

# Ageing, Health Technologies and the Built Environment Developing a New Research and Policy Agenda

Paper delivered at  
Halifax Hall, University of Sheffield  
29 May 2003

## Attitudes to and Perceptions of the Built Environments in NHS Trust Hospitals Considerations for better design technologies

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# Plan of presentation

1. Raise questions about better design technologies in healthcare buildings. For whom?
2. Research questions / aims
3. Approach & methods
4. Findings as related to design technologies
5. Suggestions and conclusions
6. Towards a new research agenda

# Better design technologies in healthcare buildings for whom?

- Healthcare buildings, designs and provisions of facilities should be responsive to patients needs by:
  - Physical ability/disability
  - Mental health
  - Age group
  - Ethnicity
  - Culture
  - Gender.
- They should provide for patient friendly environments for all groups of people.





# Better design technologies for whom? Everything but the patient!



**Admitting**



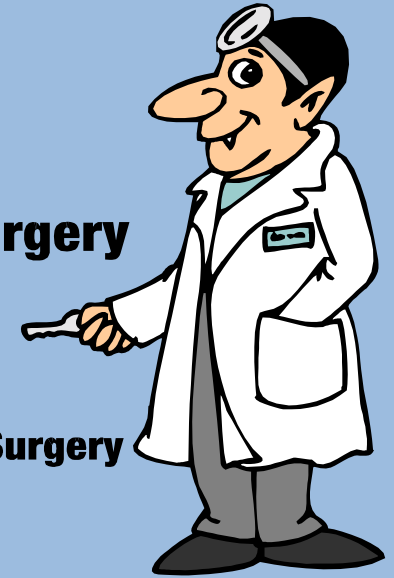
**Emergency**



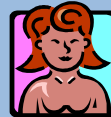
**Waiting Room**



**Surgery**



**Blood Work**



**Gynecology**



**Intensive Care**



**Burn Unit**



**Plastic Surgery**



**Maternity**



**Nursing Station**



**Orthopedics**



**Medical Aids**



**Pediatrics**



**Prosthesis**



**Podiatry**



**Psychiatry**



**Pharmacy**



**Rehabilitation**



**Counseling Services**



**Volunteer Services**



**Physiotherapy**

# Systems-led designs!

- Large demand from each area involved with healthcare provision
- Easy for designs to be systems-led
- Designs must be careful of being supply-led
- Designs should be that which are best for the user and not what is best for the system



We were interested in finding out what was best for the patient-user and not what was best for the system.



# Aims of the research

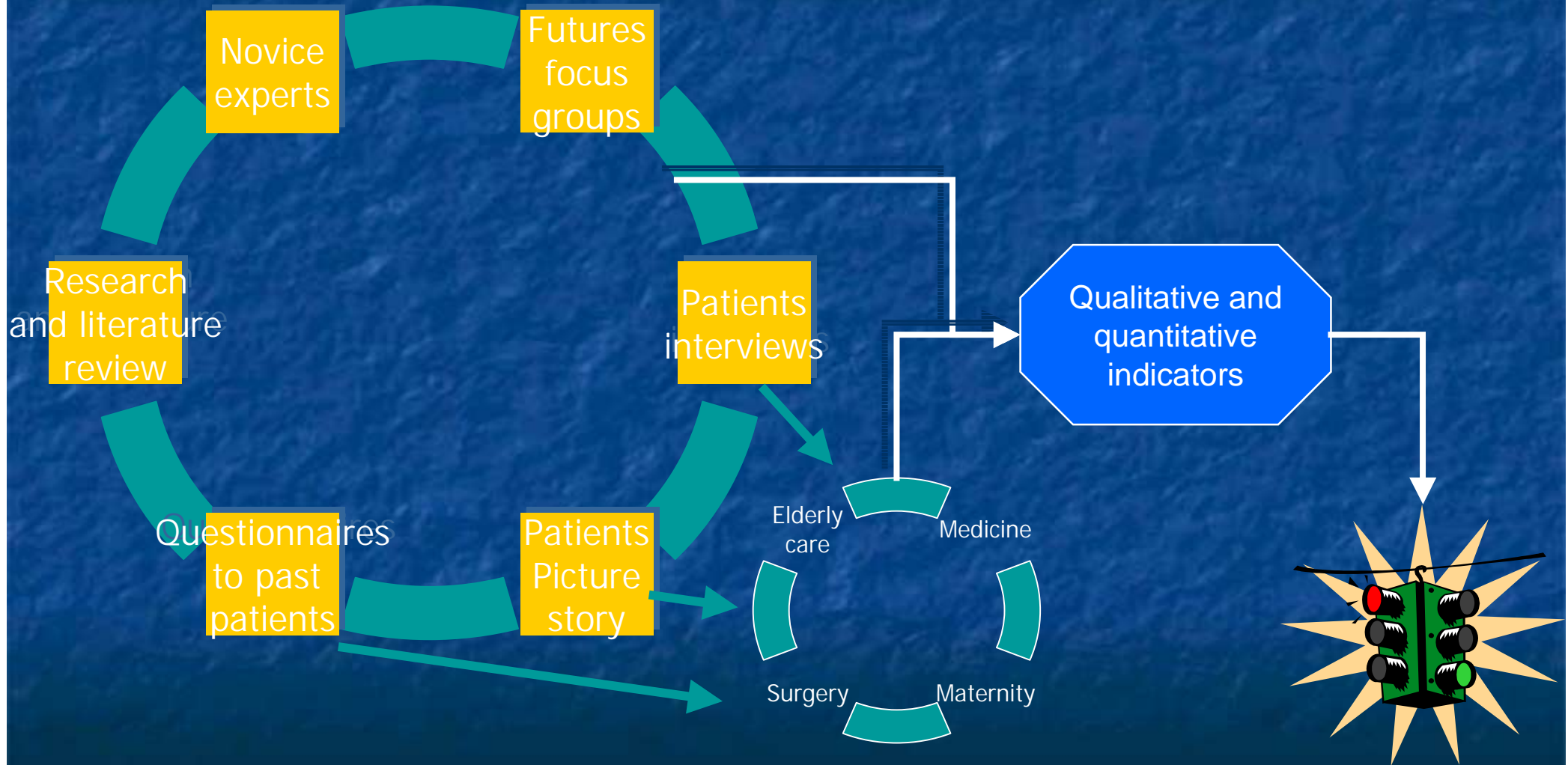
- To explore stakeholders' perceptions and views of current and future provisions of the built environments of NHS Trust hospitals, including:
  - Internal areas, including wards, transitional areas and public spaces
  - External areas and landscape
  - Aesthetic considerations
- To inform NHS Estates, in developing their vision, philosophy and evaluation criteria for design quality.
- To determine what was best for the patients and not what was best for the system.



# Research questions

- What were patients' perceptions of the environments and facilities provided in NHS Trusts and in which they socially interact with others?
- What was the nature of their experiences of the built environments and their responses as they journey through a hospital site, and how does it affect them?
- What were their understandings or definitions of a 'friendly environment' and what do they consider should be done to improve it?
- What were the preferences of these stakeholders regarding the type of facilities they want the NHS to provide?
- Given the cost of providing some facilities, were they willing to pay? What are the main deciding factors?
- What were the principal patient-led indicators of design quality for patient-friendly environments?

# Research Methods





# Questionnaires - gender and age

Age group	Male	%	Female	%	Total	%
Under 18	4	1.1%	3	0.8%	7	1.0%
18-24	9	2.5%	14	3.9%	23	3.2%
25-34	29	8.0%	30	8.4%	59	8.2%
35-44	41	11.4%	55	15.4%	96	13.4%
45-54	66	18.3%	73	20.4%	139	19.4%
55-64	75	20.8%	65	18.2%	140	19.5%
65 and over	137	38.0%	117	32.8%	254	35.4%
Total	361	50.3%	357	49.7%	718	100.0%

Excludes 67 missing cases

# Findings: - Where design technologies can enhance psychological stimulus and the elemental components of perception

## Vision

Visual functions  
Light and reflections  
Factors affecting functioning  
Factors relating to colour  
Brightness and contrast  
Temporal factors in visual perception

## Spatial

Spatial resolution  
Spatial interaction

## Space and motion

Visual space perception  
Visual motion  
Mobility

## Pattern, object, colour hue and wavelength

Organisation and form  
Perceptual stability and clarity  
Perceptual illusions  
Attentional and emotional aspects of pattern perception  
Subjective description and ordering of colour  
Physical ordering of colour

## Vision and art

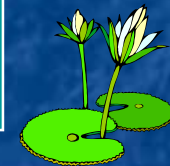
Natural perspective  
Linear perspective  
Appreciation of art

## Hearing

Perception of sound  
Auditory stimuli  
Speech  
Auditory reaction

## Smell and taste

Odour and stimulant  
Odour pollution  
Chemical signals in the environment



# Design technologies and biological needs for environmental information ...

Environmental aspects representing biological needs for visual information	Critical times/ situations	Visual information required to surmount the problem from the situation perceived
Orientation	At all times	<ul style="list-style-type: none"> <li>■ Level horizontal reference clues</li> <li>■ Definition of ground surface contours enclosing boundaries, obstructions, level changes</li> <li>■ Location relative to destinations and exits</li> </ul>
Physical security	When danger is expected	<ul style="list-style-type: none"> <li>■ Location of potential threats</li> <li>■ The nature of the surrounding enclosure</li> </ul>
	When danger is expected because the structure is perceived as threatening	<ul style="list-style-type: none"> <li>■ Comprehensive structure with clear continuity and visual logic</li> </ul>
	When danger is expected from fire	<ul style="list-style-type: none"> <li>■ Location of control and prevention equipment, visible escape routes</li> </ul>
	When danger is due to intense light or glare	<ul style="list-style-type: none"> <li>■ Reduce lighting levels</li> <li>■ Use glare shields</li> </ul>
	Due to unsanitary conditions	<ul style="list-style-type: none"> <li>■ Maximum evidence of high sanitation standards</li> </ul>



## .....design technologies and biological needs for environmental information

Environmental aspects representing biological needs for visual information	Critical times/ situations	Visual information required to surmount the problem from the situation perceived
Relaxation of body and mind	During sleep During work While awake, but idle	<ul style="list-style-type: none"> <li>■ That required to maintain sensation of security</li> <li>■ Uniform condition of light</li> <li>■ Uniform condition of sound</li> <li>■ Uniform condition of temperature</li> <li>■ Interesting visual rest centres</li> <li>■ Interesting visual environment</li> </ul>
Adjustment of the biological clock	Continuous need, particularly strong in unfamiliar situations	<ul style="list-style-type: none"> <li>■ Awareness of the state of the diurnal cycle, since luminous conditions in interiors are evaluated with reference to external conditions</li> </ul>
Contact with nature, sunlight and with other beings	Interior environments	<ul style="list-style-type: none"> <li>■ Evidence of sunlight in every space or in nearby and accessible spaces</li> </ul>
Definition of personal territory	Particularly in public or work environments	<ul style="list-style-type: none"> <li>■ Visible evidence of personal control and occupational territory</li> </ul>

# Individual factors identified by novice-experts where design technologies can be useful



- Good signage and way-finding to aid the patients' journey
- Good controllable lighting for natural and homely environment
- Privacy for patients' dignity, confidence and assurance
- Reduced noise levels in internal and external areas
- Temperature control for personal comfort and relaxation
- Access to natural environments, including views of nature
- Safety and security in internal and external areas
- Internal and external children's play areas
- Accommodation for visitors and relatives
- Shops and personal services
- Good around the clock catering facilities
- Good landscape designs with seating and garden areas



# Futures groups – Experiences and perceptions

## First experiences and perceptions

- Daunting to approach and difficult to way find, poor orientation
- Smell / odour
- This was described by one woman as a 'lingering smell' – so bad that she needed to change her clothes when she got home from visiting.
- Sound
  - For another the perception was of a "low but permanent background sound on the air"
- Visual factors
  - Poor ward designs, curtains
  - High windows sills, "we only see the ceiling and the sky"
- Little private space for families

## Perception of ground and landscape

- Walls and railings designed to keep people in.
- Encased in a car park, too much concrete not enough landscape
- Few places to sit in the grounds.
- Road systems and grounds were confusing.
- Car parks and grounds are not safe places.
- Disabled people have difficulties in getting into the building.
- Access at SRHT is difficult because there are hills up and down to the outpatients entrance.
- "See something when you look out, not just buildings enclosed by car parks".





# Perception of corridors and public spaces

- Participants felt that hospital corridors were not patient-friendly.
- Perceptions and subsequent dissatisfaction with current facilities were summarised by one participant who asked: “Why make people more disabled than they are”?
- With outpatients departments being far from the parking areas, attendees found that they had to walk too far.
- Disabled facilities were not always appropriate to meet individuals’ needs.



# Perception of entrances, reception areas and public spaces

- Casualty was an area where people sought privacy, but which was difficult to find.
- Participants spoke of 'people walking round them'.
- A lack of security and a feeling that current layouts were too open plan
- Too many types of different patients were together in one open space.





# Ward environment and designs

- Preference for four-bed bays and single rooms in future designs
- All groups identified the need for full en-suite facilities to be provided at least within every four-bed bay.
- Group members felt that current facilities did not allow for confidentiality:
  - “patients know what’s wrong with the person in the next bed –
  - there is no confidentiality”.
- Many group members pointed to the need for a quiet area for people to speak and express emotions in private.
- This is illustrated in the following extracts:
  - “Get away from being around the bed.”
  - “Hard to have conversations in hospitals, should be able to go to family type rooms.”
- There was reportedly,
  - insufficient space around beds for visitors’ chairs;
  - few wards had any facilities for patients and visitors to have a drink or get something to eat nearby.
  - this was the case even when they needed to stay close to very ill patients for many hours.
  - provision of overnight accommodation for family and friends was almost non-existent.





# Patients' interview – seven key themes to which design technology can contribute

1. A sense of personal space related to their need for privacy and confidentiality
2. A homely, welcoming atmosphere that promotes well-being and relaxation
3. An environment that meets the needs of visitors and family members
4. Physical design which promotes and helps to maintain independence through usability, accessibility and controllability
5. Access to external areas that promotes a sense of normality through large windows, pleasant outdoor views, balconies and courtyard areas
6. Supportive environments for effective communication between patients, staff and relatives
7. Facilities for recreation and leisure activity that meet personal and visitors' needs and something to occupy the mind.



# Questionnaires - rating of ward facilities

Facility	Very good	%	Good	%	Satisfactory	%	Poor	%	Very poor	%
Peace/quiet	146	19.2%	229	30.1%	251	32.9%	88	11.5%	48	6.3%
Fresh air/ventilation	134	17.7%	217	28.6%	261	34.4%	101	13.3%	46	6.1%
General ward design	111	14.8%	239	31.9%	288	38.4%	85	11.3%	27	3.6%
Cheerfulness of decoration	75	10.1%	201	26.9%	309	41.4%	106	14.2%	55	7.4%
Space around bed	103	13.5%	198	26.0%	254	33.3%	150	19.7%	58	7.6%
Patients' recreational facilities	44	7.6%	125	21.6%	191	33.0%	154	26.6%	64	11.1%
Access to phone	105	14.8%	181	25.6%	276	39.0%	104	14.7%	42	5.9%
Patients' toilets	165	21.8%	232	30.6%	241	31.8%	67	8.9%	52	6.9%
Patients bath	164	21.7%	224	29.6%	249	32.9%	76	10.0%	44	5.8%
Patients' showers	128	19.5%	183	27.9%	213	32.5%	78	11.9%	54	8.2%
Views outside	28	4.0%	78	11.1%	193	27.5%	261	37.2%	141	20.1%
Storage space	42	5.5%	129	17.0%	358	47.1%	179	23.6%	52	6.8%
Level of privacy	74	9.7%	132	17.4%	314	41.4%	145	19.1%	94	12.4%
Met cultural needs	102	17.7%	173	30.0%	277	48.1%	16	2.8%	8	1.4%
Met ethnic needs	90	18.7%	141	29.3%	237	49.2%	8	1.7%	6	1.2%
Security on ward	83	12.6%	169	25.7%	282	42.9%	82	12.5%	42	6.4%
Seating for visitors	61	8.1%	135	17.8%	259	34.2%	215	28.4%	87	11.5%
Bedside entertainment	31	5.1%	71	11.7%	162	26.6%	209	34.3%	136	22.3%
Shape/room layout	71	9.8%	188	25.8%	342	47.0%	90	12.4%	37	5.1%



# Rating of other facilities at the hospital

Facility	Very good	%	Good	%	Satisfactory	%	Poor	%	Very poor	%
Shopping areas	230	32.7%	293	41.6%	165	23.4%	12	1.7%	4	0.6%
Cafes/restaurant	214	30.4%	292	41.5%	168	23.9%	24	3.4%	6	0.9%
Kids play areas	23	10.9%	38	18.0%	48	22.7%	62	29.4%	40	19.0%
Baby-change facilities	15	10.1%	34	23.0%	45	30.4%	36	24.3%	18	12.2%
Smoking facilities	25	9.3%	29	10.8%	50	18.7%	65	24.3%	99	36.9%
Prayer facilities	45	16.7%	85	31.6%	106	39.4%	26	9.7%	7	2.6%
TV facilities	79	12.7%	128	20.6%	191	30.8%	163	26.2%	60	9.7%
Garden/outdoors	57	11.5%	105	21.2%	199	40.2%	105	21.2%	29	5.9%
Car parking	88	12.6%	154	22.0%	229	32.7%	121	17.3%	108	15.4%
Public transport	59	14.5%	108	26.6%	133	32.8%	66	16.3%	40	9.9%

# Questionnaires and ward designs



- Patients in single rooms and those staying in small bays clustered around a nursing station were the most satisfied.
- The main suggestions for improvements related to the need for:
  - Better ward decorations to improve the welcoming and homely feel
  - Better quality curtains, as they had to look at them throughout their stay
  - More windows on each side of the ward to create a more airy and less enclosed feel and to improve the views of outside
  - Less harsh lighting and/or provide individual adjustable lights
  - More storage space for personal items
  - More room and seating for visitors
  - Locally available food and drink for visitors
  - Means of controlling temperature
  - More toilets and washing facilities.



# Conclusions and suggestions for responsive designs in the built environment and in developing a new research agenda

## Consider the design for health related factors:

- The respective element should consider patients' health factors outside the immediate illness or condition that resulted in their admission to the hospital, e.g.
- The extent to which each element in the design caters for:
  - disability,
  - impairment,
  - poor eyesight,
  - hearing difficulties,
  - claustrophobia

## Consider the design for different patient groups:

- Each design element should consider the type of patient and the extent to which the design caters for each patient group, e.g.
  - elderly,
  - adults,
  - adolescents,
  - children,
  - ethnic and cultural groups
  - male/female



New designs should consider technological applications in the following areas





Personal space	Access to outside	General atmosphere and facilities	Facilities for visitors/family	Design, layout and accessibility	Services, leisure and recreation
<ul style="list-style-type: none"> <li>• Design for privacy and confidentiality</li> <li>• A choice of single room or 4 bed bay</li> <li>• Need bigger personal space</li> <li>• Could stagger layout of the beds</li> <li>• Need somewhere to go as a family if receiving bad news</li> <li>• Old nightingale design is awful</li> <li>• Need separate room for visitors</li> </ul>	<ul style="list-style-type: none"> <li>• Design in moving walk ways on long corridors.</li> <li>• Short entrance and exit points</li> <li>• Multi-storey access to the building from the car park</li> <li>• Design better ventilation - only get fresh air by opening windows – then it gets very cold.</li> <li>• Design building so that lifts are near reception and entrances</li> <li>• Windows should be low enough to see out.</li> </ul>	<ul style="list-style-type: none"> <li>• Provide cloakroom facilities at main entrances for day patients and visitors.</li> <li>• Design for proper regulation of temperature, it gets stuffy if it is too hot.</li> <li>• Design with integrated air conditioning systems in all major wards and departments.</li> <li>• Flooring-need to make it more homely</li> <li>• Design with modern seating – some different heights, some armchairs.</li> <li>• All beds should have a good view.</li> <li>• Design reception areas to be light and spacious and lead you into the building.</li> <li>• Build in centralised nursing stations in view of all patients and visitors.</li> </ul>	<ul style="list-style-type: none"> <li>• Provide facilities for relatives to eat with patients.</li> <li>• Provide disabled facilities for visitors.</li> <li>• Provide children’s play areas near to wards and within grounds.</li> <li>• Should have overnight stay facilities near to patients for all visitors who need to stay.</li> <li>• Provide tea/coffee facilities available for visitors</li> <li>• Provide visitors’ toilets close to wards and departments inclusive of children’s and baby changing facilities.</li> <li>• Design with clear signs showing where to go for instructions.</li> <li>• Provide better signage to help services e.g. citizens advice bureau, patient affairs.</li> <li>• Relatives should be able to phone in to patient directly</li> </ul>	<ul style="list-style-type: none"> <li>• Proper welcoming reception area with low desk and easy access to receptionist</li> <li>• Improved mobility through addition of moving walkways, chair lifts and escalators for visitors with mobility problems</li> <li>• Could do with fixed partition between beds to provide better separation</li> <li>• More space between beds and more chairs for visitors.</li> <li>• Carpets would be better where appropriate</li> <li>• Design each bay to have its own shower and toilet.</li> <li>• Provide better bathroom facilities for patients who are able to wash themselves.</li> </ul>	<ul style="list-style-type: none"> <li>• Shops available close to ward</li> <li>• Access to alternative therapies – reflexology and aromatherapy-makes you feel better</li> <li>• Mobile hair and beauty treatment</li> <li>• Need telephone point next to every bed</li> <li>• Design for patients to be able to help themselves to tea and coffee</li> <li>• Provide a shopping mall centrally located.</li> <li>• Design facility for visitors to have tea and meals especially if they are staying for long periods with ill relatives</li> <li>• Facilities for patients and visitor to eat together</li> <li>• Lecture theatre could double up as a cinema</li> <li>• Swimming pool</li> <li>• Video hire</li> </ul>

Ground and landscapes	Social and public spaces	Homeliness and assurance	Cultural diversity	Transport and accessibility and mobility	Safety and security
<ul style="list-style-type: none"> <li>• Provide small areas with gardens where patients can get a breath of fresh air</li> <li>• Design community gardens where people can sit and come together</li> <li>• Provide small courtyards,</li> <li>• Water features</li> <li>• More light and airy green spaces</li> <li>• Build in Japanese gardens</li> <li>• Design secure walkways in hospital grounds.</li> <li>• Some type of glass viewing area and garden at the end of wards</li> </ul>	<ul style="list-style-type: none"> <li>• Hospitals of the future should ideally have one main entrance</li> <li>• A centre which provided a core location and which ‘housed’ major facilities, e.g. shops, information and communication points,</li> <li>• An information and education centre near the main entrance</li> <li>• Mobile personal services</li> <li>• Provide numerous eating facilities for patients and visitors</li> <li>• Provide children’s play areas.</li> <li>• Design for recreational facilities including games rooms and quiet rooms.</li> <li>• These area should be accessible to all patients and visitors, able or disabled</li> </ul>	<ul style="list-style-type: none"> <li>• Digital photo of the patient could be attached to the front of the medical notes so that reception staff could walk up to each patient and speak to them directly.</li> <li>• Bright well lit environment and reception.</li> <li>• Comfortable chairs at different heights and set in squares so people can talk</li> <li>• Relaxed atmosphere</li> <li>• Individual telephone facility to call relatives and friends</li> <li>• Bed layout to allow socializing with neighbours</li> <li>• Individual patient control from bedside for TV, radio, nurse call button and telephone.</li> <li>• Space around bed for wheelchairs and equipment.</li> <li>• Ability to get cup of tea for patient and visitors</li> </ul>	<ul style="list-style-type: none"> <li>• Signs and information being inclusive of community languages</li> <li>• Staff and volunteer helpers to reflect minority ethnic community membership</li> <li>• Culturally inclusive images displayed in hospital art and publications</li> <li>• Provision of accommodation for prayer sessions for workforce, patients and visitors</li> <li>• Specialist food being served and provided in all hospital eating facilities.</li> </ul>	<ul style="list-style-type: none"> <li>• Link up public transport system to the hospital</li> <li>• Dedicated ring and ride</li> <li>• Design around a ring route, free-drop off service.</li> <li>• Hospital dedicated transport system from car park to all entrances</li> <li>• Police and control movement of traffic in the hospital grounds.</li> <li>• Develop a proper on-site road network.</li> <li>• Provide electric wheelchairs like the Trafford Centre for people with poor mobility.</li> <li>• Voice activated lift controls.</li> <li>• Call service at car parks and entrances for volunteer escort service to departments.</li> <li>• Moving floors like airports and escalators as alternative to stairs.</li> </ul>	<ul style="list-style-type: none"> <li>• Introduce electronic number system, as is established practice in many supermarkets.</li> <li>• Security CCTV and panic buttons</li> <li>• Facilities to keep personal belongings securely in ward areas.</li> <li>• One main access point with central open areas on every floor</li> <li>• Provide secure area in A/E department where people can be kept securely if they become aggressive or disruptive.</li> <li>• Security –should be a patients tag that opens the door for you to designated areas.</li> <li>• Design non-slip floors that appear non-slip.</li> </ul>



# Towards a new research agenda: Questions to raise about what should be done

- Stakeholders perceived the built environment of the hospital as a supportive health environment and as an important health resource.... but please 'A room with a view'..
- The notions of patient-friendly environments held by participants were based on three visions of the role of the facilities.
- They were:
  - Notions of homeliness
  - Notions of movement and accessibility through transitional spaces and
  - Notions of supportive environments

The important research questions are:

- How can new technologies support patients independence and enhance their privacy, comfort and convenience?
- How can new technologies improve usability, accessibility and controllability in transitional spaces, public spaces and ward areas?
- What can technology designs do to improve family facilities?
- How can technologies support communicative normalities?



# Thank you for your attention

- We hope that you will find the research results and suggestions for further study useful.
- We welcome questions about the research
- You may contact Dr Calbert H Douglas directly at:  
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