

# Hygiene *for the* World

Cutting-edge expertise in hygiene and infection control

November 2013

**The first priority is patients' welfare, not beautiful architecture**

## How hospital planning has evolved over time – from Florence Nightingale to well-being services in hospitals

Hospitals are an integral part of Western civilization. As well as being influenced by the practice of medicine itself, they are also affected by economic, political and social trends within individual societies. What began as welfare for the poor in eighteenth-century Europe is now echoed in modern hospitals, ultimately reaffirming people's essentially humanitarian nature. It was during the era of the Enlightenment that special institutions began to be established for sick people. The planning of charitable hospitals for the poor in that era is reflected in an entirely new form of future-oriented hospital architecture which is becoming increasingly prevalent today. Known as "healing architecture", it incorporates principles which were once extolled by Florence Nightingale (1820–1910):

"We should never forget that the first priority is patients' welfare, not propriety and not beautiful architecture!" Join us on a historical journey through 200 years of hospital architecture.

In 1727, the Charité opened its doors in Berlin, quickly becoming one of the most prestigious hospitals in Germany. A considerable amount of thought went into its internal layout and structure: "Rooms were established on the ground floor for the administration and the patients. The hospital was divided into small units with 10 to 12 individual beds. Each room was heated by a stove and included a fireplace to improve ventilation. The cleanliness of the rooms and the changing of the bed linen every four weeks was supervised by the nursing staff." (source: Axel Hinrich Murken: "Vom Armenhospital zum Großklinikum" ("From hospitals for the poor to major clinical centres"))).

During this same period large hospitals were being established in most of Europe's largest cities. In London, the first steps were being taken to convert Guy's Hospital into a medical institution. The new wing constructed in 1725 still had wards in the style of large halls, but all of the operating procedures were already under the supervision of doctors. The medical professional, art historian and archaeologist Axel Hinrich Murken has traced the origin of



*The General Hospital in Bamberg was long held up as an example to follow. Its wards were small and easily manageable – and the toilets were connected up to the sewage system. Photo: Wikimedia*

*More than 30 beds could be accommodated in the single-storey pavilion ward of the Städtisches Elisabeth-Krankenhaus in Aachen. Photo: Aachen University Hospital.*

European hospitals back to a particularly tragic event: the fire that tore through the Hôtel Dieu in Paris on 29 and 30 December 1772. This disaster prompted serious reconsideration of a situation in which 2,500 patients were treated under appalling hygiene conditions with a mortality rate of between 20 and 25 percent. Experts in Paris spent 10 years developing two different concepts for a new large-

scale hospital designed to cater to 5,000 patients – a decentralised rectangular shape, and a centralised circular shape with buildings spaced well apart. A specially convened hospital commission rejected both proposals. Ludwig XVI agreed with their decision and decided that the facility should be split into four individual hospitals. But the revolution came before the project could proceed any further...

It wasn't until the end of the Biedermeier period that these proposals were unearthed once again and the first hospitals built in the pavilion style finally saw the light of day in France. Yet the effects of revolution continued to make their presence felt. In 1789, the General Hospital built in Bamberg, Germany was widely praised as an exemplary design.



*It was Florence Nightingale who insisted back in the 19th century that patients' welfare should take top priority in hospitals over considerations of propriety or architectural beauty.*



In addition to the wards, it also included kitchenettes, waiting rooms and doctors' consulting rooms. The toilets were already connected to the sewage system and the wards were small and easily managed, making life much easier for the nursing staff. Efficiency was now firmly on the hospital planning agenda!

More extensive health policy legislation and hospital building programmes were ultimately prompted by a number of factors, including the Industrial Revolution, increasing migration of people to urban centres, and a spate of cholera epidemics. It was during this period that churches

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established free, charitable institutions. The nursing personnel in these institutions had experience in welfare and social work to assist them in their new positions, and the religious background also found expression in the architecture of the new buildings, with neo-Gothic façades revealing

pus. Military surgeons attended operations in uniform and students in their normal clothes. The ways in which infectious diseases spread were still entirely unknown, and it wasn't until decades after the introduction of anaesthesia that disinfection finally became a key principle of surgeons' work. When

single-storeyed because people believed ventilation to be less efficient on upper floors. Located in beautiful parks, the idea was that healthy air should help cure the patients. The pavilion style of hospitals flourished in the Biedermeier period (1815–1848). From the Heidehaus Sanatorium

"A typical example of the genre that represents the transition to high-rise buildings is the Surgical University Hospital in Tübingen, which was built between 1930 and 1935," writes Axel Hinrich Murken. The development of steam sterilisation, radiology and clinical pathology meant that specialists once again wanted certain functions to be concentrated in one

tious diseases could be successfully managed. This allowed for a gradual shrinking of infectious disease wards until they occupied just a few rooms. Complexity became the visible key to health care provision. In the case of Aachen University Hospital, this complexity was even enshrined in its façade, as Axel Hinrich Murken explains: "The building for the new medical faculty in Aachen, which was founded in 1965, represents one of the most spectacular pieces of architecture of modern times. Its aim was to combine the entire spectrum of theoretical and clinical medical disciplines under one roof. Its guiding principle was to avoid the compartmentalisation of the various specialist clinics and centres of theoretical medicine by establishing central facilities for



The neo-Gothic façade of the Künstlerhaus Bethanien arts centre in Berlin reveals the influence of medieval Christianity, reminding us that the hospital was rooted in charity, welfare and social work.



The hospital in Hamburg-Eppendorf was a typical example of the pavilion style. The architecture is characterised by small, low, mostly single-storey pavilions. The idea was that fresh air would play a beneficial role in healing patients. Good ventilation was therefore essential – one reason why the pavilions were surrounded by a beautiful park.

the roots of medieval Christianity. This architecture can still be seen in the Künstlerhaus Bethanien arts and exhibition centre in Berlin and the Marienhospital in Stuttgart.

The architecture of the time was equally influenced by progress in

it did, doctors' normal clothes disappeared under white coats – with white coming to symbolise cleanliness in medical settings – and tiled walls and floors were introduced in hospital buildings. Meanwhile, Ignaz Semmelweis had discovered the benefits of hand

in Hanover (1888) and the Eppendorf University Hospital in Hamburg (1889) to the Hôpital Lariboisière in Paris and St. Thomas' Hospital in London, this design quickly became the predominant style of hospital architecture. Architects continued to follow this trend right

place, so efforts were made to group related areas together. "People had learned that the reasons behind outbreaks of frequent infections in hospital buildings were more to do with a lack of cleanliness and a failure to observe hygiene guidelines than with spatial layouts," Murken writes.

diagnostic and therapeutic services such as clinical pathology, radiology, nuclear medicine and rehabilitation together with medical libraries and teaching facilities," Murken writes.

The ongoing evolution of hospitals has continued into the 21st century. Modern medical institu-



Aachen University Hospital also used to be a series of pavilions. However, these were torn down and replaced in the 1970s by a modern building that set new standards in hospital architecture. The green, silver and yellow-clad building wears its supply lines on the outside, a visible reminder of hospital technology. As a striking example of technical modernism, it is one of the most significant pieces of high-tech architecture in Germany and has been a listed building since 2008.

the field of medicine. By the mid-19th century, doctors were finally able to anaesthetise patients with nitrous oxide, ether or chloroform before performing surgery. New surgical procedures quickly followed and the demand for operating theatres increased. Hygiene, however, remained a very low priority. Patients were barely even washed before surgery, and the surgeons' white coats were typically covered in blood or even

hygiene, but the opinion that epidemics and infections were caused by bad air continued to hold sway on the wards and the focus remained on ventilation as a universal remedy.

Architects responded to this view, with those who believed in airborne infection constructing hospital complexes consisting of small, low pavilions in the late 1870s. These buildings were generally

up until the end of World War I in 1918.

The big changes in hospital architecture in the 20th century stemmed from the increasing importance of bacteriology and hygiene and a greater understanding of pathogens and routes of transmission. The focus once again shifted to efforts to house everything within a single building.

By the 1930s hospitals were sprouting up all over the USA. The Presbyterian Hospital occupies an impressive spot on the banks of the Hudson River. The 1960s saw another boom in the construction of new hospital buildings. Efficiency was now the byword, and the planning process focused on centralisation and automation, with hospitals evolving into complex buildings. The postwar period also witnessed a significant reduction in the emphasis on wards for patients suffering from infectious

**Efficiency is now the golden rule for inpatient treatment**

tions are characterised by the pressure to keep costs down and to innovate as well as by the principle of case-based fees and by demographic change. The demand for "green" hospitals is also increasing, at least in developed countries. Efficiency is now the



Foto: Wikipedia (McMoe)



Photo: WavebreakMediaMicro – Fotolia.com

golden rule for inpatient treatment. Hospital operating procedures, processes and personnel deployment obey their own laws and logic which have also had an effect on hospital architecture. Integrated planning, healing architecture and well-being have become the key principles of modern-day hospitals.



# Why planning is about more than just joining 3D objects together

MEIKO's technical sales and design departments play a big role in helping the company to sell more than just cleaning and disinfection machines



Planning a utility room in a hospital is very much a people's business. That's what MEIKO GmbH – a manufacturer of cleaning and disinfection appliances headquartered in southern Germany – has



Markus Braun – Sales Director and Senior Manager in MEIKO's Medical Technology division – speaks from experience: "The complexity of planning a utility room is greater than people think."

learned from its many years of doing business in this industry. "The complexity of planning a utility room is greater than people think," says Markus Braun, speaking from experience. The head of sales and marketing in MEIKO's Medical Technology division launches straight into a long list of the people involved in the planning process: "We take an interdisciplinary approach to our work in the planning phase in order to try and cover the full range of people's needs in the hospital environment. Our partners on the customer side are the management, who have the final say on budget issues; the nursing care services which check that everything is feasible and which generally understand the workflows best; the purchasing department; technical managers who focus on machine reliability, lifecycle costs and servicing and maintenance; the infection control team; the occupational safety coordinator; the IT department which has to link the equipment to its electronic infection control documentation on the IT system; and nowadays even the waste management coordinator, who is responsible for disposing of secretion bags.

To manage the complexity of all these requirements, MEIKO relies on the expertise of specialist planners. "We work very closely with architects and planners on projects all around the world," says Thomas Meier, who heads up technical sales at MEIKO. Together with his team, he is responsible for tackling the biggest challenges, some of which require an on-site visit to get things on track. "The customer, the dealer and MEIKO form a kind of triumvirate, which is only feasible if we as a company make the effort to foster certain key structures. "For MEIKO, that means showing our partners that our products are backed by a team that has the pro-



Thomas Meier is responsible for technical sales at MEIKO: "We work very closely with specialist planners all over the world!"

fessionalism and passion to develop technical and commercial solutions and clearly demonstrate their benefits," says Thomas Meier.

MEIKO's technical sales department is the link between the sales department, planners and the design department and a clear indication that the company is very much at home in the business of special-purpose machinery:

"Our strength lies in producing specialist solutions tailored to each customer's specific needs," says Thomas Meier.

One example is the Inselspital, the University Hospital in the Swiss capital of Bern, which decided to step up its infection control and hygiene measures in its Children's Hospital. "We are the only facility of its kind in the canton of Bern to offer a university hospital emergency outpatient department for children," explains Christian Walther. This is a key port of call for critically ill children and young people. As the head of the department

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## People involved in the planning process

▪ Management	- final say on budget
▪ Nursing care service	- feasibility check - in-depth knowledge of workflows
▪ Purchasing department/ technical managers	- machine reliability and lifecycle costs - service issues
▪ IT department	- linking of electronic hygiene documentation to IT system
▪ Occupational safety coordinator	
▪ Infection control team	
▪ Waste coordinator	



ment of engineering and safety at the Inselspital, Walther oversees a number of innovative approaches: "A good example is the Children's Hospital isolation ward where we decided that each room would be



Christian Walther is the head of department of engineering and safety at Bern University Hospital.

assigned to a utility room that simultaneously functions as an airlock."

Each room in the isolation ward can be accessed both from the corridor and through its allocated utility room. If a child is admitted with an infectious disease, the airlock is activated. This generates



Major plans are underway to renovate the Inselspital in Bern. In terms of the new cleaning and disinfection appliances, the trend in the Children's Hospital is very much towards patient-focused solutions.

negative pressure to prevent contaminated air from escaping the room. In the case of immunocompromised patients on the children's ward, a positive room pressure is generated to protect the critically ill children from coming into contact with viruses or bacteria from the outside.

Ever since the 1970s, the Inselspital has followed a policy of incorporating cleaning and disinfection appliances and/or bedpan

washers in patients' rooms, "essentially for reasons of improving patient safety", as Walther explains.

It is also common to see bedpan washers installed in the ensuite bathrooms of patients' rooms at the Inselspital Children's Hospital. In its Neurological Unit, for example, the cleaning and disinfection appliances are built into the wall directly above the patient's toilet. "MEIKO offered us a made-to-measure solution that

ticked all the right boxes," recalls Christian Walther. The long-established German specialist in dishwashing technology and cleaning and disinfection appliances provided prefabricated stainless steel frames to facilitate the installation of the bedpan washers, hand wash basins and toilets. This module was supplied with all the piping already fitted, so all that remained was to link up the sanitary facilities with the existing conduits. "That hugely simplified the logistics for our part of the installation work," says Walther.

To save space, the modules developed in collaboration with MEIKO also act as room dividers. The machines are positioned back-to-back, one in each room, so technicians can open up the front of one machine and gain access to the other machine through the back panel. Walther is particularly pleased with how this solution minimised disruption to the hospital's everyday activities.

Markus Braun confirms that there is a clear trend towards patient-focused solutions in the acquisition of cleaning and disinfection appliances: "We can respond flexibly and globally to different customer requirements. As a manu-

facturer of cleaning and disinfection machines and a turnkey provider of equipment for utility rooms, we are very much familiar with cultural differences relating to the disposal of patient excreta," says Braun.

The Offenburg, Germany-based company strives to achieve cost-effective solutions for customers right from the planning phase. "We support everyone involved in the project with our experience and know-how," says Thomas Meier, who sees MEIKO's planning support and expert on-site consulting service as one of the company's greatest strengths. And 3D planning tools mean that everything can now be presented in highly realistic model form as a matter of course.



## Applying concepts of healing architecture and evidence-based design in hospital architecture

Professor Christine Nickl-Weller holds Germany's only Chair in Hospital and Healthcare Building Design at the Berlin Institute of Technology and conducts research in a number of different projects. She is currently preparing a project entitled "Building hospitals with optimised energy efficiency" which is supported by funds from the German federal ministry of economics and technology.

Nickl-Weller is also the CEO of the Munich-based planning firm Nickl & Partner. The firm has won numerous awards for its outstanding designs in the healthcare industry and other sectors as well as AIT's "architecture + health" innovation award.

### Question:

Architecture is typically viewed as an interdisciplinary art or discipline. What led you to focus your work on designing hospitals, a field in which interdisciplinary work is fraught with complications?

### Christine Nickl-Weller:

Ever since we started working as architects, my husband – Professor Hans Nickl – and I have always seen people as the central focus of our planning and design work and have pursued the goal of developing the built environment to reflect the needs of its users. Since we founded the architects' firm Nickl & Partner in 1979 we have

specialised in the field of architecture in the healthcare sector. In addition to buildings for research and teaching, we have also spent many years working on hospitals and clinical centres, and we are now one of the leading firms in this sector in both Germany and Europe. We take our responsibilities to building users very seriously and try to incorporate what we learn from our teaching and research into continuously improving our architecture.

The design principles of the built environment and the impact they have on how healthy and convalescent people perceive their surroundings has always been a



Prof. Christine Nickl-Weller: "Ever since we started working as architects, my husband and I have always seen people as the central focus of our planning work."

central focus of my work as an architect.

That's why "healing architecture" fits so well into the research priorities of my Chair in hospital architecture at the Berlin Institute of Technology. The modern subject of hospital and healthcare building design covers the entire spectrum of the building process in the healthcare sector.

The symposia, which are held every

two years, offer an important and highly regarded creative platform for discussions on current developments in the healthcare environment. Invited international experts from the interdisciplinary fields of architecture, medicine, healthcare management and politics take a cross-sectoral approach to examining how healthcare will be provided in the future. As well as giving speakers an opportunity to present their experiences, the symposia also enable medical professionals, psychologists, hospital operators, architects and politicians to set out their visions for future models of healthcare provision. This interdisciplinary environment is very enriching – it helps generate new perspectives, gives ample food for thought and inspires new projects and cooperation between experts from different fields.

### Question:

How do you bring this interdisciplinary approach to fruition? And how do you approach the people who will subsequently use your buildings?

### Nickl-Weller:

In my view one of the key points is to put people at the heart of

your considerations and decision-making processes. Putting the focus on people means devoting your attention not only to patients, but also to workplaces in the hospital environment.

Patients of the future will be active patients. They need to be supported in being active recipients of healthcare services. An active patient needs to be part of his or

*Careful attention must also be paid to hospital workplaces in the planning process*

her own course of treatment and share in the responsibility for how this treatment develops. Enhanced involvement of patients improves both the quality of the treatment and the quality of each individual's experience. It also results in optimised utilisation of the hospital's resources. The key areas focused on by active patients are IT accessibility, information, communication and involvement. Ultimately this means that the working environment needs to take top priority.

That means you need physically





Each ensuite room in the Neurological Unit of the Inselspital Children's Hospital in Bern is equipped with its own cleaning and disinfection appliance built into the wall directly above the patient's toilet. This required a made-to-measure solution from the manufacturer of the machines, MEIKO. The long-established German company produced a stainless steel frame to enable the toilet, hand wash basin and bedpan washer to be correctly installed in one easy step. Photos: Inselspital, Bern



attractive spaces which have a positive effect on hospital employees through décor, colours, art, indoor climate, daylight, sound-proofing and leisure activities while also helping people to

that architecture is the bridge between the realms of proper form and function, beauty and practicality. How much beauty actually finds its way into hospital buildings?

inherent added value within the design itself. This functional and aesthetic added value plays a decisive role in the success of the overall project. It's the external expression of the corporate identity of a vital organisation – the hospital – as an integral part of the city.

job properly. Obviously the first priority of a healthcare facility is to meet all the functional and technical requirements that ensure successful treatment, but to really fulfil its purpose it has to cater to the needs of the people who work and convalesce within its walls.

learned from Scandinavian countries how important it is to have patients in separate rooms. As well as a proven drop in the risk of infection, single rooms also provide a calmer environment and give patients the feeling of being independent – two key factors that support the recovery

*We need a systematic compilation of the research findings from completed building projects*

enjoy their work and motivating them to do it well. So essentially you need enough space and flexibility to allow staff members to perform their tasks and develop themselves personally in an environment where they feel comfortable.

#### Question:

You hold Germany's only Chair of Healthcare Building Design at TU Berlin. In light of the major challenges facing the hospital sector (efficiency, undercapitalisation, "going green", etc.), do you think there's an urgent need to fund more chairs of this kind?

#### Nickl-Weller:

I think the time has come to establish a network. What we need is a systematic compilation of research findings and the evaluation of completed building projects to determine their effects when viewed through the lens of healing architecture.

#### Question:

On your website you quote Gottfried Semper, who has said

in relation to function, technology and hygiene, we're also faced with increasing demand for holistically designed spaces in healthcare environments that are appealing and welcoming places to spend time. The space itself is becoming a key factor in the recovery process. The key to creating buildings that can be adapted to future needs is to create generously proportioned basic structures which are attractive to look at but also open to change. But beauty is not the norm. It has to be consciously created as

A hospital is a key component of a city and of its social and cultural capital and it occupies a special place in society – which is one of the reasons it has to fulfil such high quality standards. The job of an architect is to create spaces that are sensory, in other words spaces that cater to all a person's senses in order to achieve a vivid effect. Architecture should stimulate your senses in a positive way. If it fails to do that, then I would say that the architect has not done his or her

process. To reinforce this sense of a personal space, patients' rooms will have a hotel-like character in the future which will focus on comfort and ambience to create an atmosphere where people feel relaxed and are less aware of being in a hospital.

#### Nickl-Weller:

The statistics tell us that some 13,000 people a year die from hospital-acquired infections in healthcare facilities. We've already

There are six large new hospitals being built right now, primarily in Denmark and Finland, which correspond to this concept of a "healing environment".

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The Children's Hospital at Heidelberg University – one of the successful projects completed by Prof. Christine Nickl-Weller's firm. Photo: www.mueller-naumann.de



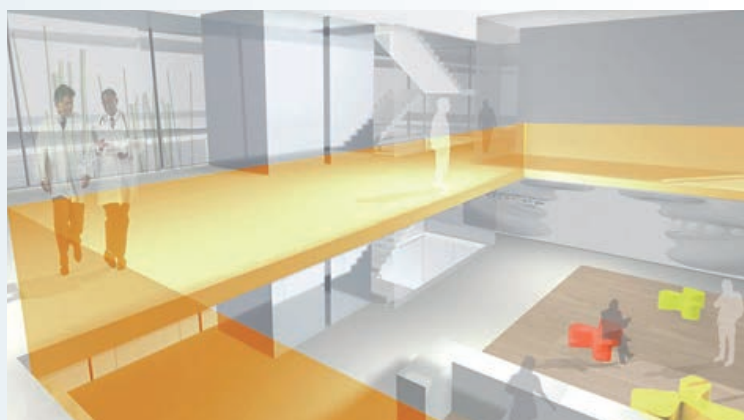
**Question:**

One of your research projects focuses on examining the mutual interaction between architecture and medical care in hospital settings under the heading of evidence-based architecture. How open is the medical profession to the idea of architecture as a key factor in the treatment process? And what about patients? Wouldn't patients ultimately prefer adequate staffing levels over a pleasant ambience?

**Nickl-Weller:**

The term "healing environment" and the method of evidence-based design are both relatively new concepts. But good hospitals designed to ensure rapid recovery and high user satis-

an attractive working environment will hospital operators be in a position to attract qualified personnel. And hospital personnel have now become a key quality feature which discerning patients take into consideration when looking for a hospital that can offer all they need. The benefits of high-quality healthcare buildings based on an architecture that addresses people's needs and promotes



The LKH University Hospital in Graz and the Graz Dental Hospital (Austria), both designed by the Munich-based architects' firm Nickl & Partner.

faction by focusing on people and their needs have been around in Germany for much longer. To understand current trends you need to examine one of the most significant changes in Germany, which is the changing role of the state. In order to reduce spending, the government is increasingly withdrawing from its obligation to provide care and is leaving the development of the healthcare sector to

the process of recovery are not confined to the economic aspects. This kind of architecture also provides genuine added value and makes an important cultural contribution to society.

**Question:**

How do you think Germany compares to other countries in this context?

**Nickl-Weller:**

For a long time Germany placed too much of a one-sided emphasis on functionality and cost efficiency. And the realisation that personal, patient-friendly architecture such as the Maggie's Centres in Great Britain can ultimately yield functional and financial benefits is something that is taking a long time to take hold. We're still at a very early stage of implementing our findings. More studies need to be carried out and the knowledge we have needs to be scientifically analysed to enable us to transfer its application to the built environment within the context of solidly based regulatory frameworks.

*Comfort and ambience in hospitals will take on an increasingly important role*

market forces. Care facilities are having to transform themselves into companies and compete against other service providers, which often means shedding personnel to cut costs. Comfort and a pleasant ambience in hospitals will therefore play an increasingly important role not just for patients but also for staff. Only by offering

# Medicine is changing personnel and hospit

**Lesley Alway is a clinical health planner at the Strategic Health Resources (SHR) planning firm in Melbourne, Australia. We spoke to her about integrated planning, hospital hygiene and the advantages of patient-focused solutions in the field of cleaning and disinfection appliances.**

**Question:**

The technical and organizational complexity of hospitals is increasing all the time. How does that affect your work as a planner?

**Lesley Alway:**

The fact that medicine and hospital processes are becoming more complex obviously makes our job more complex, too. In the past Furniture, Fit out & Equipment (FF&E) budgets were calculated very simply as a percentage of the square meterage of the building or the construction budget. But much of Australia's public health Infrastructure is now showing its age and is no longer suitable for incorporating complex medical technology. Our services have developed to tackle this issue, and delivering a project now relies heavily on two key roles, namely the specialist medical equipment planner and the clinical health planner.

**Question:**

So new professions have emerged to meet this need?

**Lesley Alway:**

Exactly. And at the same time you now have architects, engineers, cost planners, quantity surveyors, project managers and builders all playing a part in the planning of the FF&E budget. The job of the specialist medical equipment planner is to ensure accurate budgeting right from the project development phase. Meanwhile, the clinical health planner supports architects

That means the specialist medical equipment planner works with both medical and nursing staff to incorporate the needs and requirements of both groups in the facility design process. At the same time, the clinical health planner supports the integration of engineering services and gives feedback in regard to best clinical practice and infection control in relation to a number of different areas.

By working with a clinical health planner you can be confident of achieving an ergonomic working environment, increased patient safety and the ability to keep tabs on both the costs and functionality of future expansion.

**Question:**

The half-life of medical knowledge is constantly falling: What counterstrategies are you adopting to increase the flexibility of your planning solutions to cope with these changes?

**Lesley Alway:**

The dynamic effects of minimally invasive surgical techniques and interventional Imaging have transformed the hospital environment. Anaesthetic drugs are milder, patients are being discharged earlier, more rooms are now needed for day beds and the number of inpatient beds is decreasing. The result of these technical and clinical advances is a change in how services are delivered, with some 57 to 75 percent of all episodes of care in Australia now comprising day management of surgery and medical treatment. This in turn has boosted demand for all physical and human resources. At the same time, "Medi Hotels" have emerged to cater for patients and their families both before and after inpatient treatment, offering a lower cost option for staying close to required specialist care. Specialist health planners benefit planning firms such as ours by providing access to real-life experience of current practice in large tertiary teaching hospitals. As well as ensuring that the master plan reflects the latest clinical practice, the planner also brings experts into the master planning process. These experts are experienced in

their specific clinical areas, though they don't necessarily have experience in actually taking part in the briefing and building of a new or refurbished hospital, which can sometimes be problematic.

In order to help the users communicate their expectations and requirements in a meaningful way, the health planner is able to "translate" the clinical technical language of the users into the directions needed by the architectural and services consultants, and vice versa.

**Question:**

Could you give us an example?

**Lesley Alway:**

Well, one example would be ensuring that the planned operating rooms have the minimum height needed to incorporate new and emerging technologies and equipment. That has to be considered early

in the design process. By tackling these issues promptly, you enable a thorough review of the proposed space allocation and spatial relationships which saves time by reducing the number of changes required in the subsequent schematic design phase. The clinical health planner is skilled in group dynamics and speaks the clinical language used by the members of the user groups. This reassures users that the project is being verified by a clinician who understands their explanations and

*An interdisciplinary approach to planning ensures smooth-running operations*

is familiar with the standards and practices required to deliver a functional working space. In terms of critical factors that are non-negotiable from an infrastructure perspective, architectural and other specialist consultants can articulate these early in the development process for both green and brownfield sites.

**Question:**

Do you also employ medical professionals in your company to provide a broad basis for interdisciplinary cooperation?

**Lesley Alway:**

Thanks to the structure of SHR, our team can ensure that the information we develop is future minded, clinically focused, detailed and accurate.

*Specialist planners lobby for the interests of both medical and nursing staff*

and service consultants in bringing efficiency to the planning process and project. Ideally these two professionals work in tandem, though their roles are distinctly different. Both roles draw on the principles of lean thinking and apply the "Australian Health Facility Guidelines" in their work. Another key part of the medical equipment planner's work is to represent the client's and patients' interests with the aim of identifying appropriate clinical standards for aspects such as infection control and harmonising work-flows, patient flows, and inward and outward goods flows.



# – and so is the work of care al planners

That works because our staff and directors are clinically qualified in highly complex high-tech areas such as operating rooms, intensive care (including paediatric and neonatal) and emergency and imaging departments. This baseline knowledge – coupled with specialist knowledge of infection control and accreditation activities in the field of tertiary care – keeps our work thorough and focused. SHR's wide-ranging expertise makes it possible to identify problems before they arise and develop suitable solutions within the project team.

#### Question:

MEIKO's TopLine 30 appliance can be wall mounted to save space, which opens up more flexibility in the planning process. As a planner, how might you take advantage of this extra space?

#### Lesley Alway:

The TopLine 30 is an excellent product for isolation room ensuites and applications where it isn't suitable to use a centralised dirty utility room for the disposal of contaminated material. It is slimline and fits well into a wall cavity. It's very important for architects, health planners and infection control consultants who use this model to identify the rooms where this type of equipment is to be installed, because the additional wall cavity space creates the need for a non-standard ensuite bathroom design.

#### Question:

Medical devices and the intimidating atmosphere of hospitals can make patients feel stressed and nervous, which is why many architects support the idea of "healing architecture". What do you feel about this issue? Could the discreet wall mounting of cleaning and disinfection appliances be a helpful solution, particularly in isolation rooms for seriously ill patients and VIP rooms for highly sensitive patients?

#### Lesley Alway:

I think the term "healing architecture" is often used quite loosely. Good design requires the principle of "form follows function", and the infection control implications of reliable, repeatable clinical practices can be enhanced through "control by design".

By installing equipment in appro-

priate places, you can reduce the overall risk of hospital-acquired infections and reduce failures in good practice by minimising the distances staff have to cover and by ensuring care personnel have access to equipment exactly where they need it without having to leave the patient area. Additionally, good planning from an early stage of a project can avoid the need for retrofitting to meet new standards. The initial capital outlay is also easily justified thanks to savings in recurring costs such as staff wages and enhanced patient satisfaction due to staff spending more time in patient areas. And of course the best outcome of all – though admittedly hard to quantify – is

a reduction in nosocomial infection rates.

#### Question:

What do you think about the distances that some hospital personnel have to cover moving from one place to another? Could things be optimized to make things easier for staff? Would a patient-focused solution for the reprocessing of care utensils (a bedpan washer in every room) be a step in the right direction?

#### Lesley Alway:

As I said before, the evidence-based design models currently being developed around the world are already pushing design in the direction of "patient-focused"

solutions, which means bringing care services as close as possible to the patient. So that would certainly support this option.

*Patient-focused design is clearly becoming an international trend*

However, the capital outlay and the cost of maintaining multiple units will continue to pose obstacles to this type of installation. At the same time, the enforcement of infection control standards and overall infection risk management in hospital settings



A cleaning and disinfection appliance integrated in the bathroom of an ensuite patient room. "By installing equipment in appropriate places, you can reduce the overall risk of hospital-acquired infections," says Lesley Alway. Photo: MEIKO

will keep driving innovation in the management of reusable equipment for patient use.

#### Question:

Healthcare-associated infections and outbreaks of infections such as norovirus and *Clostridium difficile* are seen as major threats in hospitals and clinics, partly because of the huge costs they cause. In some countries, methods of disposing of patient excreta that involve nurses carrying soiled care utensils through the corridors can lead to conflicts between different interest groups. How can this issue be tackled at the planning stage? Do you get the chance to work with infection control experts or physicians who are familiar with these everyday pitfalls and challenges?

#### Lesley Alway:

As a clinical health planner and infection control practitioner, my role in the design team is to constantly review the multiple requirements for innovative patient care. That means reviewing all patient and staff flow patterns within the facility to ensure best practice and safety are paramount in the delivered design. This is undertaken based on "lean principles" to get the best outcomes both in terms of patient safety in all its different facets and in terms of optimum management of the recurring staff costs incurred in delivering a quality, auditable service.

#### Question:

In the Anglo-American sphere the use of macerators is widespread. What do you think about this technology in regard to infection control, ongoing costs and eco-friendliness?

#### Lesley Alway:

In terms of infection control the first thing to remember is that macerators only use cold water and have no disinfection or sanitisation cycle. Moreover, the bedpan liner supports have to be cleaned and sanitised after every use to prevent cross-contamination. So macerator equipment can't really be used without the concurrent use of a utensil decontaminator. That essentially means you are duplicating equipment because you need a cleaning and disinfection appliance as well as the macerator. In terms of ongoing costs, the key factor is the extra cost of bedpan supports, slipper pan supports and utility racking, as well as the cost of storing bulky containers of disposable pans and urinals.



# Hospital planning must incorporate process optimisation and the increasing use of technology

Preeti Chauhan is an architect and planner who played a key role in planning India's biggest hospital and who has more than 13 years of experience in handling major projects in the healthcare sector, ranging from teaching hospitals to full-service medical centres with almost 1,000 beds. Chauhan is on the management team of the planning and consulting firm "DDF Healthcare Consultants – Redefining Healthcare" based in New Delhi, India. We spoke to her about the importance of specialist expertise in an increasingly complex field and discussed how hospital hygiene affects the work of planners and architects.

## Question:

Process optimisation has become a key part of hospital planning. What consequences does that have for you as a hospital planner? How reliant are you on the transfer of specialist knowledge? Do planning firms need to consider employing medical professionals?

## Preeti Chauhan:

A hospital is a technical building comprising horizontally and vertically linked structures that coordinate the flow and arrangement of spaces which are integrated within a system of centralised services. As a result of changes in the technologies and systems used in hospital processes, process optimisation has become an important part of hospital planning. In order to design a hospital it is essential to know how the system functions, how much space it will occupy and how many users you can expect in the space occupied by that system. The working mechanisms and flow of the patients, doctors, specialists, technicians and other personnel that utilise this system are the key parameters you need to consider when designing and planning a hospital. When it comes to setting up highly specialist departments featuring the most complex and advanced technologies and procedures, it's absolutely crucial to understand how the system functions, what pro-

cesses it involves and what anthropometric basis should be taken for designing the space and installations. To do this successfully the team of architects needs to cooperate directly with the relevant departmental specialists, because they – as the end users – know better than anyone else what type of spaces, equipment and interior materials we need to take into

## Question:

Hospital hygiene is another key issue. What effect does that have on your work? Have you seen an increase in the amount of interdisciplinary cooperation between the fields of hospital hygiene and planning? Would you personally support the idea of incorporating

a hygiene specialist in your project planning process for example?

## Preeti Chauhan:

Well, hospital hygiene has become the public proof of how efficiently a hospital is run. Numerous recent studies have confirmed that many patients end up suffering from illnesses which they pick up during their hospital stay. Currently there are some areas that have highly restricted access in order to prevent germs getting in from the outside – for example operating theatres, intensive care units, accident and emergency departments and so on. But there are no physical or medical investigations of infections that are transferred to patients by personnel or visitors to the hospital. And because of chronic understaffing, nurses are permitted to sleep on the ward, yet



Preeti Chauhan is one of India's most sought-after planning experts

absolutely no checks are carried out in regard to their state of health or how conscious they are of hygiene issues. Hospital hygiene has an impact on our work because it requires us to plan the inpatient wards, lobbies, public toilets and other common areas such as stairwells and lifts in a way that ensures the maximum

possible types of spaces available for the services that are required to guarantee minimal movement of patients and doctors combined with maximum comfort for the patients and all the facility's users, while simultaneously avoiding unnecessary bottlenecks caused by objects in corridors, impediments in lobbies and queues at the doors of doctors' consulting rooms. Like I said before, hospitals are tech-

## Question:

Evidence-based planning and integrated planning are two concepts that are becoming increasingly widespread. Do these approaches attach more importance to spatial and functional planning than to aesthetics or originality?

## Preeti Chauhan:

As I mentioned in my answer to the first question, the modern field of hospital design includes an increasing number of concepts which provide for the optimisation of hospital processes and the increasing use of technology. The situation of a nurse rushing from the A&E department to the pathology unit has been replaced by

nical buildings in which functional-ity is more important than form. The exterior form of the building should be designed to minimise the need for HVAC while ensuring that all the different areas and spaces get sufficient light and ventilation. The construction industry has recently developed all sorts of materials for interior and ex-

*Planners can combine aesthetics and originality with functionality*



Process optimisation is one of the top priorities in modern hospital planning, not least because the technologies and systems involved in hospital processes are constantly changing. Photo: Fotolia.com (composing)

possible separation of patients and nursing staff. That makes the patterns of movement in hospital planning even more complicated. Where and how do we restrict access? And for which groups of users specifically? Those are vital questions for any planner working in the healthcare sector. A hygiene expert can obviously give us advice on how a hospital works, but as planners in the healthcare industry we have to take many different parameters into consideration when planning a hospital. These include the best location for the hospital, the culture and lifestyle of the people who live there and behavioural patterns and public etiquette, as well as the requirements of the hospital's end users or customers, their vision and their expectations for the project. I think that infec-

pneumatic tube transport systems, bedpan cleaning has become more hygienic thanks to the use of appropriate appliances, and drug distribution systems and toilets equipped with sensors are increasingly becoming a standard part of everyday hospital settings. Evidence-based planning is very well suited to adapting hospital functionalities on the basis of usage data collected in other successful hospitals. There's no doubt, however, that this will differ from country to country, from region to region and from culture to culture. And the success rates depend on a number of parameters including climate, weather, statutory requirements and standards. Integrated planning places more of an emphasis on improving the selection of planning areas, because you need to have all the

terior surfaces which are technically very advanced and which don't take long to install. That enables planners to combine aesthetics and originality with functionality to help make patients' stays as pleasant as possible.

*Planning firms should seek advice from medical experts*

## MASTHEAD (IMPRESSUM):

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