Transforming artificial intelligence (AI) research and innovation

Artificial intelligence is being hailed to improve NHS efficiency, deliver better outcomes and prevent ill health.

The introduction of such technological innovations has promise for Scotland, but there are many challenges. What effect will AI have on human relationships in health and care? How can we promote quality of care and minimise potentially disruptive effects? Will these technologies help eradicate or exacerbate existing health inequalities? HSRU is involved in several AI related projects at national and international level.

Aberdeen is one of the collaborators in £15.8m Innovate UK funded Industrial Centre for Artificial Intelligence Research in Digital Diagnostics (iCAIRD), a pioneering pan-Scotland consortium that brings together partners from across the academia, industry and the NHS (see https://icaird.com/). iCAIRD provides an infrastructure for research and application of AI in digital diagnostics, pathology and radiology, ultimately offering unprecedented gains when it comes to improving the health and care of our nation. The NHS Grampian's health intelligence team and the Aberdeen Centre for Health Data Science (ACHDS) lead the North East projects.

HSRU leads work to assess how to improve the ways AI-based healthcare diagnostic technologies are evaluated. This involves systematically identifying the stakeholders (and what they want); assessing setting readiness and the barriers and enablers to AI diagnostics uptake across sectors and undertaking a real-world assessment of breast screening service in Scotland.

Together with ACHDS we are also exploring opportunities to expand health AI evaluation experience globally, starting with our established partnerships with collaborators from across the academic and health care services in Brazil. HSRU were successful in receiving global pump-priming funds to hold a visit of collaborators from Ribeirão Preto Medical School, to plan implementation and evaluation of a highly innovative and competitive AI-based technology for routine healthcare management of multimorbidity in Ribeirão Preto region; and discuss future plans for building an inter-institutional partnership for research and capacity building. It was clear that the NHS in Scotland has much to learn from AI in Brazil as they do from us. Grant applications are in, we wait!

Craig Ramsay, Unit Director

Aberdeen Team and Brazilian collaborators.
NHS Research Scotland (NRS)
Career Researcher Fellowship – Callum Kaye

Callum has just started his NRS Career Researcher Fellowship based in the HSRU, looking into how we can effectively use sedation and brain monitoring to improve outcomes of intensive care patients with severe traumatic brain injury. For the rest of his time, he’s a Consultant in Anaesthetics and Intensive Care in ARI. He is really looking forward to getting his Department more engaged with clinical research and through the Fellowship, he hopes to develop skills and contacts to improve the research output from the ICU and encourage clinicians to engage with the University to answer clinically important questions for their patients.

Contact: callum.kaye@abdn.ac.uk  Twitter: @callum.kaye

THIS Institute Fellowship Award

Dr Eilidh Duncan (pictured) is a research fellow in HSRU and recipient of a personal fellowship from The Healthcare Improvement Studies (THIS) Institute. Her fellowship is looking at how to optimise Audit and Feedback, a widely used strategy to improve clinical practice. Audit and Feedback involves providing health professionals with a summary of their clinical performance of healthcare over time, often alongside comparison groups or targets. Eilidh’s work includes applying co-design (i.e. closely involving the intended users of Audit and Feedback in its design) to Audit and Feedback and exploring how the NHS uses Audit and Feedback as an organisation.

Contact: e.duncan@abdn.ac.uk  Twitter: @EilidhMDuncan

FLow AdMissions children youNG people - the Flamingo study

Zero day hospital admissions (admitted and discharged on the same day), are becoming more common in children. This CSO funded study will determine circumstances whereby such admissions may be safely avoided.

By linking hospital admission between 2015 and 2017 to other routinely collected NHS data we will answer firstly “within the ‘flow’ are there identifiable ‘streams’ of zero day admissions which could be slowed?” and secondly “what are the implications to general practice of slowing the flow of zero day admissions?” Our third question “which of these ‘streams’ is the most important to slow down first?” will involve working in partnership with children, families and NHS professionals to prioritise the next steps to develop intervention(s).

Contact: l.aucott@abdn.ac.uk  Twitter: @LornaAucott

Effective healthcare delivery in rare rheumatic disease: evaluating models of care for systemic vasculitis

This study aims to improve care for people with Systemic Vasculitis, a rare, multi-organ rheumatic disease caused by blood vessel inflammation. People with vasculitis experience delayed diagnosis, inconsistent access to relevant expertise, and care that is not well coordinated around their complex needs. Using national healthcare records, identified patients with vasculitis in Scotland will document how they have used services, and explore differences in outcomes such as heart disease, stroke and infections. We will also examine how vasculitis services are currently organised and delivered in Scotland and across the UK. We will study six sites in detail, interviewing patients and staff about their experiences of different patterns of service delivery, what aspects of care they value the most and how care could be improved. As well as working with patients and staff to design better services, patient interviews will be shared on www.healthtalk.org to support others with vasculitis.

Contact: louise.locock@abdn.ac.uk  Twitter: @LLocock

VASCULITIS

- Nervous system
  - stroke
- Heart
  - myocardial infarction
  - hypertension
- Digestive system
  - bloody stool
  - abdominal pain
- Joints
  - pain
  - arthritis
- Skin
  - palpable purpura
  - livedo reticularis
- Eye
  - reduced visual acuity
- Nose
  - bleeds
- Lungs
  - bloody cough
  - lung infiltrates
- Kidneys
  - glomerular nephritis
- Muscle
  - pain

General symptoms:
- fever
- headache
- weight loss

Contact: louise.locock@abdn.ac.uk  Twitter: @LLocock
Total or Partial Knee Arthroplasty Trial

New research shows that partial knee replacement (PKR) is as good as total knee replacement (TKR), whilst being more cost effective.

Every year 300,000 knee replacements are performed in the UK, mainly for osteoarthritis. TKR replaces all parts of the joint whereas PKR replaces only the diseased area and retains as much soft tissue as possible. TKR is fully established and used most often whereas PKR is less common and has been in widespread use for a shorter period. Surgeons and patients face a choice of which type of operation to perform or undergo for medial compartment (one area in the joint) arthritis.

Results from the TOPKAT study (Total or Partial Knee Arthroplasty Trial), involving researchers from the Universities of Aberdeen and Oxford, suggest that over five years PKR has similar, if not a slightly better clinical outcome than TKR. The study began in 2010 and 528 patients from 27 hospital sites were followed up for five years with the help of Trial Manager, Dr Lottie Davies. They were asked questions about pain, function, activity levels and satisfaction. Most of the clinical measures were very similar between the two types although more patients having a PKR reported they would have the operation again compared to those having a TKR. Failure or revision rate for PKR was found to be identical to that of TKP (both with revision rates of 4%). These findings contrast with previous research based on national registries, which showed PKR to have higher revision date.

The cost effectiveness findings (patient improvement in relation to cost) were the most persuasive to show that PKR should probably be offered to more patients. The economic benefit of using PKR is substantial and could save the NHS about £30 million per annum based on an increase of 31% usage. At present only 9% of joint replacements are PKR yet it is thought that around 40% of patients could be suitable candidates.

Selective Caries Removal in Permanent Teeth (SCRIPT) trial

HSRU, in collaboration with the University of Dundee, is leading a new NIHR HTA funded study starting in June looking at the best way to treat tooth decay in teenagers and adults in a multi-centre, patient randomised trial. Tooth decay is a very common disease and treating it costs the National Health System over £3.4 billion each year. There are different ways of treating decayed teeth where the decay has spread deep into the tooth and close to the nerve: usual practice involves removing all of the decay ("complete decay removal"). However, it can result in serious damage to the nerve making root canal treatment or tooth loss likely. For that reason, the SCRIPT trial will be comparing "complete decay removal" with a less invasive option: "partial decay removal". The main outcome is whether the tooth is healthy after 3 years and we will recruit sixty-five dental practices and 623 participants nationwide.

AWARD WINNERS

Excellence Awards 2019 - The Principal’s Prizes for Research and Engagement

Three HSRU staff were awarded prizes at the Principals Excellence Awards Ceremony.

Professor Alison Avenell – winner ‘Individuals at Further Stage of Career Development’
Dr Heidi Gardner – winner ‘Early Career Researcher’
Dr Gordon Fernie – winner ‘Outstanding Achievement in Biomedical Sciences’

International award for Trial Forge

Professor Shaun Treweek and his Trial Forge team won the prestigious international Cochrane – REWARD prize for making trials of new healthcare treatments more efficient.
HSRU Intern Programme

Eight summer interns presented their work in two seminars that were also attended by some of HSRU’s Public Partnership Group members. Valerio Bucci and Julia Zięba talked about their joint work to develop a web portal for trial participants’ complete electronic patient reported outcomes (ePRO). Hilaron Osemudiame Dawodu described the development of a study website for the ESP-2 study, and the development of a feedback tool that can create snapshots of website pages and send them via email. Alex Zabala-Findlay talked about developing plain language summaries for diagnostic test accuracy studies. Gemma Banister spoke about developing guidelines for reporting the results of diagnostic accuracy studies to participants.

Sam Alexander has been looking at recruitment profiles, in order to identify any common factors associated with good recruitment. Agata Kosztrewa, talked about her work looking at the media coverage of Baby Boxes within Scotland. Stefania Piroscia described her project on identifying and theming trial design improvements suggested by Cochrane systematic reviews.

NEWS

Recent International visitors to the Unit:-

Ivana Goluza, Research strategy Project Officer from the Agency of Clinical Innovation, New South Wales, Australia.

Associate Professor Mark Bolland, University of Auckland.

School Visit

Members of Public Engagement Group attended the Mackie Academy “Developing the Young Workforce” careers event in Stonehaven. They discussed with the students their roles in HSRU and the path that led them there.

International Clinical Trial Methodology Conference

With 13 oral presentations, HSRU held close to 10% of the whole conference oral program, as well as leading two of the nine workshops and running a parallel Trial Forge meeting. We also had a bunch of posters and HSRU staff occupied five of the top ten twitter ‘influencer’ slots for the #ICTMC2019 hashtag.

Recent Publications