

**Hospital construction**

Walter Popp, University Clinics Essen, Germany



Since 6,000 years close connection between religions and healing.

Temples of Saturn, later of Asclepius in Asia Minor, were healing centers.

Brahmanic hospitals established in Sri Lanka around 400 BCE.

King Ashoka established a chain of hospitals in Hindustan about 200 BCE.



Valetudinarium (Roman military hospital)



Hospital Hotel-Dieu in Paris, 1482



Operation theatre, 1880



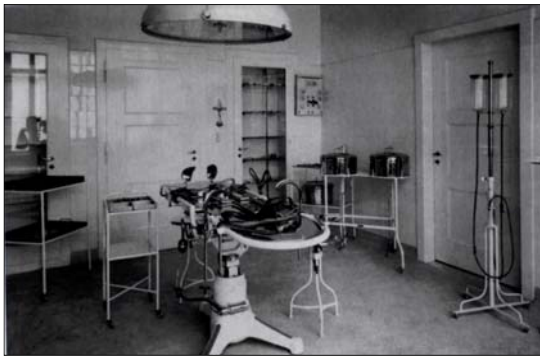
5



Sterilisation room, painting around 1900.



6



OT of Clinique Ste. Thérèse, Luxembourg, 1925



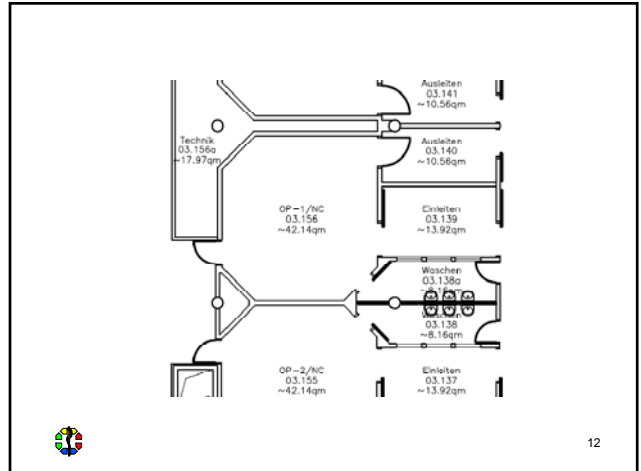
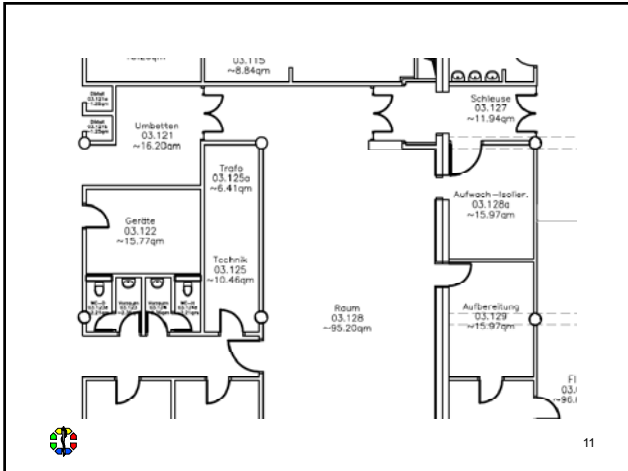
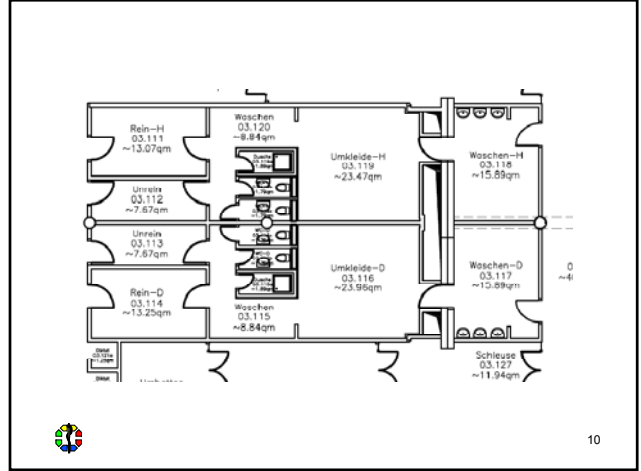
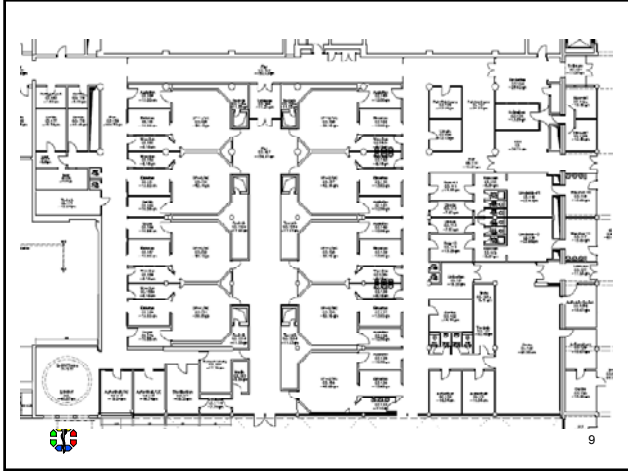
7

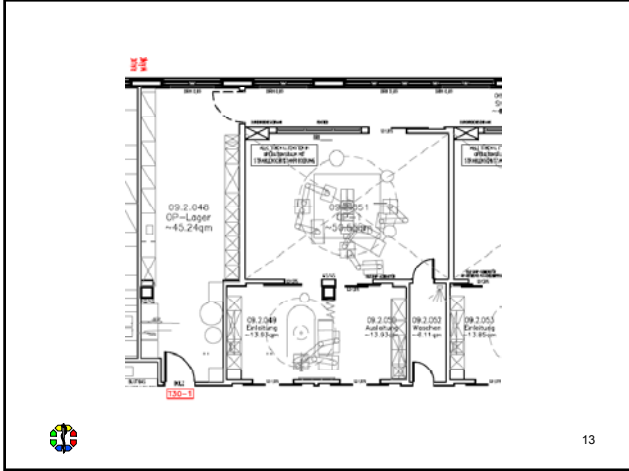


Women ward, Huysdens hospital (Essen) 1930/31

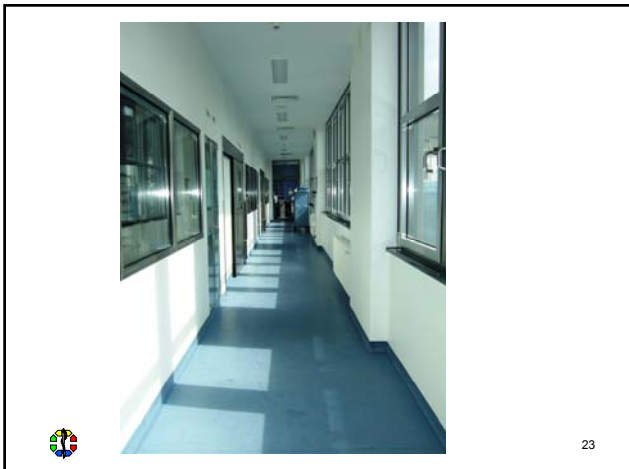
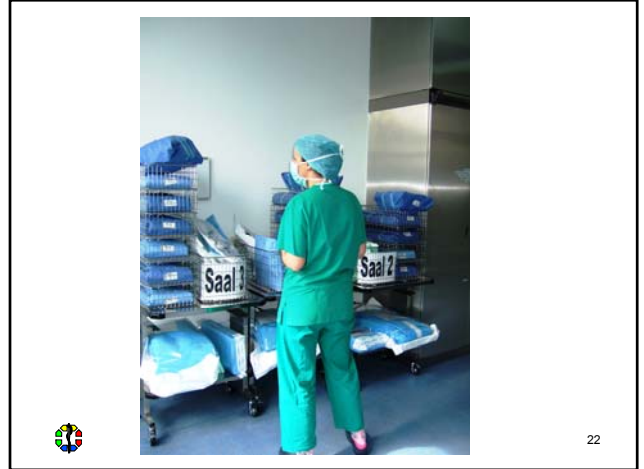


8



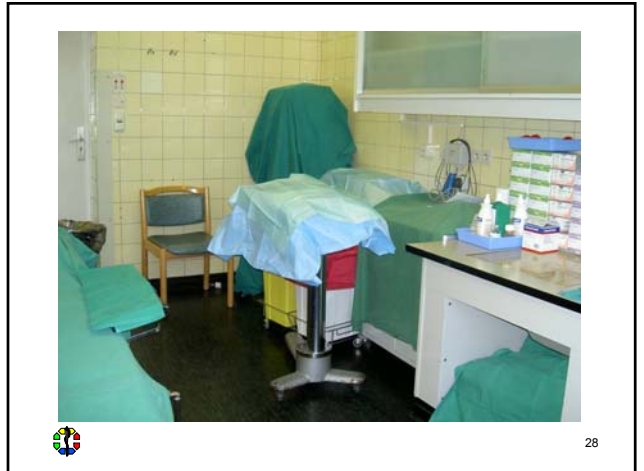




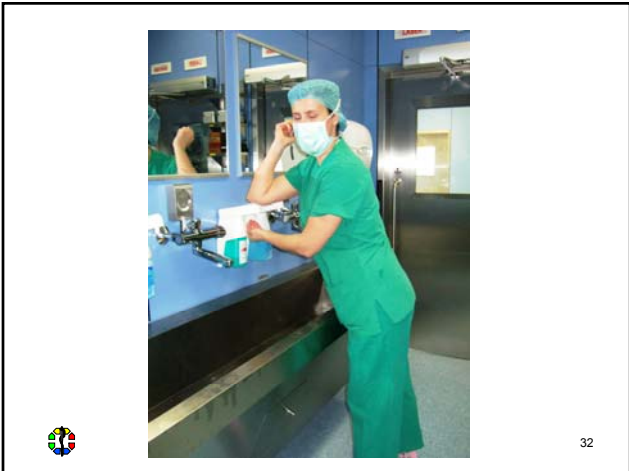


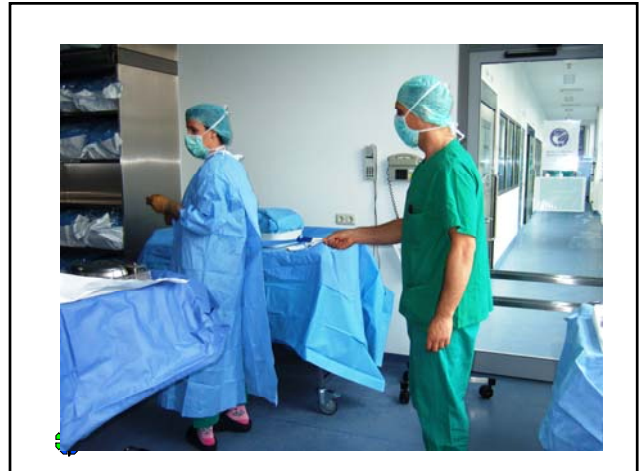
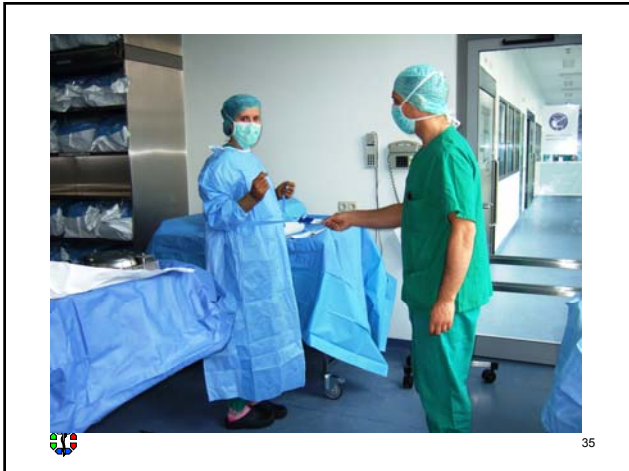


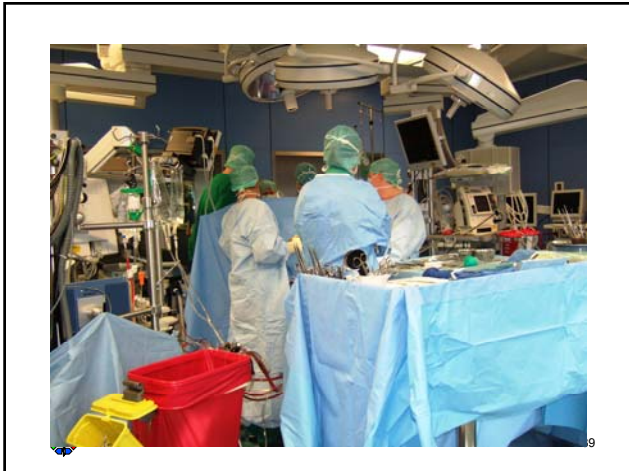
27



28







Surfaces must be smooth to be cleaned and disinfected.

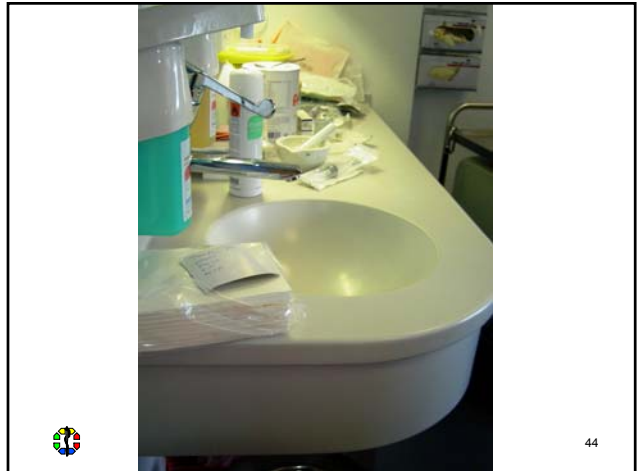
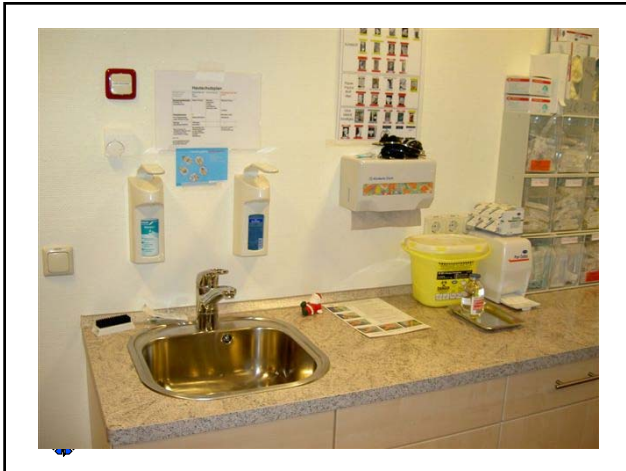
10



Clean and dirty areas must be separated.



42



44

**Floors**

Hard, withstand disinfectants  
Eg PVC

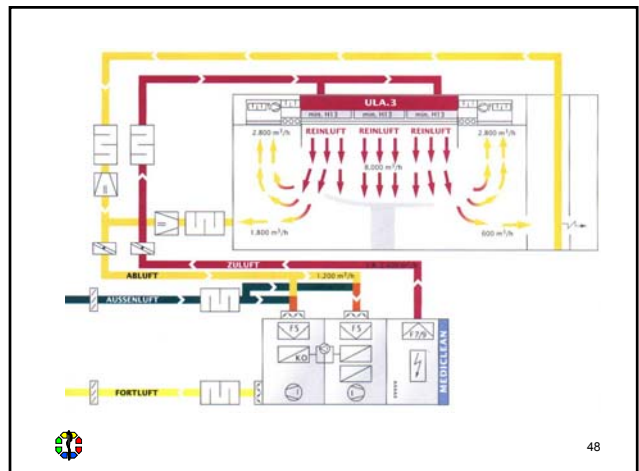
No wood  
No carpet

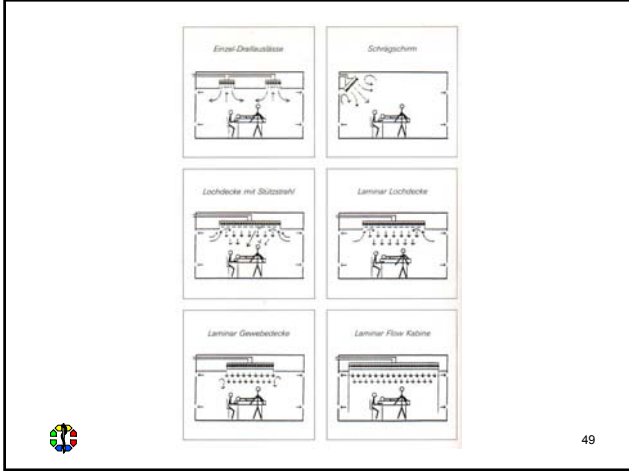
45

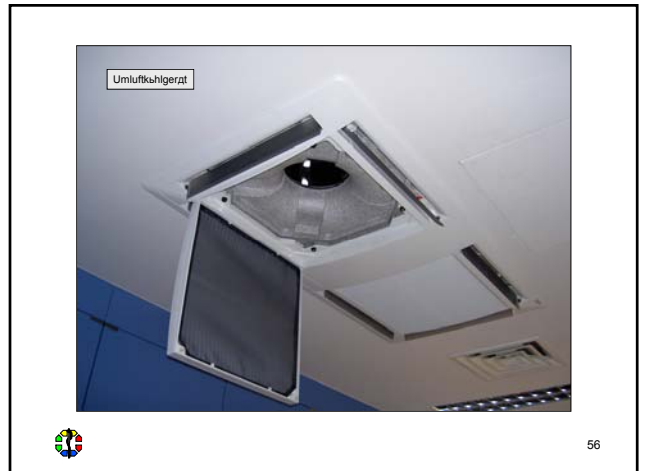
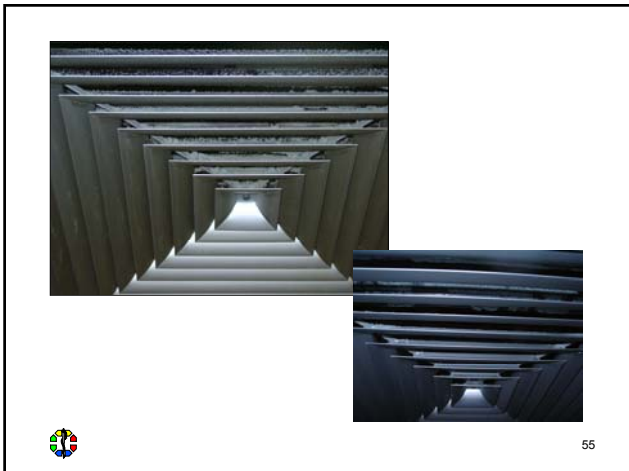


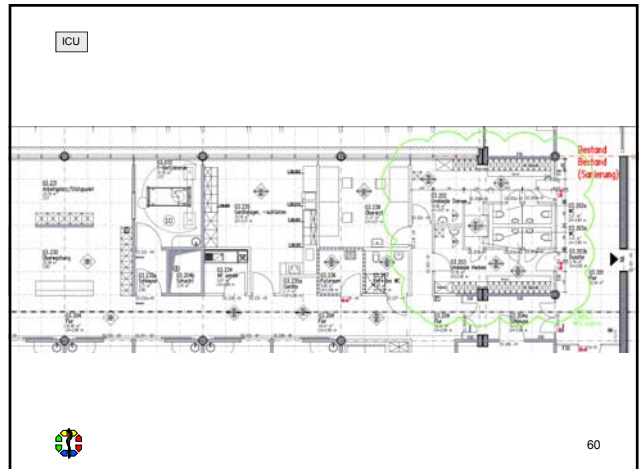
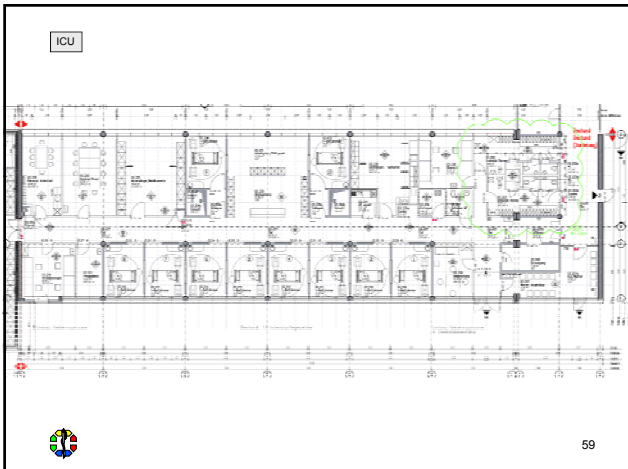
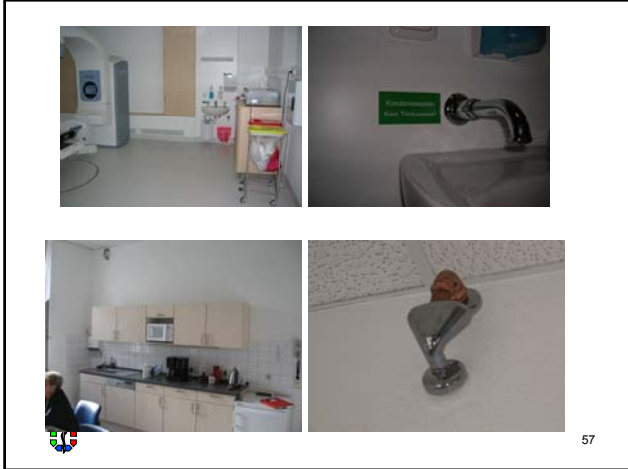
**Mechanical ventilation**

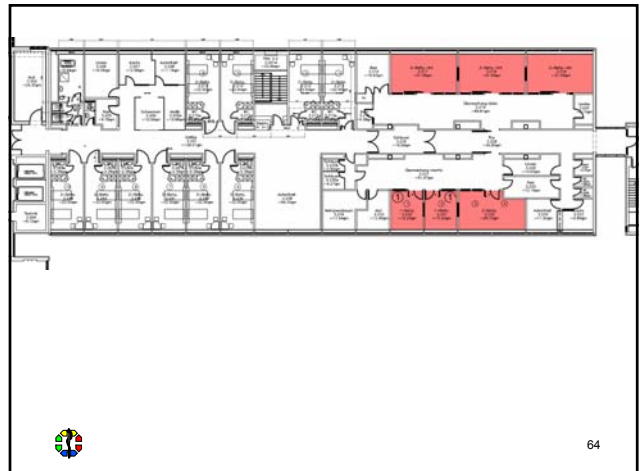
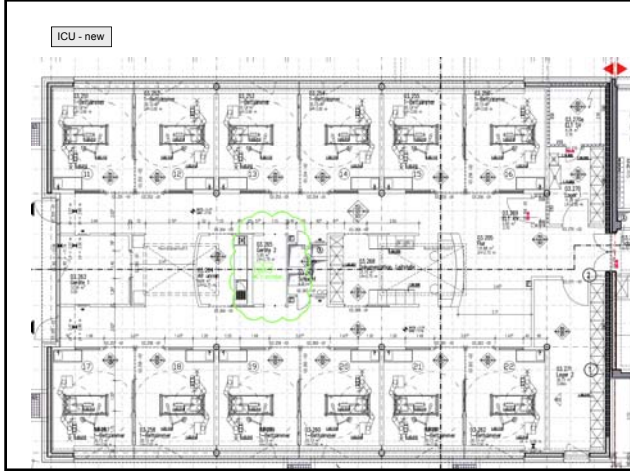
47

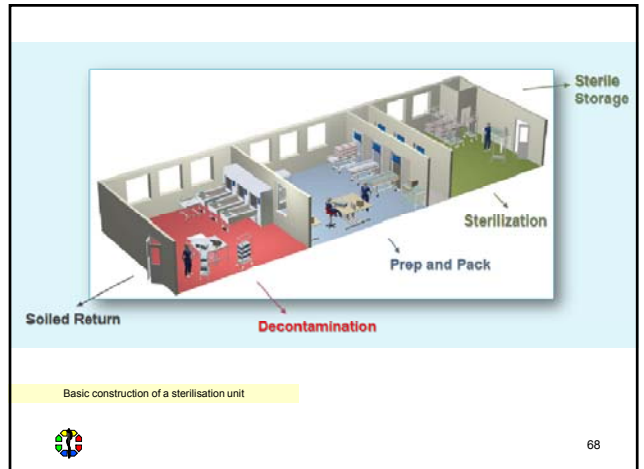


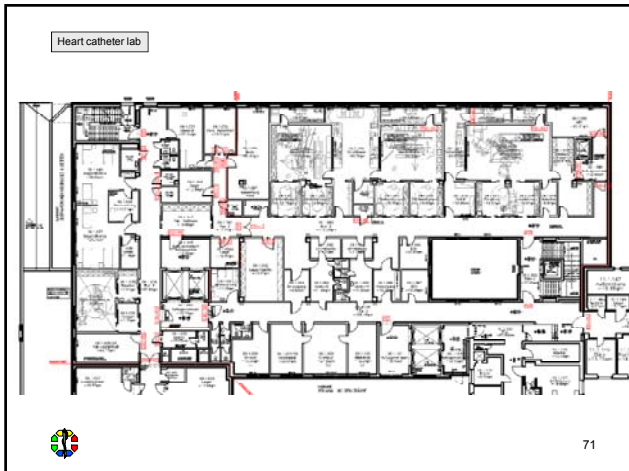
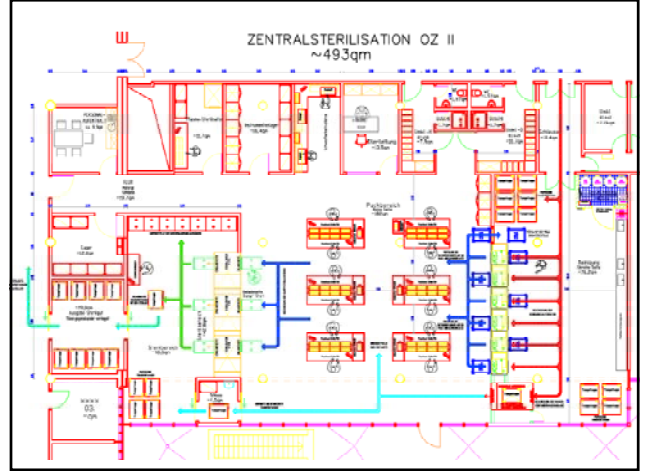
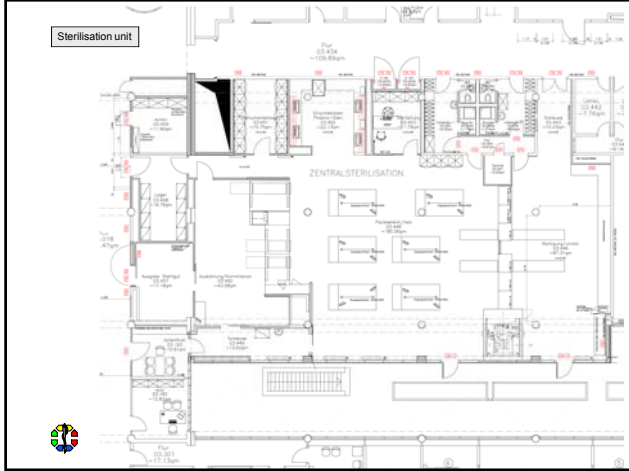














**Additional issues**

- Heating
- Cooling
- Water supply
- Toilets – for patients – for staff – sex-specific
- Room for cleaning car, supply, sink
- Clean and dirty room
- Staff room
- Room for goods supply
- Storage rooms
- Separate waste room
- Bedpans and bedpan washer





**Additional issues**

Hospital in one building:  
 + everything is rather close  
 - Renovations need lot of organisation, protection

Hospitals in different buildings:  
 + renovations are more easy to do  
 - Long ways, perhaps need tunnels for bed transport?

Height of building:  
 Think about enough elevators!  
 For staff and visitors  
 For beds  
 Elevators will never reach their final speed because they will stop on every floor!



74



International Federation of Infection Control  
[www.theifc.org](http://www.theifc.org)

→ Special interest group  
 → Healthcare facility design and construction interest group

Differentiated recommendations for low and high income countries:  
 Basic: even with severely limited resources, "this is what you should do as a minimum"  
 Standard: "this is what you should aim for in less wealthy countries"  
 Ideal: "if you have the resources, this is what you could do"

- [Design of a general ward](#)
- [Protection of immunocompromised patients during building work](#)
- [Emergency Unit](#)
- [Design of Intensive Care Units](#)
- [Design of a surgery block](#)
- [Ventilation to prevent airborne transmission](#)
- [Design of a Sterilisation Unit](#)



75

**Source Isolation**  
**embarrassing local discovery**

Southend University Hospital NHS Foundation Trust

**2003**  
 Rebuild of wards including two negative/positive pressure single isolation rooms.

**2003-2011**  
 Almost 100% occupancy, numerous open TB patients.

**2011**  
 Discovered air-supply had never worked!



ORIGINAL ARTICLES

## An outbreak of multi-drug-resistant tuberculosis in a London teaching hospital

A. S. Breathnach\*, A. de Ruiter†, G. M. C. Holdsworth‡, N. T. Bateman§, D. G. M. O'Sullivan‡, P. J. Rees§, D. Snashall¶, H. J. Milburn§, B. S. Peters†, J. Watson||, F. A. Drobniewski\*\* and G. L. French\*

A ... patient with ... tuberculosis developed MDR-TB... She was admitted to an isolation room... , but the room, unbeknown to hospital staff, was at positive pressure relative to the main ward.

Seven ... contacts developed MDR-TB.