Health & Social Care Testbed

Not just technology, application in real services, impact on peoples lives.

“Can 5G connectivity be sufficiently cheap and effective in health and social care provision that it will be cost effective to give free access to those unable to afford either phone or broadband access?”

Ann Williams – Liverpool City Council
Rosemary Kay – eHealth Cluster
eHealth Cluster: Facilitating collaboration, SME Engagement, Adoption & Integration within Health & Social Care via use cases.
## Liverpool 5G

<table>
<thead>
<tr>
<th>Feature</th>
<th>Application / Benefit – Now</th>
<th>Application / Benefit - Future</th>
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</thead>
<tbody>
<tr>
<td>Network everywhere</td>
<td>• Connect sensors</td>
<td>• Additional sensors</td>
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<tr>
<td>- Gbit broadband to premises</td>
<td>• Connect Alert systems</td>
<td>• IoT devices</td>
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<td>- 5G/WiFi in the street</td>
<td>• Access medical records</td>
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<td>High Bandwidth &amp; Low Latency</td>
<td>• Video conferencing</td>
<td>• Telepresence support</td>
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<td></td>
<td>- Health worker to GP / Hospital</td>
<td>• Remote diagnostics / scans</td>
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<td></td>
<td>- Resident to Health Worker / GP</td>
<td>• VR community interaction</td>
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<td></td>
<td>- Resident to Family / Friends</td>
<td>• Augmented reality video</td>
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<tr>
<td>Utilises large unlicensed 60GHz mmWave spectrum</td>
<td>• Unlicensed Spectrum</td>
<td>• 100Gbs roadmap (802.11ay)</td>
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<tr>
<td>(5G unlicensed)</td>
<td>- Minimises costs to the council</td>
<td>• Highly directional signal transmission</td>
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<td>- Minimises access costs for users (WiFi)</td>
<td>• Localisation for spatial reuse</td>
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<td></td>
<td>- Enable 5G ‘Capacity’ small cells</td>
<td>• Active interference management</td>
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<tr>
<td>Open Platform SDN Control</td>
<td>• Health service application development</td>
<td>• Disruptive business opportunities</td>
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<tr>
<td>Virtualised Services</td>
<td>• SON, Ad Hoc extensibility</td>
<td>• Intelligence in environment</td>
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<tr>
<td>Network Slicing</td>
<td>• End-to-end cloud based application development</td>
<td>• Big Data collection</td>
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<tr>
<td>MEC Enabled</td>
<td>• Managed end-to-end latency</td>
<td>• VR community</td>
</tr>
<tr>
<td>Council owned WATC fibre network</td>
<td>• Ultra Low latency compute functions in network</td>
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<td></td>
<td>• Highly secure</td>
<td>• Can be utilised by council to connect other public service devices</td>
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<tr>
<td></td>
<td>• Compatible with council fibre network/ISP (AIMES)</td>
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<td></td>
<td>• Easily extendable without laying new fibre / installing mobile base stations</td>
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Why Kensington?

• “A boy born in the Royal Borough of Kensington and Chelsea - home to the most expensive street in England - can expect to live to the ripe old age of 83 - 13 years longer than one delivered in Kensington, Liverpool”
  BBC News, Feb 2016

• 45.8% of households occupied by only one person

• 33.3% of households have someone with a disability or long term health condition

• 90.9% of the area is in the most deprived 10% nationally
# Medication Management

## Challenges Addressed:
- LCC funds 1,000+ meds prompts per week through home care services
- Recruitment crisis in home care sector
- Medication shortages post Brexit
- Cost of medication errors to care providers and LCC, effect on service users
- Medication wastage costs the NHS £500 million per year$^2$
- “It is estimated that over-ordering, stockpiling and not using medication, costs the local NHS around £2.5 million per year.” $^3$
- Estimated cost of people not taking their medicines properly and not getting the full benefits to their health is £500m/year. $^4$

## Potential Impact:
- Reduction in number of medication visits/costs
- Increase in support for care staff
- Increase in confidence/independence for service users
- Improvement in health outcomes for service users
- Identifying dysphasia (swallowing) related conditions early
- Improved Warfarin management
Safehouse – IoT sensors

Challenges Addressed:

• Current analogue bandwidth used in telecare equipment redundant in 2023 when all telecare will have to be digital.

• In July 2018 LCC funded 2233 users and CCG funded 1773, giving 4006 in total.  

• IoT sensors - opportunity for significant costs savings. E.g. adding digital SIM cards to existing devices = minimum of £234,000 per annum.  

• Current telecare costs £1.49 per item per week to monitor. The trial will establish comparative IoT costings.  

Potential Impact:

• The LoRaWAN technology provides an opportunity to explore alternatives to traditional telecare with the involvement of residents and care providers at very early stages.  

• Reduction in number of GP visits, hospital admissions  

• Improvement in health outcomes for service users  

• Increased independence and dignity  

• Increase in family engagement  

• Reduction in costs of monitoring
Falls detection

**Challenges Addressed:**

- Current NHS statistics: >30% of over 65s have at least one fall a year and this is the largest case of emergency admissions for the age group. 8
- The total annual cost of falls in Liverpool is £7.2 million pounds. 9
- Costs of falls among older people aged 65+ to health services in Liverpool 2016/17: 10
  - Fallers 65+ (estimated) £349
  - Ambulance Journey (estimated) £231
  - A&E Attendance (estimated) £124
  - Emergency Admission £2,719
  - Elective Admission £3,774
  - Outpatient Attendance (estimated) £114
  - GP Consultation (estimated) £38

**Potential Impact:**

- Potential reduction in falls in service users
- Potential reduction in number of GP visits, hospital admissions
- Improvement in health outcomes for service users
- Reduction in health and care costs
Loneliness

<table>
<thead>
<tr>
<th>Challenges Addressed:</th>
<th>Potential Impact:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Public Health England stated the health impact of loneliness is on a par with obesity or smoking 15 cigarettes a day</td>
<td>Through push to talk and community games</td>
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<tr>
<td>• Estimated cost of loneliness per person for older people (over 10 years) £6,000¹¹</td>
<td>• Reduction in loneliness in service users</td>
</tr>
<tr>
<td>• Estimated cost of loneliness per person (over ten years) £1,700¹¹</td>
<td>• Improvement in health outcomes for service users</td>
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<tr>
<td>• Isolation of carers</td>
<td>• Reduction in number of GP visits, hospital admissions, call-outs</td>
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<tr>
<td>• Isolation within supported living services for learning disabilities services</td>
<td>• Increased level of service user engagement (button pushes, calls per user, call duration)</td>
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<tr>
<td>• Reduction in available day services</td>
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Dehydration

Challenges Addressed:
• Cause of high levels of unplanned hospital admissions\textsuperscript{12}
• In Home Care settings, early detection of signs of dehydration can reduce the likelihood of UTIs and AKIs
• High number of falls caused in the home due to dehydration

Potential Impact:
• Reduced number of GP visits, prescriptions, hospital admissions
• Reduction in UTIs in service users
• Reduction in falls in service users
Telehealth

**Challenges Addressed:**
- CCG already using for patients where risk of being admitted to hospital for their LTC within the next 12 months is >25%
- Existing trial shows reduction in hospital re-admissions between: 22%-32% \(^{13}\)
- Patient Reported Outcome Measures - CCG trial \(^{14}\):
  - Decrease in healthcare utilisation 55%
  - More control, confidence or ability to cope 90%
  - Lifestyle (e.g. diet, exercise) improvement 52%
  - Sharing of self-care results with others 64%
  - Improved health or better health management 79%
  - Willingness to use Telehealth in the future 76%
- The challenge is to apply telehealth in acute setting to reduce the need for follow up appointments and enable early discharge.

**Potential Impact:**
- Reduced number of follow up appointments
- Reduction in emergency readmissions for patients
- Reduction in the mean length of stay for key long term conditions.
- Improvement in health outcomes for service users
- Empowering patients to self-care.
Cloud based clinical mobility

**Challenges Addressed:**

- Redesign of outpatient services
- Telemedicine enables a person-centred approach through:
  - Remote Access Clinics to aid patient flow and experience.
  - Extra-ordinary Virtual MDT for expedited MDT sessions.
- Clinical Mobility – use of single devices to aid peer to peer collaboration driving productivity.
- Secure messaging for broadcast of images and video.
- First of type “Digital Lab” to deliver a safe testbed for collaboration of clinicians, academics and SMEs for IoT devices from the hospital to home.

**Potential Impact:**

- Patient Flow improved through use of technology to deliver a “virtual” experience.
- Supports %YOO increase of OPD appointments.
- Better collaboration tools improves clinical productivity. More time with the patient for improved outcomes.
- Digital Lab will act as a gateway to trialling tech in health and social care – difficult market sectors to enter for SMEs.
Conclusions

- Liverpool City Council Adult Social Care spending has been cut by £92m since 2010 while demand has risen 15%.\(^{15}\)
- Forecast increasing demands on health and care systems from an ageing population living with co-morbidities.
- Combined LCC & CCG spend on health and social care in 2017/18 was over £232m. This pilot will demonstrate the potential savings 5G enabled technology could bring across services.
- We need new, innovative ways of working.
- Technology has a key role to play but not in isolation, as part of wider system changes, incorporating service users, social care providers, Local Authorities, NHS and technology companies
- At the end of this pilot we will have trialled our “Adoption Readiness Levels” (ARL) which will complement the TRL.
Sources

1. Liverpool City Council Ward Profile Data
2. Health Secretary Jeremy Hunt on Medication Adherence 2nd July 2015
5. Figures obtained from Liverpool City Council – Adult Social Care
6. Figures obtained from Liverpool City Council – Adult Social Care
7. Figures obtained from Liverpool City Council – Adult Social Care
8. Healthy Liverpool Statistics
9. Healthy Liverpool Statistics
12. Clinical signs of dehydration in older people: (School of Medicine, University of EastAnglia & Gateshead NHS Trust)
13. Liverpool CCG trial data
14. Liverpool CCG trial data
15. BBC News: [https://www.bbc.co.uk/news/uk-england-merseyside-38882189](https://www.bbc.co.uk/news/uk-england-merseyside-38882189)
Any Questions?