with continuous improvement.



Figure 17. University Hospital in Linköping Master Plan

Examples of Southern Alvsborg hospital, Sahlgrenska University hospital and Skane University Hospital were also provided.

Sweden has gone through a 20 year period of healthcare decentralisation. As such responsibility for construction has been at a county level and many counties have focused on maintaining existing estates, few have been engaged in new department or block building but there have been no significant new build projects other than Karolinska. Over this period however many counties have been developing master plans, many of which are now seeking approval. At this stage there is a huge need for new investment and a new generation of hospitals and period of extensive reconstruction is likely. However there is no national institution or department that can oversee and regulate such a large scale structural change. This possibility for upcoming practical end economical problem highlights the need for coordination and the need for a centralised regulatory or building commissioning authority. The importance of research networks and knowledge management in order to develop new lean healthcare and better decision making was seen as vital in moving forward.

2.5. Decision Support for Hospital Reconfiguration: New Guidelines and Tools

Marte Lauvsnes, Senior Health Advisor, SINTEF Health Research, Norway

This presentation described the challenges for hospital planning in Norway along with the tools and guidelines currently used within hospital planning. At present, in Norway there are very few big hospital projects (Akershus University Hospital, St Olav's Hospital, Rikshospitalet University Hospital, New Østfold hospital). The current planning process tends to focus on building projects. However, there has been a growing need to look at "everyday hospitals" i.e. old hospitals that require refurbishment and reconstruction. She described this as

“continuous processes” which take place within the built environment and require continuous planning for minor add-ons in projects and for changes in healthcare delivery between various specialities.

New technology and medical developments, changes in inpatient, outpatient activities, introduction of new regulations (food delivery, infections, and carbon emission reduction), workforce and political demands are all drivers for changes in healthcare systems. Building adaptability has to meet the challenges set by activity demands, and the key issue is to determine construction changes to meet these demands. It is imperative to think about a strategy to deal with this change. Traditionally, there have been systematic guidelines for the up-front planning process, which deals with strategic, conceptual and design phases along with decision making. These have been developed by the Competence Network for Hospital Planning and adopted by all regional health authorities. There are guidelines for master plan development and cost calculation but there is a lack of thinking about the “continuous processes”. There is a need to develop and change this guidance for smaller projects.

There are a number of tools for activity and capacity analysis:

- Space classification system- to measure space capacity, productivity and utilisation; and for comparison between units and hospitals
- Care pathway tool- taking account of future capacity and space demands; extrapolating activity, calculating and mapping capacity and space
- Flow diagrams and illustrations

All existing hospitals in Norway are classified through the same space classification system which compares space utilisation and productivity and is developed by the Competence Network for Hospital planning. They have been working with a care pathway model (described by patient processes) within a trust that is undergoing reconfiguration to see how activity and capacity can change needs. It is also trying to answer questions: how should flexibility be incorporated within a new building to manage change? How to reconfigure an old hospital within a new hospital?

Basis Model for calculating and dimensioning a hospital (based on area and space standards) is shown below (See Figure 18).

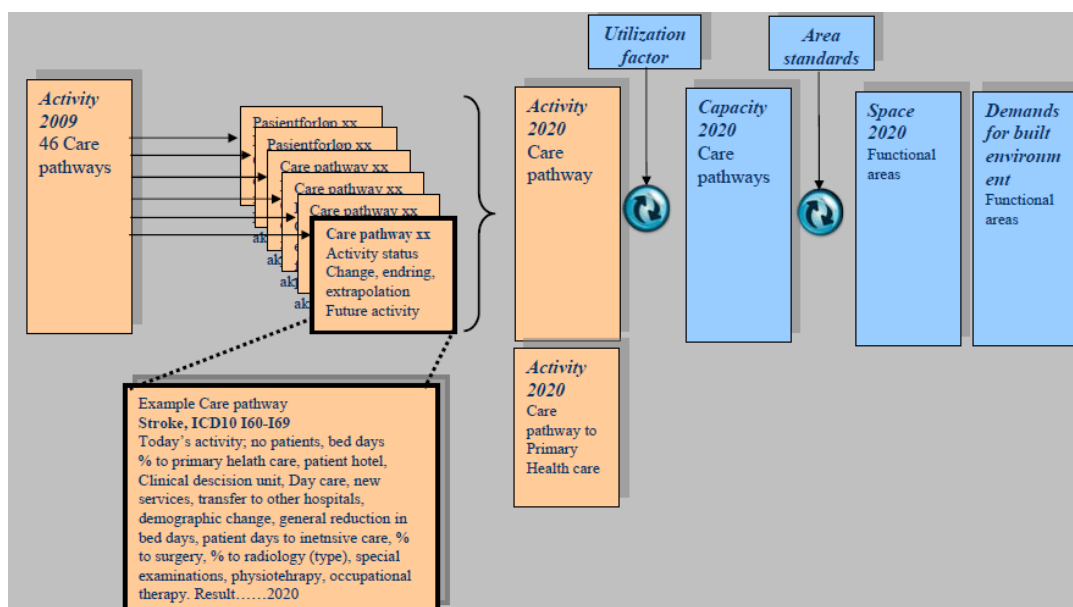


Figure 18. Hospital Dimensioning Calculation

Care pathways are determined based on activity and capacity calculations. So far the trend has been for vertical thinking but this has changed to horizontal thinking. The speaker further provided a brief demonstration of the tool. Furthermore, she described an innovation project financed by Innovation Norway and the Health Directorate for mapping demands for planning methods and tools for reconfiguration of hospitals. This project aims to connect existing everyday planning tools to enhance the decision process through visualisation (of alternative solutions) and communication (between various stakeholders).

2.6. Innovation in Healthcare Infrastructure Planning in Italian Regions – Tools and Methods

Dr Gianluca Ghiselli, Asti Azienda Sanitaria Locale, Asti, Italy

Dr Gianluca Ghiselli provided a background to the Italian healthcare system, in which primary care is traditionally available from 08.00 – 20.00 during the week, with no cover over the weekend. He further presented a case study of Cardinal Massaia Hospital, a middle sized Italian hospital in Asti which has a density of 144/km². The hospital has about 600 beds and the emergency room receives around 61,000 patients per year. This hospital has a central square dedicated to non-hospital activity and has proved to be a useful connection between hospital and the town (Figure 19). It also has a range of additional specialities, which patients can visit without prior booking. He further explained the concept of health houses, where GPs work with hospital's specialist and patients have access to laboratory tests (including X-rays), in other words the hospital move to the people instead of the other way round. He also introduced the Project, Economy and Health (P.E.H.) programme which started in 2008 and targets to prevent diseases and provide healthier living through lesser health facilities. He expressed the need for healthcare facility to catalyse some social and economic aspects with a large impact locally with possible improvement in health and economy. The three steps of development in this programme include:

- Start "2Q" programme (Daily Quality, Qualità Quotidiana in Italian): The main objective is to develop short supply chain by using local fresh food. This enables to stimulate local economy along with improvement of environmental conditions due to less use of transport and shorter journey times. This has further reduced the consumption of frozen food within the hospital.
- Weak people rehabilitation (drugs and alcohol patients): This short supply chain was utilised to introduce rehabilitation patients to a work environment (production of jams, taking care of animals etc). This worked as social therapy for the patients. A dedicated area was identified in front of Asti Hospital for this purpose.
- Optimise energy consumption in Asti Hospital and all medical facilities: This step is an essential part of an E.C. project called "Europa 2020" dedicated to facilitate renewable energy, energy saving and reduction in polluting substances.

Since June 2007 this hospital has also signed an agreement with the Regional Government for 'Research in Innovative and Renewable energy sources'. This was initiated by the introduction of a hydrogen continuity power supply dedicated to an emergency room. Other means included:

- Energy saving by means of biomass (wood) co-power supply installation and modification on refrigerant system
- Connection of the two hospital's buildings to the above mentioned co-power

As part of optimising the energy consumption in Asti Hospital renewable fuel became part of the 'short supply chain' as sunflowers (or short rotation forestry), rape or wood waste (bio-oil) or biogas from anaerobic fermentation of kitchen waste. A number of other projects are also being developed, such as:

- Photovoltaic electric installation
- Solar cell heating system
- Hydrogen UPS (as for the Emergency Room)
- Heat pump as heating system
- Refrigerant system improvement

- Geothermal energy

He concluded by summing up the advantages of short supply food and energy chain. This has helped in reduction of hospitals heat costs. They plan to implement these measures in other hospitals; such as Valle Belbo. He further demonstrated how a hospital can work as a catalyser to promote economic and social activity through events such as debates, art exhibitions, and school meets.



Figure 19. Cardinal Massaia Hospital, Central Square and Relationship to Town

2.7. French Regional Planning: To Build New Hospitals or to Renovate Existing Structures?

Bertrand Bailleul, President, Forum European; CEO, Hospital Saint Jean des Gresillions, Paris, France.

This presentation addressed the link between standards and funding and provided some examples of how these considerations have played out in practical case studies. It also detailed how economic drivers have driven development.

Over the past 10 years France has seen a regular succession of public sector healthcare reforms that have contributed to rapidly changing strategies. In 2002 there was an ambitious investment policy (16 billion Euros) in infrastructure. This paid for 900 projects that renovated or rebuilt some of the 3,000 existing hospitals. The result of this policy was 156 new and refurbished hospitals with improved buildings and introduced new technologies. The procurement of new buildings started quickly and the evaluation of the viability of schemes was not as effective as it could be, with the result that some hospitals which already had problems went further into deficit. Evaluation was also problematic as all schemes started at different times. There was a subsequent programme for investment in technological infrastructure. This policy was for 20 billion Euros. Those healthcare providers that were successful were those who could demonstrate that they had been working together to integrate. A number of examples were discussed along with some of the political drivers that enabled them to obtain funding. Local decisions were made against five key criteria. These included:

- Hospital capacity
- Need for re-organisation and the bringing departments together
- Architectural improvement
- Failure to comply with new regulations (e.g. fire and water)
- High maintenance costs and difficult to maintain systems

Political decisions were made on three other criteria, these included:

- Care priority areas (e.g. reduced cost care pathways, safety)
- Affordability (borrowing capacity, capitalisation, credit rating)
- Political quality (how does the work being carried out help to deliver the aims of the political system?)

2.8. Clinical Space Calculator: How to Move towards Generic Healthcare Spaces and Fit the Facilities to the Activity

Jonathan Millman, Department of Health, Gateway Reviews Estates & Facilities Division, England; Ashley Clough, Parallel Interactive, England

This presentation previewed a new Department of Health (DH) approach for defining the utilisation and capacity needs of new spaces. The objectives of this new tool are to:

- Link baseline space recommendations to the cost of a facility and the activity that it generates; demonstrating the relationship between the cost of a building and the income it generates
- Establishing opportunities for providers of care to drive down costs
- Identifying generic rooms, across specialities, that can be used flexibly and adapt to change

The future intended direction is to:

- Achieve better value through encouraging the use of rooms on a time-separated basis for a range of different activities and the elimination of under-used facilities
- Relate them to the ongoing development of Healthcare Premises Cost Guides (HPCGs) based on UK-industry best practice
- Link space to activity calculations and to graphic room data sheets

The new DH approach to costing will differentiate between public, clinical and staff spaces. Each space within the new example schedules of accommodation is categorised according to its location (or zone) in the department. The three space types correspond to three zones, which are defined as follows:

- Public zone: The zone within the department that contains the reception and waiting area and is accessible to the public.
- Clinical zone: The zone from which the delivery of the departmental function occurs. Most patient/client contact spaces will be located here, as will any clinical and staff support spaces required in the immediate vicinity.
- Staff zone: This zone contains staff support spaces.

The new schedules of accommodation include allowances for engineering, circulation and communication space. Each allowance is expressed as a percentage of the net internal area and when added to the net internal area produces the gross internal area (GIA).

The presentation included a demonstration of the new tool. This allows healthcare planners to determine the capacity and number of rooms within a facility using a number of demand calculating parameters. These include demand calculated against a population / list size / default catchment. Capacity and room numbers are calculated according to whether spaces are designated or shared and their level of utilisation. Then basic occupancy assumptions are added to include: weeks per year, opening hours, number of sessions per day and average length of patient appointment (which can be changed and used to play out what-if scenarios). The existing prototype tool is being trialled using only primary care and maternity data at present. Services have pre-defined generic room types and typical annual access rates. The discussion after the presentation identified a similarity between this approach and work being carried out by SINTEF in Norway. The question of how the system calculates other support spaces as they relate to clinical areas was raised as well as the need to better demonstrate efficiency and effectiveness (that is, the savings that can come from increased utilisation or through the use of shared spaces) along with rigorous testing and local validation of a number of underlying assumptions. There is also a need to explore how the tool could respond to changing clinical technologies.

3. From Planning to Realisation: how to get 'there' from 'here'

3.1. The Ex-Ante Evaluation Methodology in Regional Planning: The Italian Case

Dr. Simona Ganassi Agger, Ing. Daniela Pedrini – Società Italiana dell'Architettura e dell'Ingegneria per la Sanità(SIAIS)

This presentation provided a background to the Italian health system along with the state of health infrastructure and public investment in general. The main challenges for the Italian health system include getting regional health systems to deliver equal quality services in all regions, in order to reduce the gap between north and south of the country. There is a growing need to develop national and regional networks based on highly specialised hospitals. Out of 918 hospitals, 16% are more than a century old, 43% were constructed before World War 2, and only 17% of the hospitals are less than 30 years old. There is a need to invest in infrastructure and to plan local social care and health services based on a high level of home-based care.

The methodology for ex-ante evaluation of regional investment programs has been called MEXA (Methodology of Ex Ante Evaluation), an interactive tool which enables an iterative process of evaluation and also provides guidance (Figure: 20) to the regions in preparing programme documents. MEXA comprises of:

- An explanatory summary
- A Socio-Medical Economic Analysis, consisting of epidemiological, demographic, and social-economic analysis to identify and quantify the need for health services
- A Strategy proposed to meet the identified needs
- Coherence of strategy with EU, national and regional policies
- Expected results (based on a system of indicators) and impact evaluation (social, program value and technology assessment)
- Procedures to plan implementations (management structure and quality of public private partnership, whole life cycle investments) and financial plan, construction and procedural monitoring

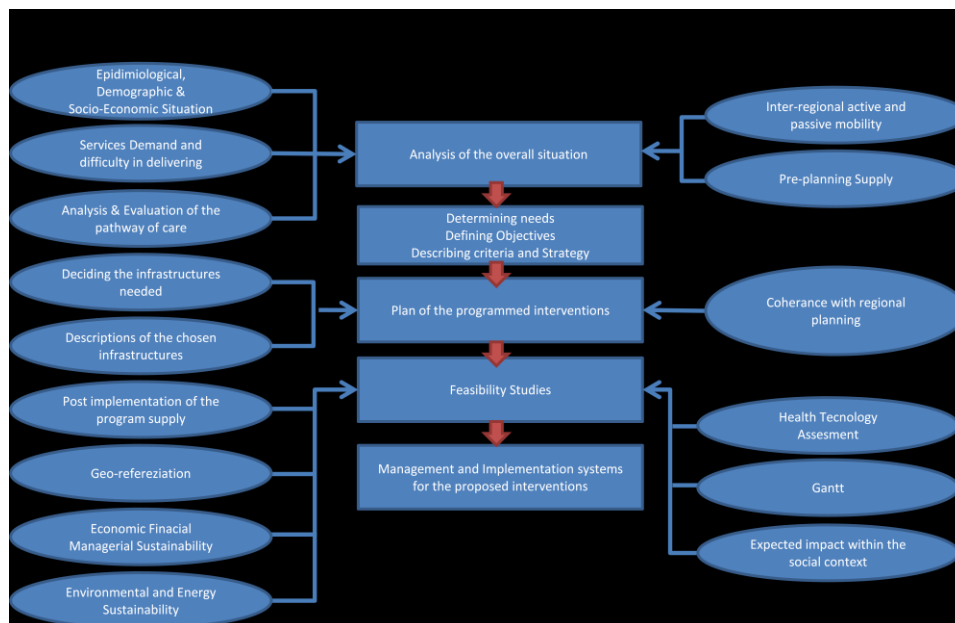


Figure 20. Methodology for Ex-ante Evaluation of Regional Investment

From 2004 to 2008 this methodology was tested in the regions of Abruzzo, Puglia, Calabria and Sardegna, where health infrastructure programs had not been developed. It proved to be useful not only for evaluating plans before implementation but also as a planning tool. Recently ‘Payback Plans’ for the health sector spending have been introduced which are aimed towards economic and financial equilibrium at regional as well as national level. Regions which suffer from a significant health sector deficit have to investigate their most problematic issues and the present their payback plans. MEXA has proved, during the period of its application, to have significant value as it provides a common tool for structured investment planning in a system of healthcare based on regional decentralisation. In future its effectiveness will have to be measured against its ability to evolve with changing health needs within society. The presentation concluded with some brief case studies of new innovative hospitals which included: the Meyer Children’s Hospital in Florence; the Verona University Hospital of Borgo Trento (new surgery complex); the Asti Provincial Hospital (developing its “piazza”); Mestre Venice (the “terraferma” new hospital); and Modena Baggiovara (the hospital structure that represents one of the regional “hubs”).

3.2. The Hospital and its Role in Economic Development

Alan Hennessy, *Architecte-associé Président, bdp groupe6*

This presentation began with a brief introduction to bdp groupe6, who offer comprehensive professional services for the built environment. Bdp groupe6 currently designs 2% of all UK’s new non-residential buildings and are working on 55 hospital sites in France. They also have international projects in over 25 overseas countries and have won over 330 awards. Alan Hennessy further explained the economic impact of hospitals with the help of certain examples; the population of Stockholm is 760,000 (city) and 1,800,00 (county) and the active population constitute 66% of this. Healthcare or social care employs 13% of this active population, only wholesale/transport and financial services employ more people. According to Business Week (Sept. 2006) since 2001 in the US, the healthcare industry has added 1.7 million jobs and is an important element in economic growth, see table below (source: Business Week, 2006).

Sector (In the US)	Million jobs created 2001-2006
Healthcare and related industries	1.7
Construction and real estate-related	0.94
Government except hospitals	0.9
All other Private Sector	1.2

According to the US Census office (2009) the healthcare industry represented 12% of total US workforce in 2006. The healthcare industry consists of companies that are developing and manufacturing drugs, medical supplies, health insurance providers; wholesalers and retailers, health charities and hospitals. The healthcare sector and its employees purchase large amount of goods and services from local businesses. This in turn provides a benefit to the economy and this secondary impact is referred to as the multiplier effect (expressed in employment and economic terms). He further explained the concept with the following example: employment multiplier of 2 indicates that if one job is created by an industry one additional job is created in other sectors due to indirect and induced spending. The other contributor to the multiplier effect is the income, as this sector is labour intensive most of the spending ends up with the workers and this income is then spent locally, contributing to the local economy. The multiplier effect is calculated by considering both these factors. He also presented a comparative analysis of the economic contribution to GSP through healthcare in 2009 for Missouri (\$36,7 bn), Iowa (\$14 bn) and New Hampshire (\$3,7 bn). The healthcare industry also creates other job opportunities apart from related employment. Some economists predict that medical spending may rise to 25% of GDP by 2030. US healthcare's share of jobs could rise to 15-16% of the labour market from the current 12%. It is important to strike a balance with job creation and provide a well balanced economy.

In the example of Clermont Ferrand University Hospital, the primary objective was to draw up development guidelines for Clermont Ferrand's extensive unused industrial land and to provide adequate access to public transport. Bdpgrroupe6 produced a spatial development plan to respond to the social, economic, transport and environmental needs and the development was concentrated around an 800m future tramway line. The economic contribution by extrapolation for this hospital is 5.6% of employment in Clermont Ferrand (population 144,000). This may create 3000 jobs in the future (2010-2020).

3.3. The North Tees Momentum Project: Care Pathway Planning and the Consequences for the Health Estate

Carole Langrick, Deputy Chief Executive/Director of Strategic Development, North Tees and Hartlepool NHS Foundation Trust; Alison Wilson, Director of Health Systems Development, NHS Stockton.

This presentation concerned the exploration and integration of new care pathways with primary and community and acute hospital capital projects. The health status of the population of north Tees is particularly challenging, and long-standing political issues have made it difficult to achieve efficient re-organisation of local health services. The project had managed to go a long way towards a successful outcome because of a highly collaborative programme jointly led by a Foundation Trust and local Primary Care Trusts. This had enabled whole system change, service redesign and care pathway change in anticipation of substantial capital development (Figure 21).

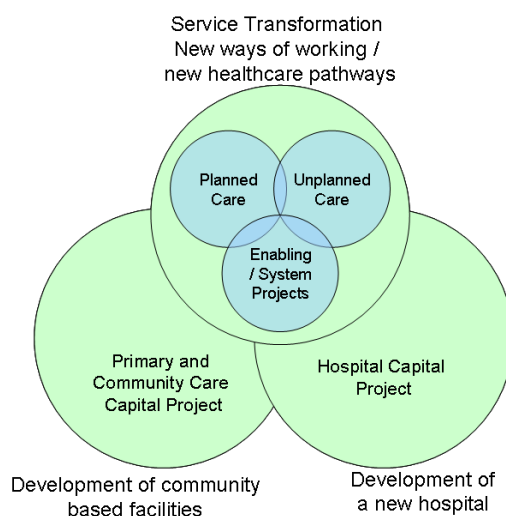


Figure 21. Whole System Change Framework

The Project has proposed a mixed economy of funding – LIFT and Public Dividend Capital and at the time would have been the first scheme of this type to be funded out of Public Dividend Capital for at least 15 years. There were a number of drivers for change, including past experience (past service reviews), the strength of existing strategic planning and partnerships, alignment with the national policy direction, attention to safety and quality, a high aspiration for service improvement, the high priority placed on improving the health and wellbeing of the population and the need for sustainability in service provision. The difficulty in achieving a solution that was acceptable to all parties led to a review by an Independent Reconfiguration Panel (IRP). The IRP made a number of recommendations, which included the need for a: modern new hospital to replace the existing out of date buildings, provided on a new site in a well situated location accessible to the people of Hartlepool, Stockton, Easington and Sedgefield. It also recommended further initiatives to improve the provision of primary and community care, including community midwifery. A community based model was determined, as shown in Figure 22.

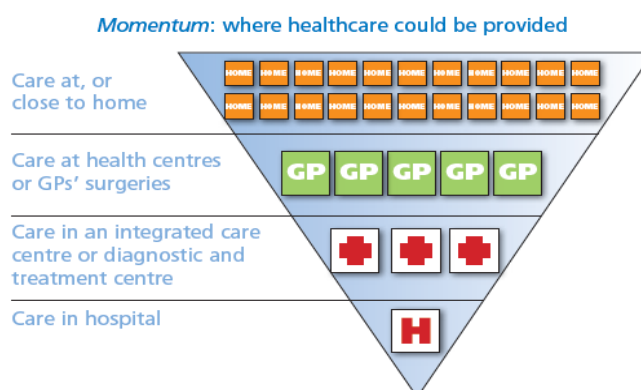


Figure 22. Community Based Model

One key lesson from the Momentum project is the need to align all future service models with the design and build of facilities. Furthermore, the need to undertake major service change clearly requires a sharp focus on change management, a strong emphasis on the financial model and the need to engage people along the way.

3.4. Integrated Infrastructure Planning in UK and Sweden: Two Perspectives on the Context and Tools for Strategic Development

Grant Mills, HaCIRIC, Loughborough University. Phil Astley, Medical Architectural Research Unit, UK. Göran Lindahl, Chalmers University of Technology.

This presentation compared the organisational or project structures, standards and tools, master planning approaches and ongoing research of Sweden and the United Kingdom.

The findings of the comparison of the organisational structure of both countries was that England has an array of estates and facilities project and procurement structures and varying facilities management roles versus those like Locum in Sweden. Broadly speaking the organisational levels were similar; however there seemed to be a difference in the way the two countries re-organised; with Sweden seeing this as an internal business process, whereas in England it might be more politically driven. With regards to standards, guidance and tools; England was seen to have a more centralised approach and relying more on standards. Sweden is seeing the need for greater coordination and has a number of advanced stakeholder participation approaches developing solutions rather than basing them on standards. Both countries may be able to learn from the other taking health care context and societal and political structure into account. A comparison between the master planning approaches used in Sweden versus those used in England was made. Sweden appeared to have a more well defined approach to master planning, which included the long term involvement of a lead architect, a high level of urban planning, the use of design competitions and shared learning (in place of guidance). Three types of infrastructure (care, estates and transport) were described along with a new research project that is investigating the integration of these. See Figure 23.

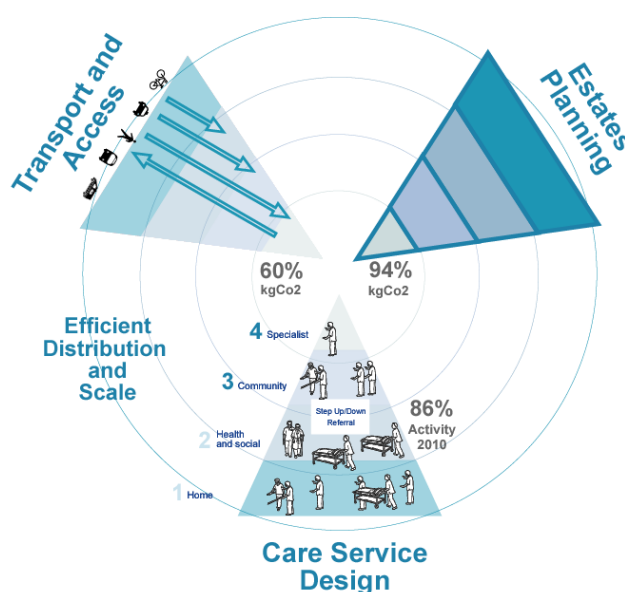


Figure 23. Integrated Healthcare Infrastructure

This work also explored the need to understand care model scenarios against each care pathway, as shown in Figure 24.

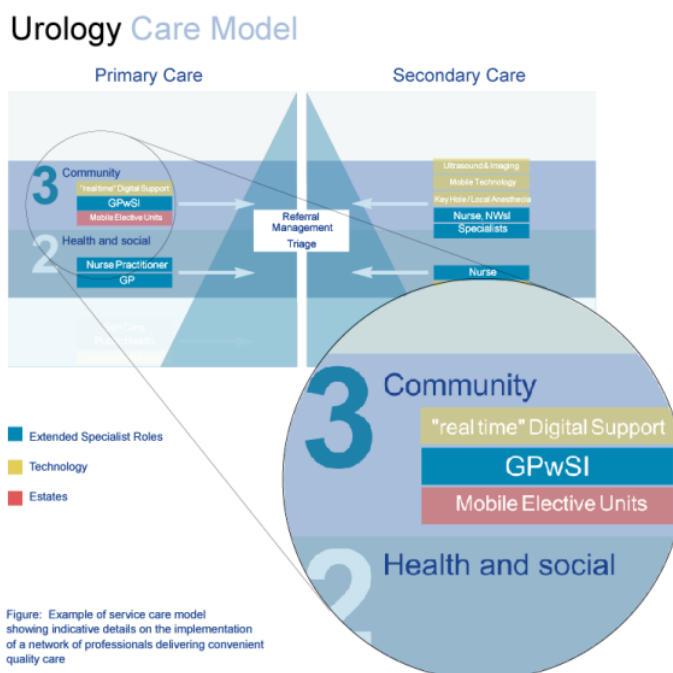


Figure 24. Urology Example Care Model Hierarchy of Infrastructure

The master planning approaches taken towards acute and primary care were compared using three example projects: Örebro, Cambridge and Finchley Memorial Hospital. This demonstrated the importance and the need for an understanding of scenarios that can change over various timescales.

Recommendations were made for: clearer estates and facilities competencies, a definition of the role quality standards play versus locally defined stakeholder engagement, the need for open scenario planning approaches that facilitate the discussion of scale and distribution and an integrated European approach to research and development.

3.5. Bringing Capital into the Equation: Building a Health System where Capital Goes with the Diagnosis

Rhonda Kerr, Rhonda Kerr and Associates, Australia.

In the Australian healthcare system capital for healthcare has traditionally been assessed with reference to institutions and their requirements to provide a range of services for patient treatment and care. Expenditure for capital in healthcare has been set separately from recurrent expenditure and, after the initial investment, has been seen as a free component of healthcare delivery, until repairs or maintenance or replacement was required. Healthcare facilities are largely seen as assets with very long life spans. Reforms in hospital service funding proposed are for the capital to be attached to individual patient funding based on diagnosis groups.

Capital along with labour and consumables is one of the significant inputs to healthcare yet has been undervalued as a driver of major change and tool for reform. Traditionally budgets for capital have been determined by the fiscal conditions at the time. This approach has become increasingly problematic and has impacted on the efficiency and effectiveness of the health service delivery system². The competition for capital

² Garling Report, (2008) Final Report of the Special Commission of Inquiry into Acute Care Services in NSW Public Hospitals, Commissioner Peter Garling SC. Available at: <http://healthactionplan.nsw.gov.au/garling-report.php>.

disenfranchised less attractive services such as mental health, aged care, rehabilitation services and sub-acute care. The overall connectedness of ICU, theatres and emergency departments to acute beds and outpatients services were also lost in this process leading to blockages and imbalances. Oddly, healthcare capital investment is not been seen as a driver for higher productivity, unlike private industry which prioritises capital investment on a Return on Investment (ROI) basis.

The National Health and Hospitals Review Commission³ lead by Dr Christine Bennett after nearly two years of consultation, found the case for health reform was compelling, that the system was too fragmented and that there were issues with respect to access and health outcomes. The Review set a blue-print for creating an agile and self improving health system with long term financial sustainability. A key element of the reform package was funding hospital services, including outpatient and emergency department services, by diagnosis related group or activity based funding. For the first time this funding will include a realistic cost for capital per patient episode. Capital is usually defined as buildings and major equipment but now needs to also include information management systems.

Healthcare in Australia costs close to \$125 billion US dollars per annum, and employs 7.3% of the workforce⁴. The average Australians life expectancy is high at 81 years and most health outcomes are in the higher levels when compared internationally⁵. However aboriginal populations have lower than average life expectancy, higher infant mortality, significant chronic disease, higher trauma rates and poorer health outcomes. All Australians have access to the 768 free public hospitals which treat 4.7 million patients per annum⁶. Last financial year it was estimated that AUS \$53 billion was invested in capital for healthcare, or 5.6% of all health expenditure. Federal and state governments fund nearly 70% of all health expenditure, individuals pay for 17% and the remainder is funded through insurance⁷. One of the primary objectives of health reform in Australia has been to keep healthcare costs below 10% of GDP, and to minimise financial burdens on the individuals and government as the population ages. The NH&HRC Review⁸ and the Productivity Commission Research Report⁹ have both sought to create a new funding system for sustainable healthcare. Finding the right capital price is a part of the process. The Productivity Commission has two options for capital cost by DRG. The first is the user cost of capital¹⁰ and the second is based on a multivariate analysis¹¹.

However, there is a need for capital and life cycle costs and costs that are allocated around the patient, rather than the cost of existing capital replacement. Appropriately priced DRGs integrate hotel services, circulation,

³ Commonwealth of Australia, (2009) A Healthier Future for all Australians- Final Report of the National Health and Hospitals Reform Commission, Canberra, pg 47.

⁴ Australian Institute of Health and Welfare, (2008) Australia's Health, AIHW, Canberra, pg 433ff. Available at: <http://www.aihw.gov.au/publications/index.cfm/title/10585>.

⁵ Commonwealth of Australia, (2009) A Healthier Future for all Australians- Final Report of the National Health and Hospitals Reform Commission, Canberra, pg 47.

⁶ Productivity Commission, (2009) *Public and Private Hospitals*, Research Report, Commonwealth of Australia, Canberra, Overview pg xxv. Available at: <http://www.pc.gov.au/projects/study/hospitals/report>.

⁷ Australian Institute of Health and Welfare, (2008) Australia's Health, AIHW, Canberra, pg 400. Available at: <http://www.aihw.gov.au/publications/index.cfm/title/10585>.

⁸ A Healthier Future for all Australians, (2009) Final Report of the National Health and Hospitals Reform Commission, Commonwealth of Australia, Canberra.

⁹ Productivity Commission, (2009) *Public and Private Hospitals*, Research Report, Commonwealth of Australia, Canberra, Overview pg xxv. Available at: <http://www.pc.gov.au/projects/study/hospitals/report>.

¹⁰ Productivity Commission, (2009) *Public and Private Hospitals*, Research Report, Commonwealth of Australia, Canberra, Overview pg 300. Available at: <http://www.pc.gov.au/projects/study/hospitals/report>.

¹¹ Productivity Commission, (2010) *Public and Private Hospitals: Multivariate Analysis*, Supplement to Research Report. Available at: <http://www.pc.gov.au/projects/study/hospitals/supplement>.

diagnostic and administrative functions as well as teaching and research. It is expected that costs for capital will be calculated for the full range of capital used by the patients for the treatment regime including wards, outpatients' areas and theatre and imaging suits. DRG payments also include clinical costs, imaging, theatres, pathology, pharmacy, ICU and hotel costs within a hospital. Allocating costs around the patient better ensures that capacity matches demand and accelerates the process of improvement. When capital travels with the patient the system has a conduit for change. Capital can be transforming when it is allocated as a payment. When Capital is calculated using best practice benchmarks it is possible to flag appropriate investment responses to subtle variations in practice. The capital link to best practice and admitted patients then builds the case for future investment patterns at either higher or lower acuity care settings.

This shift to move to funding healthcare systems on the basis of outcomes rather than inputs ensures payment for success and incentives and reduces the risk of system failure. Further this system may readdress some of the imbalances in the systems, which seem to benefit less complex care pathways. Rather than the current system of unpaid overhead costs, capital by DRG permits an appropriate combination of capital resources to be allocated for DRGs associated with case complexity and multiple diagnoses. Capital calculated for these patient groups can promote better integration of services and use of substitution technologies sometimes as alternatives to higher cost clinical interventions. Future research is being undertaken to identify capital costs and develop investment strategies with a mix of IT, equipment and building infrastructure for each DRG.

3.6. Design Dialogues: A Collaborative Method for Design Driven Innovation and Specification in Front End Planning

Professor Peter Frost, Chalmers University of Technology, Sweden

The key challenges in healthcare are to better capture and describe client and user needs in a complex environment and to support change and organisational innovation through facility planning. A planning process is needed where visions, requirements and spatial solutions can develop in parallel. There is a growing need to create dynamic tools for variable planning objectives; along with creating new forms of interaction in variable, team-based design processes in which multi professional teams (patients), client, builders and experts all work together.

Professor Peter Frost described Design Dialogues, a research developed collaborative design method which can be used in the early phases of building projects and has been applied in 50 consultancy projects in various fields. Design Dialogues are planned as a carefully structured process with clear purpose, content and expected results in each step. The work is carried out in a number of workshops in which various activities and discussions are included in order to build knowledge and develop ideas. At the workshops, different tools such as photo, video, game design and interactive computer tools are used to support dialogue. The architect documents and interprets the comments and suggestions from the workshop groups. Based on documentation, sketches and visualisations are developed, which form the basis for next steps. Proposals develop gradually with varying level of detail and are successively incorporated into the ongoing dialogue. An initial workshop is conducted with the project's steering group before the work commences in order to define the goals, objectives of the project along with identifying key issues, governance and design issues and setting priorities. The expected results are determined along with future plans. The following methodology is adopted:

Workshop 1: Formulate qualities and flows - The first workshop often starts with a short video or photo documentation of the existing premises; and participants comment upon them. This creates a gross list of

problems and opportunities. Following this, the group works with building relationships and flows with the help of "quality images" and images from the video.

Workshop 2: Design Games - In order to stimulate innovation and new approaches, inspirational material with examples from other similar projects, are often used. A "design game" is conducted where the task is to build a conceptual disposition proposal of an ideal future with their main functions, flows and need for connections.

Workshop 3: Evaluate alternatives - In this workshop, the architects visualise two alternative layout sketches based on results of workshop 1 and 2. If necessary, the options are illustrated using simple digital 3D models where one can walk around the premises and see the spatial consequences of various options. The participants discuss, evaluate and consider the alternative layout sketches.

Workshop 4: Scenario and reconciliation - The layout sketches have been reconciled and processed into a synthesis proposal before this workshop commences. A good tool to evaluate complex layouts is scenario techniques. With the help of statistics and experience the participants prepare a business scenario of an "average day" or "worst case". The work processes and flows are described in detail within the synthesis proposal.

Professor Frost provided examples of projects in: ESS (European Spallation Source) Lund, Södersjukhuset Stockholm Operating theatre + Emergency department, New Karolinska Solna (to develop programs and conceptual block layouts for functions and flows) and Designing a Couplet Care level III NICU (using Developmental Care and Design Dialogue). He further described an example where this methodology was applied. Workshop 1 consisted of multi-disciplinary teams of doctors, nurses and managers to decide which services can be retained and what changes were required within the units. Conceptual proposals were developed based on initial findings. A workshop was also conducted with 8 parents of a total of 6 premature infants treated in neonatal ICU during the period 2007-2010 and with a representative from the Parents Association. Some participants also had experience from neonatal ICU at Karolinska Solna, Uppsala, and Lund. A synthesis layout was generated based on the workshops along with a walk through. The various layout scenarios were evaluated with the participants and a revised layout was created based on their input.

Professor Frost described Design Dialogue as part of the programming work for a collaborative design process with multi professional teams working together. It is not a project management method. This approach differs from other approaches as it based on design research and participatory design methodology and is integrated on a big scale within a planning process. It promises to be more engaging, innovative, fast and stable than traditional methods to develop organisational and business needs. He suggested in terms of future development to merge standardised interactive multi-professional processes and standard rooms or units based on Evidence Based Design. He concluded the session by introducing the recently established Research Centre for Healthcare Architecture at Chalmers University.

4. Challenges and Opportunities in planning and delivering the health estate

4.1. How Healthcare Infrastructure can and should contribute to making a better civil society

Jonathan Erksine, Executive Director, European Health Property Network

Mr. Erksine introduced the session with a brief overview of the previous sessions and also highlighted the importance of making information from such workshops more accessible. Excellence in clinical and medical research and education is a key driver for high quality patient services. Case studies within Europe are important for planning and designing; and collaboration across institutions is imperative for being at the forefront of medical advancement. The planning and delivery of the healthcare estate is influenced by various organisational, political, financial and environmental factors. There is an underlying need to depict best practice in terms of design solutions, evidence of links between service models and the built environment and the assessment of effectiveness of strategic planning. Environmental factors are increasingly important and there is a drive to reduce carbon emissions in all areas including healthcare. EuHPN is also a partner in the Low Carbon Building project.

4.2. Barriers to Innovation in Public Sector Procurement - the Case of Low Carbon Healthcare Buildings

The Low Carbon Building (LCB) Healthcare Project Team: Angus Hunter

The speaker described the challenges that arise from increasing climate change targets and the consequential impact on health and well being. The current EU commitment is to reduce carbon emissions by 20% by 2020. As the healthcare sector owns and operates energy intensive facilities, energy and carbon will become more expensive in the future. The existing facilities and services cannot deliver the scale or pace of change required. New healthcare buildings need to be future proof and the existing buildings and facilities need to be adaptable. Innovative solutions are important to deliver these changes, but such innovations are generally slow to be adopted. Various barriers to innovation have already been identified: in some cases the solutions just don't exist in the market, or if they do, they are inadequate, unacceptable or expensive. One of the main barriers to innovation is market failure; which includes lack of credible articulated demand, and lack of knowledge in purchasing and driving innovation. Despite initial aspirations, projects often do not incorporate innovative design solutions in the actual build and there is a notion that innovation is always expensive.

A proactive intervention is necessary to deal with these challenges, as the industry cannot be reliant only on the market to deliver the relevant changes. The Lead Market Initiative (LMI) tool was developed to bring innovative solutions to the market, in addition, the innovation policy initiative was launched in 2008, where EU Member States, companies, NGOs, other stakeholders and the European Commission are working together to reduce time-to-market of new products and services. Their focus is on six key sectors: sustainable construction, protective textiles, bio-based products, recycling, e-Health and renewable energy. As part of this programme, the Low Carbon Building-Healthcare project was recently launched. It is a three year, EC funded project (2010-12), and is one of three LMI Public Procurement Networks. It has 6 partners across 4 countries:

- Department for Business Innovation and Skills (UK)
- European Health Property Network (EuHPN)
- Dutch Centre for Health Assets (Netherlands)
- Directorate for Health Affairs (Norway)
- Rawicz Hospital (Poland)
- Department of Health (UK)

Their aim is to develop a European procurement network and to review current practice. There is also a plan to undertake demonstrator pilots, to encourage sharing of good practice and mutual learning along with disseminating lessons learnt. These pilots include the following case studies:

Netherlands: Erasmus Medical Centre, Rotterdam (new 185,000m² hospital). Aim to reduce energy consumption by 30%.

Norway: Builds on Norwegian Network for Low Energy Buildings. In dialogue with several hospitals in Norway.

Poland: Rawicz Hospital, 10,000m² to meet new standards by 2012.

UK: Builds on Forward Commitment Procurement programme in health sector (ultra efficient lighting); in dialogue with several NHS Trusts in England (more complex projects – FCP Plus). The following diagram (Figure 25) depicts the benefits of this program.

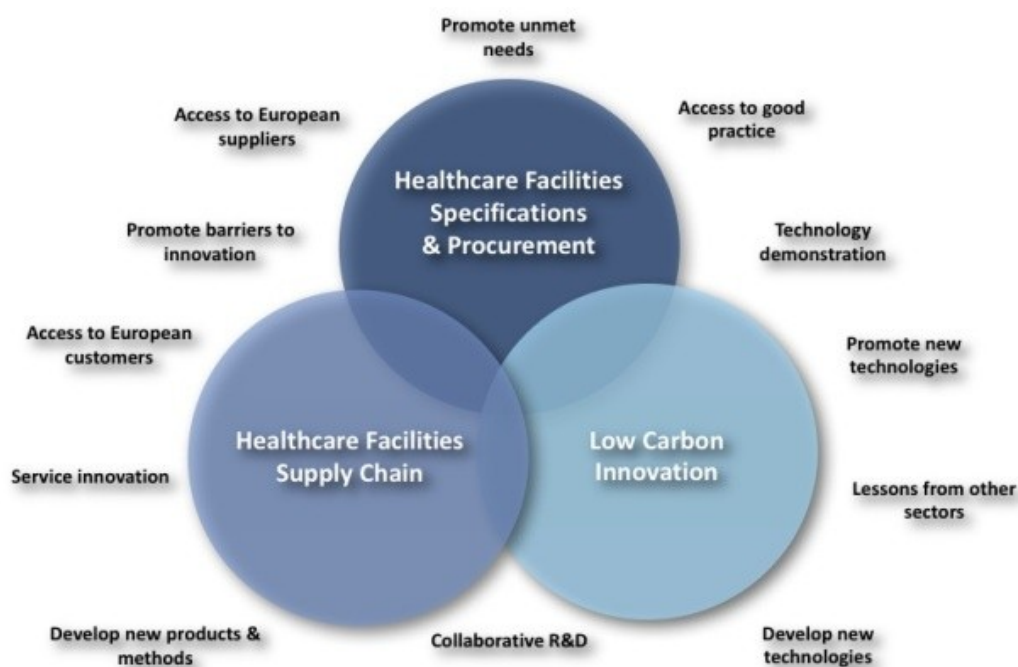


Figure 25. Programme Benefits

This program aims to benefit from mutual learning and encourages rapid spread of best practice in order to promote global leadership and growth of European LCB Healthcare industries.

4.3. The Adverse Effects of the Absence of Return on Investment (ROI) Calculations in the Public Sector in General and Healthcare in Particular

Dr Arne Bjornberg, Chief Operating Officer, Health Consumer Powerhouse

The healthcare industry contributes to about 9% of the GDP in many European countries, but it is not a capital intensive industry. Traditionally investments in healthcare are determined based on "affordability" rather than

thinking about consequences of disinvestment. Dr. Bjornberg put forth the question of whether capital investments in healthcare can be profitable in traditional ROI terms. He explained the importance of investing in e-health as it improves patient safety, and increases patient empowerment, choice, self-management and communication. It also serves as a support tool for clinical research and delivers better care in a shorter time with better outcomes at a lower cost, along with a saving potential in healthcare budgets. E-health allows information about the patients to be accessible to health professionals when required, thus enabling care to be organised around the patient and not around institutions. On average, the value added time due to this is around 3-10% of the total time. The potential gains in time and the improvement from the patient's point of view are shown in the following Figure 26.

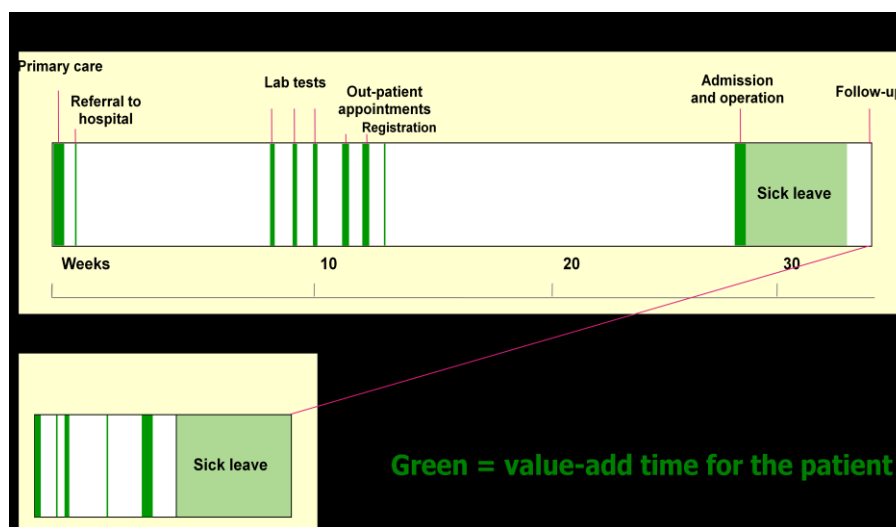


Figure 26. Improvements in Patient Care Pathway

One of the main problems in the healthcare industry is that an IT investment postponed or not made is often considered as a cost saving. The potentially huge return on IT investment is seldom recognised. He further pointed out that there have been large differences in capital investment strategies for hospital equipments in various countries. Furthermore, there is also a significant difference in treatment results and the two are seldom co-related. There is a tendency for healthcare providers to supply all the hospitals or clinics with the desired equipment. This was highlighted by the following example: in Bremerhaven, which has a population of 120,000, three general hospitals wanted to start a women's clinic in 2006 and all three were unfortunately successful in achieving this (an expensive solution which hindered the creation of a center of excellence). Planners often do not take into account rent and depreciation and the effect of compensation by higher revenue and lower operating costs. He concluded the session by highlighting the shortage of conventional management skills in the public sector and the need to learn more from the management of businesses. He proposed if healthcare was run like a business venture, it may be more efficient.

4.4. Rebalancing Care Infrastructure in Hungary: Barriers to Success

Dr Miklos Szocska, Director, Health Service Management Training Centre, Semmelweis University, Budapest

Hungary has an insurance based health system which is gradually moving towards a tax based system. The ageing index has grown rapidly from 64.5% to 109.9% from 1990 to 2009. Public spending in Hungary is 4.3% which is much less than the EU average of 6.76%, which has subsequently led to a big gap in population health status, compared with a number of other European countries. In Hungary, major problems arise from non-transparent budget setting, with inefficient spending. The healthcare delivery system is over centralised and does not respond to the changing needs of the population. There are a number of emerging geographical and

professional inequities due to political influence of resource allocation. The centrally controlled payment system has been inefficient, and is further burdened by the existence of informal systems, coupled with inadequate managerial capacity. Healthcare workers are largely dissatisfied with deteriorating working conditions, low salaries, and decreasing prestige of their professions.

Strategic fund projects have a good potential for development in the Hungarian healthcare sector as these focus on system efficiency gains rather than health gains. Such development resources are more suitable in times of budget deficit consolidation or fiscal crisis. The development and implementation of a sustainable health care reform takes time and commitment. Since 1990 Hungary has had 12 health ministers, frequent changes in political direction, and consequential disruptions in the development process. Tactical project level instruments cannot replace strategic policy level programmes; sustainability statements by decision makers have proved to be useless in the short run. Some of the main constraints in utilising strategic funds include a lack of horizontal coordination within a project scheme. There is no strategic integrative co-ordination between primary care, outpatient care, and inpatient care. The complex bureaucratic processes reduce transparency, generate dependence and expose organisations to a network of project consultants who add to the expense of making grant applications.

There is a lack of expert capacity at various levels within the Ministry and municipalities that mainly considers policy development and project administration. At the managing authority level there is lack of capacity and most of the regional or county level municipalities have to rely on external expertise in their development or grant applications. A division of power exists between the Ministry of Health as the professional arm of policy making and the Managing Authority as the development policy “supervisor” for the preparation and implementation process. This division of power either works as a safeguard measure or causes political paralysis. The existing culture within the preparation and development of projects is unsuitable, with the deadlines for grant applications changing regularly and being regularly postponed. Dr. Szocska highlighted the imbalance between the magnitude of infrastructure investment and the development of human resources. This lack of coordination is not only a problem between the various levels of Structural Fund Investments, but also across other domains of EU development activities.

4.5. Europe Matters: A Reflection of Trends and New Directions in European (& EU) Capital Investment Strategies

Barrie Dowdeswell, Research Director, European Centre for Healthcare Assets and Architecture (ECHAA).

Healthcare has always been regarded as an important sector, but is also an essential contributor to the fundamental economic drivers within society. In recent years there has been a growing need to demonstrate the benefit of healthcare investment, in order to justify a “fair share” of resources. But the key issue has been how to determine the value of investments in healthcare, since these comprise both tangible benefits and other, less tangible ones.

In addition, healthcare systems face other challenges, such as continuing to reduce inequalities and managing demographic and epidemiological transitions. It is also important to improve safety and quality, and to ensure appropriate and equitable allocation of resources. Thus: policy makers are under pressure to ensure that health care systems are efficient and deliver better value for money, with increased emphasis on relevant health impact measures and analysis of return on investment.

Health inequalities exist within and between European countries. UK health has improved on average over the past 50 years (Independent Inquiry into Inequalities in Health 2004, The Acheson Report, Department of Health London) But in recent decades inequalities in health have either remained static or widened (based on reduction in mortality rates). National reports highlighting how inequality and disadvantage damage health have been published by other Member States including Sweden, Holland, Norway and Spain. INSERM (Institut National de la Santé et de la Recherche Médicale) reports that mortality in France among blue-collar workers

aged 45-59 years is 71% higher than among their white-collar peers. The "Independent inquiry into inequalities in health" suggests that working independently can do little to reduce inequalities in illness, injury and life expectancy. The EU in launching its communication *Solidarity in Health: Reducing Health Inequalities in the EU, October 2009* called for concerted action to reduce unnecessary ill-health and the shortened life span of disadvantaged people in Europe; key policy areas must be addressed.

The needs of the chronically ill and ageing population along with the difficulty of managing public expectations has actually increased conflict between the hospital centric model and the changing needs of the society. Clinicians, managers and the public still tend to follow the hospital centric model, and hospitals using the Private Finance Initiative (PFI) model of financing are built with debts retained that will be locked in for 20-30 years. This cycle persists, and hospitals are rarely if ever designed for significant adaption or disinvestment. Current economic conditions may have ended an era of cumulative investment – capital and workforce and health funding are collectively heading towards a zero sum game. There is an underlying need to move from incrementalism towards “disinvesting to reinvest”. There is an acceptance that balance of healthcare provision and future funding priorities must change but there is an equal reluctance to do it.

With increasing pressure on financial resources there is a drive to rethink the planning base and investment framework. A more realistic critical mass is required for investment (or reinvestment) planning and sensitivity to regional and area needs; the trend towards greater regionalisation seems inevitable. But some conflict always exists between funding models and service cohesion. Ideology too often tends to overwhelm an evidence based approach. For example, hospital datasets are often used to reinforce the need for new hospitals rather than made available to wider interests to explore alternative models of care - this culture should change. The current economic environment is bound by intersectoral tensions between the finance ministry and other spending departments. The biggest single problem is health impact assessment - we do not know what the health investment is delivering.

Spending in healthcare is often caught between a “cost” or an “investment”. From a finance ministry or industry perspective the financial return on capital invested has stakeholder accountability and involves macro debt management. The cost of capital is priced into services to account for depreciation as a charge against income. Transparency over value for money has to exist to account for subsequent profit or loss. From a public health perspective, health gain returns on capital invested include clinical outcomes, patient satisfaction, societal value and health status of the population. Thus the term “Return on Investment” suffers from confusion where financial returns and health gain returns imply different meanings as seen above. These principle are highlighted in a number of case studies from the recent EuHPN or European Observatory “Capital Investment for Health” study which provides a broad spectrum of case studies across the EU. The common themes emerging were vision, innovation, discretion and cohesion. Mr. Dowdeswell further quoted the communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions Brussels, 19.11.2009 COM(2009) 615 final. This depicts the strong drive to promote PPP models, as one solution to the deficit recovery for Europe. The steady gains in economic growth and job creation witnessed over the last decade have been wiped out by the economic crisis of the past year. GDP fell by 4% in 2009, and industrial production dropped back to the levels of the 1990s and 23 million people or 10% of the active population are now unemployed. Public finances have been severely affected, with deficits at 7% of GDP on average and debt levels at over 80% of GDP; two years of crisis erasing twenty years of fiscal consolidation. Growth potential has also been halved during the crisis. Many investment plans, talents and ideas risk going to waste because of uncertainties, sluggish demand and lack of funding.

The European Centre for Healthcare Assets and Architecture (ECHAA) seminar series also provided some perspectives on the current health scenario. The critical catalyst for the global crash has been the asymmetry between East (saving) and West (spending). In order to improve the current circumstances this situation has to be addressed and rebalanced. There is a shift from cumulative growth to redistributive investment, the credit crisis will inhibit capital availability for a decade or more for many sectors including health. The tipping point has been the subprime crisis. Health has not generally attracted ‘stimulus’ investment. Rising revenue spending has supported accumulation and has been reliant on high GDP growth levels. PPP (PFI) has been hit

by the monoline collapse, but the debate about resolution is underway. The following Figure 27 depicts the cycle of change and re-instates the importance of incorporating sustainability.

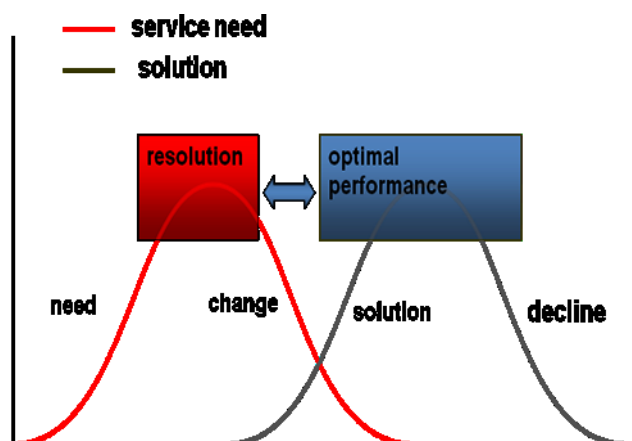


Figure 27. Cycle of Change

An emerging issue is to manage the risk of public investment retreat and move from crisis oriented to strategic systems thinking. The risk management focus must become more strategic and systems based, and less crisis orientated and individual provider based, in order to provide its greatest value to the organisation and the patients those organisations serve. But it is important to learn lessons from Toyota and BP who failed to look at the totality of the system. Part of the problem in making these shifts is performance management in institutional based tiers and disease based tiers, but we do not know how to structure the reward system.

There is enormous reliance on various forms of structural funding due to legacy vs severe austerity and the cost of borrowing along with the lack of tools and skills necessary to drive these changes. ECHAA is contributing towards improving the effectiveness of healthcare investment by a piece of research which deals with case study analysis along with process and competency improvement. Typically many types of funding processes are judged on:

- Delivery of programmes “on cost and on time”
- Compliance with probity requirements
- Within generally agreed overarching policy frameworks

The case studies show that hospitals were rewarded even if they performed badly, which would not occur in an industry based environment.

The various funding models have certain predisposing effects:

- Government Grants can be seen as “free” at point of hand over, but have had problems of historical deficit based reward, monofocus, monoculture.
- Leverage based Government Grants come with specific investment targeting, but need to avoid ad-hoc solutions, to recognise the underlying importance of relevant Master Planning and synergy, and to acknowledge the principles of ROI.
- Commercial loans secured on income collateral and debt servicing is biased towards financial performance, economic sustainability, and raise issues of patient selectivity and quality.
- Public Private Partnerships (NHS PFI) put undue emphasis on asset performance or utilisation rates, issues of ownership, sustainability and cost. Full service (stakeholder) models were dependent on stakeholder balance and influence, importance of contract frameworks and societal engagement.

In terms of use of structural funds, the speaker presented the following diagram (Figure: 28) which depicted a review of competency needs.

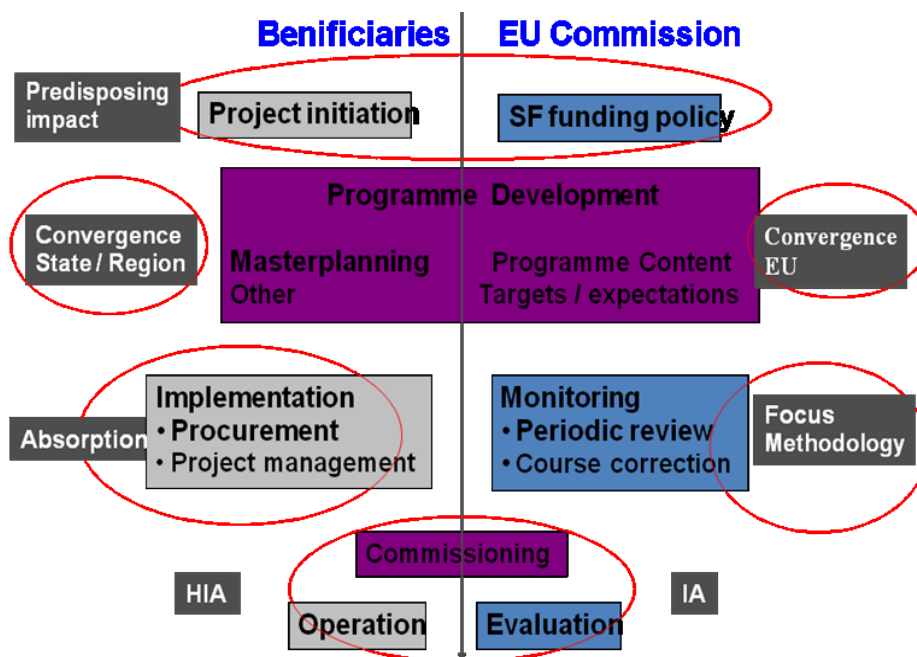


Figure 28. Capital Investment Competencies

The following mapping system (Figure 29) is under development: part of a new methodological tool kit which will provide evaluation and decision criteria, and move towards more complete assessment of investment value.

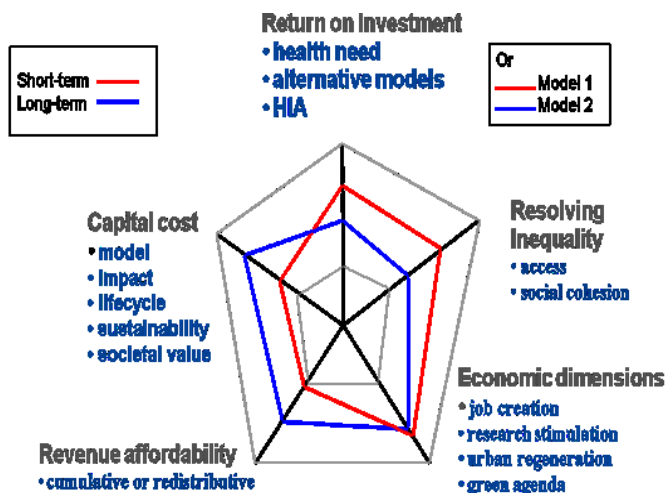


Figure 29. Capital Investment Value Assessment Toolkit

Europe 2020 will soon be dominating many of the agendas and its key priorities are:

- Smart growth: developing an economy based on knowledge and innovation.

- Sustainable growth: promoting a more resource efficient, greener and more competitive economy.
- Inclusive growth: fostering a high-employment economy delivering economic, social and territorial cohesion.

The Commission is putting forward seven flagship initiatives to catalyse progress under each priority theme:

- "Innovation Union" to improve research and innovation, ideas can be turned into products and services that create growth and jobs
- "Youth on the move"
- "A digital agenda for Europe"
- "Resource efficient Europe"
- "An industrial policy for the globalisation era", notably for SMEs, and to support the development of a strong and sustainable commercial base able to compete globally
- "An agenda for new skills and jobs" to modernise labour markets
- "European platform against poverty" to ensure social and territorial cohesion - benefits of growth and jobs widely shared - and people experiencing poverty and social exclusion are enabled to live in dignity and take an active part in society

They are also proposing country specific accountability and integrated guidelines to be woven in within the structural fund policy. The speaker concluded that many European health trends are moving in the wrong direction. But at the same time, there is a need to move from a cumulative to redistributive model of investment. Better understanding of the measurable interaction between care models, workforce and capital assets is required, along with the ability and will to act on the evidence. Sustainability is fast becoming one of the critical decision criteria. Support for "EU12" is available through Structural Funding policy but there is a problem of focus and absorption and help is badly required.

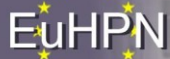
5. Recommendations

Grant Mills and Sameedha Mahadkar, Researchers, Health and Care Infrastructure Research and Innovation Centre, Department of Civil and Building Engineering, Loughborough University

This workshop provided a highly insightful European perspective on the policies, principles, processes and tools that shape healthcare infrastructure planning. It provided an exciting opportunity to meet with a wide range of experts and to share global lessons. Most significant was the workshop's focus on the relationship between changes in services and health outcomes, the realisation of value and delivery of innovation and the need for a more integrated approach to planning healthcare service and infrastructure. There was a clear need to:

- Identify Healthcare Planning Evidence that supports the relationship between clinical experience or volume and clinical outcomes or quality. This evidence must be applied to projects to understand the scale and distribution of healthcare infrastructure and to link demands and capacity;
- Combine strong quantitative activity, space, time, cost and quality tools so that they can dynamically respond to changing clinical technologies and enable infrastructures to scale based on varied demands;
- Better understand how population distributions, demographics and prevalence data can inform the equitable distribution of care models that meet patient access and care needs;
- Improve service life building value to ensure that infrastructure capital investment is assessed against a complex set of competing multi-disciplinary value measures, metrics and evidence throughout an integrated planning and design process;
- Learn lessons and gather evidence from previous healthcare buildings to ensure that infrastructure can make the most efficient and effective contribution to healing and patient or staff satisfaction;
- Adopting an efficient estate management strategy which strives to achieve a balance between investment opportunities and effective service provision;
- Understand the interdependency and integration between levels of care, estates and transport infrastructures and their impact on whole-system and whole-life value;
- Improve adaptability and facilitate open and flexible decision making that can respond to changing social, economic, political, technological and environmental factors;
- Incorporating socially sustainable solutions within refurbished and new build that appropriately quantify future levels of demand;

- Develop a dynamic stakeholder consultation approach, that has appropriate levels of stakeholder engagement and robust participation approaches that manage stakeholder expectations and powers;
- Apply advanced modelling and simulation approaches that improve the integration of multi-parameter building and service performance data and inform whole system optimisation in infrastructure planning and design and reduce whole system Green House Gases.



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