From bench to bedside and back again

1. **Invention**
   MAHSC provides the infrastructure and support to ensure new scientific discoveries, technologies and healthcare practices generated by our researchers and healthcare professionals...

2. **Evaluation**
   ...are thoroughly tested by our member organisations with the participation and partnership of clinical and healthcare collaborators, industry, patients and our local population...

2. **Adoption**
   ...in order to ensure the best, evidence based, innovations are embedded into routine care for patients in Greater Manchester and beyond to improve health outcomes and stimulate the economy...

**Evolution**
...we then assess our impact and use what we learn to inform new research and innovation to continuously improve.

This brochure employs the personal stories of our patients and staff to guide you through the translational medicine journey: from invention to evaluation.
Welcome to our annual report for 2014/15, which aims to give you an overview of our exciting plans and achievements since renewing our Academic Health Science Centre (AHSC) accreditation in April 2014.

Established in 2009, our partnership brings together The University of Manchester and six NHS organisations, uniting leading healthcare providers with world-class academics and researchers. We share a common goal of providing patients and clinicians with rapid access to the latest discoveries, and improving the quality and effectiveness of patient care.

Levels of major diseases like cancer, diabetes and cardiovascular conditions are higher in Greater Manchester than in many other parts of the UK, and life expectancies are lower. We are at the forefront of efforts to find new and better ways to treat these diseases, and to prevent ill-health by delivering more effective public health programmes.

In the following pages, you can read about our achievements in responding to these challenges, across research, training and education, and clinical care. Successes range from meeting ambitious health improvement targets across our six domains (cancer, cardiovascular, inflammation and repair, mental health, population health and implementation, and women and children), to hosting major clinical trials and shaping new clinical practice in partnership with the National Institute for Health & Care Excellence (NICE).

Our drive to get discoveries from the laboratory bench to the patient’s bedside is fuelled by strong partnerships with the biohealth industry and the close involvement of patients and their families. MAHSC is the top AHSC for recruitment to research studies, and Greater Manchester is host to the highest number of life-sciences commercial trials in England.

This in turn is contributing to the growth of our local economy, attracting new businesses to the region, creating jobs and securing investment. Health, economic and social challenges are inextricably linked, and MAHSC is working with the Greater Manchester Academic Health Science Network (GM AHSN), industry, local authorities and many other partners as a catalyst for change.

Improving health outcomes and quality of care received a major boost with the announcement in March 2015 that Greater Manchester is to become the first English region to get full control of its health spending. The ‘Devo Manc’ plan is part of an extension of devolved powers to our city region, with the £6bn health and social care budget being taken over by the region’s councils and health groups. MAHSC will be an important player in this new health and social care landscape, which comes into effect in April 2016.

However, our focus is not just on improving health across our region, or even the wider UK. Through collaboration with governments, voluntary organisations and non-governmental organisations, our academics and clinicians are also helping to shape healthcare policy, training and delivery in low and middle-income countries.

We are very grateful for what our partners and their 36,000 plus staff have contributed so far to the communities we serve. It is also a pleasure to welcome the new Director of MAHSC, Professor Ian Greer, who joins us in the summer.

Looking ahead, our vision for the next 12 months is to continue the journey of transforming health and quality of life, making things better for everyone. We are very proud to be working with a committed leadership team and some of the best researchers and clinicians in the country to make this a reality.

Sir Howard Bernstein
MAHSC Chairman

Professor Alistair Burns CBE
Interim MAHSC Director
We are MAHSC

Manchester Academic Health Science Centre (MAHSC) is a partnership between The University of Manchester and six NHS organisations. We share a common goal to translate our best discoveries and developments in research, educational and clinical work into improving the quality and effectiveness of patient care as quickly as possible.

By collaborating, we can recognise the strengths of each of our organisations and build on these by sharing our resources and our ideas to continuously improve the care our clinicians and healthcare professionals provide.

We have identified six headline objectives to make a real difference to the lives of people across Greater Manchester and beyond:

- Discovery science – further enhancing our excellent science base.
- Translational research – ensuring world-class translation of the latest scientific discoveries into real-life healthcare practice for patient benefit.
- Integrated education – delivering high-quality education across science, healthcare and healthcare management.
- Excellent healthcare – providing outstanding healthcare services to the population of Greater Manchester.
- Innovation and enterprise – contributing significantly to the economic development of Greater Manchester and the UK.
- Social responsibility – using our expertise to achieve fairer and healthier societies locally and globally.

We will reach these objectives by achieving specific goals across our six domains and four enabling themes:

- Cancer
- Cardiovascular
- Inflammation and repair
- Mental health
- Population health and implementation
- Women and children
- Business development
- Education
- Research
- Global health

You can read more about this exciting work on pages 9 to 33.

Key achievements and highlights 2014/15

April 2014

MAHSC begins its second five-year programme of work, as the only AHSC outside the South East of England.

MAHSC and Roche embark on a unique UK research collaboration to boost clinical research studies, leading to the development of new drugs and diagnostic tools and giving patients in the region greater access to new treatments in development. See page 28.

May 2014

Graduation of the first cohort of the Improvement Science for Academics (IS4Ac) programme. This bespoke MAHSC programme seeks to support clinical academics and their teams to make healthcare improvements at a pace and scale to deliver high impact research. See page 18.

June 2014

NICE signs a second three-year memorandum of understanding with MAHSC. Our partners contribute to the assessment of new drugs and medical technologies, and support development of new treatment guidelines and quality standards for conditions ranging from cancer and diabetes to heart disease and psoriasis. See page 25.

Hitachi Ltd launches a proof of concept project using data to identify people at risk of developing type 2 diabetes with MAHSC and NorthWest E-Health (NWEH). In January 2015, the company expands its European Big Data Laboratory into new facilities at Citylabs, Manchester, continuing its strong relationship with MAHSC. See page 27.

July 2014

MAHSC partners UHSM and The University of Manchester show that a new lung cancer diagnosis tool is safe and effective for older patients.

A delegation from China’s Peking University Health Science Centre (PUHSC) visits Manchester to discuss progress on the MAHSC-PUHSC Centre for Genomic Medicine.

August 2014

MAHSC establishes a strategic partnership with Australia’s Monash Partners Academic Health Science Centre (Monash Partners). The partnership offers seed funding awards totalling £50,000 to researchers, clinicians, innovators and educators. See page 33.
Proud to be a partner in MAHSC

"Manchester is closing the gap in cancer treatment and survival rates."
@Mike Spence

"The patient voice is being listened to much more carefully in @ManAHSC research."
@North West People in Research

"MAHSC helps to reorganise stroke services that will save 50 lives per year."
@NHRIWT Manchester CRF

"Collaboration and co-ordination are key."
@Professor Alistair Burns

"Anti-inflammatory agents for schizophrenia. Brilliant concept."
@Professor Ian N Bruce

"No health without mental health. Great work by @NHSMHSC colleagues to make mental health everyone’s business."
@Citizen Scientist

Key achievements and highlights 2014/15

October 2014
The Medical Research Council (MRC) awards The University of Manchester £6 million to fund research into new ways to tackle dementia and £13 million to set up a Clinical Proteomics Centre, which has been named the Stoller Biomarker Discovery Centre. See page 32.

AstraZeneca and The University of Manchester agree a strategic collaboration and launch the North West Centre for Advanced Drug Delivery. See page 28.

November 2014
The first major MAHSC partner conference celebrates ‘Our Impact on Health’ and is attended by over 500 delegates.

December 2014
MAHSC partners The University of Manchester and CMFT lead a new £5.1 million consortium of universities and industry partners in a project aimed at eliminating the ‘trial and error’ approach to the treatment of lupus. See page 29.

January 2015

February 2015
Research by MAHSC partners The University of Manchester, CMFT, and The Christie has improved outcomes for children with acute lymphoblastic leukaemia (ALL) in the UK, Netherlands, Australia and New Zealand. Almost nine out of 10 new patients diagnosed with paediatric ALL in the UK are now expected to make a full recovery. See page 33.

We must be a voice for the poorest in slums in mega cities on a global level.
@Dr Arpana Verma

We will build resilience in the community to help people help themselves through healthier behaviour.
@Professor Aidan Halligan

Great ideas for tackling health from our schools at MAHSC conference #ourimpact2014
@Professor Colin Sibley

Personalisation of care is crucial to making a difference to people and needs their involvement
@Professor Mukesh Kapila

Caring for a population of 3.5m
Over 300,000 patients recruited into studies over the past five years
We are taking a four-pronged approach to reach our goal of a 70% five-year survival rate for cancer patients diagnosed in 2020:

Public health
- Prevention | Earlier diagnosis | Local access to diagnostics, care & end of life services

To encourage early diagnosis of cancer, which improves survival rates, Manchester is testing the impact of screening. The PROCAS study found a third of women may benefit from more frequent mammograms, and we were also involved in the largest-ever study into ovarian screening.

Research delivery
- Leading researchers | Easy access to research for patients | Cutting-edge science

More patients participate in cancer research in Manchester than anywhere else nationwide. A trial testing a new way of treating lymphoma saw a total reversal of symptoms in nearly 70% of patients. We are developing new classes of medicines to fight lung cancer and drug-resistant skin cancer, as well as a new test to predict which treatments are best suited to individual ovarian cancer patients. Manchester scientists have also designed and manufactured a new device to improve the efficiency of blood tests, so patients can receive their diagnoses more quickly.

Precision medicine
- The latest genetic tests | New treatments tailored to the individual | Translation into frontline care

Manchester recruited the first patient in the UK into the government’s 100,000 Genomes Project, and will analyse her genes to try and understand why so many of her family members suffer from breast cancer. It is hoped this type of genetic analysis will enable researchers and doctors to tailor treatment to individuals according to their personal characteristics.

New tests and therapies
- Diagnostics | Radiotherapies | Chemotherapies

Manchester now hosts one of only two MRI-guided radiation therapy systems and will soon launch its proton beam therapy service – one of only two in the UK. Proton beam therapy is a revolutionary radiotherapy that UK citizens can only currently access abroad.

“I don’t know where I’d be right now if I hadn’t have found out my breast cancer risk”

Angela, a nurse working in Wigan, took part in the PROCAS study, a trial involving over 50,000 women, which assessed the benefits of risk assessment for cancer prevention and was held at UHSM.

Last time I got a letter inviting me for breast screening at the hospital, I also got a form I could fill out if I wanted to know my risk for developing breast cancer. My mum and two cousins had suffered from the disease, so I was keen to put my mind at rest. The questionnaire asked about my family and lifestyle, and they also sent a tube and swab for me to provide a saliva sample. A few weeks later I got a call from a Professor on the study to let me know my risk was a little higher than the average. He recommended I have a mammogram every 18 months. I’m so glad I filled out that form, because when I went for my first 18-month mammogram, they found a lump. The cancer was at such an early stage, I had no symptoms yet and my breasts didn’t feel any different at all. Within a month, I had surgery at Wythenshawe Hospital to remove the tissue. Because they caught it so quickly, I didn’t have to have any chemotherapy. I had a short course of radiotherapy treatment at The Christie and now I go back for yearly check-ups.

Without the PROCAS study, I don’t know where I’d be right now. There’s no telling what stage my cancer would have reached before I realised there was anything wrong.

“I get my chemotherapy at the supermarket”

The Christie’s mobile chemotherapy units were launched in 2014 and provide 70% of appropriate treatments close to patients’ homes. Kevin lives in Rochdale. He was diagnosed with bowel cancer in February 2014 and, after having surgery to remove his tumour, he started chemotherapy.

It was quite a journey to The Christie in Withington to have my chemotherapy. The first time I went, it took about an hour and a half to get there, and another hour back again even though I tried a different route. By the time I’d got there, had the treatment and got home, it could be almost a full day.

Then I saw notices advertising the mobile unit at Rochdale – they bring their chemotherapy services to one of my local supermarkets! It’s fantastic. It’s not as stressful as going to the main site, as it’s only a ten minute walk from my home, there’s no queuing and I’m straight in. I usually only have about two or three minutes before I’m seen.

The facilities at The Christie are second to none and the mobile unit is no different. The treatment is exactly the same you would get at the main site, except now it takes two and a half hours rather than a whole day, and you get one-to-one service from the nurses – they’re wonderful.

Manchester recruited the first patient in the UK into the government’s 100,000 Genomes Project, and will analyse her genes to try and understand why so many of her family members suffer from breast cancer. It is hoped this type of genetic analysis will enable researchers and doctors to tailor treatment to individuals according to their personal characteristics.
We are screening the population for heart abnormalities before they cause illness, and improving diagnostic tests and treatments for cardiovascular disease and diabetes.

To increase the early detection of atrial fibrillation (AF) – an abnormal heart rhythm which can lead to strokes – screenings are taking place in the community, including in GP surgeries and supermarkets.

A same-day service is being piloted to transfer patients at high risk of heart attack from district hospitals to the MAHSC partners, where specialist interventional cardiology expertise is available. We have devised and implemented a new protocol to better identify which patients presenting to accident and emergency with chest pain are at risk of heart attack and which are not, reducing unnecessary admissions to hospital – and unnecessary worry for patients. We published this research this year.

A specialist multidisciplinary clinic has been set up at CMFT for patients suffering from the inherited cardiovascular disease Marfan’s syndrome, where families can see cardiologists, clinical geneticists and genetic counsellors in “one stop”. We have shown this approach to be of benefit to patient care and in line with family preferences. We are also continuing our world-leading research into the genetic causes of structural heart diseases at The University of Manchester, building on the outstanding clinical services for these patients in the MAHSC partner Trusts.

The service in the multidisciplinary High Risk Pregnancy Clinic at CMFT, which has won national awards, has been developed by increasing input from Consultant Obstetricians and Cardiologists to improve access to cardiology services for pregnant women in the North West. We have set up regular multidisciplinary team meetings to discuss complex cases, coupled with regional meetings for professionals across cardiology, obstetrics, anaesthesiology and midwifery, to upskill our staff and improve patient experience. We are also researching better ways to detect and manage heart problems during pregnancy.

Diabetes is a new focus for the cardiovascular domain and we are piloting a screening service for neuropathy – a complication of the disease that causes loss of feeling, can be painful, and is a major cause of lower limb amputation. Our research into copper imbalances in diabetics could also lead to new treatments for complications of the disease.

We have devised and implemented a new protocol to better risk of heart attack from district hospitals to the MAHSC partners, a goal MAHSC is aiming for through a mobile application being developed by UHSM Consultant Cardiac Surgeon Professor Ben Bridgewater.

When I was told I had to have coronary artery surgery, my wife and I looked on the internet to find out more about the surgeons involved in those operations. We read the patient reviews, looked up what qualifications they had, mortality rates, that kind of thing. We ended up with a list of three or four names we were happy with.

I was delighted my surgeon was on that list. I recognised him as soon as he entered the room. I found that quite reassuring, actually. It wasn’t as if it was a total stranger coming in, it was sort of more like a friend coming in.

I believe it is a good thing for information about doctors to be published online.

You have to use a modicum of sense, of course, the information you are given doesn’t tell the whole story, but overall my wife and I were a lot more comfortable feeling that we’d made our choice.

I felt more comfortable knowing more about my surgeon

Angina patient Barry was referred to UHSM in 2015. He explains why patients benefit from more transparent information on surgeons’ performance, a goal MAHSC is aiming for through a mobile application being developed by UHSM Consultant Cardiac Surgeon Professor Ben Bridgewater.

Research has shown that if we prescribed anti-coagulants to everyone with atrial fibrillation (AF), over 4,500 strokes could be prevented every year. But it’s difficult to identify who suffers from AF because it is often asymptomatic and population screening is not currently commissioned on the NHS. My trial will screen people over the age of 65 – who are at higher risk of AF – with a handheld device in community settings like supermarkets, places of worship, social groups and retirement homes. We aim to test whether this is an effective way to screen for AF, and identify which screening locations are the most successful.

We’ve seen enormous enthusiasm for the study already, with 700 people expressing interest before it has even begun, and ASDA permitting us to screen customers in any of its stores. Although we originally planned to screen 2,000 people in South Manchester, the trial has now been extended as far North as Clitheroe and we have increased our recruitment target to 3,000.

Previous research has shown opportunistically screening for AF in community settings is just as effective as inviting people for tests in the clinic; it’s also more cost-effective. We hope this study will add to the evidence required to commission population screening, which could significantly reduce the incidence of stroke.
Mental health

This year we became the first clinical care provider to pilot ClinTouch, a smartphone app created at The University of Manchester and funded by the MRC (www.clintouch.com). It records real-time symptoms of people with schizophrenia in order to assist them in symptom self-management and improve their experience of care. The app has been built into the ICT systems at MMHSCT to sync the data inputted by patients with their medical record and flag potentially serious symptom patterns to health professionals. Over 100 people with serious mental health problems have used the app regularly and we will be deploying this to help people with physical long-term conditions.

Lifestyle factors associated with serious mental illness can also put sufferers at increased risk of stroke, heart disease and diabetes, so we offered specialist nursing staff to all GP practices in the MMHSCT footprint, leading to a 38% increase in the number of patients with serious mental illnesses at a high risk of such conditions having their physical health monitored. We have also been working with the local media to improve the way they report on death by suicide and we continue to research the best ways to monitor and manage suicidal behaviour.

MAHSC promoted collaboration between specialist facilities across Greater Manchester to deliver research into dementia. Now, our region recruits among the highest number of patients with dementia into clinical research in the UK and is well on track to meeting the Prime Minister’s Challenge of enrolling 10% of people with the disease into studies by 2016. Manchester also won £6m in capital funding to develop new PET/MR scanning facilities to enable studies on the molecular processes in the brain that cause dementia, as part of the national MRC-funded UK Dementia Platform. Manchester will manage projects on physical activity monitoring.

It records real-time symptoms of people with schizophrenia and I'm really glad I did. The app prompted me to think about how I was feeling throughout the day, so I was able to notice early warning signs of my symptoms worsening and take action immediately before they became overwhelming. By managing my symptoms this way, I felt well enough to attend all of my lectures and I’ve also started teaching computing at schools as part of my volunteering role as a STEM Ambassador for a local museum.

One of the major things I found helpful about ClinTouch wasn’t really about my symptoms at all, but about helping me connect with the people around me. When the alarm went off on my phone, people would be interested in what I was doing, so it gave me the perfect opportunity to explain my condition to them, which helped them understand me and brought us closer together.

Leo and his wife Pat engaged in a trial of an experimental treatment for Alzheimer’s disease at the Manchester clinical research facility (MCRF)*. I have been caring for Pat since she was diagnosed with Alzheimer’s disease in 2010 and we were both very interested in taking part in research, so we asked our consultant to refer us to any trials we were eligible for.

Nurses came to our home and explained in detail the study and how we would be involved. It was fairly and very delicately done so we felt it was completely voluntary. We came to look forward to our visits to the MCRF. The doctors and nurses were very friendly and caring and took the time to listen to us, offering help and advice where they could. I was impressed particularly with their extensive knowledge of how Alzheimer’s affects a couple’s daily life, and it was comforting to deal with people who understood our situation and had time to discuss it with us and its impact, including on me as a carer.

Overall, the experience was an enjoyable one, which may seem a strange thing to say about a medical project, but that’s down to the people and the atmosphere. We were almost sad in a way when the trial came to an end, but we came away feeling we’d done something worthwhile and hopefully, in some small way, we had contributed to what may someday halt the progression of - or even prevent - Alzheimer’s disease.

*National Institute for Health Research (NIHR)/Wellcome Trust Manchester Clinical Research Facility
Inflammation and repair

Through our stratified medicine programme, we aim to provide the right treatments to patients first time. Many conditions, such as rheumatoid arthritis, psoriasis, lupus and asthma, are currently treated using a trial and error approach, as individual patients respond differently to one another to the same treatments. Our research aims to group these patients according to characteristics such as their genetic makeup and the presentation of their condition to help doctors make informed decisions about which treatments will generate the best response. Manchester has three significant MRC Stratified Medicine Awards in the fields of inflammation and repair. See more on pages 29-31.

We have made improvements to the way our patients receive clinical care. The new Virtual Biologics Clinic at CMFT’s Kellgren Centre for Rheumatology has halved waiting times for patients to receive biologics for rheumatoid arthritis, saves the NHS £100,000 per year, and has doubled patient recruitment to clinical research trials into rheumatoid arthritis, which is known to improve patient outcomes. The same service model is now being established for patients with inflammatory bowel disease.

Manchester hosts one of only three NIHR Musculoskeletal Biomedical Research Units nationally. Last year our BRU secured £1.7m grants for research into juvenile idiopathic arthritis, recruited a paediatric rheumatologist who is a national specialist in transitional care, and funded breakthrough research that confirmed the existence of psoriatic arthritis.

Clinicians in Salford also now have access to a free mobile app to diagnose and treat Chronic Obstructive Pulmonary Disease after MAHSC partners teamed with Technet Apps to deliver the unique tool.

Sandhya took part in a research trial through the Virtual Biologics Clinic at CMFT.

After I gave birth to my daughter Rosa in 2012, I felt overcome by excruciating pain. I’m a busy person, a hard worker, but all of a sudden I couldn’t get out of bed, nevermind prepare my baby’s food. In 2013, I was diagnosed with rheumatoid arthritis. They tried two medicines – Methotrexate and Naproxen – but nothing really helped

I moved to Manchester and started at The Kellgren Centre at CMFT. I didn’t expect they could do much more than manage my pain and fatigue, but my consultant had higher hopes. She suggested I join a research trial they were running on a biologic therapy called Tocilizumab.

The change was incredible. The pain disappeared. I could play with Rosa and really enjoy and engage with this precious time of her life. I’ve even been able to volunteer part-time in the area I’m passionate about – women’s rights.

“My pain has disappeared and I can be a bigger part of my daughter’s life”

In April 2014, Rebecca attended the first Manchester Psoriasis Shout Out® – a week of events led by The Manchester Centre for Dermatology Research that encouraged patients to speak out about their condition and engage with doctors, researchers, fellow sufferers and the general public.

Sometimes my psoriasis was so severe I had it all over my body apart from my neck. A couple of treatments worked in short bursts, but nothing really gave me consistent relief and I’ve been hospitalised a few times.

By 2014, over 20 years from my diagnosis, the condition was so bad even my scalp was thick with psoriasis scales, and I’d pretty much given up on treatment. Then I joined Twitter and, on a whim, decided to search #psoriasis. That’s how I found out about the Shout Out, and it changed my life.

“I don’t think I would have tried a new medication. That’s why I’m now a Shout Out ambassador. I want to give others hope and maybe even change their lives too.”
Population health and implementation

We translate high-quality research and education into large-scale implementations of change to improve the health of the population.

NHS Health Checks

Our NHS Health Checks Programme, which aimed to improve the uptake of free NHS health checks to people between the ages of 40 and 75, exceeded its target of 60% of eligible patients accepting a health check within the first six months of 2014/15. Over the next two years, we aim to expand this programme across all MAHSC partners to improve uptake across Greater Manchester. We have assembled a multi-disciplinary team to develop a broad-based research programme to expand the coverage of health checks, identifying ways of reaching out to individuals who can benefit most, and evaluating the impact on population health and costs to the NHS.

Increasing patient safety

In 2014, we established our Making Safety Visible programme to improve boards of NHS organisations’ understanding of patient safety and their capability to monitor it. We also implemented our Medication Safety Thermometer in local hospitals to help reduce medication errors in secondary care. In 2015, we will work with the NIHR Greater Manchester Patient Safety Translational Research Centre, which is hosted by SRFT and bring teams from across Greater Manchester together to identify and implement ways to reduce harm from medication errors.

“Without my Health Check I wouldn’t have known anything was wrong”

Carol from Swinton recently had a health check.

I’d never had one before and I didn’t really think I needed to go, as I felt fine. I also have a phobia of needles so wasn’t keen on having the cholesterol test. A member of Salford Healthy Communities Collaborative encouraged me to go and I was so glad they did! I discovered my liver wasn’t functioning properly. I had no idea about this as I felt fine! The doctor told me I needed to cut out alcohol and I have to go for regular checks. I’ve not had a drink for two months now, and I’m told my liver will repair itself. It could have been so much worse if this condition wasn’t picked up, I’d never have known. It was a wake-up call for me and I’d recommend everybody has an NHS Health Check as you can make a change now, before it’s too late.

“The Medication Safety Thermometer has changed the way we work”

Steve Williams, Consultant Pharmacist in Medication Safety at UHSM, helped test our Medication Safety Thermometer in 2014.

Whilst the vast majority of what occurs in the NHS is done well and safely, up to 3 million doses of medication are given in an average hospital each year, so even if errors occur 0.1% of the time, we’re still talking huge numbers. The Thermometer is a quality improvement tool that allows organisations to reliably identify and focus on high-risk areas. Previously, we relied on voluntary reporting of medication safety incidents by health professionals, but we know that does not give us anywhere near the complete picture.

“We’ve changed the way we work since getting involved with IS4Ac”

Dr Clare Gibbons is a GP and Medical Director at Salford Health Matters, a group of three GP surgeries and a service for homeless people. She led one of 20 teams that have taken part in IS4Ac Programme so far. The course trains clinicians in effectively translating innovation and research into service improvements.

We’d tried for years to reduce unnecessary A&E visits in our area by encouraging patients to see their GPs, but none of our efforts were as successful as hoped. The first thing we learned as part of IS4Ac was that we had bitten off a bit more than we could chew. Our goals were too ambitious, and we were trying to overhaul entire systems where we could have made minor changes. We identified where small tweaks could be made to our everyday processes and found their impact was much bigger than we thought!

For instance, calls to GPs late in the day plummeted when we changed our answering machine message to tell patients they should contact us early to increase their chance of being seen. More patients picked up our phone calls when we explained that we would call from a withheld number, and with this success we were prompted to install a new telephone system from which none of our numbers are withheld and which communicates to patients where they are in on-hold queues. Now we’re training receptionists to field some calls themselves rather than over-burdening busy GPs.

Our IS4Ac experience was such an eye opener that we’ve changed the way we work. With better use of the resources we already have, we’re seeing real benefits to patients in a cost-effective way.
In 2014/15:
We were selected to undertake the government’s 100,000 Genomes Project to transform diagnosis and treatment for those with rare diseases. What’s more, our NIHR/Wellcome Trust Manchester Children’s Clinical Research Facility (CCRF), a world-renowned centre for research into rare and potentially fatal childhood diseases, was in such demand we expanded it.

We:
- Helped develop the first-ever treatment for Morquio A syndrome, the sufferers of which rarely live beyond their third decade
- Ran the first-ever trial on Sanfilippo Disease treatment Genstein, which itself was developed in Manchester
- Were the first to offer treatment directly to the brain of children with Hunter Syndrome
- Identified genes behind childhood diseases that cause brain tumours, skin cancer, cleft palate and hearing loss, and recommended changes to care
- NIHR awarded £1.14 million to Dr Alex Heazell to continue his pioneering work identifying women at risk of experiencing stillbirth. The suite of research clinics at the Maternal and Fetal Health Research Centre have contributed to a reduction in stillbirth. The suite of research clinics at the Maternal and Fetal Health Research Centre have contributed to a reduction in stillbirths of 19% at Saint Mary’s Hospital.
- Elsewhere, The University of Manchester and CMFT are taking a trial of new screening methods for deaf babies on tour next year, travelling to the homes of participants across the UK.

“We’re really lucky we found out before it was too late”

Ben, 12, was diagnosed with rare disease Senior-Loken Syndrome (SLS) when his parents took part in genetic research. Dad, Stuart, explains:

Ben and his little sister have had severe vision impairment since they were babies. This is caused by a condition called Leber congenital amaurosis (LCA). We attended Manchester Royal Eye Hospital for appointments and were told it was probably genetic, but there isn’t much they can do.

Out of the blue, we got a phone call from the Manchester Centre for Genomic Medicine (MCGM) at CMFT asking my wife and I to give blood as part of some research they were doing. We had the samples taken and then a doctor called us into clinic to explain that our children have a very rare genetic disease and sometimes it can affect the kidneys as well as the eyes. Ben was screened and we found out he was on the verge of becoming really unwell. His kidneys were covered in cysts and they were failing.

Looking back, Ben had been under the weather. He had lost his appetite, especially in the morning, but it was such a small thing and he was fine otherwise, we thought it was just a phase. It wasn’t until just before Ben had his kidney transplant that he started to feel really ill. Who knows what would have happened if we hadn’t have taken part in research. He could have just collapsed one day and ended up in intensive care, and they wouldn’t have known what was wrong.

It’s been a very bumpy and stressful road, but Ben went back to school and is doing the same thing as before. We had the samples taken and then a doctor called us into clinic to explain that our children have a very rare genetic disease and sometimes it can affect the kidneys as well as the eyes. Ben was screened and we found out he was on the verge of becoming really unwell. His kidneys were covered in cysts and they were failing.

What’s really important for me is that other families get to find out as soon as possible if their children have the disease so their kidneys can be screened and monitored for any problems.

We were the first NHS centre to run next-generation-sequencing tests – a type of advanced genetic testing – on patients with LCA in 2012. Fewer than 1-5% of patients with LCA have the same disease as Ben, so the kidneys of patients with the condition are not routinely screened. But now, any patient who presents at our hospitals with LCA undergoes genetic testing to check for underlying diseases, and those diagnosed with SLS will have their kidney function measured with a simple blood test that can be performed the same day.

Ben’s story has been accepted for publication in the Lancet.

“When I left hospital with her, it was a really big thing”

Kate was referred to the Rainbow Clinic – a specialist clinic for families who have experienced stillbirth – after her son Scott died following complications in her first pregnancy.

When I fell pregnant again, we were overjoyed, but after what happened last time I couldn’t help but feel afraid that something might go wrong. It was such a relief to know there was a specialist team who understood what we’d been through.

I never went for more than two weeks without a scan, I could ask for extra check-ups or just phone up for a chat any time. As the weeks progressed, they helped me believe I could walk out of hospital with a baby.

Celia was delivered on 23rd June 2014. She’s amazing – she loves doing everything, apart from sleeping! But a few tired mornings could never take away from knowing we’re waking up to our own little family.
MAHSC is a major UK centre for the education and training of healthcare professionals at all stages of their career development and across a broad range of specialties, subspecialties and healthcare related disciplines. MAHSC’s education programmes develop healthcare professionals as practitioners, researchers, innovators and leaders, and as part of multidisciplinary teams. Students and trainees benefit from being educated and trained by qualified educationalists, practicing clinicians and active researchers in integrated and high-quality clinical and research environments.

Our Integrated Clinical Academic Training programme, run in collaboration with Health Education Northwest, provides mentorship, training and support to those pursuing clinical academic careers in dentistry and across 22 medical specialties. Currently, 50 Academic Clinical Fellows and 22 Clinical Lecturers are supported through the programme, which is also being extended to support foundation doctors who want to develop their research, teaching and leadership skills.

Health Data Science – including Bioinformatics and Health Informatics – involves the collection and analysis of healthcare data, such as genetic information and patient records. This is a growing and important field in the UK, and has a critical role in the development of new and more personalised diagnostic tests and treatments. However, there is a serious international shortage of qualified Health Data Scientists. To support this burgeoning industry and Manchester’s already strong track record in this field, we offer through the Manchester Academy of Health Science Education (MAHSE), the only Health Education England-commissioned Scientist Training Programme in Clinical Science (Bioinformatics), as well as Master of Science programmes in Genomic Medicine and Health Data Science.

Manchester excels in nursing, midwifery and allied health research, with The University of Manchester leading the nation in these fields in the 2014 Research Excellence Framework. MAHSC supports researchers in these professions to develop their research skills and apply for external funding to conduct research alongside their clinical practice.

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Education

“I’m learning a profession that’s interesting and rewarding”

Simon is in his second year of the MAHSE MSc in Clinical Bioinformatics, part of its Scientist Training Programme (STP). He has a paid placement at the MCGM at CMFT, and attends The University of Manchester.

I was working in a genetics lab in Leeds when I found out about the MAHSE course. Colleagues at my Trust were completing STPs and it seemed like a great way to progress my career. The MAHSE website provided all the information I needed to make an informed choice.

Bioinformatics really appeals to me because of the problem-solving aspect to it; it can be a really interesting challenge. It’s also a rapidly growing industry, so I feel confident that I’ll always be able to find work.

When I started the course, I knew a bit about genetics from my previous degrees in Animal and Plant Sciences and Molecular Evolution, but I didn’t know anything about the computational side of bioinformatics – all of that I learned on the job. My colleagues at the MCGM taught me the practical side of the work, but I also attend lectures at The University of Manchester where they provide academic background and best practice. I have assignments and projects to deliver, but they’re linked to what I’m doing in the lab on a day-to-day basis, which is what I really like about this course – that the practical and academic components are so closely linked. The trainees also have opportunities to work on innovation projects. I’m currently creating a new methodology for diagnosing patients with developmental delay.

I graduate next year and I hope to stay on at MCGM. I think Manchester is the best place to grow and develop as a bioinformatician. There’s been huge investment in the infrastructure here and I’m working alongside an expert team where there is a lot of collaboration; you just don’t get that in other parts of the UK. MCGM hosts many research projects addressing important health issues, which makes the work even more interesting and rewarding.

“I met leading international researchers to inform my work on a smartphone app for rheumatoid arthritis”

Dr Will Dixon, Director of the Arthritis UK Centre for Epidemiology at The University of Manchester, travelled to Boston in 2013 to meet leading experts at the Massachusetts Institute of Technology (MIT) and discuss his research, as part of the M2EET international collaboration established by MAHSC.

My trip to MIT was inspiring, generating ideas for how advancing technology can be applied to healthcare. Ideas developed whilst in Boston have since become funded projects, such as a project I am leading at The University of Manchester’s Health eResearch Centre (HeRC) to measure symptom severity in rheumatoid arthritis (RA).

RA affects around 400,000 people in the UK and causes fatigue, pain, swelling and stiffness in the joints. It can be a debilitating condition and its symptoms are erratic and unpredictable. It is essential clinicians can accurately understand the progression of their patients’ disease, but there is currently no way to objectively measure symptom severity between appointments.

Our new smartphone app, designed by software developers U-Motif, uses sensors to track patients’ activity as part of everyday life, then the patient is prompted to record how they are feeling on a scale from 1 to 5 on key indicators such as pain, fatigue and general wellbeing. The app also requests information from local weather stations to capture climate data, as many patients have pointed to a suspected link between their symptoms and the weather.

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Our research is coordinated through the MAHSC Research Office (MRO) – a one-stop shop for our researchers and the life sciences industry, to which we deliver easy access to leading researchers and healthcare professionals, world-leading infrastructure and diverse patient cohorts across Greater Manchester.

It acts as a hub to more closely align our seven partners, as well as our research infrastructure such as the MAHSC Clinical Trials Unit (MAHSC-CTU) and our three clinical research facilities (CRFs), as demonstrated through our case studies below. This allows for faster contracting and costing with external collaborators, and more effective and efficient processes, whilst improving the speed of initiating and delivering high-quality clinical research to time and target.

Launched in 2014, the MRO is now established as a single point of access to all research and innovation departments across MAHSC partners, providing a standardised set-up fee for commercial clinical trials within those organisations and a competitive turn-around time for agreeing costs and contracts with our life science industry partners.

We manage and analyse the latest data on research activity across the partnership in order to support strategic developments and co-ordinate with the National Institute for Health Research Clinical Research Network. Greater Manchester (NIHR CRN GM) and GM AHSC Innovation Nexus to maximise opportunities for industry and investor engagement.

For researchers, we are a central knowledge base for governance, regulatory approval and general research advice, and work closely with MAHSC Education leads to deliver skill-building programmes that meet the needs of those working in research in Greater Manchester.

“The MCRF was key to the development of the first-ever treatment for a rare genetic condition”

The MCRF is based on the CMFT site and includes a specialist children’s unit at Royal Manchester Children’s Hospital. Dr Simon Jones, Consultant in Paediatric Inherited Metabolic Disease at CMFT and Honorary Senior Lecturer at The University of Manchester, led a trial into rare genetic condition Morquio A syndrome at the facility.

Morquio A syndrome is a rare, genetic condition that affects around 3,000 people in the developed world and usually leads to death in the second or third decade of life. We have cared for patients with the disease at the Royal Manchester Children’s Hospital for a long time, but so far we have only been able to manage their symptoms, as there were no treatments available.

I led Manchester’s part in an international study into the first and only treatment for Morquio A at the MCRF. Our facility was the only research centre globally to be involved in every stage of the research, which was conducted over five years and completed in 2014. The new drug, elosulfase alfa (Vimizim™), was demonstrated to be effective at improving quality of life for patients with the disease.

The main symptoms of Morquio A syndrome are short stature and low stamina, which leads to increased wheelchair use and loss of independence. The new treatment significantly increased the distance patients could walk in six minutes compared with a placebo. In a patient’s everyday life, improved endurance translates to an improved ability to perform daily tasks, such as walking, bathing independently and getting dressed.

Vimizim is an enormously exciting development, as it offers the potential to slow the progression of this devastating disorder.

“The MAHSC-CTU was instrumental in the award of £1.5m for heart research”

Professor Simon Ray, Consultant Cardiologist at UHSM, is Chief Investigator of the £1.5m UK Early Mitral Surgery (UKEMST) Trial – a 20-centre national study managed by the MAHSC-CTU and funded by the British Heart Foundation.

“The MAHSC-CTU was involved with UKEMST from an early stage and has been instrumental to the success of our grant application. This trial – from which we hope to recommend best practice in the surgical treatment of mitral valve regurgitation – is significant both clinically and in its size, so it is essential it is managed at the highest standard. The MAHSC-CTU is valuable to me as a researcher because its involvement further enhances the high-quality of our work and serves as a stamp of excellence to funders and journals.”

Phil Barley
Associate Director of the MAHSC-CTU:
“We are currently ensuring the study will meet the highest regulatory standards and are creating a bespoke database for the independent validation of results. Once recruitment begins, we will preserve the high quality of Professor Ray’s research through on-site monitoring visits at all 20 centres, which serves to ensure consistency in the way the trial is conducted globally, the accurate transfer of data and to ensure patient safety.”

Phil Barley
MAHSC works with a wide range of organisations across the health and care spectrum, including major policy-making, advisory and funding bodies. Our partnerships involve sharing knowledge, facilities and discoveries, and we are also enormously grateful to the many funders who provide essential grant support to our research programmes.

**Partnership with NICE shapes clinical practice**

NICE renewed its three-year Memorandum of Understanding (MoU) with MAHSC and The University of Manchester in June 2014. The three organisations have made significant contributions to:

- the assessment of new drugs and medical technologies for cancer, digestive system conditions and swallowing difficulties
- the development of treatment guidelines and quality standards, ranging from cancer, diabetes and heart disease, to pionitis and mental health
- major research programmes covering health data, text mining and water fluoridation
- developing teaching and training tools for medical students and postgraduate programmes
- collaborations with industry on clinical trials and technology adoption

A further collaboration with GM AHSN has been brokered through the MoU to help develop the NICE Medtech Early Technology Assessment Tool (META), which was launched on 20 April.

“Our relationship has been a very fruitful one because of our shared commitments to using the very best science and evidence to improve the health of our population.”

Sir Andrew Dillon, Chief Executive of NICE.

**Addressing inequality with Public Health England/Well North**

Well North is a collaborative programme which aims to identify and address the causes of ill health in our most deprived communities, as well as seeking to cure the consequences. The programme will pilot innovative approaches to tackling significant health inequalities and premature mortality levels across the North of England. It brings together Public Health England, MAHSC and a pioneering group of local authorities.

The programme seeks to improve the health and wellbeing outcomes of individuals and families, and achieve three important goals:

- Address inequality by improving the health of the poorest, fastest;
- Increase resilience at individual, household and community levels; and
- Reduce levels of worklessness, a cause and effect of poor health.

It will do this by supporting people to improve their health, bringing the health system and economic growth priorities into closer alignment and building a best practice framework which can be replicated and transplanted.

Public Health England is providing £9 million to fund Well North which is being matched by local authorities, and other agencies in the nine pilot areas, in cash and in kind. The first three pilot sites begin on 1 April 2015, with the remainder starting work over the following 12 months.

“MAHSC is playing a key role in Well North, by providing a unique springboard across the North of England and access to world class academic support.”

Professor Aidan Halligan, Well North Director.

**NIHR support for our facilities**

MAHSC researchers benefit from three NIHR-funded Clinical Research Facilities (CRFs). Each provides a dedicated infrastructure to support high-quality experimental medicine research and education. Our facilities include:

- MCRF and Children’s CRF is a generic adult and paediatric facility offering state-of-the-art equipment, a team of specialist nurses and experience in supporting over six hundred commercial and academic studies, including world-first paediatric studies.

NIHR/Cancer Research UK Cancer CRF is the largest cancer treatment centre of its kind in Europe and an international leader in research and development.

NIHR Respiratory and Allergy CRF is a specialist facility which collaborates closely with the Medicines Evaluation Unit, a unique 36-bed clinical trials facility on the same site. This is the largest clinical trials unit for Early Phase Asthma and COPD studies in the UK.

See page 23 to read a case study on how the MCRF’s research into rare diseases has the potential to change lives.

We are deeply saddened to share the news that Professor Aidan Halligan passed away in April 2015.

Incoming MAHSC Director Ian Greer said: “Aidan will be very sadly missed, not only because of his stature in UK Medicine and Health, and the wisdom that he gave so generously, but also because of his humanity and caring qualities. His visionary leadership was transformed into reality with his major initiative – Well North – which will be a legacy for our society.”
Working with industry

The MAHSC Business Development team works closely with a wide range of commercial organisations, from global corporations to local businesses. The aim is to develop strategic programmes and partnerships that leverage our expertise and infrastructure, and contribute to both health and economic development. We work closely with GM AHSN, UKTI, MIDAS – Greater Manchester’s inward investment agency – and the Greater Manchester Business Hub to attract inward investment to the region, promote SME business growth and thus actively encourage economic development to enhance the wealth of our population.

“Rapid Rhythm Ltd, a spin-out company from CMFT, is developing a rapid, multi-lead handheld Electrocardiogram (ECG) for ECG screening and rapid access ECG in primary care, care homes and emergency settings.

Dr Adam Fitzpatrick, Consultant Cardiologist at CMFT, and Founder of Rapid Rhythm: “I started working with TRUSTECH, which facilitates collaboration between the NHS and commercial partners, in 2008 to develop an initial prototype of the device. By 2012 enough progress had been made to allow for the incorporation of a new company, Rapid Rhythm Ltd, which is based at Manchester Science Park for innovative health services.”

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Using ‘big data’ to improve health outcomes

A Memorandum of Understanding between MAHSC, Hitachi, Eagle Matrix Consulting, NWEH and the NHS in Greater Manchester, was signed in April 2013. The partners agreed to work together to plan and develop informatics technology to manage and improve patient care and population health. We are collaborating on a range of projects to use ‘big data’ resources to identify and pre-empt potential health conditions such as type 2 diabetes.

“Electronic health records make unique drug trial possible

The Salford Lung Study (SLS) is the world’s first phase III pragmatic randomised control trial (RCT) in asthma and chronic obstructive pulmonary disease (COPD). A collaboration between The University of Manchester, Salford CCOS, local GP and community pharmacy staff, GlaxoSmithKline (GSK) and NWEH, it is trialling a new inhalated medicine on 2,800 COPD and 4,000 asthma patients as they go about their daily lives – a novel ‘real world’ approach to an RCT.

The study benefits from access to Salford’s local health record system, in which primary and secondary care records are integrated, allowing close monitoring of patients with minimal intrusion into their lives. The SLS is now rolled out across Greater Manchester and, in 2014, a bespoke electronic monitoring system was developed to manage the unique challenges associated with this expansion – including working with over 120 local retail pharmacies responsible for dispensing the study medication.

“This is a first in the world, testing a pre-license medicine in a real-world setting, and is a tribute to the partnerships we’ve created together, our collaborators and the health care professionals and community pharmacy staff.”

“MAHSC launched a major partnership with AstraZeneca, which has a facility based in Cheshire, partnered with The University of Manchester in 2014 to establish the North West Centre for Advanced Drug Delivery at Manchester Pharmacy School. The ultimate aim of the centre is to create advanced drug delivery technologies that can enhance the way medications work and improve health outcomes for patients.

“Advancing Drug Delivery

AstraZeneca, which has a facility based in Cheshire, partnered with The University of Manchester in 2014 to establish the North West Centre for Advanced Drug Delivery at Manchester Pharmacy School. The ultimate aim of the centre is to create advanced drug delivery technologies that can enhance the way medications work and improve health outcomes for patients.
**Precision Medicine in MAHSC**

Medicine is inexorably moving from a ‘one-size-fits-all’ treatment approach to a precision medicine approach where individual patients receive the care that is most appropriate for them. The processes involved in precision medicine involve stratifying patients or clients so that their care is appropriate for whatever sub-type of disease the patient has and how he/she is likely to respond to particular medicines. Such stratifying of disease requires linking disease features with detailed information about the patient’s genome and phenotype. With all this information, the healthcare practitioner team can personalise the care package for the patient so that it takes into account all the needs of the individual. All of this requires a sophisticated health informatics system in the background to ensure optimal care. Through major recent awards, MAHSC now has world-class infrastructure through which stratified medicine research can be conducted.

**Improving Lupus treatment**

**Ian Bruce, Professor of Rheumatology, Director of The NIHR Manchester Musculoskeletal Biomedical Research Unit and Principal Investigator of the MASTERPLANS**

Lupus is a chronic, incurable disease that affects around 16,000 people in the UK and can lead to kidney failure, heart attacks and strokes. Lupus patients vary widely, both in the extent of organ involvement as well as the overall severity of their condition. Treatment is often on a ‘trial and error’ approach and only 40-50% of patients currently respond well even to our ‘best’ therapies.

Our £5.1m MASTERPLANS consortium aims to change that by identifying ways to select the best treatment first time. The partnership is funded by the MRC and 11 industry partners including GlaxoSmithKline (GSK), Roche, UCB Pharma, Epistem, Aventic Limited, Imagen Biotech, Aurinia, Pfizer and Myriad RBM.

*Maximizing Ste TheRapeutic Potential by Application of Novel and Stratified approaches*

**Identifying personalised biologic treatments for psoriasis patients**

**Professor Chris Griffiths, Consultant Dermatologist at SRFT and lead investigator on the PSORT**

Psoriasis is a common, chronic, potentially disfiguring disease that affects more than 1.8 million people in the UK. In the past 10 years, there has been a dramatic improvement in clinical outcomes for patients with severe psoriasis thanks to a new class of injectable drugs called biologics. However, these medications are very expensive and a significant number of patients still fail to respond adequately.

PSORT is a unique consortium formed by world-leading dermatologists, scientists, industry partners and psoriasis patients. With a £5 million grant from MRC, and a further £2.5 million from industry partners, the four-year study aims to use clinical, genetic and immune biomarkers to predict and reproducibly stratify response of psoriasis patients to biologic therapies in a manner that is minimally dosed and cost-effective. Thus, patients will receive the right biologic first time.

The PSORT consortium consists of universities and ten industry partners including Janssen and Qiagen.

*Psoriasis Stratification to Optimise Relevant Therapy (PSORT) www.psort.org.uk*

**Developing new medicines for severe asthma sufferers**

**Ashley Woodcock, Professor of Respiratory Medicine and deputy lead for the RASP.UK**

International treatment guidelines currently advocate a one-size fits all approach to the treatment of severe asthma, despite wide variance in the condition. The RASP.UK consortium is MRC funded (£4 million), with matching industry partner support. The consortium aims to stratify patients with severe asthma according to novel objective measures of treatment adherence, and then according to the type of inflammation in their lungs in order to target much-needed novel biologic drugs to the right patients. Our seven industry partners include Amgen, Aerocrine and Niche Science and Technology.

*Refractory Asthma Stratification Programme*

**Treating schizophrenia more effectively, earlier**

**Shon Lewis, Professor of Adult Psychiatry and Manchester co-lead for the STRATA**

Schizophrenia affects 1% of people, usually long term. Antipsychotic drugs, which block brain dopamine, work for two-thirds of these patients. In the other third, who are treatment resistant, recent magnetic resonance spectroscopy and genetics studies suggest that the primary abnormality may be in the neurotransmitter glutamate, not dopamine. A seven-centre national consortium led from Manchester and King’s College London and funded by the MRC (2014-18) with industry partners (Lilly, Amgen, Roche) will use genetics and molecular imaging approaches (working with the MCRF and Wolfson Molecular Imaging Centre) to test this hypothesis in randomised trials as the basis for future stratification.

*SChizophrenia, Treatment Resistances and Therapeutic Advances*
A cutting-edge informatics platform to stratify asthma patients

Adnan Custovic, Professor of Allergy and Principal Investigator on the STELA® consortium

Asthma is the most common chronic childhood disease, affecting around one in every 11 children and 5.4 million people in the UK. As such, there is a need for a more effective way to treat and stratify patients according to the therapy to which they are most likely to respond. Through this work we hope to enable earlier and more effective treatments to sufferers while improving the cost-effectiveness of NHS care.

Working with the HeRC at The University of Manchester, we created Asthma e-Lab, a secure web-based research environment to support consistent recording, description and sharing of data, computational methods and findings across the five UK birth cohorts (>17,000 children). The e-Lab serves as a data repository for our unified dataset, but also a scientific social network to support collaborative research. All activities are visible to all researchers across the five sites, and research findings are shared via the e-Lab, enabling interdisciplinary dialogue between clinicians, statisticians, computer scientists, mathematicians, geneticists and basic scientists.

*Study Team for Early Life Asthma Research

Targeting treatments for rheumatoid arthritis

Anne Barton, Professor of Rheumatology and co-lead of the MATURA* consortium

Rheumatoid arthritis (RA) affects around 500,000 people in the UK and costs the NHS around £8 billion a year. We are leading Strand 2 of the MATURA consortium, which aims to identify a blood-based biomarker signature to stratify RA patients according to the therapy to which they are most likely to respond. Through this work we hope to enable earlier and more effective treatments to sufferers while improving the cost-effectiveness of NHS care. MATURA is jointly funded by the MRC and Arthritis Research UK as well as 11 industry partners, including Amgen, Qiagen, Pharmatics, Janssen, Avacta, Pfizer and Protagen.

*Maximising Therapeutic Utility for Rheumatoid Arthritis

Working towards stratified clinical trials in cancer

Professor Andrew Hughes is Strategic Director of the Experimental Cancer Medicine Team at The Christie, a partner in the MCRC

MCRC is a leading centre for the exploration of cancer biology through the use of biomarkers in the blood, which have already demonstrated their potential in predicting treatment response and disease progression as demonstrated by the recent approval of their use for diagnostic testing in non-small cell lung cancer.

The TARGET* study aims to use circulating tumour DNA (ctDNA) – taken via a blood sample or “liquid biopsy” – alongside conventional biopsy material to identify the most suitable clinical trial in which to enrol patients. This project was conceived in the Clinical and Experimental Pharmacology group (CEP) at the Cancer Research Manchester Institute (CRUK MI) led by Caroline Dive and Ged Brady, and draws heavily on the world-leading work by this team in developing protocols to isolate and study circulating tumour cells (CTCs) and ctDNA.

Working alongside CEP, the clinical leads for the implementation of TARGET are Dr Matt Krebs and Dr Emma Dean of the Experimental Cancer Medicine Team at The Christie. The project demonstrates the translation of biomarker research taking place at the Cancer Research UK Manchester Institute into the clinic and the benefit of the single site location in Withington for both laboratory and clinical research. Collaborative in nature, it is largely funded by Cancer Research UK. In the first phase, a process to fast-track genetic analysis from patient samples will be established. In the second phase, insights from the molecular profiling will be used to match patients to investigational medicinal products and inform which clinical trial at the Christie would be most likely to benefit the patient. This will require the growth of the clinical studies open at The Christie with an aim to deliver genetic analysis within 24 hours of tissue biopsy, demonstrating the translation of biomarker research into clinical practice.

*Study Team for Early Life Asthma Research

Infrastructure

Investing in world-class cancer research

Professor Nic Jones, Director of the MCRC – MAHSC’s cancer research arm

In early 2015, construction of our new £28.5 million MCRC building was completed. This world-class laboratory facility will enable the expansion of cutting-edge fundamental research into the biological basis of cancer. An improved understanding of the characteristics of an individual’s disease allows for the stratification of patients and the development of new treatments, leading to more personalised cancer medicine and better outcomes. The new building, which is funded by Cancer Research UK, The Christie, The University of Manchester and several charitable trusts, is expected to attract international experts to Manchester and facilitate the translation of research findings from bench to bedside by uniting doctors and scientists on a single site.

Improving sample analysis

Tony Whetton, Professor of Cancer Cell Biology, The new Stoller Biomarker Discovery Centre is a first-in-European clinical proteomics facility with the primary aim of supporting clinical research into precision medicine in Greater Manchester. The £23 million project is, however, more than proteomics; as it links a pathology node, genomics and health informatics together with a major investment in infrastructure for multidisciplinary research. We will develop new diagnostic tests and screening methods to quickly and accurately stratify patients prior to the administration of treatment, or investigate the effectiveness of treatment shortly after it has begun, rather than wait months for results. We will enable more efficient translation of research into clinical practice. We are also delivering robust health informatics infrastructure specifically designed to support precision medicine research.

Finding new treatments for cancer and rare diseases

Bill Newman, Professor of Translational Genomic Medicine at Manchester Centre for Genomic Medicine.

Over three million people in the UK suffer from rare diseases and around 160,000 cancer patients die each year. The Manchester Centre for Genomic Medicine recruited the first patient into the government’s 100,000 Genomes Project to find new tests and treatments and to personalise care for those affected by these conditions.

The project will use genetic information in combination with knowledge of a patient’s health problems to diagnose and treat disease, in part by stratifying patients into subsets according to their genetic makeup, leading – especially in cancer – to more effective selection of treatments.

MAHSC also hosts:

* HeRC – part of the Farr Institute, and the Single Cell Genomics Centre, both funded by the MRC.
* A Cancer Research UK Major Cancer Centre at The Christie.

MAHSC Report 2014-15: Working together to improve Greater Manchester’s health
Global reach
The global reach of MAHSC’s work includes both our strong international partnerships with MIT/Harvard (see page 22 for a case study of an M2EET project with the university) and Monash Partners, and the humanitarian work of the MAHSC Global Health Office, which supports the improvement of health outcomes in low and middle-income countries through research, education and influencing and advising on policy.

Learning lessons from tackling Ebola
Professor Mukesh Kapila, Executive Director of MAHSC Global Health, meets President of Sierra Leone Ernest Bai Koroma while travelling with International Medical Corps to assess progress in the battle against Ebola in Sierra Leone and Liberia.

Dr Amy Hughes, Clinical Lecturer in Emergency Response at The University of Manchester’s Humanitarian and Conflict Response Institute, was named the UK’s 200th Point of Light by Prime Minister David Cameron after she led the first wave of NHS volunteers to Sierra Leone in November 2014.

Bringing UK and Australian researchers together
International research collaborations to improve the health of pregnant women, prevent older people in hospital from having falls and enable early detection of hearing problems have all been awarded funding through the £50,000 MAHSC-Monash Partners Collaborative Fund.

“Only unique board game aims to reduce maternal deaths in Africa”
Professor Dame Tina Lavender is Professor of Midwifery and Director of the Centre for Global Women’s Health at The University of Manchester, and Principal Investigator of Lugina Africa Midwives Research Network (LAMRN), which aims to empower midwives in evidence-based practices in Malawi, Tanzania, Uganda, Zambia, Kenya and Zimbabwe.

There is an internationally recognised chart for recording a women’s status during labour called a partograph, but midwives in developing countries have commented they find it difficult to complete and use as a decision-making aid. To help them practice, gain new knowledge and discuss methods with peers, we developed a board game based on an idea by international midwifery consultant Dr Gaynor Maclean, which involves charting a hypothetical labour and making decisions based on randomly selected question cards. The game, called Progression and funded by the Laerdal Foundation, has been piloted among 165 midwives in east Africa, who overwhelmingly found it useful, entertaining and educational. We now hope to widen distribution of this low-cost resource across LAMRN partner countries as an aid to reducing the major issue of maternal death due to labour complications.

Patients and the public gain unique role in training doctors
Manchester Medical School launched the DoubleDay Centre for Patient Experience in 2015, becoming the first such establishment to involve patients and the public in the training of doctors. The centre, which was created through a grant from the Dr Edwin DoubleDay Fund, will allow students to work with and be assessed by patients in order to better understand their needs and feelings, enhancing the treatment they deliver.

Friends of MAHSC
Friends of MAHSC is a new initiative for people who wish to be informed, engaged and/or involved in MAHSC. The aim of Friends is to ensure that MAHSC’s cutting-edge work in driving health improvements remains aligned to the public’s needs and expectations. MAHSC is currently working with its partners to develop the framework for Friends, prior to going live in summer 2015.

Listening to and learning from our patients and communities
By listening to the feedback of our staff, patients and the local population, we are able to target research and innovation where it is most needed, and ensure we continuously enhance the positive impact of our work.

Some examples of the infrastructure established to ensure we are listening to our patients and communities are detailed below:

MIMIT
Manchester Integrating Medicine and Innovative Technology (MIMIT) is the first international affiliate of the highly successful Boston-based Consortium for Integrating Medicine and Innovative Technology (CiMIT). Site leaders across the MAHSC partners proactively identify unmet clinical needs and innovative ideas for the improvement of healthcare within their organisations. Innovators are then connected with industry at the earliest stage, enabling new technologies to reach patients more quickly and effectively.

Bibhas Roy, Consultant Orthopaedic Surgeon at CMFT, and MIMIT Site Minor “One third of people over 65 will suffer a fall, which frequently leads to severe injuries and can even be fatal. Falls are estimated to cost the NHS more than £2.3 billion every year, and the problem is expected to intensify as the population ages. We identified Emma Stanmore’s work as an innovative approach to improving healthcare in older people.”

Dr Emma Stanmore, Lecturer in Nursing at The University of Manchester
“Research has shown that engaging in certain physical exercises can prevent falls by at least 40 per cent, but that compliance with prescribed exercise is a barrier. Working with older people, we developed a series of computer games called Exergames, which are based on current best evidence therapy and make staying active more engaging for older people.

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BBC Home Editor, Mark Easton, already signed up as the first Friend of MAHSC, said: “I’m delighted to accept the honour of becoming the first Friend of MAHSC, as part of an initiative that will see staff, patients and the public become further engaged and involved in MAHSC’s work. I would urge people to think: is there something that I can bring to improve health outcomes for me, my family and also for Manchester by joining Friends?”
From research to patient

Follow the diagram to see how two major new innovations have been developed, evaluated and adopted in Greater Manchester for the benefit of patient care.

IGR Care-Call is a telephone service supporting people to decrease their risk of developing diabetes by adopting a healthier lifestyle.

FARSITE is Manchester-developed software which provides a safe, convenient and effective way for family GPs to control the recruitment of their patients into clinical research – protecting patient confidentiality, while allowing NHS-based research to run complex and powerful searches over anonymised population level health record data.

Invention

**IGR Care-Call**

“We designed a self-care programme to help prevent diabetes”

Diabetes accounts for around 10% of the NHS budget. Approximately 50% of people with impaired glucose regulation (IGR), a condition associated with obesity, will develop it. Losing weight and increasing activity can reduce the risk. In the IGR Care-Call Pilot Project, GPs referred patients with IGR to a telephone programme. Lifestyle goals were identified with the support of a healthcare professional. Monthly follow-up calls monitored progress and provided education, motivation and support. Many patients made long term lifestyle changes and over half of those who took part in the pilot project no longer had IGR a year after completing the programme.

Katherine Grady, Former Care-Call Manager, SRFT

“We listened to patients to improve our service”

We held patient focus groups, workshops and questionnaires throughout the IGR Care-Call Project and analysed feedback to continuously improve the service. We also worked with GPs to improve consistency in recording diagnosis and annual recall of patients with IGR.


**FARSITE**

“We designed FARSITE to fill an important unmet need”

As hospital-based clinicians and researchers in diabetes, we were having difficulty recruiting patients to clinical research studies because eligible patients were increasingly only seen by their GP. After discussing this issue at length with Iain Buchan, Clinical Professor in Public Health Informatics at The University of Manchester, we were able to invent a method that could safely allow researchers to search anonymised records, revealing identifiable information only to GPs who could then decide whether to invite appropriate patients in their care into specific studies. In 2008, we set up health informatics organisation NWEH with one of our first tasks being to engineer Iain’s design to create the finished product – FARSITE.

Martin Gibson, Chief Executive Officer, NWEH

“FARSITE improves recruitment rates to trials”

I use FARSITE to check that a sufficient number of patients in the local area meet the eligibility criteria of proposed trials – an essential task when failure to recruit patients is a major reason some clinical research fails. For this reason, I think FARSITE has given Greater Manchester an edge with industry. In fact, last year we recruited the highest number of patients to life-sciences commercial trials nationwide. Helen O’Brian, Feasibility Officer, NIHR CRN GM.

**DID YOU KNOW?**

NICE referred to Salford’s IGR project as an exemplar when it published its PH38 guidance on diabetes prevention.

A GM CLAHC evaluation showed that if fewer people develop diabetes, the projected future cost of diabetes care could reduce by over £1m within 10 years of IGR Care-Call being implemented in Salford

NHS England and Public Health England have selected Salford as a demonstrator site for their National NHS Diabetes Prevention Programme.

**Continuous improvement**

“We’re developing technology to further improve the Care-Call service”

Hitachi was introduced to the IGR service in 2013 during a visit to MAHSC, with which we already had a strong relationship. We were impressed with the results and had some ideas about how we could collaborate with the NHS in Greater Manchester to leverage synergies from our experience and knowhow of delivering a similar efficient and effective lifestyle disease service, utilising IT that we offer in Japan. Using our software, patients can login online to fill out a questionnaire on their lifestyle ahead of their telephone assessment with Care-Call, allowing healthcare professionals to provide targeted advice, and patients to monitor their progress while on the go.

Yo Nakajima, Chief Technology Officer and General Manager, Information Systems Group, Hitachi Europe Limited

**Care-Call and FARSITE could improve care for older people in Salford**

We brought FARSITE and Care-Call together in our £1.2m Comprehensive Longitudinal Assessment of Salford Integrated Care (CLASSIC) study. CLASSIC is assessing the impact of the Salford Integrated Care Programme (SiCP), which aims to provide better access to community support and further integration of health and social care, including through a telephone programme based on the Care-Call design. All GPs in Salford now have access to FARSITE and this helped us to identify and recruit a cohort of over 4,000 older people – exceeding our target – in just four months.

Peter Bower, Principal Investigator on the CLASSIC Study

**FARSITE improves GP services**

FARSITE has allowed Salford CCG to target health improvement activity more effectively, as we can use it to identify patients across Salford whose treatment pathways could be further optimised.

Shelia McCorkindale, Local GP and Clinical Lead for Diabetes and Kidney at Salford CCG & Primary Care Research Specialty Lead for NIHR CRN GM

**We use FARSITE to improve GP services**

In 2015, we launched a wide-scale programme to roll-out FARSITE across at least 150 GP surgeries within three AHSN footprints: Greater Manchester, North West Coast and North East and North Cumbria. This area covers approximately nine million patients and the roll-out will significantly boost the North’s clinical research power, improving our ability to provide better and safer care to patients.

Gary Leeming, Associate Director of Informatics, GM AHSN.

**Working together to improve Greater Manchester’s health**

Hitachi Europe Limited

**Working together to improve Greater Manchester’s health**

GM AHSN
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On the web
Further information, case studies and news from Manchester Academic Health Science Centre can be found on our website:
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Through our newsletter
We publish a monthly e-bulletin that includes the latest operational updates regarding the work of our six domains and four corporate functions. Subscribe to our monthly newsletter:
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Glossary

The Christie
The Christie NHS Foundation Trust

CIMIT
Consortium for integrating Medicine and Innovative Technology

CMFT
Central Manchester University Hospitals NHS Foundation Trust

CRF
Clinical Research Facility

GM AHSN
Greater Manchester Academic Health Science Network

GM CLAHRC
NIHR Collaboration for Leadership in Applied Research and Care Greater Manchester

HeRC
Health eResearch Centre

IS4Ac
MAHSC’s Improvement Science for Academics Programme, delivered by Haelo within the Population health and implementation domain

LAMRN
Lugina Africa Midwives Research Network

MAHSC-CTU
MAHSC Trials Coordination Unit

MAHSE
Manchester Academy of Health Science Education

MSP
Manchester Science Partnerships

MCGM
Manchester Centre for Genomic Medicine

MCRC
Manchester Cancer Research Centre, MAHSC’s cancer research arm

MIMIT
Manchester Integrating Medicine and Innovative Technology

MIT
Massachusetts Institute of Technology

MMHSCT
Manchester Mental Health and Social Care Trust

Monash Partners
Monash Partners Academic Health Science Centre

MRC
Medical Research Council

MRO
MAHSC Research Office

NICE
The National Institute for Health and Care Excellence

NIHR
National Institute for Health Research

NIHR CRN:GM
National Institute for Health Research Clinical Research Network: Greater Manchester

NWEH
NorthWest eHealth

PUHSC
Peking University Health Science Centre

Salford CCG
Salford Clinical Commissioning Group

SRFT
Salford Royal NHS Foundation Trust

TRUSTECH
An innovation management service for NHS organisations within the North West and a consultancy service for companies throughout the UK and beyond.

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