Acoustics, Health and Wellbeing in Mental Healthcare Environments – A Service User Perspective

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Duty of Care

• Healthcare environment (DoH, 2007)
  – “Good healthcare environments are key drivers of patient experience......matters to patients, their visitors and carers and staff”
  – enhance clinical outcomes and patient recovery, improve staff working lives etc

• back in the spotlight again with the Mid Staffordshire NHS Foundation Trust Public Inquiry (Robert Francis QC) that identified **systemic failures** in healthcare provision
Why this project?

• Evidence suggest that soundscapes may play an important role in service user and service provider satisfaction, health, wellbeing and productivity
  – Positive soundscapes assist in the recovery process (healing environment / therapeutic setting)
  – Negative soundscapes can be highly destructive – affect irritability, anxiety, stress-related dementia, lowered immune system etc.

• Nothing has been done in mental healthcare settings
Why sound?

• Acoustic environment is often forgotten about outside of spaces designed for performance (classrooms, lecture theatres, performance venues etc)

• The ears are constantly monitoring environmental events – whereas we can close our eyes and screen out the world, it is very difficult closing our ears!
Why mental healthcare??

- Population **demographics are unique**
  - Occupants with a range of **capabilities, requirements** and ‘lived’ experiences – not necessarily ‘normal’
  - **Vulnerable population**
    - Low **tolerance** to stressors
    - Lived **experience** may have been a factor in **mental health** issues
      - Depression, anxiety, behavioural / personality disorders, abusive / chaotic households / lives
  - **Sound / noise** may have played a **role** in some of these
Behavioural setting for service user is unique

- Lack of **sensory richness** (visual, olfactory, thermal) e.g. through infection control measures etc. Therefore certain ‘sensations’ are more likely to ‘stand out’
- Lack of **personal space** or **privacy** (cohabitation vs single occupancy)
- Lack of **freedom / autonomy** to control personal outcomes
- Likelihood of **incongruity** between **needs** and **wants** – psychological reactance, disempowerment, helplessness, anger, aggression etc
Aims of the research

To build a picture of how the soundscapes within mental healthcare facilities influenced the behaviour and actions of those exposed to them.

• Why do sounds matter?
• What do they mean?
Method

- **Mixed methods** with a grounded theory basis
  - started with **meetings** with service providers and users (PPI) and included unstructured interviews and focus groups – allowed us to build **context** and understand **operational limitations**
  - **Ethnographic** mixed methods
    - **qualitative** (field observations / informal interviews in settings)
    - **quantitative** (physical measurements of acoustics parameters. SLM + Dose Badges)
  - **Questionnaires**
    - Point-in-time
    - Reflective
    - Likert scale + free response
Field observations – crisis unit

- Noisy and active environment
- Nurses station and staff office busy. Lombard effect
  - Telephones / bells / buzzers, photocopiers, fax machines.
  - Lots of people in confined space doing different jobs
  - Door between staff office and nurses station open – considerable transfer between both
- Conversation pervasive but highly important as part of therapeutic process and for functioning and management of unit.
- Shouting / aggravated raised voices. De-escalation suite. Distressing to staff and other patients
- Sounds easily proliferated to other parts of the unit – hard, reflective surfaces. Fire doors left open. Dormitory doors left open.
- Ebb and flow of soundscape
  - Cleaning in morning
  - Hand-over / shift change times
  - Medication times
  - Lunch time
  - Tuck-shop trolley
- Complexity and richness to soundscape.
Physical measurements (SLM) – crisis unit

- **Overall** measurement $L_{A_{eq}}$ 74dB
  - Equivalent to vacuum cleaner at 2m ALL day
  - Loud to moderately loud
- **4 distinct periods**
  - Nurse-doctor handover / shift changes
  - Medication time
  - Lunch time
  - Tuck shop
- Outside these periods, $L_{A_{eq}}$ approx. 64dB – normal conversation. **No respite / quiet time**
- **4 measurement outliers** – patients singing into measurement equipment
- **Research challenge**
  - **Culture of suspicion** – what are you recording, are you recording me, why are you recording me etc. Linked with mental health issues
  - **Endangerment of patients** – mental health unit with people who have self harmed and attempted suicide – cables, objects that can inflict harm on themselves and on others etc.
Physical measurements (dose badge) – crisis unit – staff office

<table>
<thead>
<tr>
<th>LAeq (dB)</th>
<th>% exceeding level</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;=65</td>
<td>49.8</td>
</tr>
<tr>
<td>&gt;=68</td>
<td>24.7</td>
</tr>
<tr>
<td>&gt;=71</td>
<td>6.1</td>
</tr>
<tr>
<td>&gt;=74</td>
<td>1.4</td>
</tr>
<tr>
<td>&gt;=77</td>
<td>0.3</td>
</tr>
<tr>
<td>&gt;=80</td>
<td>0.0</td>
</tr>
</tbody>
</table>

- Range of **acceptable** (or normal) sound levels in an office is 45 to 55dB(A)
- Therefore for almost **50% of the time**, nurses office was at least **TWICE as loud** as a standard office
- Attributable to:
  - Lots of **telephone** activity
  - Multiple **conversations**, patients and staff (Lombard effect)
  - **Doorbell**
  - **Filing cabinets**
- Sounds are in many cases **a-periodic** and **unpredictable** – leading to annoyance
Physical measurements (dose badges – researcher and nurses) – crisis unit

<table>
<thead>
<tr>
<th>LAeq (dB)</th>
<th>researcher</th>
<th>nurse 1</th>
<th>nurse 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;=65</td>
<td>49.8</td>
<td>89.7</td>
<td>74.3</td>
</tr>
<tr>
<td>&gt;=68</td>
<td>30.4</td>
<td>57.3</td>
<td>61.7</td>
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<td>&gt;=71</td>
<td>16.3</td>
<td>36</td>
<td>47.2</td>
</tr>
<tr>
<td>&gt;=74</td>
<td>3.5</td>
<td>15</td>
<td>29</td>
</tr>
<tr>
<td>&gt;=77</td>
<td>1.0</td>
<td>4</td>
<td>13.5</td>
</tr>
<tr>
<td>&gt;=80</td>
<td>0.7</td>
<td>1</td>
<td>2.3</td>
</tr>
</tbody>
</table>

- Researcher (quiet) used to gauge ‘intensity’ of transactions
- Nurses talked a LOT!
- Engaging in transactions between staff and patients
- Communication is important and occurs frequently
- Important to the therapeutic environment
Questionnaire analysis – crisis unit.

Patients

- n = 8
- Time on unit – 6 days to 1 year and 4 months!
- Significant dissatisfaction with soundscape

<table>
<thead>
<tr>
<th>Do you believe that noise impacts on your:</th>
<th>Mode (1 to 5)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>mental health state</td>
<td>5</td>
<td>Significant impact</td>
</tr>
<tr>
<td>• state of mind</td>
<td>Agree</td>
<td></td>
</tr>
<tr>
<td>• mood and temperament</td>
<td>4</td>
<td>Definite impact</td>
</tr>
<tr>
<td>• ability to interact or socialise with others</td>
<td>4</td>
<td>Definite impact</td>
</tr>
<tr>
<td>• anxiety</td>
<td>5</td>
<td>Very anxious</td>
</tr>
</tbody>
</table>
Noise-related annoyance

- Confirming field measurement patients found
  - It was **not** a quiet environment; mode: disagree
  - Noise was one of key reasons why they would **prefer to be at home**; mode: agree

<table>
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<th>Do you believe that noise on the unit?</th>
<th>Mode (1 to 5)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is annoying</td>
<td>4</td>
<td>Definite impact</td>
</tr>
<tr>
<td>• Interferes with communication</td>
<td></td>
<td>Agree</td>
</tr>
<tr>
<td>• Can be controlled</td>
<td></td>
<td>Disagree</td>
</tr>
<tr>
<td>• Is necessary</td>
<td></td>
<td>Disagree</td>
</tr>
</tbody>
</table>
What factors contribute to this annoyance | Mode (1 to 5) | Description
--- | --- | ---
Furniture moving | 4 | Definite annoyance
Noise from fixtures and fittings | 5 | Extremely annoying
Bells and alarms | 5 | Extremely annoying
People talking | 3 | Some annoyance  
• Patients kicking off  
• Isolation room
TV / Radio / Music | 3 | Some annoyance
Staff Conversation | 2 | Little annoyance
Footsteps | 2 | Little annoyance

All of these backed up by both *ethnographic observation* and *self reports*.
What were the characteristics of these sounds?

- Highly **transient & impulsive** with some ‘urgency’
  - Doors banging
  - Bins / filing cabinets banging shut
  - Bells and alarms
  - Door buzzer
  - Panic / emergency alarms

- Deeper **meaning / symbolism**
  - alarming
  - alerting
More subtle sounds

• **Lights** being turned on and off at night (sleep disturbance) – reflection of alertness / mental health state?

• People ‘shuffling’ around the ward (linked to certain **individuals**)
Areas identified as being problematic or good

Problematic

• Kitchen / eating spaces
• Nurses station

Good

• Dining Room
• Outside
Sounds identified as being beneficial / positive

- Radio
- Music
- TV
- Patient conversation (particularly softly spoken)

Reasons
- Connections to the outside world (i.e. beyond the ward)
- Accompanied solitude
- Communication showed camaraderie / community – that people cared
Patient observations

• “a lot is to do with my state of mind and thoughts and pains I am suffering from”
• “the environment is too small for the capacity of 26 patients”
• “it varies on the ward – some days it is really quiet and other days it is really loud”
Conclusions

• Work showed that from a service user perspective, this was far from a therapeutic environment
• Exacerbated by patients who
  – lived there 24/7
  – could not escape – limited behavioural freedom
• Understanding different occupant requirements therefore key – who are we actually designing for?
• Are our preconceptions correct?
• Are people actually telling the truth?
• ‘architecture’ of the environment did not help – propagation of sound between and across spaces was an issue
Conclusions

• **Simple interventions** could markedly improve lives
  – **Education** of staff – soundscape management – making staff more aware of their actions
  – **Soft closing devices** on doors, bins and filing cabinets with soft closing features, better design of furniture to minimise scraping noise
  – **Redesign of bell and buzzer systems** (e.g. to stop repeated pressing)

• **More involved interventions** could have a significant impact
  – Staff **office redesign**. Too many people, not enough space, too many functions happening
  – **Acoustic solutions** to soundscape propagation
    • Absorption in key noise generating areas