Personnel-Centered Study
for Advancing the Quality of Hospital Care

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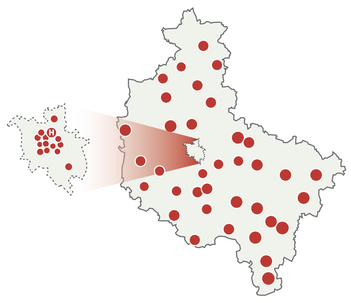
The study explores an experimental Personnel-Centered approach for improving healthcare. Research investigates medical staff routine and movement tendencies within healthcare facility to identify and reveal critical areas of hospital spatial organisation and circulation. Investigating and taking into consideration personnel perspective is of the highest importance to enhancing the quality of healthcare for both carers and patients.
Personnel's perspective is crucial to optimally design their work environment. Since staff wellness matters for patient care, hospital should positively support their wellbeing and therefore their work by increasing their productivity and reducing risks including medical errors. Spatial organisation and its efficiency plays a significant role in advancing care quality, patients' satisfaction and overall hospital performance.
The research was carried out in the city of Poznan (Greater Poland).

CONTEXT + INITIAL FINDINGS + METHODOLOGY + CASE STUDY + DESIGN CONCEPTS

The ongoing research has genuinely essential meaning for the Greater Poland region, where there are 60 general hospitals and 45 public hospitals functioning. Among 3.484.975 citizens of the region there are 11.000 doctors and twice as much of nurses employed. It can be observed from open government data, that there are only 32 employed doctors and 13 nurses for 10.000 citizens, while the whole number of citizens in the Poznań agglomeration is 647.018. The above presented parameters are the motivation for focusing research on the quality of medical carers' work.

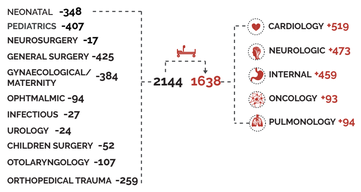
While population is ageing and the lack of medical carers can be noticed, the demand for health care services increases. A better and technologically innovative equipment for personnel is considered to relieve carers from unnecessary activities and let them focus on the most important tasks. To enhancing human experience, both medical staff and patients, a priori to technological innovation the spatial organisation needs to be optimised.

HOSPITAL NETWORK



Hospital Network is a coordinated group of hospitals, that improves organisation of providing healthcare services. There are 50 hospitals in the Network in Greater Poland and 553 in the Republic of Poland.

NUMBER OF BEDS **IN DIFFERENT WARDS PROGNOSED TO BE REDESIGNED IN 2029**



"The present study supported the view that aesthetic environmental enrichment of a surgical ward, including colour, textile and photos, was perceived as positive by **health professionals**. Related to their experiences and expectations the environmental enrichment promoted a perceived positive atmosphere and an enrichment of their work circumstances.";[1]

"Research indicates that **staff wellbeing, productivity and satisfaction** are linked with a hospital's physical environment, in particular the aspects that are determined during early design stages of a building's life cycle. Incorporating healthcare providers' perspectives during the design of a facility is, therefore, essential to create an effective therapeutic environment"[2]

The physical environment plays an important role in improving the **health and safety for staff**, increasing effectiveness in providing care, reducing errors, and increasing job satisfaction. These improved outcomes may, in turn, help in reducing staff turnover and increase retention — two key factors related to providing quality care in hospitals. However, it has become increasingly clear that efforts to improve the physical environment alone are not likely to help an organization achieve its goals without a complementary shift in work culture and work practices"[3]

1. Wilkstrom B. , Westerlund E., Erkkila J., *„The healthcare environment - The importance of aesthetic surroundings: Health professionals' experiences from a surgical ward in Finland", Open Journal of Nursing,* 2012, 2, 188-195

2. Mourshed M., Zhao Y. , *„Healthcare provider's perception of design factors related to physical environments in hospitals"* Journal of Environmental Psychology 32, 2012, 362-370.

3. Joseph, A. "*The Role of the physical and social environment in promoting health, safety, and effectiveness in the healthcare workplace. Concord*", CA: The Center for Health Design. Issue Paper www.healthdesign.org

"Too little space dedicated to examine a patient"

"Too little space for transporting patients on beds"

"Lack of designated space for patient consultations"

"Lack of overall architectural cohesion"

"Storage space difficult to access, used continuously"

"Cramped spaces"

"Too little number of toilets and common rooms for personnel"

"Too small patients' rooms"

"Too narrow doors"

"Patients' rooms in pediatric wards should include space dedicated to parents of their hospitalised children"

"Too little space; tawdry colors; uncomfortable furniture"

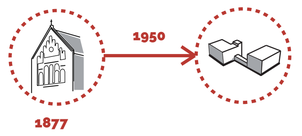
"No access to the bed from any of the 3 sides"

Mixed methods have been used in order to understand personnel's perception of their work space quality. The undertaken research aimed to gather and compare both quantitative and qualitative data. The collected information through survey was juxtaposed with a map of communication channels and simulated medical staff movements within healthcare facility. The gathered data was evaluated in a relation to one of the hospitals in Poznan. Case study analysis undertaken within this facility parallely, have transformed to a design probe.
The analysis of this multicriterial methodology were built on literature review and tailored to the context of polish healthcare system condition. It aims to allow evaluation of functional connection qualities in hospital to establish the basis for modernisation (Post-Occupancy Evaluation for hospitals).

An 12-item questionnaire was designed to collect the data from health professionals of Poznan public hospitals. It was used to gather perspective of different profession such as nurses, midwives, doctors, interns etc. The original versions of the items were selected to gather both quantitative and qualitative data. Its structure assumed to become a continuation of M. Mourshed and Y.Zhao study published in Journal of Environmental Psychology (2012).

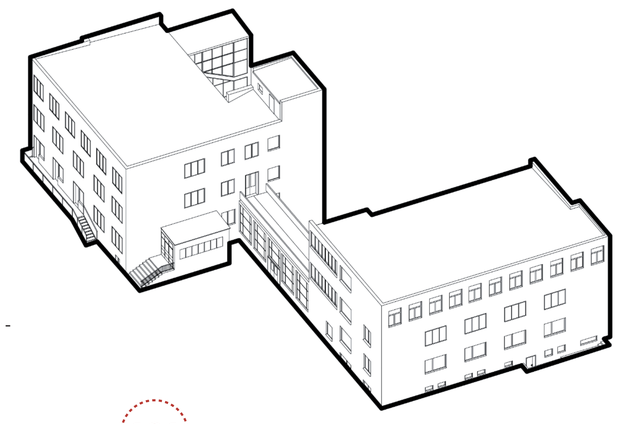
First part of a questionnaire was to investigate both physical and psychological load of medical staff work and perception of the quality of their workspace.
In the next part, respondents were asked to evaluate the influence of listed environmental design aspects on the influence it has on work quality and general frame of mind (which they rated from 1 to 5, 1- no influence, 2- small influence, 3-medium influence, 4-significant influence, 5- very significant influence). Among those elements were: lighting, acoustics, air quality, colour, furniture, closeness to nature etc. Further on, respondents were asked to assess to what extent new technologies in healthcare can improve personnel's work?
Respondents were also asked to describe some possible spatial issues that might need improvement. The aim of open-ended responses was to allow listing specific impediments they find in their workspace design. In one of the last questions health professionals were subjectively indicating the causes of medical errors.
Overall goal was to identify critical areas of hospital spatial organisation and circulation. That knowledge could significantly help in improving the quality of space within healthcare facility for creating a better workspace for health professionals which could result in advancing the quality of hospital care.

HOSPITAL ON SPORNA STREET



IN 1877 FIRST PAEDIATRIC HOSPITAL IN POZNAŃ WAS BUILT, ON KRYSIEWICZA STREET. IT WAS 4TH CHILDREN HOSPITAL IN POLAND.

In 1950 the hospital got new building on Nowowiejskiego.



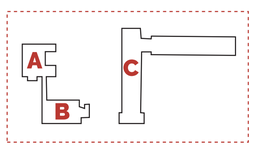
The hospital was designed by famous architect from Poznan - Wladyslaw Czarnecki.

411 number of beds of all paediatric hospitals in Poznan

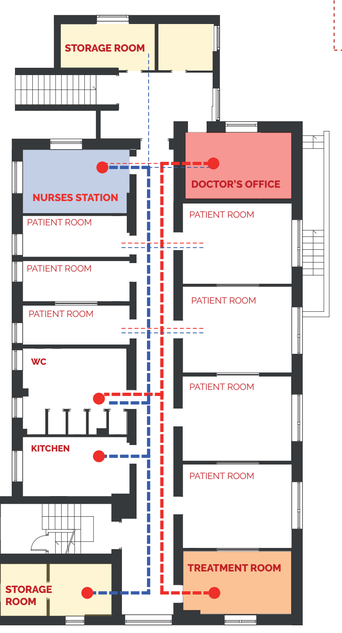
7201 number of children hospitalized in a year

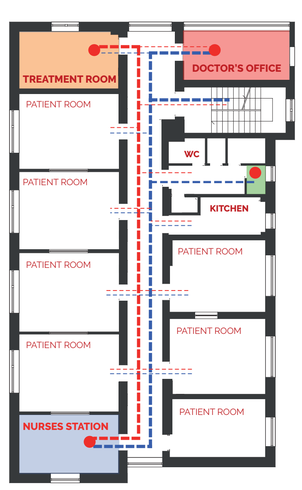
125 number of beds in the hospital on Sporna Street

101 doctors
3 pharmacists
264 nurses
4 physiotherapists
76 midwives
27 medical technicians
90 medical personnel



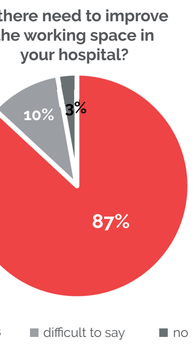
		beds	patients	patient rooms	bed per patient room
A	ISOLATION WARD	55	1452	19	2,89
B	OLDER CHILDREN WARD	25	600	6	4,17
B	INFANTS WARD	45	1025	17	2,65
C	CLINICAL SUPPORT SERVICES	47337 SERVICES GIVEN IN A YEAR			

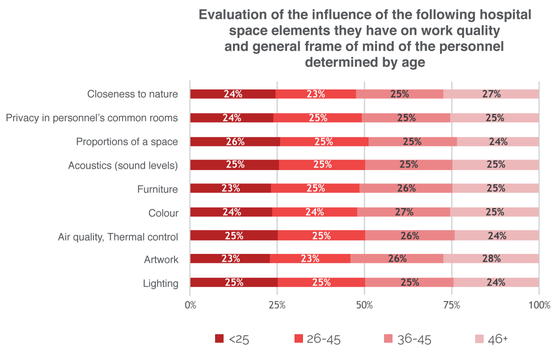


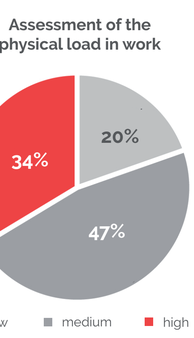


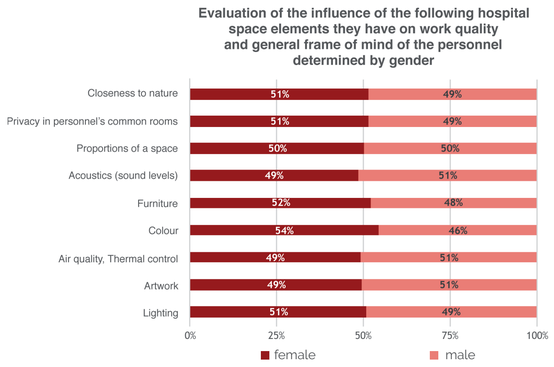
Analysis of communication channels, personnel paths and location of strategic functional areas on children wards.

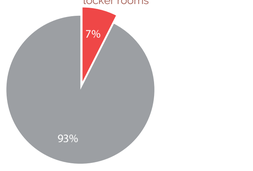
NURSE'S CRITICAL PATH
DOCTOR'S CRITICAL PATH
NURSE'S OTHER PATHS
DOCTOR'S OTHER PATHS
CRITICAL DISTANCE
COMMUNICATION COLLISION



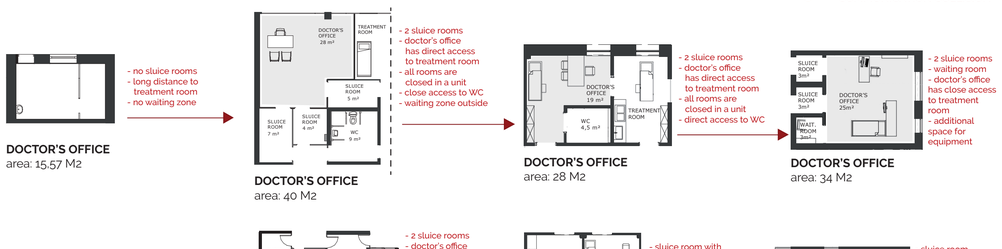


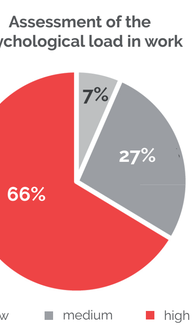


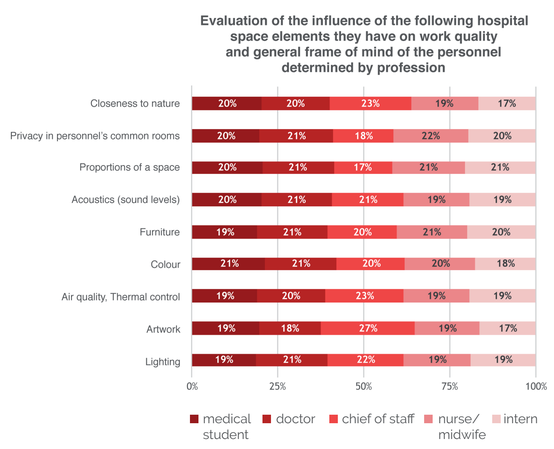


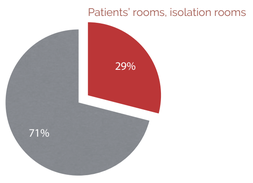


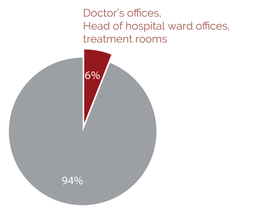
Percentage of specific zones in Sporna Hospital

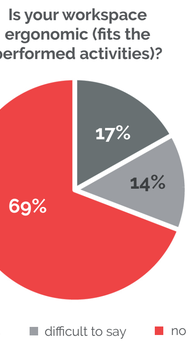


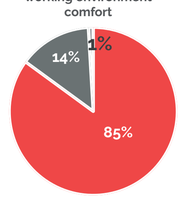


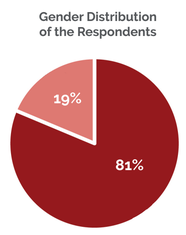


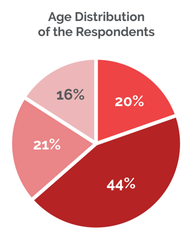


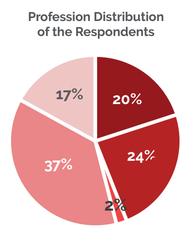












Diagrams of arrangement problems in the concept of modernisation project of Sporna Hospital (expertise by professionals)

A 12-item questionnaire was used to gather perspective of nurses, midwives, doctors, interns and medical students. The majority of respondents were female healthcare providers (80%), aged 36-45 (44%) working as a nurse/ midwife (37%) and as a doctor (20%).
More than half of respondents assessed psychological load of their work as high (66%), whereas only 7% described it as low. 34% of them considered their work of a high physical load and almost half of respondents (47%) as medium. 66% of health professionals participating in the study found the ergonomics of their workspace negatively. 87% of respondents, being a statistically significant result, believed that it is necessary to improve and redesign their workspace.
Respondents ranked acoustics (sound levels), lighting and the proportions of a space as factors associated with the working environment comfort the most.
Further analysis were applied on the responses to investigate the relationship between perceptions of environmental design factors and variables in age, gender and profession of respondents.
The biggest differences between female and male respondents were found in perceiving colour as an important environmental factor (colour was more significant to female). When the data are demarcated by age, it can be seen that artwork, closeness to nature and colour are the factors assessed differently by young and older health professionals.
Moreover, *artwork, lighting and air quality/ thermal control* were those elements rated high by chiefs of staff, whereas in nurses and midwives opinion, artwork had the least significance. This group of personnel prioritised the proportions of a space (rooms).

In conclusion, taking into consideration the gathered perspective of medical staff, it seems that there is need for improving personnel's work space quality. The voice of healthcare professionals in hospital modernisation projects should be acknowledged. However, their feedback should be evaluated in regards to their profession, age and gender as all these variables may determine different expectations and preferences of working environment characteristics.

Diagnosis of critical areas and their spatial sense in existing hospital modernisation

+ **Redesign of patients' rooms:** *increase surface areas, modify design arrangement (access to private bathrooms, more quality space for personnel, space for medical equipment), additional space for parents and family visitors*

+ **Redesign and completion of areas dedicated to treatment rooms:** *optimise communication for medical personnel, increase surface areas, create sluice rooms, modify design arrangement, create waiting rooms near treatment rooms*

+ **Redesign of areas dedicated to the personnel:** *concentrate within areas of units, increase surface of social rooms, locate near treatment rooms and storage rooms*

+ **Reorganisation through improvement of communication channels:** *shorten communication channels, eliminate functional confusion in areas of units, eliminate crossing communication channels, eliminate critical communication collisions*