Transforming Outcomes and Health Economics Through Imaging (TOHETI Programme):

An overview

December 2019
TOHETI in numbers

- **1** PET-MR scanner
  - one of very few in the UK

- **>50** Radiographers
  - including 5 trained in recruiting and consenting patients to research

- **>50** Emergency Nurse Practitioners
  - trained in recruiting and consenting patients to research

- **3** hospitals involved
  - including Guy’s, St Thomas’ and King’s College Hospital

- **3** CT scanners installed in 2016

- **2** CCGs
  - across Southwark and Lambeth

- **90** GP surgeries
  - across Southwark and Lambeth

- **1** University
4 key TOHETI workstreams

1. Quality, access and efficiency of care
2. Better targeting of treatments
3. Identify ineffective treatments
4. Transforming the way we work
# 1. Quality, access and efficiency

Medical imaging as the **driver for change** across several clinical pathways.

<table>
<thead>
<tr>
<th>Research Study</th>
<th>Study Question/Design</th>
<th>Proposed benefits</th>
</tr>
</thead>
</table>
| Chronic Headache   | Evaluating **direct access from GPs to MRI imaging services** for patients with chronic headache | ✅ Reduction in waiting times  
✅ Reduction in Neurology appointments  
✅ Supports patient management within the primary care setting due to MRI reassurance effect |
| Colon Cancer       | **Replacing colonoscopy with CT colonography** for patients symptomatic for colon cancer. | ✅ Increase early detection and improve prognosis.  
✅ Lower risks and discomfort to patient.  
✅ Address capacity issues, and release optical colonoscopy capacity to focus on high-risk patients. |
| Lung Cancer        | **To identify high-risk patients in the smoking population** aged between 55-80 years (current and former smokers) and offer **low-dose CT scans**. Patient identification and engagement methods will include GP records & Community Pharmacies. | ✅ Increase engagement and enable early detection  
✅ Explore possibility of direct access for GPs to low dose CT.  
✅ Increase understanding of non-compliance, and potential barriers to uptake of low-dose CT screening |
| Acute Chest Pain   | **To assess the use of CT Coronary Angiography (CTCA) in patients with Acute Chest Pain (ACP) and no myocardial ischaemia** referred from the A&E department to the Rapid Access Chest Pain Clinic (RACPC). | ✅ Increase the efficiency associated with the management of patients discharged from A&E following a non-ischaemic ACP episode  
✅ Improve clinical care by enhancing the completeness of diagnosis, ruling in or ruling out Coronary Artery Disease (CAD) as the underlying cause of ACP |
| Scaphoid Fractures  | Assessing **MRI, alongside plain x-rays, on presentation** for patients with suspected scaphoid fracture | ✅ Improves the diagnostic pathway for suspected scaphoid fractures, to enable appropriate and timely treatment  
✅ Cost of additional MRI scan predicted to be offset by savings made in decreasing the amount of unnecessary diagnostic and treatment procedures |
| HIFU Research      | **MRI guided high intensity focused Ultrasound** for palliative treatment of painful bone Metastases | ✅ Innovative treatment for end of life cancer patients  
✅ Pilot study investigated the safety and efficacy of MRgHIFU, compared to standard palliative pain treatments. |
Suspected scaphoid fracture: before

Aim: To redesign the current pathway by introducing immediate MRI as add-on test for patients with negative findings in the initial radiographs.

Methods: Randomised 136 participants – 68 each for control and treatment group

Results: The intervention led to cost-savings at 6 months post-recruitment (mean cost difference of £266 per participant)
Successful roll out of immediate acute MRI wrist as an add-on test in the acute management of suspected scaphoid fractures.
2. Better targeting of treatments

- High-intensity focused ultrasound (HIFU) uses focused ultrasound waves to destroy pathological tissue by heating it rapidly to 60 degrees.

- Progress with the MRgHIFU system was slow, driven by research requirements (novel interventions using a new equipment) but mostly facility requirement to house the equipment.

- Improving the patient selection criteria and access to patients might improve outcomes, but recruitment remains a particular challenge.

3. Identify ineffective treatments

- The PET-MRI purchased as part of the TOHETI programme was the second to be installed in the UK.

- Multiple research studies recruited over 230 patients from 11 tumour groups.

- New scanning protocols have been developed, tested, improved and validated for all cancer subtypes.

- PET-MRI has been established as non-inferior compared to PET-CT in oesophageal cancer and superior to PET-CT in mesothelioma and prostate cancer.
4. Transforming the ways we work

**RIEs e.g. on:**
- Vetting & Scheduling
- Nuclear Medicine
- Interventional Radiology
- Acute reporting
- Ultrasound
- Computer Tomography

**Clinical and operational impacts, e.g.:**
- +17% in routine booking turnaround time
- -23% in ‘did not attend’ (DNA) rates in US
- -21% DNA rates in CT
- -13% DNA rates in MRI
- -16% DNA rates in Nuclear Medicine
- +48% in acute plain film reporting productivity
- -20% of plain film report turnaround time
- -70% in paper usage in Nuclear Medicine
- +31% of referrals vetted on day of referral
- +X% increased activity in multiple other areas

**Financial and efficiency benefits:**
£930k (full year effect)
5 drivers for success

1. Complete system redesign
2. Moving to a clinically led autonomous management model
3. Research + Health Economics
4. Analytical framework for delivery
5. Building a culture of continuous improvement
Some of these successes so far…

8 eight clinical pathways (over 5,000 patients /year)

£2m+ annual cost-savings to the NHS

500+ members of staff engaged

5 national / international awards

22 scientific papers

25 conferences attended.