

Tentative Schedule:

I-Sustain and The Integrated Design Lab's Scandinavian Study Tour



The Integrated Design Lab and International Sustainable Solutions (I-Sustain) in collaboration with BetterBricks are planning a transformative learning opportunity to evaluate innovative Scandinavian hospitals June 7-12. These hospitals embody high indoor environmental qualities for patients and staff, simultaneously using 25-50% the energy of average Pacific NW hospitals. Our vision is to bring Pacific NW design and owner teams together to see these projects first-hand and meet the design teams that made them a reality.

- **Sunday, June 7th:** Copenhagen, Denmark
 - Meet in Evening for Opening Dinner
- **Monday, June 8th:** Copenhagen, Denmark
 - Visit with Danish Energy Agency
 - Visit Emergency and Infectious Disease Unit at UMAS Malmö Sweden with Danish Architecture Firm, CF Møller.
- **Tuesday, June 9th:** Copenhagen, Denmark
 - Visit Rigshospitalet in Copenhagen, Denmark, an existing facility that has undertaken extensive energy efficiency measures.
 - Meet with Danish Consulting Engineering firm, Esbensen, leaders of the EU's "5 Innovative Hospitals Project."✈ Travel to Oslo, Norway
- **Wednesday, June 10th:** Oslo, Norway
 - Visit Akershus Hospital, with Danish architecture firm, CF Møller and engineering firm Interconsult.
 - Meet with White Arkitekter, designers of the New Karolinska Solna in Stockholm, Sweden, at Oslo School of Architecture and Design.
 - Optional dinner with White Arkitekter
- **Thursday, June 11th:** Oslo, Norway
 - Site visit of Rikshospitalet with Norwegian Architecture firm, MedPlan AS, also designers of St. Olav's Hospital in Trondheim.✈ Travel to Trondheim, Norway
- **Friday, June 12th:** Trondheim, Norway
 - Visit St. Olav's Hospital, with chief architect and lead engineer, and public relations manager from St. Olav's, MedPlan, and COWI engineering.
 - Visit Enova demonstration building, Norwegian Energy Ministry.
 - Farewell dinner

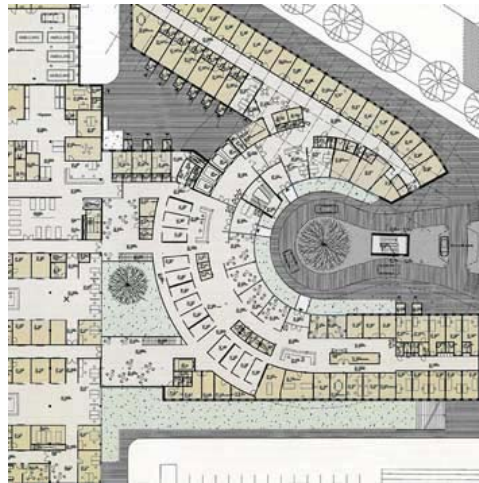
Emergency and Infectious Disease Unit

Universitetssjukhuset MAS, Malmö Sweden

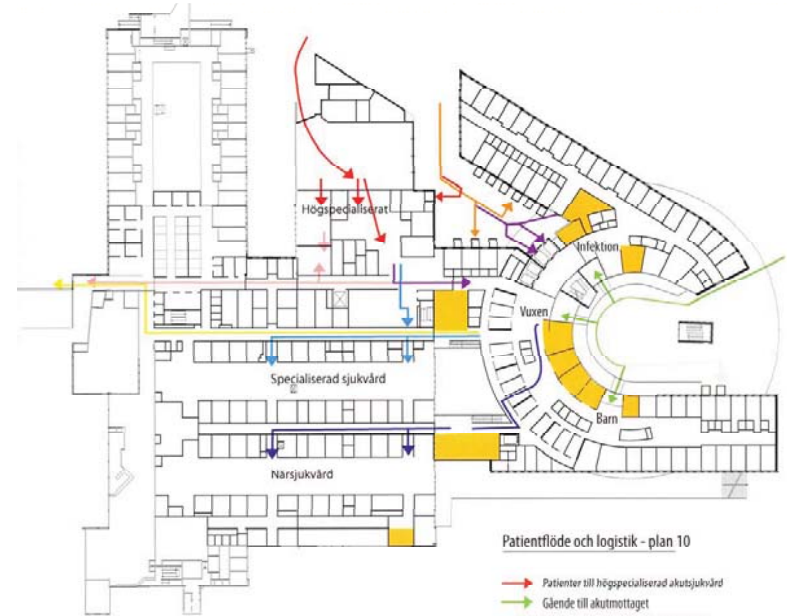
Location: Malmö Sweden
Architect: CF Møller in coll. with SAMARK Arkitektur & Design
Mechanical Engineer: Incoord AB, FLK Sverige AB
Opening: 2011
Size: 18000 m2 new building and 4000 m2 renovation

"The cylindrical emergency and infectious diseases unit at Malmö University Hospital, Sweden, is designed to minimize the risk of spreading diseases. The distinctive shape also provides a new landmark for the hospital complex. Patients enter the isolation ward via an airlock from the walkway that surrounds the entire building. The exterior lifts are used exclusively by patients of the infectious diseases unit and for hospital waste, while the interior lifts are used to transport staff, supplies and clean materials. Each storey can be divided into sealed-off smaller units in the event of an epidemic. C. F. Møller Architects furthermore designs fixtures for the emergency and infectious diseases unit."

-- CF Møller



Site Plan



Floor Plan

- Patientflöde och logistik - plan 10
- Patienter till högspediserad akutsjukvård
 - Gående till akutmottaget
 - Patienter till specialiserad akutsjukvård
 - Patienter till närsjukvård
 - Gående akuta patienter till röntgen
 - Akuta brittpatienter till CT etc.
 - Infektiosa patienter till infektionsmottag
 - Infekterade patienter till Vårdavdelning



Exterior View



Images courtesy of CF Møller and SAMARK Arkitektur & Design

Rigshospitalet

Location: København, Denmark
Opened:
Beds: 1,150 with 8000 staff. Campus covers 2.5 million SF
Energy Consumption:

“Rigshospitalet (Danish for The Kingdom’s Hospital), or simply Riget, is the national hospital of Denmark, located in the capital city of Copenhagen. Rigshospitalet is part of the Copenhagen University Hospital, together with the faculty of Health Sciences at the University of Copenhagen.

Rigshospitalet was founded in 30 March 1757 under the name “Kongelig Frederiks Hospital”, named after King Frederick V. It was back then located in Bredgade in central Copenhagen. Since 1903 the state has been the owner of the hospital (where as other hospitals in Denmark are owned by the Regions).

Rigshospitalet’s mission is to be Denmark’s leading hospital for patients needing highly specialized treatment. Rigshospitalet’s main specialist role has been enhanced in recent years by



Image courtesy of www.medicalrecruitment.ee



Image courtesy of www.rigshospitalet.dk © Rigshospitalet.

the decision that it should serve as the host institution for many of Copenhagen’s speciality departments. Because of this, other hospitals refer patients to Rigshospitalet for the unique expertise available there.” -- www.wikipedia.org

From the early 1990s to today Rigshospitalet has achieved energy savings equivalent to USD 5 mill./annum. Consumption of electricity has only risen approximately 15% since 1979. This example serves as an existing facility that has undertaken measures to maximize energy efficiency.



Image courtesy of www.medicalrecruitment.ee

Rigshospitalet · Copenhagen University Hospital

Blegdamsvej 9 • DK 2100 Copenhagen Ø • tel. (+45) 3545 3545 • www.rigshospitalet.dk

On weekdays after 14.45 and on holidays:
Free parking in the Rigshospitalet area

Important - if you come by car

Weekdays 8.00 - 14.45:

Only outpatients with a free one-day parking sticker issued by Rigshospitalet (i.e. patients for examination, treatment or control - exceeding two hours). The hospital parking sticker can be obtained from the ward or the out-patient’s clinic.

On weekdays, i.e. Monday to Friday 06.45 - 14.45 relatives and guests are not allowed to park in the Rigshospitalet area!

Relatives, guests and other patients - roadside parking in free 2-hour-zone, weekdays 8.00 - 19.00 Municipal parking stickers for more than two hours may be obtained from the hospital kiosk for 20 and 50 kroner. For further information, contact: Hotline 7015 1770

Only staff with a parking sticker issued by Rigshospitalet.

Bus and S-train
Further information on services and schedules can be obtained from HT, phone 2613 1415 (open daily 7:00-21:30) www.ht.dk or www.rjsejplanen.dk

Details about Copenhagen: www.aak.dk

BRIC.dk
Biomedical Research and Innovation Center under construction



Image courtesy of www.rigshospitalet.dk

Akershus

<i>Location:</i>	Oslo, Norway
<i>Architect:</i>	CF Møller
<i>Mechanical Engineer:</i>	AF Statkraft Grøner / Theorells
<i>Opened:</i>	2008
<i>Beds:</i>	735
<i>Energy Consumption:</i>	Est. 60 KBtu/SF•year

Akershus was just completed in the Fall of 2008 and is a more recent example of the contemporary pavilion style hospital. It was designed by CF Møller and displays their Danish design roots in its clean, straight lines in comparison to the more organic nature of Rikshospitalet. This hospital demonstrates that this form with horizontal adjacency between treatment block and patient wings is still relevant for the Norwegian hospital system.

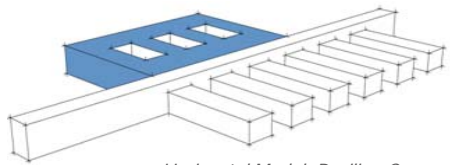
The hospital form is similar to Rikshospitalet, but the systems approach is even more contemporary in this example. 40% of the heating and cooling for the hospital is renewable energy using a combination of ground source heat pumping and seasonal energy storage.

The state-of-the-art systems include a closed loop ground source heat pump with 350, 200 Meter bore holes. The project also re-captures waste heat from systems equipment, medical equipment, lighting, people, and other heat generators. In this sense, this project has solved the thermodynamic equation, thus saving a substantial amount of energy.

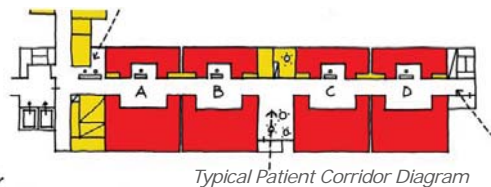
Patient corridors are organized in clusters where each group has seven patient rooms, with three single and two double rooms. Each cluster has a workstation for staff that has borrowed light, captured from above the bathrooms in the patient rooms. Between the clusters in the corridor is a lounge space for patients, family, and staff with an accessible outdoor deck.



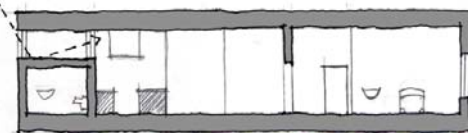
Aerial View



Horizontal Model: Pavilion Concept



Typical Patient Corridor Diagram



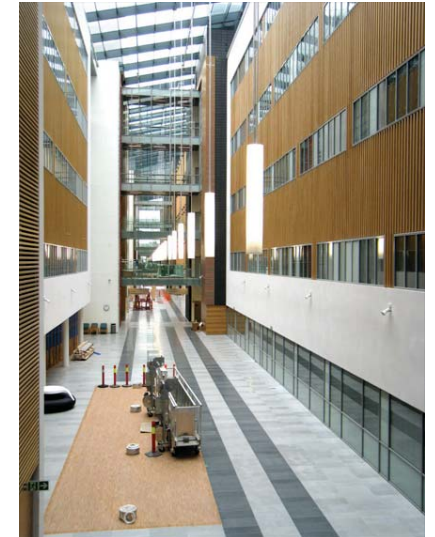
Section Through Nursing Station and Patient Room



NE Entry © CF Møller



Interior "Street"



Interior "Street"

The New Karolinska Solna

Location: Stockholm/Solna, Sweden
Architect: White Arkitekter
Mechanical Engineer: ÅF Consult
Opening: 2016
Beds: 600
Energy Consumption: Est. 50 KBtu/SF•year



Image Courtesy of Stockholm County Council



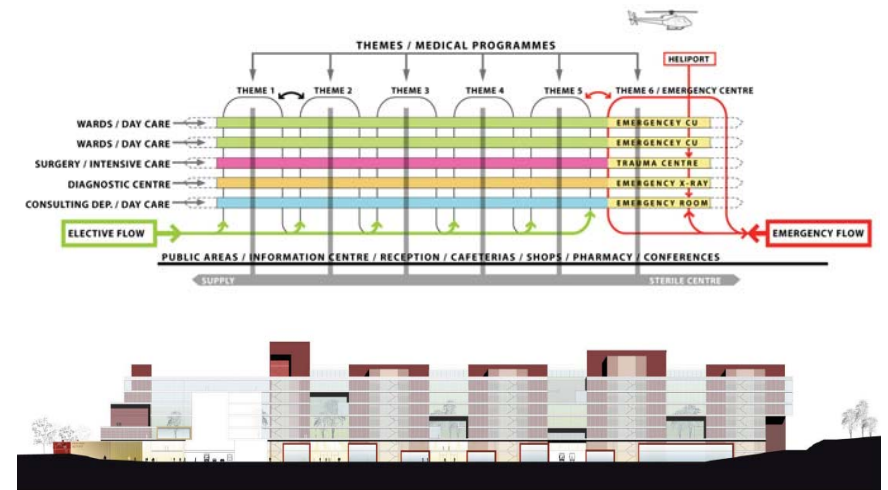
Image Courtesy of White Arkitekter



Image Courtesy of Stockholm County Council

"In 2015, Stockholm and Sweden will have one of the world's leading university hospitals, in the shape of the New Karolinska Solna. We were awarded the commission to design the new hospital in the face of stiff competition. However, White is also playing a key role in the unique working process that in future could lead the way internationally."

The New Karolinska Solna will also be the engine for the Stockholm region's investment in a world-class medical research centre. Achieving such an ambitious hospital, that will be around for decades, demands a great deal of consideration and planning. In the case of the New Karolinska Solna, the planning process has been exceptionally well thought out and comprehensive." -- White Arkitekter



Images Courtesy of Stockholm County Council

Rikshospitalet

Location:	Oslo, Norway
Architect:	MedPlan AS
Mechanical Engineer:	COWI
Opened:	2001
Beds:	585
Energy Consumption:	117 KBtu/SF•year

Rikshospitalet showcases the shift in typology from a predominantly vertical distribution to a horizontal distribution. This contemporary pavilion hospital draws its inspiration from Victorian hospital models, adapted to today's contemporary practice. This is the large National University research hospital that serves specialized patients from all over Norway. The philosophy that permeates the design is an environment that is for people. Its functional areas are organized as if the building is a town unto itself.

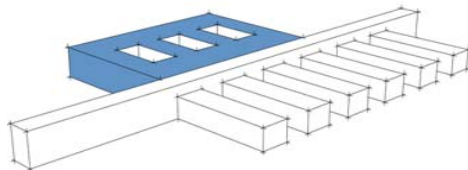
The wards and diagnostic and treatment areas in this hospital are horizontally opposed, and circulation between the two occurs on sky bridges that span the interior street. This shift in form creates the opportunity for plan-enclosed courtyards in the diagnostic and treatment area of the hospital, allowing daylight and views into spaces such as surgery and imaging.

This form incites a challenge in the floor-to-floor height variation between the treatment building and patient wings. In this example, the treatment floors are layered with interstitial floors so that they match up with the patient wing floors. In this case, the challenge becomes a benefit for the hospital. These interstitial floors allow for easy maintenance of systems, fast re-construction, and limit the disruption that occurs on the clinical floors.

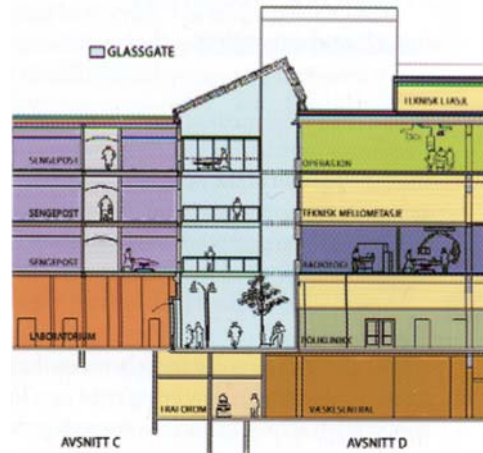
Patient rooms use displacement ventilation rather than a traditional overhead mixing system to deliver fresh air to the room and the Interior Street is naturally ventilated.



Aerial View



Horizontal Model: Pavilion Concept



East- West Section



Floor Plan



Courtyard in D & T



Operating Room



Interior "Street"

St. Olav's

Location: Trondheim, Norway
Architect: MedPlan AS, Frisk Arkitekter AS (Phase I) and Narud Stokke Wiig (Phase II)
Mechanical Engineer: COWI, Gunnar Karlsten
Opened: Phase I, 2004-6; Phase II, 2009-15
Beds: 802
Energy Consumption: 100-117 KBtu/SF•year



Aerial Site View

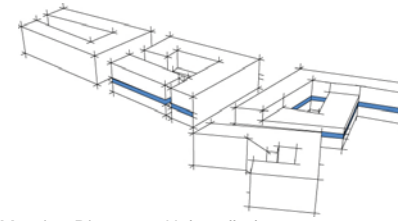
St. Olav's Hospital in Trondheim Norway is an example of a contemporary hospital designed with "community placemaking" in mind. Here, the horizontal concept is then pushed even further, with buildings spread apart (unbundled) into separate distinct centers of care that act as individual hospitals; while maintaining connectivity between the campus at the second level via sky bridges and underground through service functions. Each of the buildings preserves its own unique architectural character allowing the buildings to be recognized and distinguished from one another while softening the potential overwhelming institutional rhythm that might otherwise be created in such a large facility.



Exterior View



Patient Room



Massing Diagram: Unbundled

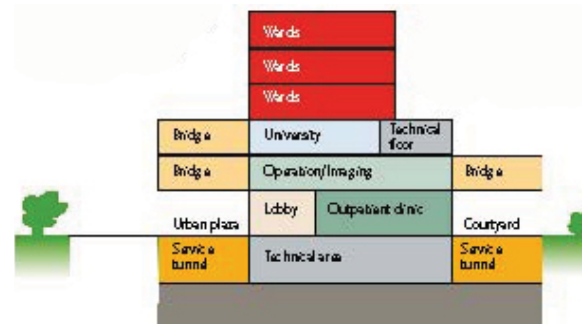


Courtyard of Women and Children's Centre

The Women and Children's Centre here is a great example of providing outdoor space and views within an urban setting. Every opportunity is taken to create spaces to be outside, throughout the hospital. It is a thin plan building that wraps around a large central courtyard. Patient rooms open directly onto decks or terraces. Generous windows daylight the patient rooms and provide light in the surgery suites. Daylight is controlled on all of the façades with automated exterior louver blinds that move with the movement of the sun. Micro-adjustments allow for personal control.



Women & Children's Centre Plans



Building Section