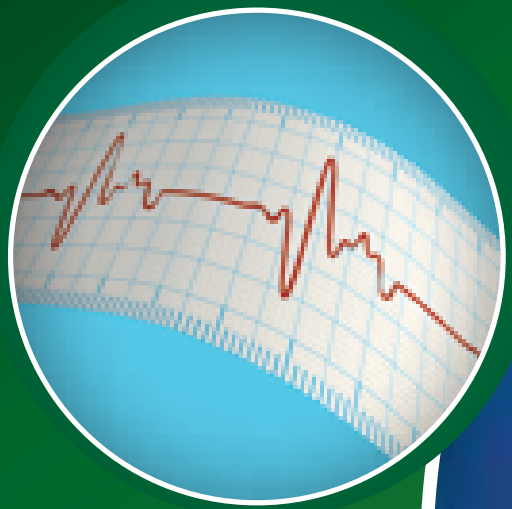
Healthcare Science Transforming Patient Care

Quality Improvement Case Studies from the

CSO NATIONAL HEALTHCARE SCIENCE QUALITY IMPROVEMENT CHAMPIONS NETWORK



Delivering the Forward View 2017 -2018

Healthcare Science
Quality Improvement Champions Network

Supported by

INNOVATION AGENCY

AHCS

Healthcare scientists transforming patient care

The Chief Scientific Officer (CSO) is head of profession for the 50,000-strong healthcare science workforce. The workforce provides the scientific backbone of NHS and public health services, working across the four divisions of laboratory (pathology) sciences, physiological sciences, physical sciences and engineering and bioinformatics. Their work underpins 80% of all diagnoses and they make a direct contribution to treatment pathways, particularly in specialist services such as cancer and cardiovascular disease.

NHS England's ambition is to ensure the delivery of high quality care for all, now and for future generations. Scientific and diagnostic services are central to this ambition, not least through supporting the delivery of the NHS Five Year Forward View. We need to influence and work with patient groups, commissioners and providers to co-create new models of care, and operational priorities and change enablers to drive efficiency and transformation.

As part of NHS England, the CSO's team leads on a range of key priority areas:

- driving forward the commissioning of high quality, innovative patient-centred diagnostic and scientific services to support the delivery of new models of care and the Five Year Forward View
- providing leadership and scientific input to specific projects that will deliver improved, sustainable care for patients
- developing the professional capacity and capability to deliver whole system change
- providing broader scientific and diagnostic leadership and science-based intelligence.

The new CSO national Quality Improvement Champions Network (QIC) brings together healthcare scientists from across the country who are delivering change right here, right now to support the New Models of Care national programme for NHS England. The network is chaired by Dr. Martin Myers (Consultant Clinical Biochemist , LTHTR) and Fiona Carragher, Deputy Chief Scientific Officer, represents the CSO.

This brochure contains a selection of case studies and projects submitted by the QIC Network and CSO national team at NHS England to promote their contribution to transforming patient care.

We know there are many more examples out there so please get in touch so we can add your examples to our library, and if you would like to join this national expert panel as a Quality Improvement Champion please contact **Helen Liggett, National Quality Improvement Lead (CSO team, NHS England) helen.liggett@srft.nhs.uk / Kieran.smith1@nhs.net**

Fiona Carragher

MSc FRCPath EuSpLM CSci

Deputy Chief Scientific Officer for England

Fiona Carragher is the Deputy Chief Scientific Officer for England, supporting the head of profession for the 50,000 healthcare science workforce in the NHS and associated bodies – embracing more than 45 separate scientific specialisms.

A consultant clinical biochemist by background, Fiona has a broad portfolio of policy responsibilities, providing professional leadership and expert clinical advice across the health and care system as well as working with senior clinical leaders within both the NHS England and the wider NHS.

Fiona has a strong background in both public health and treatment & care, having led and worked in multi-professional teams for two decades at Guy's & St Thomas' Hospital, the Royal Hospital for Sick Children, Edinburgh and Kings College Hospital, London - with a focus on providing high quality, innovative laboratory services. Most recently she led a number of specialised laboratories for the diagnosis and monitoring of inherited metabolic disease and was Director of Newborn Screening for the South East Thames Region.

As Scientific Director for London she led a number of broader healthcare science projects including technology adoption and leadership development, and created a proactive scientific and diagnostics network across the capital that supports quality improvement and effective commissioning. She is a Fellow of the Royal College of Pathologists and is a member of multi-professional organisations such as the Association for Clinical Biochemistry and Laboratory Medicine and British Inherited Metabolic Disease Group.

Dr Martin Myers MBE

PhD, FRCPath, CSci, EuSpLM

Dr Myers is a Consultant Clinical Biochemist at Lancashire Teaching Hospitals NHS Foundation Trust, Laboratory Director of Clinical Biochemistry and Associate Divisional Medical Director for Diagnostics. He is also the Lead Scientist for the Trust.

Martin has taken a lead role in a continuous programme of pathology re-design as well as ensuring the effectiveness of pathology delivery, which encompasses state of the art robotics and advanced technology through to the use of point of care devices used anywhere. He chairs the Trust Point of Care Testing Committee.

His scientific interests include the use of automation, point of care testing and informatics in improving the quality of the diagnostic process, redesigning pathology delivery through innovation, and delivering a distributed and integrated laboratory service.

Dr Myers' clinical interests include the use of laboratory testing in improving patient pathways and he has introduced the "Laboratory Anywhere" concept of pathology delivery where Lab in a Box and Lab in a Bag models are delivered in a variety of locations. He is involved in several projects for the direct delivery of diagnostics to BAME communities and vulnerable groups requiring different diagnostic pathways.

He is on the CSO LIA team and within the CSO team is leading on the delivery of point of care diagnostics in patients with learning difficulties and patients experiencing mental health issues.

Name of service: Innovative Management of Ultrasound Diagnostic Equipment

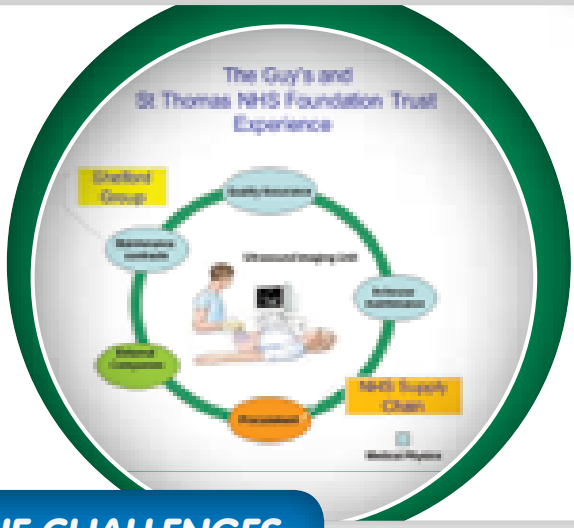
Area covered: Guy's and St Thomas NHS Foundation Trust and related community services in Lambeth, Southwark and Lewisham

Organisation: Guy's and St Thomas NHS Foundation Trust

Contact: Fiammetta Fedele, Deputy Head, Non-Ionising Radiation

ABOUT THE SERVICE

The Trust has around 400 ultrasound scanners - a total asset value of about 20 million. The life cycle management of such equipment requires the support of several teams trust wide, the NHS Supply chain and commercial companies. Our transformation focused on the creation of a support network involving all these teams with the clinical teams and the clinical needs at the centre.



WHY CHANGE?

There was no structured and centralised management of this equipment so, despite the good efforts of staff, maintenance was disjointed and not efficient. Different support teams were often working independently not optimising resources and down-time. Equipment purchases happened within each department, without ultrasound specialists' support and were often budget led. So some units would have over specified equipment underused, others would suffer from lack of funding to purchase equipment to cover critical areas.

THE WORKFORCE

The project required training of some staff and establishing new collaborative protocols to work across teams.

The key skills needed to achieve this were communication and negotiation techniques and training additional staff on ultrasound.

We enhanced the role of the Medical Physics Ultrasound Specialist to advise departments and directorates trust wide to negotiate collaboration. We co-designed new protocols with clinical teams and support units and seconded maintenance staff to ultrasound teams for 0.2 wte. Training was needed on ultrasound physics and electronics for maintenance staff and on quality assurance methods for clinical staff.

The project co-coordinator had access to the first cohort of the NHS Leadership Academy Mary Seacole programme in 2014, which helped to grow leadership skills and acquire management tools to sustain such a programme. Engineers in the maintenance roles accessed in-house training from Physicists on ultrasound and external training from manufacturers on equipment. Clinical teams were trained by Medical Physics staff on simple quality assurance tests.

THE CHALLENGES

This is a distributed leadership model with all parties interacting freely with the same level of authority. In particular, the project leader primarily worked as a co-ordinator. This was quite a significant challenge in the first year that found the obstacle of historical hierarchies and of silos between different teams.

One of the biggest challenges was to overcome the existing preconception against new procedures that often have been imposed top-down without co-design with the front-line staff involved in delivering the service.

THE OUTCOMES

We have used quantitative measures such as increase on equipment enrolled in a quality assurance programme (more than doubled) and cost saving achievements.

We have also used qualitative methods, such as interviews and open questions questionnaire to ask the feedback of the clinical teams and all involved support units.

We saved over £0.5m in the last year, and received positive feedback from stakeholders involved. In particular the clinical team appreciated the improvement in communication and workflow.

The model has been discussed at national meetings, and in particular within the Shelford Group of 10 leading UK organisations of which Guy's and St Thomas is part. King's College Hospital and University College Hospital London are starting to implement some aspects of the changes.

The service is mostly on a 5 days basis, but maintenance is provided also on a 7-day basis.

Healthcare Science Specialism:
Medical Physics and Clinical Engineering

Name of service: Increasing capacity and quality of training for medical physicists and clinical engineers

Area covered: London

Contact / Organization: Sarah Peel, Senior MR Physicist and Regional Tutor, Guy's and St Thomas' NHS Foundation Trust

Clare Anderson, Senior Radiotherapy Physicist and Regional Tutor, Mount Vernon Cancer Centre

(Secondment funded by HENCEL project grant)

ABOUT THE SERVICE

Radiotherapy, imaging, radiation safety and equipment management services are reliant on medical physics and clinical engineering staff to ensure equipment is safe and effective, treatments are performed accurately and emerging techniques (such as proton beam therapy) are implemented correctly. We need to increase the capacity and quality of training for these scientists in London to meet workforce shortages.

WHY CHANGE?

Training must be of a high standard but it can be time consuming for centres to supervise individual trainees in isolation. If departments are short staffed, this can delay feedback on work and result in a poor trainee experience, which can affect retention. Niche competencies (those requiring specialist equipment or expertise) can be difficult to cover and this can limit overall trainee numbers for departments that cannot cover the full range of rotations and specialisms.

THE CHALLENGES

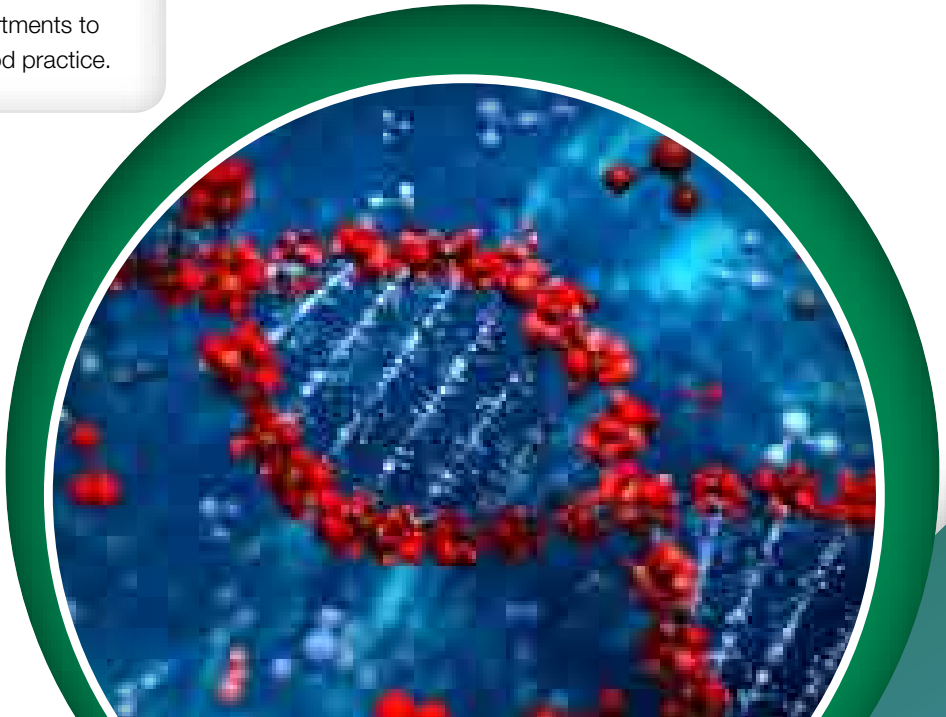
Breaking down traditional barriers between departments to encourage more collaboration and sharing of good practice.

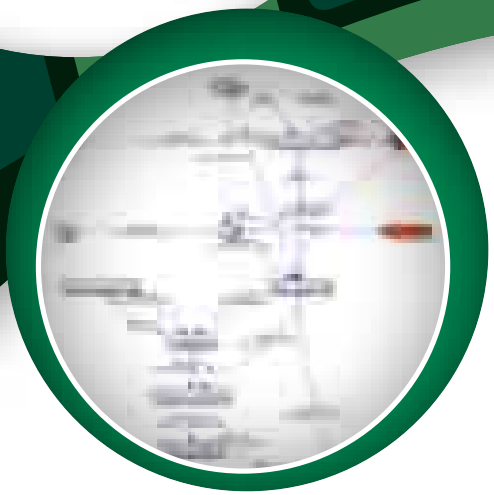
THE OUTCOMES

Initially, former and current final year STP trainees were interviewed to identify areas of good practice and suggestions for improvement. We have then focused on developing a strategy to increase training capacity.

- A series of practical assessed workshops were devised in niche areas and run collaboratively at centres with the relevant expertise and access to equipment and offered to trainees across London. We received very positive feedback from trainees, supervisors and heads of department on the value of this approach and how it helps streamline training.
- A pan-London meeting of STP trainers was held in February 2017 to develop a novel approach to training that is effective for trainee learning and makes the best use of supervisor time and resources. We used this day to identify further ideas for practical workshops and initiatives to increase capacity.

There is potential for this model to be applied to other healthcare science specialisms.





Name of service: Electronic Check-in and Workflow System for Outpatient Clinics

Area covered: Sheffield

Organisation: Sheffield Teaching Hospital NHS Foundation Trust

Contact: David Jones, Clinical Scientist

ABOUT THE SERVICE

In hospital outpatient clinics the patient is likely to see several healthcare professionals in sequence, with possible optional and alternative pathways. We have combined electronic check-in kiosks with a workflow system to manage the clinic process.

To operate the workflow system, staff members choose a role such as “Reception”, “Blood Room” or “Consultant”. They are shown a list of patients who are at the corresponding stage in the process. By clicking on options for the patient, they can then direct the patient to the appropriate next step in the process. The patient then appears on the list of the next staff member that they will see. The workflow system allows different pathways to be used for different clinics or categories of patient.

The workflow system was developed in-house by the scientific computing section of the Medical Physics and Imaging department.

Initial pilot implementations were undertaken in three outpatient departments, one of which was a new-build.

WHY CHANGE?

We needed to improve patient experience within the outpatient setting, for example to reduce waiting times and improve the clinic environment. We also aimed to free up staff to perform other duties.

THE WORKFORCE

Staff training was needed to use workflow task list software, although the system is designed to be very simple and so this is minimal. Within the scientific computing section staff needed training in how the new products function and how to support them effectively.

THE CHALLENGES

Key staff from outpatient departments need to engage with the process of developing pathways to ensure that the post check-in workflow meets their requirements. Our Service Improvement Department has assisted outpatient departments in considering whether any of their processes could be standardised following introduction of our system.

Since the first deployment of this technology there has been a huge “pull” from most outpatient departments so there have been no real barriers from the clinical services. However, funding the project and getting buy-in from the trust executive has been a very slow process. The trust has now committed resources to deploying the system throughout the organisation, but it has taken several years to get to this point.

Since the trust has funded an institution wide roll out of the product they are now taking a lead role in managing the deployment of the system which should help significantly.

THE OUTCOMES

The system automatically acquires and archives tracking data of timings for all stages in the clinic process. This is a wealth of data that can be used to assess resource allocation and appointment booking patterns.

In the first deployment of the system to Rheumatology outpatients, the patient visit duration reduced from 81 to 64 minutes for new appointments and reduced from 61 to 46 minutes for follow-up appointments.

In the deployment to the new build outpatient department, a common nurse assessment station can serve multiple different specialties and the system results in a calmer and more relaxed waiting area.

The service is currently live in three outpatient departments. In November 2016 the system received funding to be deployed Trust-wide which will involve 50 departments and over 1 million patients a year going through the system. Once the Sheffield deployment is completed we will be looking to exploit this product commercially and use it in other areas to manage similar processes such as cancer patient management.

Healthcare Science Specialism: Genetics/Genomics

Name of service: Rapid diagnosis of unexplained paediatric rare diseases by trio exome sequencing
Area covered: Based in Exeter but patients referred from across the UK
Organisation: Royal Devon and Exeter NHS hospital
Contact: Sian Ellard, Consultant Clinical Scientist

ABOUT THE SERVICE

A gene-agnostic, inheritance-based whole exome sequencing approach for the rapid diagnosis of severe paediatric disorders in babies or children. This strategy results in a very high rate of diagnosis (>50% of cases) as a consequence of being able to analyse nearly every known rare disease gene.

WHY CHANGE?

Rare monogenic severe paediatric onset disorders are both phenotypically and genetically heterogeneous, making these disorders very difficult to diagnose. Trio exome sequencing can be used as a first line test for patients with a clinical presentation indicative of a monogenic disorder where it is likely to be the most cost-effective strategy or for patients where standard genetics tests have not identified a diagnosis.

Our rapid trio "whole" exome sequencing service aims to provide a diagnosis for children with severe paediatric disorders who are either not eligible for the 100,000 Genomes Project or for whom a diagnosis is required more urgently to aid clinical management, prenatal testing or pre-implantation genetic diagnosis.

The aim was to enable a diagnosis for more families and to shorten their 'diagnostic odyssey'. Previously these patients would have undergone a series of tests, often over an extended time period and sometimes including misdiagnoses that were later retracted.

THE WORKFORCE

The service required a new approach by the clinical scientists who traditionally have expertise in a limited number (<100) of rare diseases but now needed to apply their scientific knowledge more broadly to any of the ~5000 rare diseases for which the genetic cause is known.

We established a dedicated "Exeter exome team" that includes clinical scientists, bioinformaticians and genetic technologists. The team includes a clinical academic geneticist who advises on the appropriateness of cases and prior probability of a diagnosis based on phenotype and has provided training for the clinical scientists to improve their understanding of phenotypic data. Coaching was provided by the Consultant Clinical Scientist.

We developed telephone/WebEx MDT meetings to discuss results with clinical geneticists. An exome sequencing analysis workshop was delivered by the South West NHS Genomic Medicine Centre for clinical genetics service users in September 2016 and is being repeated in March 2017.

THE CHALLENGES

There is a shortage of registered clinical scientists so we needed not just to upskill the current workforce, but to identify additional personnel who could undergo a fast-track training programme. We were fortunate to secure funded HSST posts that allowed us to appoint two new healthcare scientists from a research background, one of whom was appointed to the Exome team together with a recent in-service STP graduate.

THE OUTCOMES

We monitor the number of cases in which a diagnosis is obtained and a graph showing the diagnostic yield for all cases reported is available on our website. We encourage feedback from service users through user satisfaction surveys and are also pleased to receive spontaneous feedback.

The availability of this service, and especially the opportunity to discuss cases prior to referral has increased understanding about which cases to refer and general awareness about the benefits and limitations of the technology.

We have carried out prenatal diagnosis for a number of cases diagnosed through the rapid exome sequencing service. The service has been particularly welcomed by couples with a current pregnancy, enabling them to make informed choices and reduce patient anxiety.

Name of service: Spirometry at a substance misuse clinic (reaching the hard to reach)

Area covered: Liverpool

Organisation: Liverpool Heart and Chest Hospital NHS Foundation Trust

Contact: Jennifer Furlong, Senior Chief Clinical Physiologist

ABOUT THE SERVICE

Liverpool Clinical Commissioning Group funded spirometry at Addaction's community based substance misuse clinics, to screen 1100 heroin smokers (current or ex) for COPD. The substance misuse clinics are the key anchor points for these patients and often the only point at which they reliably access healthcare.

Respiratory physiologists from Liverpool Heart and Chest Hospital performed spirometry at the client's usual drug keyworker appointments over 31 sites including the Addaction offices and GP surgeries. Detailed tobacco/drug smoking history, brief medical history, and breathlessness scores (CAT and MRC) were recorded. Clients found to have COPD were informed of the diagnosis and referred to their GPs for management.

This service utilised our existing portable spirometry technology in new settings.

WHY CHANGE?

Many heroin smokers develop and die from premature severe COPD. Their lack of engagement with conventional health services contributes to late diagnosis.

13% of COPD admissions to A&E at The Royal Liverpool and Broadgreen University Hospitals are heroin users/ex users. This is not an effective use of NHS services and not providing the best care for the patient.

THE WORKFORCE

The service required hospital staff to provide community based care. Physiologists visited the substance misuse clinics to provide spirometry at the key worker appointments but first delivered 2 spirometry training sessions to the drug keyworkers so they could explain spirometry to their clients. This allowed the clients to make an informed choice.

We worked very closely with new outside partners. Clinical and managerial staff from the substance misuse clinic (Addaction), physiologists from Liverpool Heart and Chest Hospital, and medics from The Royal Liverpool and Broadgreen University Hospitals and Aintree University Hospital met regularly to discuss the service and the results it was producing.

THE CHALLENGES

Primary, secondary and tertiary care, along with substance misuse services had to come together and demonstrate integrated work practices.

The service was funded by Liverpool Clinical Commissioning Group and so pitching it to them and keeping them up to date via meetings/email was vitally important. 2 Physiologists from the Pulmonary Function department went out every day to Addaction clinics for a period of almost 6 months. To accommodate this workforce changes had to be made to the whole department in order to facilitate 2 members of staff being off general departmental duties.

We could have better planned our IT support. Each hospital and the substance misuse clinic use different software (e.g. EMIS, blue cherry, PAS, EPR) and none of them communicate with each other. By developing an Addaction database at Liverpool Heart and Chest Hospital, we solved most of our data sharing issues.

THE OUTCOMES

This new service demonstrated that anchoring screening to keyworker appointments was an effective use of services and there is scope to use this method in other hard to reach groups such as the homeless.

69% of patients signed a consent form, building up a solid research database for future projects. Liverpool Heart and Chest Hospital's IT and Pulmonary Function teams created a new database to store demographics and results.

47% of those tested had spirometry consistent with COPD. 225 (59%) were undiagnosed but symptomatic offering significant scope to improve treatment.

It is hoped these initial results may secure funding for continuation of this, and development of other, anchor models of diagnostic testing/ monitoring.

Healthcare Science Specialism: Respiratory Physiology

Name of service: Improved booking and management of lung function clinics
Area covered: Manchester
Organisation: Central Manchester University Hospitals
Contact: Heloise Costello, Senior Respiratory Physiologist

ABOUT THE SERVICE

We have reviewed and changed the way we book appointments, to the benefit of staff, patients and hospital finances.

WHY CHANGE?

Referrals to the department for lung function tests would have appointments made in a paper diary, on our computer appointment/letter generating system (PAS) and these would also be recorded on Excel. Further duplication occurred whent two copies of test results were printed, with one copy to the referring consultant and the other copy filed. Process mapping identified significant time wasted and quality improvements which could make our service more efficient and make better use of physiologist and admin time.

We have never charged for tests. By improving our clinic booking system we would be able to charge for tests and generate an income of £300,000 plus/year.

Faster access to digital results can improve referral pathways and quality of care. Access to results should be immediate for doctors wherever they are in the trust by logging on and other departments should have access to see when patients have appointments with us or whether they have already had their appointment.

THE WORKFORCE

No new skills were required - just better use of current skills and removal of duplication processes.

A clinic booking system required everyone who books appointments to learn new skills and new clinic booking codes. As a result we are now going to be able to charge for tests and cut down on time consuming duplication of appointment booking and recordings.

We now scan our results on to the computer systems to which all doctors have access. We had to learn how to use the scanner and upload the results on to Chameleon.

Training was accessed for an internal hospital programme called Medisec. This allows us to create patient letters, so the results which we scan are inserted into a patient letter and can be accessed by all relevant staff.

Extra training was required for another hospital system called PAS, although we had always used this programme to create patient appointments it is now used to create appointments on clinics.

THE CHALLENGES

The process of change has been diplomatic, with everyone directly involved with the service present at the meeting to discuss possible improvements. Everyone was very receptive and had their own input to give to the changes. We faced very few leadership challenges as everyone agreed the changes were beneficial.

THE OUTCOMES

The time taken to scan results into an internal results programme, compared to filing and despatching is significantly reduced. We have also observed a decrease in the number of phone calls form secretaries asking us to fax results.

The new approach has been well received by consultants and secretaries and the overall outcome has been improvement to the efficiency of our service. The time saving measures we have implemented and the removal of duplications have allowed for an increase in the number of patients which can be seen every week and waiting list times have decreased.

We are hoping that once these changes have been studied and we are able to demonstrate the service improvements we will be able to share these improvements with other similar departments.

Quality Improvement methods have been instrumental in transforming patient care in the NHS and these QI methods are providing healthcare scientist teams with the tools to systematically improve the quality of care patients receive. Innovative healthcare scientists are continually improving their services using Lean methodology, A3 thinking and Plan Do Study Act (PDSA) cycles as tools for improvement and here you can find a few examples of their approaches and findings.

Name of service: Leading organisational culture change through a Continuous Quality Improvement initiative Viapath
Organisation: Biochemical Sciences, Viapath
Contact: Rachel Carling, Consultant Scientist & Director, Biochemical Sciences

THE PROBLEM

By delivering A3 training to key individuals in the organisation, the team in the pathology lab believes it can improve many different patient pathways while also increasing efficiency in the laboratory.

Although the aim of each A3 project is specific, the over riding ethos is to put the patient at the heart of the process, embed quality into each stage of the pathway and produce the right result, on the right patient, at the right time. This is achieved by systematically reducing waste, identifying the root cause, implementing counter measures and devising ways in which the changes can be measured and monitored.

THE OUTCOMES

One of the longest running CQI projects looked at the impact of immunosuppressant drug turn around time on the renal transplant patient pathway. In 2012, prior to the start of the CQI project, only 65% of samples were reported in a timely fashion and the goal of the project was to increase this to 90%. By October 2013 74% of samples were meeting the goal and since January 2015 the goal has consistently been achieved.

Name of service: Where on earth are my results"? Using A3 methodology to reduce turn-around times of referral tests and improve patient care.
Organisation: Biochemical Sciences, Viapath
Contact: Dr Stamatina Agalou, Senior Clinical Scientist

THE CHALLENGE

The process for reporting a referral test was ambiguous resulting in delays to patient results, impacting negatively on multiple patient pathways.

The aim was to reduce the turnaround time (TAT) for the validation part of the process to 3 days.

The root cause analysis identified inadequate training for post-analytical activity and the fact that nobody was taking overall responsibility for the outstanding results.

THE OUTCOMES

The project raised the visibility and perceived importance of send aways as an integral part of the CQI project. The team put actions in place to eliminate the waste activities, drafting a new focused and structured SOP.

As a result, two years later, referral tests are validated on average within 2.4 days (median = 2.0) and 71% of all tests are validated within 3 days. The team continues to work towards its goal of 90% within 3 days.

Name of service: Accelerating amino acid analysis
Organisation: Biochemical Sciences, Viapath
Contact: Luisa Beltran, Senior Clinical Scientist

THE CHALLENGE

Analysis of amino acids in plasma, CSF and urine is essential to support the diagnosis and management of a range of inherited metabolic diseases. The analysis is performed using ion-exchange chromatography, which provides highly reproducible separation and quantitation of amino acids but is time consuming.

The team used a systematic approach, employing A3 methodology, to identify issues within the amino acid workflow pathway and improve turnaround times (TATs) to the benefit of patients and clinicians while saving laboratory time. They developed a two-phase action plan to target areas for potential improvement.

THE OUTCOMES

Data collected during January – March 2016 showed that the mean TATs for plasma, CSF and urine amino acid analysis were 8.0, 7.3 and 12.3 days respectively - 43% of plasma samples were reported within 7 days.

Following implementation of phase 1, data showed that mean TATs for plasma, CSF and urine amino acid analysis had improved to 6.4, 6.8 and 9.9 days respectively and 67% of plasma samples were reported within 7 days.

Furthermore, waste steps were reduced, awareness in the laboratory was increased and improvements in working practice were reported.

Name of service: Sample delivery from King's College Hospital (KCH) to Clinical Transplantation Laboratory (CTL)
Organisation: Clinical Transplantation, Viapath
Contact: Kamla Reddi, Clinical Scientist

THE CHALLENGE

Over the last 30 years samples have been couriered privately from external hospitals to Guy's Hospital (GT), but as the field of transplantation has evolved, the same protocols/processes may not be adequate now. Since the joint venture and Viapath this process of sample delivery remained unchanged and was not re-evaluated. This project aimed to implement an efficient sample delivery pathway through Viapath from Kings College Hospital (KCH) Central Specimen Reception (CSR) to Guy's Hospital CSR and Clinical Transplantation Laboratory (CTL) .

THE OUTCOMES

A root cause was identified as lack of knowledge and awareness of the pathway and Viapath sample bag by various departments. Training on the pathway and courier times was actioned to introduce the use of a new pathway and the renal and liver teams were briefed on courier times with liaison with KCH CSR and GT CSR to ensure samples are delivered in a timely manner.

The new pathway was monitored internally and weekly liaison with KCH ensured the pathway was working. Since October 2016 no samples have gone missing or been delayed from the renal unit.

Name of service: Sweat and Tears
Organisation: Clinical Biochemistry, Viapath
Contact: Louise James, Specialist Biomedical Scientist

THE CHALLENGE

The time of biomedical scientists is being reserved for sweat test appointments but 1 in 5 fail to attend and the facilities provided are not ideal. As a result, time is not being well used, waiting times are artificially extended and quality of care is potentially compromised. The aim was to reduce the number of patients failing to attend, reduce the waiting time for a sweat test by 50% and improve the 'patient experience' during the sweat test procedure, by modifying the processes.

THE OUTCOMES

The solution was to address root causes that significantly contribute to appointment wait time and the logistics of sweat tests.

- amend patient information sheet to include cancellation procedure and cost of sweat test
- implement appointment reminder service
- determine suitable location for sweat test procedure

Name of service: Putting the 'monitor' back into PKU monitoring
Organisation: Biochemical Sciences, Viapath
Contact: Erin Msozley, Principal Clinical Scientist

THE CHALLENGE

Patients with phenylketonuria (PKU) require routine monitoring of their blood phenylalanine levels by metabolic dieticians to optimise their ongoing treatment and management.

The turnaround times (TATs) did not meet the needs of the metabolic dieticians who need the results by 4pm daily.

The goal was to report 90% of all PKU monitoring results to the dieticians by 4pm on the same day of receipt, excluding those that arrive once the batch has been started.

THE OUTCOMES

By analysing the workflow, modifying the pathway and improving communication, the TATs have been improved. 3 areas of waste were identified and the pathway was shortened by removing these. Additional staff were trained in performing the PKU monitoring assay and an MLA now books in the samples while the BMS prepares the analyser.

The relationships with dietetic teams were strengthened and awareness raised in the laboratory of the importance of making the results available in a timely manner. By Jul-Oct 2016 the percentage of samples reported by 4pm had risen from 73% to 98%. In the same period there was a small increase in the number of samples received and analysed daily.

Name of service: Evolution of CF Screening in the SEThames NBS laboratory

Organisation: Biochemical Sciences, Viapath

Contact: Ian Hutton, Senior Clinical Scientist

THE CHALLENGE

The sample pathway for CF testing in the Newborn Screening laboratory is complex and involves multiple steps. The process was established in 2007 and new technologies have since been introduced into the laboratory. Errors have led to CF results being delayed.

THE OUTCOMES

The previous process consisted of 4 stages completed by 4 different staff members. The new process has removed 2 stages releasing the time of 2 staff members. The new process means not suspected results can be reported in under an hour and newborn screening staff members have stated “This process is far quicker and simple, means I can get on with other tasks”

Name of service: QA Efficiency improvement

Organisation: Southend University Hospital

Contact: Benjamin Mingard, Head of Quality Assurance, Radiotherapy Physics

THE CHALLENGE

With the development of new technology in radiotherapy there is a need for ever more quality assurance (QA), while there is also an increasing demand upon the treatment machines causing a reduction in the time available for QA. Daily, weekly, monthly and annual QA tests are carried out on every linear accelerator and the aim was to increase the efficiency of the weekly QA systems to allow the QA to be completed 10% faster than previously.

THE OUTCOMES

Analysis showed that calculations add 20/40 minutes per session. Automating the calculations would take approximately a quarter of the time needed before. A spreadsheet which automates all calculations was written and tested until the spreadsheet operated error free for a minimum of 20 full uses.

Name of service: Improving the recording of outcome measures and follow up provision in adult audiology

Area covered: Basildon and Thurrock University Hospital

Organisation: Basildon and Thurrock University Hospitals NHS Foundation Trust

Contact: Hollie Partridge, Senior Audilogist

ABOUT THE SERVICE

In audiology the main outcome measure used is a patient questionnaire compiled in two parts; with the first part being administered at the assessment appointment and the second completed at the follow up appointment. The follow up appointment is therefore a vital part of measuring patient outcomes and provides patients with the assurance that they will have a chance to ask questions about their care or give feedback on the benefit the hearing aid is providing. In two trials, follow up appointments were delivered over the telephone instead of patients attending the department. Based on selection criteria, those considered suitable received a phone call from an audiologist. Should the need for a clinic appointment be identified, this was booked within the same timeframe as the original hospital based follow up process.

WHY CHANGE?

We identified that follow up appointments have not always been booked, that part 2 of the questionnaire is not always completed at the follow appointment and there was a high cancellation and DNA rate for follow up appointments. Of those who cancelled many did so as they were satisfied with their hearing aids. We wanted to increase the numbers of patients having a follow up appointment and completing part 2 of the questionnaire, whilst also reducing the waste built in to the existing appointments system.

By considering telephone follow ups the department is reducing the need for patients to attend the hospital. This sits well with intended direction of NHS care put forward by the NHS Five Year Forward View. Follow ups by phone in patients' own homes provides increased choice and relieves pressure on the hospital facilities. Follow up appointments are booked for 30 minutes, but this time is not always required, so clinical time was not being well used.

THE WORKFORCE

No new skills were needed, although audiologists have to adapt to a change of delivery of counselling to over the phone rather than in person.

At present calls are made by audiologists, but it is hoped that in future associate audiologists can be trained to make the calls. If the phone follow up pathway is found to be effective it may be possible to reassess the workload on the current workforce or recruit in order to more efficiently use audiologists' time.

THE CHALLENGES

We are still in the process of finding ways to successfully reserve appointment times for patients who receive a phone call but subsequently require a hospital appointment.

Support from our line manager and the QI team was provided and continues to be valued.

THE OUTCOMES

87% of patients are suitable for a telephone follow up according to the draft SOP. In trial 1 64% were discharged over the phone with part 2 of the questionnaire completed and in trial 2 the figure rose to100%. Staff and patient response has been positive and telephone calls last on average between 6 and 10 minutes compared to 30 minutes in hospital.

NHS
Basildon and Thurrock University Hospitals
NHS Foundation Trust

Name of service: Minimally Invasive Extracorporeal Technology (MIECT)

Area covered: Cardiothoracic Unit, Castle Hill Hospital, Cottingham, East Yorkshire

Organisation: Hull and East Yorkshire NHS Trust

Contact: Lindsay Mclean, Chief Clinical Perfusion Scientist

ABOUT THE SERVICE

We now do not offer a conventional form of cardiopulmonary bypass. We offer a closed, minimised circuit that reduces the need for donor blood and reduces the length of stay of our patients. The new system also has more safety features when compared with conventional practice.

WHY CHANGE?

Our main aim was to improve patient outcome and safety, by adopting new technology and adapting it to fit our bespoke system. Reducing the need for transfusions means an improved outcome and long term survival according to research.

THE WORKFORCE

The whole team of 7 perfusionists had to learn the new technique, the new technology and its limitations. They had to devise methods of safety should things go wrong. It was also important to improve team approaches to development, learn how to analyse cases once completed and discuss how we could have done things better. They improved on reflective practice.

We introduced a learning/ training package so that the less experienced could learn from the more experienced and visited European units that perform these techniques to learn from them.

THE CHALLENGE

Some of the team were initially reluctant to adopt the new methods, although once they mastered the technique they realised this is a much improved and safer method of cardiopulmonary bypass. It was also difficult at first for the surgeons to trust that we knew how to correct potential bypass problems. To run this system requires a total team approach from all the theatre team. For it to work a high level of communication is paramount.

THE OUTCOMES

We monitor length of stay, units of transfused blood used and renal function markers to measure improvements.

Adopting this new practice, and improving their understanding of how the bypass affects patients, changed the team's view of how we manage and run our other form of cardiopulmonary bypass. Consequently we do not offer the standard form of bypass that creates a haemodiluted patient that has an increased risk by being exposed to donor blood.

The whole team has gained more knowledge in the understanding of cardiopulmonary bypass and how it affects patients. Consequently we offer a more tailored service to the patients.

The practice is now copied in some European units and Papworth hospital has also utilised the practice with excellent results.

We have had visitors from all over the world to learn our practice and we have ran a master class in January sponsored by British Heart Research UK. This was so successful that they have asked us to repeat the master class later in the year.

Name of service: Hearing and Balance Services

Area covered: East Berkshire

Organisation: Berkshire Healthcare NHS Foundation Trust

Contact: Dr Jagjit Sethi, Head of Hearing and Balance Services, Lead Healthcare Scientist & Clinical Director for West Berkshire Community Hospital

ABOUT THE SERVICE

We set out to design a new pathway and test the benefits of fitting pre-programmed hearing aids (Screen&Fit) with new learning technology in selected patients with mild-moderate hearing loss. This was compared to the same aids without learning and a traditional service model, where the same aids are fitted individually either with or without learning.

WHY CHANGE?

Our aims were to improve efficiency while responding to increased demands due to an ageing population and managing workforce shortages.

Through maximising the use of innovative technology we wanted to find a way to reduce consultation time and need for qualified staff whist improving user satisfaction and facilitating self-management of their hearing care.

THE WORKFORCE

Typical staff comments:

“I had not realised the potential impact, regardless how scary this is personally, I am still excited by it.”

“Patient experience seems to be much better than people on the normal pathway with the normal technology.”

THE CHALLENGES

To be sustainable, workforce capability and capacity needed to be ensured, and this approach required a move from organisational to systems planning. Integrated pathways and innovative community based models were essential to adapt to this environment.

It was recognised that there may be clinical, scientific and/or professional risks in such an approach. Therefore, proof of concept, pilot and study trials in differing clinical contexts were done to identify and eliminate/reduce risks and refine red-flags.

THE OUTCOMES

The effectiveness of the initial fitting appointment was measured by the use of a ‘red flag’ questionnaire, an expectation questionnaire and completion of a Glasgow Hearing Aid Benefit Profile (GHABP) part I.

At the follow-up appointments, a GHABP part II was used along with a service satisfaction questionnaire, an International Outcome Inventory for Hearing Aids and a questionnaire to measure the usefulness of a patient booklet.

Other measures included objective hearing assessments and verification of hearing aids using real ear measurements and test box assessments. We also carried out an ethnographic study interviewing of staff to gain insights into their views of the new technology. This was underpinned by an interpretivist paradigm rooted ontologically in social constructionism with an inductive approach.

Post-trial analysis revealed the red flag to possess high sensitivity and specificity with no false positive selections and only 4 false negative rejections for study inclusion. Post trial analysis revealed the red flag to possess… Patient suitability rate for this pathway was found to be up to 48% with 97% of users reporting being satisfied, 86% using their hearing aids for a reasonable amount of the the time and 82% begin helped at least moderately.

With such promising results, we are now in the process of developing a protocol to review the 121 patients seen in this trial after a year on this technology as well as looking towards putting this into practice locally pending commissioning agreement.

New learning hearing aid technology with a revised clinical pathway can reduce consultation time and need for qualified staff as well as improve user satisfaction, benefit and facilitate self-management of their hearing care. Furthermore, several clinicians have commented that it has changed or influenced their day to day clinical practice away from the medical paternalistic approach.

Patient feedback:

“I don’t know whether I have learned or the hearing aids, but I now wear my hearing aids.

Name of service: Clinical Exome Project
Organisation: North West Coast Genomic Medicine Centre
Contact: Andrew Swale, Trainee Clinical Scientist (Genomics)

ABOUT THE SERVICE

Currently at the Merseyside and Cheshire Regional Genetics Laboratory (also the NW Coast Genomic Medicine Centre), targeted gene panels are routinely used for diagnosis of epilepsies, hereditary neuropathies, and hereditary spastic paraplegia. For this project, I was tasked with the validation of an exome-based NGS testing strategy for clinical diagnostic service.

WHY CHANGE?

There are several approaches that may be deployed when implementing NGS methods into diagnostics: targeted gene panels, clinical/focused or whole exome sequencing, and whole genome sequencing. With the costs surrounding laboratory-based NGS having substantially decreased in recent years, it is now more cost effective to run whole exome sequencing for a patient.

The major benefit of exome-based sequencing comes through its flexibility – this methodology retains the ability to analyse a small focused number of genes (through a 'virtual panel' strategy) whilst also allowing the number of genes to be increased in line with new literature and research findings. In cases where a positive result is not obtained through a focused virtual panel strategy, analyses can be expanded out to further genes/all disease-associated genes without having to conduct any further costly laboratory work.

Implementing this test would allow for a more flexible testing strategy and ultimately result in an increase in diagnoses and improved health outcomes for patients. The change would also be a requirement of any genomic facility that would aspire to provide state of the art testing, as currently provided in other western countries around the world, assuring equity of access to the most effective testing strategy for patients.

THE CHALLENGES

1. Whole Exome Sequencing (WES) or Clinical Exome Sequencing (CES). WES identifies variants found only in the protein-coding region of the human genome (the exome), which represents <2% of the genetic code, but contains ~85% of known disease-related variants. CES is a highly targeted design that enables analysis of only the disease-associated targets within the exome.
2. The IT framework. As our current IT infrastructure would not be able to handle the amount of data generated by WES, a new IT infrastructure has been developed for CES in conjunction with the Trust's CIO, that has required additional investment, secured through NHS E.ngland.
3. Multiple clinical exome kits are commercially available - we initially compared two and then evaluated these based on data quality, cost and existing lab infrastructure.
4. Different bioinformatics software/tools can be used to analyse the data – this project was conducted in tandem with that of a bioinformatics trainee who evaluated different pipelines and provided recommendations on the most suitable.
5. Implementing the test into clinical service. This is part of on-going discussions aligned to our wider lab strategy for genomics and to support this I shadowed the diagnostic exome sequencing service of a renowned European lab (Genome Diagnostics - RadboudUMC, Nijmegen) for my 4 week STP elective placement, in order to look at a different health system that has been delivering this new technology as routine across a wide geography

THE OUTCOMES

An in-house audit of our targeted gene panel for epilepsy (50 genes) identified a diagnostic detection rate of approx. 10%, A similar audit undertaken at Genome Diagnostics identified a higher rate of approx. 30% for a 'virtual' epilepsy panel made up of ~250 genes. This clearly demonstrates that the flexibility to increase the size of existing gene panels through use of virtual panels via exome sequencing will provide a higher diagnostic rate, a better service to patients and improved health outcomes if virtual panels are offered equitably across all referral categories.

Name of service: 1) Gaming technology for improving health outcomes
2) 3D printing of biomaterials

Area covered: Thames Valley

Organisation: Royal Berkshire NHS Foundation Trust

Contact: Professor Malcolm Sperrin, Director of Medical Physics

ABOUT THE SERVICE

1) We are working closely with University of Reading to establish new techniques based on gaming technology. This originally began with the use of the Microsoft Kinect system to look at the patient's range of motion but we are now looking at the use of such technology for condition assessment, drivers for condition monitoring and improvement and assistive technology.

2) We are working with the Polytechnica of Leiria (near Lisbon) in Portugal, to develop new techniques for printing biomaterials, or conventional materials intended for implants. This has included the identification of key material characteristics as well as the development of techniques such as electrospinning, where fibres can be created down to a few tens of nanometers. This work is also looking at functional biomaterials.

WHY CHANGE?

1) There is a clear drive to develop software and human-machine interactions for gaming or leisure purposes. We are transferring this technology into healthcare by utilising novel methods.

2) The creation of highly detailed biomaterials mimicking the natural form is highly desirable. This is also meant to take 3D image sets and use this to recreate the imaged tissue. There is an increasing interest in the material properties with an intent to improve durability, acceptance and stress distribution.

In both projects we are aiming to improve patient experience and the quality of care, while enhancing service efficiency and productivity. We also wish to enhance technology transfer in order to increase treatment options and reduce the delay between idea and implementation.

Drivers have included patient demand and a desire to improve outcomes for patients. Current options are limited, while new techniques are available in non-medical disciplines.

THE WORKFORCE

This work may lead to transformation, since the skills required and opportunities presented are not normally encountered in the traditional health environment. New technology is central to this work.

THE OUTCOMES

Measures will include:

- feedback from patients
- feedback from health professionals
- co-morbidity
- options appraisals.

Name of service: Application of microsystems to Medical Photography
Area covered: Sheffield
Organisation: Sheffield Teaching Hospital NHS Foundation Trust
Contact: Robert Salthouse, Medical Photography Lead

ABOUT THE SERVICE

Medical Photography started its microsystems approach in December 2015. This process, if allowed to work correctly, encourages all staff to take part and voice their opinions and suggestions free from management constraint. Our initial use of microsystems highlighted a number of issues.

WHY CHANGE?

We agreed our main aim was to streamline our processes, reduce the completion time for medical photography and clinical video work and improve the data quality that the department holds.

The data gathered for April 2015 demonstrated a significant number of jobs that had been requested more than 21 days previously and a number of jobs that were taking over 100 days to complete. The reasons could include staff training, pressure to complete some work more quickly than others and poor or incorrect data.

THE WORKFORCE

Meetings were held weekly and all photography and clerical staff attended at some point. The process started with an analysis of the 5Ps - purpose, patients, professionals, processes and patterns.

Each photographer was asked to produce their version of the photographic process from receiving a request to completing the work and this demonstrated a number of variations away from the core process. Clerical staff also produced process maps for their area of work.

We contacted all trust consultants to gain insight into their expectations of medical photography and to understand the completion times they would expect the department to achieve.

The response was good and the completion times ranged from instant to 2-3 weeks being adequate. This information then allowed us to design a new process and we created three turnaround slots; 0-48 hours, 1 week and 2-3 weeks. The work required in 0- 48 hours was for use in MDT meetings, work within 1 week comprised dental and diabetic foot patients and the remaining clinical jobs were put into a 2-3 week turnaround slot.

THE CHALLENGES

Historically photographers had always worked on their own jobs. The downside of this type of workflow is that when a photographer is absent his or her work is not progressed until their return. For the new process we put all the jobs collectively into the 3 turnaround slots.

Each photographer then works on the oldest jobs from each of the 3 time slots.

We resolved a number of smaller issues that could be dealt with by producing a standard operating procedure, with a number of staff working to produce these documents. We can identify plenty of work still to do which will continue when staffing levels allow.

THE OUTCOMES

Each morning we have a group meeting lasting 5 minutes. We decide lunch breaks and allocate each photographer to an area of work to complete. The results have been very positive - data from September 2016 demonstrated that no job took more than 50 days to complete, which is a significant improvement. Although it is still too long, we are moving in the right direction.

CSO 1 - ACCESS FOR LD TO DIAGNOSTICS

Improving Access for People with a Learning Disability to Diagnostic Screening within Primary Care.

University of Sunderland

SUMMARY AND OUTCOMES

People with learning disabilities (LD) have a decreased life expectancy which, in part, is due to the under diagnosis of common diseases such as diabetes and cardiovascular disease[1]. Patients with LD also have an under diagnosis of hearing problems leading to poor quality of life[2]. The diagnosis of these conditions requires diagnostic tests but reduced or no access to the tests in patients with LD can lead to delays in diagnosis. Whilst guidance frameworks have been set up to assess the health and well-being of patients with LD[3], these frameworks do not always routinely include diagnostic testing for long term conditions such as diabetes, cardiovascular disease and hearing loss. There is a lack of evidence showing who is doing what and also giving insight into reasons for this.

This project aims to explore issues associated with diagnostic screening for people with a learning disability and identify if the use of point of care (POC) diagnostics can improve access to diagnostic testing for some key health risks for people with a Learning Disability, using minimal invasive diagnostic testing (POC).

The project is important as there are known inequality and poor experience issues in access to healthcare, well-being and diagnosis for people with a learning disability.

The study will also provide opportunity to explore new product design for non-invasive technology for people with LD, transferrable to other vulnerable patient groups.

1. CIPOLD 2013 - The Confidential Inquiry into the Premature Deaths of People with Learning Disabilities, https://www.improvinghealthandlives.org.uk/publications/1246/Joint_Learning_Disabilities_Health_and_Social_Care_Self-Assessment_Framework_2014
2. Bent, Sarah; McShea, Lynzee; Brennan, Siobhan. (2015) The importance of hearing: a review of the literature on hearing loss for older people with learning disabilities British Journal of Learning Disabilities. Dec 2015, Vol. 43 Issue 4, p277-284. DOI: 10.1111/bld.12148 accessed 20/1/17
3. A Step by Step Guide for GP Practices. Annual Health Checks for People with a Learning Disability. M. Houghton & RCGP 2010

ANTICIPATED OUTCOMES

- Insight into patient and carer current experience of diagnostic screening and POCT.
- Evidence to inform national NHS England and PHE on the current use of diagnostic testing and inclusion of new standards within the annual health checks for LD
- Proposal designs for incorporating point of care diagnostics in the patient pathway and new pathways that could improve access to screening.
- Best practice model for workforce education in LD POCT mapped against Generic Service Intervention Framework and Skills for Health Point of Care competences education.
- A clearer connection between diagnostic testing and intervention using algorithms such as the Lester tool already in use for patients experiencing severe mental illness.

PROGRESS

The work is funded by NHS England and led by the University Of Sunderland Point Of Care Centre for Education and Research. It is overseen by the Deputy CSO Chief Scientific Officer Team through a multi stakeholder group including clinicians, commissioners and Public Health England.

The work is being conducted in four stages. The first two phases of service evaluation are nearing completion. It is anticipated that the output from the third phase will provide the basis for alternative models of pathway delivery for diagnostic screening access for hearing loss, diabetes and cardiovascular assessment, incorporating point of care testing. These models will then be piloted and evaluated in a range of care delivery settings and geographical locations. Anticipated outcomes from this final stage include recommendations for future diagnostics access and point of care adoption and guidance to be incorporated into the national review of Annual Health for people with LD.

Karen Giles, Principal Lecturer, University of Sunderland Point of Care Centre

Dr. Martin Myers, Consultant Clinical Biochemist (LTHTR)

Fiona Carragher, Deputy Chief Scientific Officer, NHS England

Helen Liggett, Scientific Project Lead for Quality Improvement (CSO Team, NHS England)

Dr. Dominic Slowie National Clinical Associate for Learning Disabilities

Dr. Isabel Gordon, Research Associate University of Sunderland

Dr. Lynzee McShea, Senior Clinical Scientist (Audiology), City Hospitals Sunderland NHS FT, Chair of the national Hearing and Learning Disabilities Special Interest Group (HaLD SIG)

Professor Jonathan Ling, Professor in Public Health, University of Sunderland

Ashley Murphy, Primary Health Facilitation Nurse Specialist, Physical Health Stream, Community Treatment Team, Acute Liaison Nurse, Learning Disabilities City Hospitals Sunderland NHS FT

Tony Gibson MBA, FIBMS, FRSPH, Scientific Director, We Are Point of Care Ltd.

Crispin Hebron, Learning Disability Programme Clinical Lead NHS England

Judith Thompson Network Manager & Assurance Lead, North East & Cumbria Learning Disability Network Northern Clinical Networks and Senate, NHS England

Anna Marriott, Project Manager for Improving Health and Lives, National Development Team for Inclusion

David Oglesby, Clinical Fellow, Healthcare Science, Health Education England.

CSO 2 - CSO WISE FELLOWSHIPS 2016

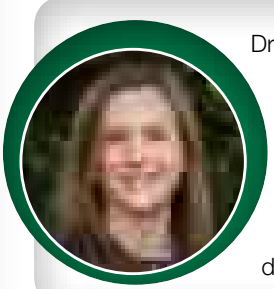
In support of NHS England's business objective of developing the capability and infrastructure for transformational change, The Office of the Chief Scientific Officer, in partnership with the Women in Science and Engineering (WISE) Campaign – the campaign to promote women in science, technology and engineering, set up the CSO WISE Fellowships.

The Fellowships are a unique opportunity for career development and to inspire the next generation of female scientists. The bespoke 12 month initiative will expose the Fellows to a range of career development opportunities, including:

- the WISE career development programme and professional coaching sessions
- the NHS Healthcare Leadership Model
- mentoring from the Office of the Chief Scientific Officer and senior leaders in healthcare, academia and industry
- speaking and ambassadorial opportunities
- WISE and professional network membership.

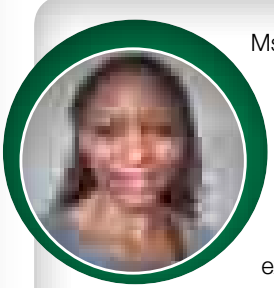
The competition to identify inspiring female healthcare scientists to join the first year of the fellowship programme was launched in conjunction with international women's day in March 2016. The competition attracted 60 applicants from female healthcare scientists keen act as role models to inspire the next generation of female scientists.

Following a highly competitive selection process, in June 2016, NHS England announced the four successful recipients of the first Chief Scientific Officer's (CSO) Women in Science and Engineering (WISE) Fellowship scheme (see below). Due to the high quality of applications, an additional one day leadership development opportunity will also be open to all applicants.



Dr Kathryn Harris, Clinical Scientist, Microbiology, Great Ormond Street Hospital for Children, NHS Foundation Trust

"This is also a brilliant opportunity to promote the role of healthcare scientists in translational research and innovation to deliver a world class healthcare service."

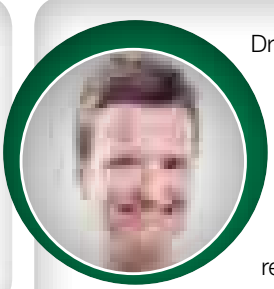


Ms Sandra Chinyere, Clinical Service Manager, Neurophysiology, Ashford & St. Peter's Hospitals NHS Foundation Trust

"Healthcare scientists are the invisible hand behind every healthcare story in the NHS. The CSO WISE Fellowship is an exciting opportunity to be developed into the next generation of scientific leaders, showcasing and bringing our roles from the shadows!"

Mrs Michelle Martin, Lead Specialist BMS Haematology and Transfusion-Training, Blood Sciences, Haematology and Blood Transfusion, Barking, Havering and Redbridge University Hospitals NHS Trust

"I am personally inspired by the many women who share their story of persistence, vision, courage and kindness and would like to consciously bring other women to Science and Engineering, and helps build confidence in other women."



Dr Charlotte Kemp, Head of Clinical Measurement, Consultant Clinical Scientist, South Tees Hospitals NHS Foundation Trust

"I am excited about the opportunity to raise the profile of my profession and to reach out to young women as a role model and ambassador, with a particular aim to show how exciting, diverse and worthwhile a career in Medical Physics and Engineering can be and that it is possible to be driven, have a successful career and to be a mum as well!

If I can inspire one young woman to believe in themselves and see that they can pursue their goals in a STEM career when they may otherwise have shied away from reaching their potential, then I will consider my Fellowship to have been a success"

Professor Sue Hill OBE, Chief Scientific Officer for England, said: I am proud to announce the first CSO WISE fellows who now have the opportunity to inspire the next generation of female scientists. We have been working with WISE to create this unique fellowship scheme and support the aim of getting one million more women working in the UK science, technology, engineering and maths (STEM) workforce. The NHS Constitution makes it clear that a central principle of the health service is that it 'operates at the limits of science'."

CSO 3 - HACKATHON
Collaborate To Improve Care
Learn more online at www.carehomehack.org

COLLABORATE TO IMPROVE CARE

TRANSFORMING CARE HOMES #CAREHOMEHACK

NHS England's new care models programme is one of the first steps towards delivering the Five Year Forward View and supporting improvement and integration of services. Fifty vanguard sites were chosen to deliver the programme and will act as the blueprints for the NHS and the inspiration to the rest of the health and care system. Six of the sites are dedicated to enhancing health in care homes, which was the focus for a unique event, the Collaborate to Improve Care Hackathon, inspired by Chief Scientific Officer Professor Sue Hill OBE and her national Quality Improvement Champions Network of healthcare scientists. Working in partnership with the Innovation Agency in the North West, the vanguard sites and the New Models of Care team supporting them, Professor Hill and the Quality Improvement Champions Network brought together 150 professionals from a range of backgrounds over two dynamic and fast paced days in July 2016. This pioneering event was supported by the masters of healthcare hackathons from Massachusetts Institute of Technology in Boston.

The Quality Improvement Champions Network of healthcare scientists is a network of innovators and problem solvers seeking to collaborate with national teams and key stakeholders who may require their expertise to transform patient care. See their great work here (PDF) and if you would like to link to the expertise in their network then email at england.cso@nhs.net. You can also view the contribution healthcare science makes to high quality patient care here.

To view this information as a separate pdf with links, see www.nwhcs.nhs.uk/images/news/carehomehack.pdf

ACCELERATING INNOVATION

JULY 2016, LIVERPOOL: Fiona Carragher, Deputy Chief Scientific Officer for England, urged “some of the brightest brains” among healthcare scientists and engineers, clinicians and other healthcare professionals, social care staff, designers, IT specialists and industry representatives to collaborate, create and innovate at the ground breaking healthcare hackathon, funded by Professor Sue Hill OBE.

WHY CARE HOMES?

William Roberts, National Care Homes Programme Lead, New Care Models Team, NHS England, explained the aims behind the Enhanced Health in Care Homes (EHCH) programme. These are to improve the quality of life, healthcare and planning for people with long term conditions in care and nursing homes, Extra Care Living Schemes and the community.

In his presentation William set out the four core values enshrined in the EHCH programme which are clinical engagement, patient involvement, local ownership and national support.

JUDGEMENT DAY

Fiona Carragher led the panel of six eminent hackathon judges who had the challenging task of choosing one winning team from the 14 whose pitches spanned topics ranging from mental health, hearing and quality standards to safety, telecare and family support.

WINNING SOLUTION WITH PATIENT FOCUS

Sense and Sensibility’s seven strong team pitched a winning idea to address undetected hearing loss and enable those living in care homes to reach their potential. They fielded a passionate team with a diverse skill mix including a biomedical scientist, audiologist, care home advisory service lead, effectiveness officer and clinical scientist.

One of the key features of the team’s solution to preserve the dignity of people in care homes was that it was co-designed with a patient focus. Judges were particularly pleased to hear from team member and patient advocate Jean Strauss.

CSO 4 - DIAGNOSTICS AND AMR

Diagnostics and Antimicrobial Resistance (AMR)

Preventing AMR using patient-centred, cost effective diagnostics. Maximise the use of available and innovative technologies in human and animal health sectors.

DIAGNOSTICS – PREVENT, PROTECT, PROMOTE

RIGHT TEST, RIGHT PLACE, RIGHT TIME, RIGHT TREATMENT, REDUCE RESISTANCE

The predicted future impact on global mortality from AMR is devastating with millions of deaths predicted by 2050 if the issue is not addressed.

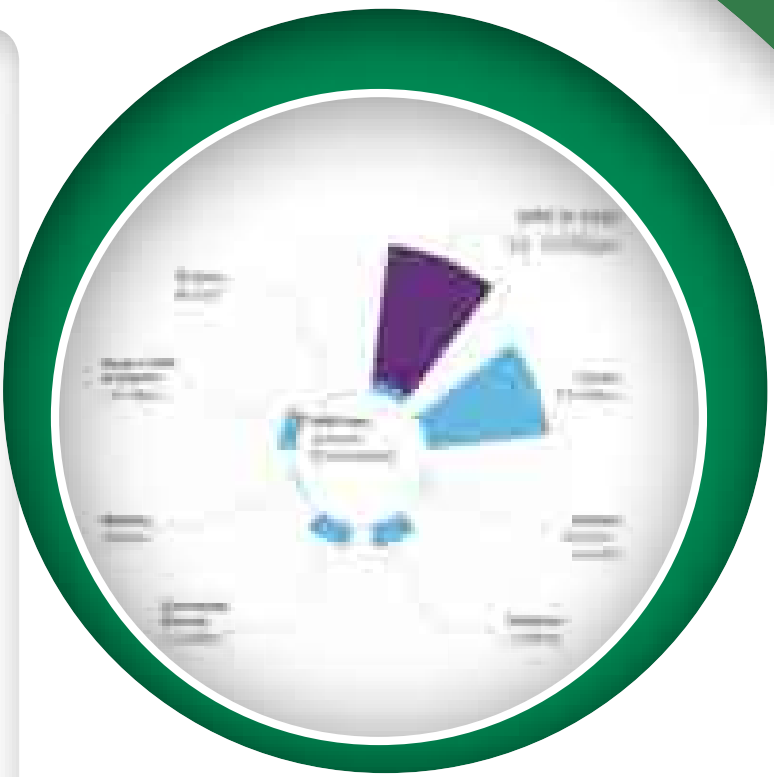
Inappropriate use of antibiotics is a key factor in the increase of antimicrobial resistance. Correct antibiotic use should occur following clear diagnosis, clinical judgement of need and appropriate agent selection. However most prescribing, supply and administration of antibiotics is currently carried out without information about the nature of the infection or its susceptibility to a particular drug.

NHS England is working with system partners to lead a national antimicrobial resistance diagnostics subgroup with the following ambitions:

Ambition:

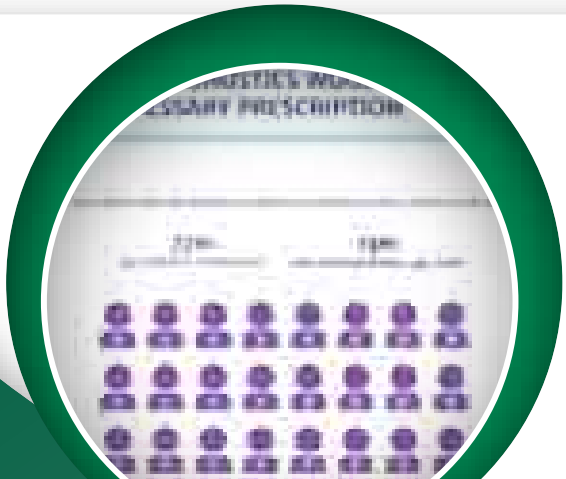
- in every part of the country, in every healthcare setting, the same level of access to rapid diagnostic technology and digital antimicrobial guidance tools are available
- the technology meets nationally set standards of quality and response times,
- there is recognition that different settings might need different technical solutions
- services are flexible and responsive to the adoption of new technologies that will provide continuous improvement.

The use of diagnostic tools needs to be considered in the context of patient care pathways and particular diagnostic strategies – broader approaches to characterise infection, guide treatment and minimise unnecessary use of antibiotics, tailored to the specifics of the patient, their symptoms, healthcare system, behaviours and social setting.



MAXIMISE THE USE OF AVAILABLE TECHNOLOGIES IN HUMAN AND ANIMAL HEALTH SECTORS TO:

- provide a more precise diagnosis
- provide more targeted, personal and timely treatments for patients when needed, avoiding putting people through unnecessary treatment
- prevent infections and control their spread
- improve research that support new drug development and stewardship
- recognising and protecting the value of antibiotics to society through optimising their prescribing for both humans and animals
- slow the growth in AMR



ANTIBIOTIC GUARDIAN

KEY AREAS FOR ACTION

Systems analysis

- Addressing and empowering healthcare professional and the publics' behaviour, physician–patient interactions, patient expectations and attendant social and cultural factors
- Identifying issues/ barriers (scientific and behavioural) that may impact on diagnostics and susceptibility testing and solutions
- Identifying the issues affecting adoption and the levers that can support the systematic adoption of new and recommended technologies

Pathway mapping

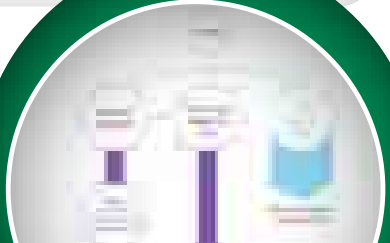
- Identifying issues in primary, secondary and community care, diagnostic testing implementation and use to identify evidence based appropriate and cost-effective deployment of diagnostics using point of care and centralised facility testing methodologies across the pathway
- Making use of rapid reporting of laboratory results and capitalising on opportunities for improved systems processing and higher throughput in laboratories

Embedding practice

- Ensuring that the workforce is appropriately skilled to use the technologies available
- Ensuring that the system is sufficiently flexible to take advantage of new technologies that come available, including genomic technologies and that technical solutions are appropriate for each setting, achieving the right balance between speed and quality
- Embedding expectation of and delivery of POC testing in pharmacies and local high street settings

Economic analysis

- Addressing cost and benefits of investing in technology and undertaking tests and assessing value across care pathways of diagnostic testing and identification of potential improvements and benchmarking standards to implement endorsement of positive practice measures
- Utilising commissioning systems to ensure the right tests are carried out in the right setting



Diagnostics test matrix evaluation

- Identification of One-Health system wide quality process improvements in regards AMR and diagnostics by establishing principles in relation to regulation and quality of technology in development
- Evidence based quality mapping
- Benchmarking, standard setting and controls
- Best practice sharing, network creation and adoption
- Digital platform use and commissioning consistency

Innovation

- Horizon scanning and identification of priority areas for improved diagnostics and susceptibility research within the One-Health system
- Supporting One-Health system wide informatics, genomic, surveillance and technological infrastructure
- Use of digital technology to transform diagnostics and resistance identification and monitoring services
- Deployment of new and innovative technologies such as POC tests, or technologies currently in limited practice with potential to influence system wide improvements using evidence based agreed standards
- Supporting health entrepreneurs and drive positive changes
- Improving the use of diagnostic testing to identify candidates for clinical trials to support the development of new treatments

One-Health and Public Health Intelligence

- Availability of test results to support public health intelligence.
- Sharing of knowledge and intelligence between human and animal health sectors to maximise the benefits of existing and new diagnostics to improve prescribing across sectors and support the One-Health approach to tackling AMR
- Ensuring that outcomes of tests are fed into international, national and local data collections and improve outcomes for patients

Antimicrobial Resistance Diagnostics Sub-Group, Secretariat Office of the Chief Scientific Officer

(Diagnostics – Prevent, Protect, Promote Programme)

CSO 5 - MENTAL HEALTH

Diagnostics at the point of care and at the point of contact of patients with psychosis.

SUMMARY

The Five Year View for Mental Health (Mental Health Taskforce, 2015) clearly sets out the priority action required of NHS England and Health Education England to tackle 'one of the greatest health inequalities in England'. Evidence shows that compared to the general population, the life expectancy of people with severe mental illness is reduced by around 15-20 years. This project proposes the introduction of technology to deliver diagnostics at the point of care and at the point of contact of patients with psychosis via lab-in-a-bag and lab-in-a-box innovations. This will improve the diagnosis of certain physical health conditions, such as diabetes and hyperlipidaemia, in patients with mental health.

INTRODUCTION

In February 2016 The Five Year View for Mental Health stated that:

- by 2020/21, at least 280,000 people living with severe mental health problems should have their physical health needs met
- they should be offered screening and secondary prevention reflecting their higher risk of poor physical health.

This highly innovative and unique collaboration between the mental health and healthcare science workforce proposes improving access to diagnostic testing in order to transform the care pathway into physical healthcare for people with severe and enduring mental health problems.

The National Audit of Schizophrenia highlighted the need to improve the physical health monitoring of service users against their higher risks of diabetes and cardiovascular disease. Poorly agreed responsibilities between primary and specialist mental healthcare combined with poorly coordinated systems explained many of the serious inadequacies observed by the NAS.

Compared to the general population, the life expectancy of people with severe mental illness is reduced by around 15-20 years, with a threefold increased risk of premature death. About 75% of deaths are caused by physical disorders:

- cardiovascular disease is the single biggest and potentially preventable cause of premature mortality, more common than suicide
- diabetes is 2-3 times more common (almost entirely from type 2 diabetes)
- a Belgian study found that 37% of people with schizophrenia by the age of 38, were biochemically at high risk of developing diabetes.

Poor physical health impacts negatively on self-esteem, mental health, stigma, discrimination, and quality of life. Weight gain and metabolic disturbance may occur from early in the course of psychosis, accelerating within weeks of initiation of antipsychotic medication.

INVERSE CARE LAW

Despite higher risk of premature morbidity and mortality, some directly linked to the treatments they are given, people with severe mental illness receive suboptimal healthcare.

- NAS reported only 29% of people with schizophrenia had had an adequate cardiometabolic assessment in the previous 12 months.
- Systematic under-recognition and under-treatment of CVD in people with schizophrenia in primary care (Scottish study of 314 general practices) .
- Almost half as likely to see a practice nurse (key providers of CVD risk screening and health promotion) as the general practice population.
- Even when health risks are detected treatment rates remain low; e.g. Rates of non-treatment ranged from 30% for diabetes, to 62% for hypertension, and 88% for dyslipidemia.

Controversially the GP Quality Outcome Framework retired its requirement to measure weight, glucose and lipids from April 2015 in a decision viewed as further widening health inequalities.

In response, the Lester tool was developed to provide a simple but comprehensive assessment framework, endorsed by many relevant national organisations including NHSE and NICE. The Lester's mantra 'Don't just Screen, Intervene' has become the touchstone of various quality improvement initiatives to implement the Lester resource. The challenge is now not why but how to implement the Lester tool, although the poorly agreed responsibilities between primary and specialist mental healthcare have resulted in low adoption, primarily due to reduced access to diagnostics tests.

The aim of our proposal is to use innovative lab-in-a-bag and lab-in-a-box technology to carry out these diagnostic tests at the point of care, providing easier access to the results required for the adoption of the Lester tool.

RATIONALE TO THE 'LAB IN THE BAG' AND "LAB-IN-A-BOX" INITIATIVE

One of the difficulties identified in the NAS and the AQUA initiative is that a barrier to the satisfactory management of glucose and lipids is a set of practical problems such as organising blood tests, following-up abnormal results, and retrieving and communicating lab results.

The Lab-in-a-bag approach is to have several meters in a mobile diagnostic back-pack and the diagnostic meters relevant to the investigation will be chosen. The Lab-in-a-box approach is to have one mobile diagnostic device that can take the place of several diagnostic devices used in the Lab-in-a-bag approach. These devices are rapidly appearing on the market.

This initiative will take point of care diagnostic testing directly to the patient. Diagnostics can then be delivered in a variety of different localities using a variety of different models, enabling personalised medicine for physical health well-being in patients with mental health.

A finger prick sample will be used to measure glucose, HbA1c, total cholesterol and HDL cholesterol at a location where the patient attends. Results can be transferred to the patient's record, ensuring that a permanent record of the results is available. This can be achieved by "hard-wired" download at present but the intention is to use cloud-based middleware servers that can pick the results up from the device wherever it is used and then transferred to the electronic patient record.

Near-Patient Testing has become established in diabetes care and more recently in the monitoring of patients on long-term anticoagulants. We believe this new technology can displace an unwieldy pathway that makes the current approach to blood-testing of glucose and lipids the 'weakest link' in the Lester assessment. Near-Patient Testing may also herald a future where the service user and their family have opportunities for self-management that are unthinkable in the current system.

THE NATIONAL CQUIN FOR MENTAL HEALTH

The National CQUIN for Mental Health was introduced to tackle the premature mortality of people experiencing psychosis. Introduced initially for in-patient settings in 2014, the CQUIN included EIP services last year, and now has been extended to wider community settings in the current year. In helping mental health trusts meet the requirements of the CQUIN our lab-in-the-bag initiative may improve the implementation of the Lester resource for those with established psychosis in community mental health settings, a group particularly at risk from lipid and glucose disturbance.

LAB-IN-THE-BAG AND LAB-IN-A-BOX FEASIBILITY PROJECT (PRESTON, SALFORD AND LONDON)

In order to assess the feasibility of this proposal, three pilot sites have been identified; one at Preston, one in Salford and the other in London. All three have the support of the local mental health multidisciplinary teams. We have identified what population of patients with mental health should take part in the feasibility project.

We have chosen to focus on patients attending Drug Depot clinics. Patients attending these clinics will have finger prick samples taken and analysed on two meters by Healthcare Scientists. The first meter will measure HbA1c and the second meter will measure total Cholesterol and HDL (glucose meters will be available if it is found that the patient has diabetes).

Diagnostic tests are only part of the patient pathway and the whole care pathway will be reviewed in order to ensure that a system is introduced where clinical responsibility for patient care is introduced. The process will be evaluated from a financial and clinical efficacy approach to ensure that the system is effective.

The design process will be such that it will meet the concerns of the National Audit of Schizophrenia and the CQUIN recommendations. More importantly it will be designed to introduce a personalised medical approach for the identification and treatment of physical disease in patients with mental health, which will improve morbidity and mortality in patients with mental health.

CONCLUSION

NHSE is mandated to tackle the significant health inequalities that people with severe and enduring mental health problems face. Access to diagnostics is a weak link in implementing the Lester tool. This proposal intends to address this weak link and introduced better access to diagnostics so that the physical health of patients with mental illness can be improved.