# Table of Contents

4 Welcome

7 Venue Floorplan

8 Conference Partners

9 Committees

11 EFMI and The Farr Institute

12 Host Organisation & Rising Stars

13 General Information

17 Five Facts about Manchester

18 Programme at a glance

32 Doctoral Symposium

37 Pre-Conference Tutorials

52 Keynote Speakers

54 Scientific Programme

113 Conference Posters

128 Social Programme

132 Exhibition Floorplan

133 Exhibitor Information
welcome to
Informatics for Health 2017

Dear delegate,

It is a pleasure and a privilege to welcome you to the Informatics for Health 2017 conference in Manchester.

Manchester is the city where Marx met Engels and where Rolls met Royce; it was the birthplace of the industrial revolution. Now it hosts one of the most vibrant health informatics communities worldwide. It is a place where science, industry, and healthcare work together to explore the exciting opportunities of digital health innovation.

For me personally, the conference is a unique opportunity to unite my old friends from the European Federation for Medical Informatics (EFMI) with my new family at the UK’s Farr Institute for Health Informatics Research. I look forward to five days of inspiring discussions in a programme that is unparalleled in scientific breadth and depth.

Apart from the science we offer a wide variety of social activities, including a walking tour that explores Manchester’s history of science and engineering; an interactive theatre play exploring people’s attitudes towards the sharing of health data; a Science Slam where research is presented in entertaining and unusual ways; and a Gala Dinner at Manchester Cathedral with live brass music.

I hope you will enjoy our party.

Dr Niels Peek
Chair, Local Organising Committee
Dear Informatics for Health 2017 delegates,

Welcome to Manchester and to Informatics for Health 2017. This is a unique and important gathering. For the first time, the European Federation for Medical Informatics (EFMI) has brought the continent’s leading conference, Medical Informatics Europe (MIE 2017) together with the UK’s annual scientific meeting in this field, The Farr Institute International Conference 2017.

Informatics research has a strong tradition within The University of Manchester. This spans four decades with a rapid expansion in recent years following investments in the MRC Health eResearch Centre, The Farr Institute, the Connected Health Cities programme and Innovate UK’s Internet of Things demonstrator project, CityVerve. It also plays a key role in the transformation of health and social care in Greater Manchester made possible through the devolution of national government responsibilities to local control. This has created a vibrant and collaborative informatics community in Manchester across researchers, health and social care partners, and the digital health economy.

I am therefore delighted that today Manchester is hosting one of the largest conferences in this field, welcoming an international audience of academics, health professionals and industry partners.

We are looking forward to providing you with the ideal environment in which to present and discuss ideas over the next five days, enabling delegates to share their knowledge, insights and experiences within data-intensive health science, health care, and digital health business innovation.

The conference assembles a rich variety of speakers, from scientific global thought leaders to tomorrow’s ‘bright stars’, the future leaders of this booming and vital field. By fusing academic and industry-led research and innovation, Informatics for Health 2017 will stimulate and challenge its delegates to look at digital health horizons in new ways.

Have a wonderful stay in Manchester. I hope the conference informs, challenges and links you in partnerships at an international scale befitting the importance of informatics for human health.

Best wishes,

Professor Dame Nancy Rothwell
President and Vice-Chancellor
The University of Manchester
Dear colleagues,

Welcome to Informatics for Health 2017. We are delighted to welcome you to this joint conference between Medical Informatics Europe (MIE 2017) and the Farr Institute International Conference 2017, bringing together the best science across the medical informatics landscape.

We had almost 700 submissions for presentations, posters, panels, tutorials, workshops and demonstrations which after a thorough peer review process and debate by the Scientific Programme Committee have been turned into this final conference programme.

Our conference starts with a selection of 19 tutorials covering a wide breadth of subjects available to delegates on a single site over Saturday 22nd and Sunday 23rd April. We then move onto the conference itself where we have four keynote speakers, 237 oral presentations, 16 panels, 14 workshops, 155 posters and nine demonstrations timetabled to run across the two and a half days.

We have been very fortunate to recruit four keynote speakers from different backgrounds who we believe will entertain and educate all our delegates. Professor Riccardo Bellazzi starts on Monday speaking on “The value of variety: methods, strategies and architectures to deal with the most intriguing “V” of biomedical big data” followed by Professor Susan Michie later that day with a talk titled “Artificial Intelligence meets behavioural science: The Human Behaviour-Change Project”. On Tuesday we have Professor Frank van Harmelen speaking on “How linked (and even open) data can benefit healthcare systems”. Finally, Sally Okun will give our final keynote “Crossing the river by feeling the stones: a journey towards health and thriving” on Wednesday.

We would like to take this opportunity to thank all those who submitted their work for the conference, all our reviewers who helped us choose the best work to be presented and especially the members of our Scientific Programme and Awards Committee (Damon Berridge, Catherine Chronaki, Will Dixon, Catharine Goddard, Mira Hercigonja-Szekeres, Anne Moen, George Moulton, Niels Peek, Rebecca Randall, Paul Taylor, Philip Scott).

Enjoy IforH 2017 and we hope you leave Manchester informed, invigorated and inspired.

Professor Colin McCowan and Dr Ronald Cornet
Scientific Programme Committee Chairs
venue

floorplan

Ground Floor:

First Floor:
committees

Local Organising Committee

Chair:
Dr Niels Peek, Health eResearch Centre, The University of Manchester

Committee:
Alan Campbell
Kate Holmes
Dr Zoher Kapacee
Dr Evan Kontopantelis
Stephen Melia

Dr Georgina Moulton
Ruth Norris
Dr Claire Smith
Dr Sabine van der Veer
Leonnie Wharton

Scientific Programme Committee

Chairs:
Dr Ronald Cornet
Academic Medical Center, Amsterdam, The Netherlands
Linköping University, Sweden

Professor Colin McCowan
Robertson Centre for Biostatistics, University of Glasgow, UK

Committee:
Professor Damon Berridge, Swansea University, UK
Dr Catherine Chronaki, HL7 Foundation, Belgium
committees

Professor Will Dixon, The University of Manchester, UK
Dr Catharine Goddard, University of Dundee, UK
Professor Mira Hercigonja-Szekeres, Hrvatsko Zagorje Polytechnics, Krapina, Croatia
Dr Georgina Moulton, The University of Manchester, UK
Dr Rebecca Randell, University of Leeds, UK
Dr Philip Scott, University of Portsmouth, UK
Dr Paul Taylor, UCL, UK

Bursaries Committees

**EFMI Bursary**
**Chair:**
Professor Elske Ammenwerth, UMIT, Austria

Professor Nicolette de Keizer, Academic Medical Center, Amsterdam, The Netherlands
Dr Vassilis Koutkias, Centre for Research and Technology Hellas, Greece

**Rising Star Bursary**
Dr Ronald Cornet, Academic Medical Center, Amsterdam
Dr Georgina Moulton, The University of Manchester
Ruth Norris, The University of Manchester
Dr Niels Peek, The University of Manchester

**Farr Institute Bursary**
Dr Catharine Goddard, University of Dundee

**Awards Committee**
Co-chair on behalf of EFMI: Professor Anne Moen, University of Oslo, Norway
Co-chair on behalf of Farr: Professor Damon Berridge, Swansea University, UK

**Science Slam**
Wouter Gude, Academic Medical Center, Amsterdam, The Netherlands
Will Hulme, Health eResearch Centre, The University of Manchester
EFMI and The Farr Institute

The European Federation for Medical Informatics (EFMI)

The European Federation for Medical Informatics (EFMI) is the leading organisation in medical informatics in Europe and represents 32 countries. EFMI is organised as a non-profit organisation concerned with the theory and practice of Information Science and Technology within Health and Health Science in a European context.

Since its foundation in 1976, the objectives have been:
• To advance international co-operation and dissemination of information in medical informatics on a European basis
• To promote high standards in the application of medical informatics
• To promote research and development in medical informatics
• To encourage high standards in education in medical informatics
• To function as the autonomous European Regional Council of the International Medical Informatics Association (IMIA)

The Farr Institute of Health Informatics Research

The Farr Institute is a UK-wide research collaboration involving 21 academic institutions and health partners in England, Scotland and Wales. Publically funded by a consortium of ten organisations led by the Medical Research Council, the Institute is committed to delivering high-quality, cutting-edge research using big data to advance the health and care of patients and the public.

The Farr Institute aims to position the UK as a world leader in health informatics research through scientific discovery and the enhancement of patient and public health. By analysing data from multiple sources and collaborating with the government, public sector, academia and industry, the Institute will unleash the value of vast sources of clinical, biological, population and environmental data for public benefit.
Host Organisation
The University of Manchester

The University of Manchester, a member of the prestigious Russell Group of British universities, is the largest and most popular university in the UK. It has 20 academic schools and hundreds of specialist research groups undertaking pioneering multi-disciplinary teaching and research of worldwide significance.

The University of Manchester is one of the country’s major research institutions, rated fifth in the UK in terms of ‘research power’ (REF 2014), and has had no fewer than 25 Nobel laureates either work or study there. The University had an annual income of £1 billion in 2014/15.

www.manchester.ac.uk

Rising Stars

Through generous sponsorship from partners (see page 8) the conference is delighted to award four ‘rising star’ bursaries. Awarded to non-clinical early career researchers presenting at the conference, this bespoke award recognises the importance of future leaders for our field. Congratulations to the successful candidates:

Dr Amy Nguyen; University of New South Wales
Felix Holl; University of California
Dr Richard Boadu; University of Cape Coast
Dr Ruth Blackburn; University College London
Abstracts and Papers

Full paper contributions are published in IOS Press series “Studies in Health Technology and Informatics” [1]. This volume is made available via open access.

Abstracts are published in the Journal of Innovation in Health Informatics, the house journal of the BCS [2].


Additionally, the descriptions of all contributions to the conference are available on the website and via the conference app.

Accessibility

Manchester Central is designed for maximum accessibility, entrances are fully accessible and foyer entrances are sensor-activated. The majority of rooms are on the ground floor and all meeting rooms on the first floor can be accessed via stairs or lifts.

If you require special assistance or have any questions about accessibility, please contact the team at the registration desk for further information.

Cloakroom

The cloakroom is located in the Exchange foyer, close to the registration area. It is free of charge and open during conference hours. Please see the venue map for the location of the cloakroom on page 7.

Emergency Procedures

In the event of an evacuation being necessary, the following alert message will be broadcast:

“ATTENTION PLEASE! ATTENTION PLEASE! WILL EVERYBODY LEAVE THE BUILDING BY THE NEAREST EXIT. THIS IS AN EMERGENCY. THE STAFF WILL ASSIST AND DIRECT YOU. PLEASE DO NOT USE THE LIFTS.”
general information

In the event of an evacuation of the venue, you are requested to assemble at the nearest assembly point. If these areas are not appropriate, you must follow instructions from Security Staff. Once at the assembly point, do not re-enter the venue until you have been instructed to do so by a member of the venue staff.

Suspicious Packages
If a suspicious package is discovered, the article should not be touched. Telephone the Security Control Room (0161 834 2700 ext.2206) or inform a member of the Manchester Central Convention Complex staff/steward.

Exhibition and Catering
The exhibition is located in Exchange Hall, access to the exhibition will only be given to those with name badges. Please see a floorplan and full list of exhibitors on page 132.

Tea, coffee and lunch are served in Exhibition Hall during designated break periods.

<table>
<thead>
<tr>
<th>Date</th>
<th>Morning Coffee</th>
<th>Lunch</th>
<th>Afternoon Coffee</th>
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<tbody>
<tr>
<td>Monday 24 April</td>
<td>11:00 – 11:30</td>
<td>12:30 – 14:00</td>
<td>15:30 – 16:00</td>
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<tr>
<td>Tuesday 25 April</td>
<td>11:00 – 11:30</td>
<td>13:00 – 14:30</td>
<td>15:30 – 16:00</td>
</tr>
<tr>
<td>Wednesday 26 April</td>
<td>10:00 – 10:30</td>
<td>13:30 – 14:15</td>
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Filming and Photography
Filming and photography will take place during the conference. All persons attending Informatics for Health 2017 give their express consent to use their image and voice in connection with the event, and its marketing and advertising, without compensation or credit, throughout the world for an unlimited time. If you do not wish to be included in any photographs and would like your photo/footage removed please contact:
informaticsforhealth@conferencepartners.com
**First Aid**
If first aid assistance is required, please notify any volunteer or member of staff who will alert first aid immediately.

**Insurance**
The organisers and its agents will not be held responsible for any medical expenses, loss or accidents that may occur during the conference. Delegates are strongly advised to arrange their own personal insurance to cover medical and other expenses including accident and loss. Where a delegate has to cancel for medical reasons, the normal cancellation policy will apply. It is recommended that citizens from the EU bring a current EHIC card with them.

**Internet**
Complimentary wireless internet access is available at Manchester Central for all delegates. To login select the ‘MCCC’ network and follow the on screen instructions.

**Conference App**
We are delighted to offer a mobile app for Informatics for Health 2017. Download the official app to access session abstracts and speaker profiles, build your own personal agenda, network with your colleagues and explore the exhibition.

We encourage you to post your photos and highlights on the app social feed, you can also link the app to your social media accounts to share your thoughts and feedback on Twitter, Facebook and Instagram.

Search for **Informatics for Health 2017** on the Apple or Google Play store.

**Mobile Phones**
Delegates are kindly requested to keep their mobile phones on silent in all rooms where sessions are being held.

**Name Badges**
Badges must be worn at all times as this is your ticket to all sessions, including all social events. Access will not be given without a badge.
general information

Registration
The main registration and information desk will be open in the conference venue as follows:

**Opening hours:**
- Monday 24 April 07:30 – 18:30
- Tuesday 25 April 07:30 – 18:30
- Wednesday 26 April 07:30 – 14:30

Enquiries for the following should be made at the registration desk:
- Registration queries
- Social events
- Internet access
- General information
- Taxi bookings
- Accommodation queries and bookings

Smoking
Under UK law smoking is not permitted inside any public building.

Social Media
The official conference hashtag is #IforH2017. We encourage you to tweet your highlights during the conference and to link the conference app to your social media accounts to share your photos and feedback on Twitter, Facebook and Instagram.

Speaker Preview Room
The speaker preview room is located in Exchange 7, on the first floor. Speakers should bring a copy of their presentation and related papers on a memory stick, to be uploaded at least four hours before their session.

**Opening hours:**
- Monday 24 April 07:30 – 17:30
- Tuesday 25 April 07:30 – 17:30
- Wednesday 26 April 07:30 – 13:00

Useful Telephone Numbers
- Acute emergency requiring ambulance, fire brigade or police: 999
- Non-acute police service: 101
- Non-acute medical service: 111
Over twenty Nobel prize winners have worked or studied at The University of Manchester. These include Melvin Calvin (for his research on carbon dioxide assimilation in plants, 1961), James Chadwick (for discovery of the neutron, 1935) and Sir Arthur Lewis (for his pioneering research into economic development, with particular consideration of the problems of developing countries, 1979).

Manchester is the city where Rolls met Royce. Henry Royce made his first car in his Manchester factory in 1904 and was introduced to Charles Rolls at the Midland Hotel on May 4th that same year.

The first modern computer was built in Manchester, at The University of Manchester. It was called “Baby” and was built using communication technology from World War 2. It ran the world’s first stored program at 11am on Monday 21st June 1948.

The atom was first split in Manchester. The experiment took place at The University of Manchester and was carried out by Ernest Rutherford.

On average, more than 1mm of rain falls in Manchester on 143 days of the year.
## at-a-glance programme

**Saturday 22nd April | Doubletree by Hilton Manchester Piccadilly**

<table>
<thead>
<tr>
<th>Time</th>
<th>Scone</th>
<th>Glamis</th>
<th>Brodick and Cawdor</th>
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</thead>
<tbody>
<tr>
<td>09:30</td>
<td>Introduction to DataSHIELD</td>
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<td>11:00</td>
<td>Coffee break</td>
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<tr>
<td>11:30</td>
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<td>Introduction to DataSHIELD</td>
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<td>13:00</td>
<td>Lunch break</td>
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<tr>
<td>14:00</td>
<td>Sonification – A new method for representation of medical data</td>
<td>Data provenance: Principles and why it matters for biomedical applications</td>
<td>mHealth: Developing mobile applications for health</td>
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<td>15:30</td>
<td>Coffee break</td>
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<tr>
<td>16:00</td>
<td>Sonification – A new method for representation of medical data</td>
<td>Data provenance: Principles and why it matters for biomedical applications</td>
<td>mHealth: Developing mobile applications for health</td>
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<tr>
<th>Time</th>
<th>Inverary and Balmoral</th>
<th>Atholl</th>
<th>Linlithgow</th>
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<tr>
<td>09:30</td>
<td>Healthcare text analytics</td>
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<td>Coffee break</td>
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<td>Healthcare text analytics</td>
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<td>Lunch break</td>
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<tr>
<td>14:00</td>
<td>Multi-dimensional data visualisation techniques</td>
<td>How to develop clinical content specifications and achieve interoperability</td>
<td>Introduction to machine learning in health</td>
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<tr>
<td>15:30</td>
<td>Coffee break</td>
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<tr>
<td>16:00</td>
<td>Multi-dimensional data visualisation techniques</td>
<td>How to develop clinical content specifications and achieve interoperability</td>
<td>Process analytics for care pathways</td>
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<tr>
<td>17:30</td>
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## at-a-glance programme

### Sunday 23rd April | Doubletree by Hilton Manchester Piccadilly

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<tr>
<th>Scone</th>
<th>Barony and Glamis</th>
<th>Holyrood and Borthwick</th>
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<tbody>
<tr>
<td><strong>09:30</strong></td>
<td>Model-based therapeutic decision support</td>
<td>Techniques to incorporate human factors engineering into interactive health information technology</td>
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<td>Measuring health outcomes in routine care</td>
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<tr>
<td><strong>11:00</strong></td>
<td>Coffee break</td>
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<tr>
<td><strong>11:30</strong></td>
<td>Model-based therapeutic decision support</td>
<td>Techniques to incorporate human factors engineering into interactive health information technology</td>
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<td>Principles of health interoperability</td>
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<td><strong>13:00</strong></td>
<td>Lunch break</td>
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<tr>
<td><strong>14:00</strong></td>
<td>Introduction to advanced types of predictive models for population health management</td>
<td>The science of learning health systems</td>
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<tr>
<td><strong>15:30</strong></td>
<td>Coffee break</td>
<td>Developing and improving digital skills to empower the integrated healthcare workforce</td>
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<tr>
<td><strong>16:00</strong></td>
<td>Introduction to advanced types of predictive models for population health management</td>
<td>The science of learning health systems</td>
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<td>Developing and improving digital skills to empower the integrated healthcare workforce</td>
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<td><strong>17:30</strong></td>
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<tr>
<th>Brodick and Cawdor</th>
<th>Inverary and Balmoral</th>
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<tr>
<td><strong>09:30</strong></td>
<td>Doctoral symposium</td>
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<td>Coffee break</td>
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<td>Doctoral symposium</td>
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<td>Doctoral symposium</td>
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<td>Time</td>
<td>Exchange Auditorium</td>
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<tr>
<td>0:00</td>
<td>Opening Ceremony</td>
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<td>10:00</td>
<td><strong>Keynote Plenary: Exchange Auditorium</strong>&lt;br&gt;The value of variety: methods, strategies and architectures to deal with the most intriguing “V” of biomedical big data&lt;br&gt;Riccardo Bellazzi, Professor of Bioengineering and Biomedical Informatics, University of Pavia, Italy</td>
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<tr>
<td>11:00</td>
<td><strong>Coffee break, Exchange Hall</strong></td>
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<tr>
<td>11:30</td>
<td><strong>Paper session</strong>&lt;br&gt;Global health</td>
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<tr>
<td>12:30</td>
<td><strong>Lunch and poster session, Exchange Hall</strong></td>
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<tr>
<td>12:45</td>
<td><strong>Working Group meeting</strong>&lt;br&gt;NursIE: Nursing Informatics Europe</td>
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<tr>
<td>14:00</td>
<td><strong>Panel</strong>&lt;br&gt;Implementing eHealth systems in low-income countries</td>
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<td>15:30</td>
<td><strong>Coffee break, Exchange Hall</strong></td>
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<tr>
<td>16:00</td>
<td><strong>Paper session</strong>&lt;br&gt;Data integration</td>
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<tr>
<td>17:30</td>
<td><strong>Welcome reception and poster session, Exchange Hall</strong></td>
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<tr>
<td>Time</td>
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<td>Working Group meeting</td>
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<td>Healthy ageing</td>
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<td>Workshop</td>
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<td>Welcome reception and poster session, Exchange Hall</td>
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<td>Time</td>
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<td>11:00</td>
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<td>Paper session</td>
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<td>Innovative information governance</td>
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<td>14:00</td>
<td>Paper Session</td>
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<td>Security and privacy</td>
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<td>15:30</td>
<td>Coffee break, Exchange Hall</td>
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<td>16:00</td>
<td>Workshop</td>
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<td>EFMI WG SSE 2017 Security and privacy - impact on patients new roles</td>
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<td>17:30</td>
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<td>11:00</td>
<td>Lunch and poster session, Exchange Hall</td>
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<tr>
<td>14:00</td>
<td>Demonstration TRANSFoRm platform for collecting patient reported outcome measures in clinical trials</td>
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<td>15:30</td>
<td>Coffee break, Exchange Hall</td>
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<tr>
<td>16:00</td>
<td>Demonstration WISH: Web Improvement Support in Healthcare</td>
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<tr>
<td>17:30</td>
<td>Welcome reception and poster session, Exchange Hall</td>
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<td>19:30</td>
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</table>
# Programme

**Tuesday 25th April**

<table>
<thead>
<tr>
<th>Time</th>
<th>Exchange Auditorium</th>
<th>Exchange 1</th>
<th>Exchange 2</th>
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</table>
| 08:30 | **Keynote Plenary:** Exchange Auditorium  
Machine learning meets behavioural science: The Human Behaviour-Change Project  
Susan Michie, Professor of Health Psychology, University College London, UK | | |
| 09:30 | **Paper session**  
Knowledge discovery from routinely collected data | **Paper session**  
Data quality assessment methods | **Workshop**  
Extracting evidence from clinical free text: opportunities and challenges |
| 11:00 | **Coffee break, Exchange Hall** | | |
| 11:30 | **Farr Institute Annual Meeting** | **Paper session**  
Interactive and visualisation tools for health data | **Paper session**  
Electronic phenotyping |
| 13:00 | **Lunch and poster session, Exchange Hall** | | |
| 13:15 | | **Working Group**  
UK Health Data Analytics  
Network: Opening the Black Box | |
| 14:30 | **Keynote Plenary, Exchange Auditorium**  
How linked (and even open) data can benefit healthcare systems  
Frank van Harmelen, Professor of Knowledge Representation and Reasoning, Vrije Universiteit Amsterdam, The Netherlands | | |
| 15:30 | **Coffee break, Exchange Hall** | | |
| 16:00 | **EFMI special session:**  
Accreditation of health informatics courses in Europe; EFMI – IMIA collaboration | **Panel**  
Regional health records: Integrating the integrated | **Paper session**  
Translational bioinformatics |
| 17:30 | | | |
| 18:30 | **Close** | | |
| 19:30 | **Conference Dinner – Manchester Cathedral** | | |
### Schedule

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
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<tbody>
<tr>
<td>08:30</td>
<td><strong>Exchange 3</strong> Panel: mHealth: From research to records to real people</td>
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<td></td>
<td><strong>Exchange 4</strong> Workshop: Activating and motivating students in online courses of health informatics</td>
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<td><strong>Exchange 5</strong> Paper session: Clinical decision support systems</td>
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<td>09:30</td>
<td><strong>Coffee break, Exchange Hall</strong></td>
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<tr>
<td>11:00</td>
<td><strong>Exchange 3</strong> Panel: Internet of Things for smart, healthy cities</td>
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<td><strong>Exchange 4</strong> Workshop: Competence for IT-induced change in healthcare work practices</td>
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<td><strong>Exchange 5</strong> Panel: Healthcare information standards for frailty: why, when and how?</td>
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<td>11:30</td>
<td><strong>Lunch and poster session, Exchange Hall</strong></td>
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<td>15:30</td>
<td><strong>Coffee break, Exchange Hall</strong></td>
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<tr>
<td>16:00</td>
<td><strong>Exchange 3</strong> Paper session: Patient and public engagement in health informatics</td>
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<td><strong>Exchange 4</strong> Panel: Towards developing a reference scheme for informatics recommendations:</td>
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<td>a TIGER, IFHIMA and AHIMA joint action</td>
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<td><strong>Exchange 5</strong> Paper session: Health outcomes and health services research</td>
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<td><strong>Conference Dinner – Manchester Cathedral</strong></td>
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## Programme

**Tuesday 25th April**

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<tr>
<th>Time</th>
<th>Exchange 6</th>
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<td>08:30</td>
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<tr>
<td>09:30</td>
<td><strong>Paper session</strong> Quality assessment and improvement</td>
<td><strong>Workshop</strong> Informing solutions to enable cross-centre research</td>
<td><strong>Paper session</strong> Children’s and adolescents’ health</td>
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<td>11:00</td>
<td><strong>Coffee break, Exchange Hall</strong></td>
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<tr>
<td>11:30</td>
<td><strong>Paper session</strong> Patient safety</td>
<td><strong>Panel</strong> Maximising ‘Depth of Field’ for health data</td>
<td><strong>Paper session</strong> Biosurveillance and population health monitoring</td>
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<tr>
<td>13:00</td>
<td><strong>Lunch and poster session, Exchange Hall</strong></td>
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<td>15:30</td>
<td><strong>Coffee break, Exchange Hall</strong></td>
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<tr>
<td>16:00</td>
<td><strong>Paper session</strong> Dashboards and feedback</td>
<td><strong>Panel</strong> Lost in translation? Scaling health informatics research across the Atlantic</td>
<td><strong>Paper session</strong> Clinical epidemiology</td>
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<tr>
<td>17:30</td>
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<td><strong>Science slam: Science in 8 minutes</strong></td>
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<tr>
<td>Time</td>
<td>Exchange 10</td>
<td>Demo Area 1</td>
<td>Demo Area 2</td>
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<td>08:30</td>
<td>Paper session</td>
<td>Demonstration</td>
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<td></td>
<td>Terminological systems</td>
<td>Virtual reality: visualising complex cohort study data in new dimensions</td>
<td>A HealthyR quick-start demonstration to healthcare data analysis</td>
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<tr>
<td>11:00</td>
<td>Coffee break, Exchange Hall</td>
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<td>Paper session</td>
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<td>Semantic technology and research objects</td>
<td>GP-ACT: A tool to improve the efficiency and reproducibility of research using primary care electronic health record databases</td>
<td>A HealthyR quick-start demonstration to healthcare data analysis</td>
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<tr>
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<td>Lunch and poster session, Exchange Hall</td>
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<tr>
<td>16:00</td>
<td>Paper session</td>
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<td>Text mining</td>
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<td>19:30</td>
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## Programme Wednesday 26th April

<table>
<thead>
<tr>
<th>Time</th>
<th>Exchange Auditorium</th>
<th>Exchange 1</th>
<th>Exchange 2</th>
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<tbody>
<tr>
<td>08:30</td>
<td><strong>Workshop</strong> EFMI working group on translational health informatics – emerging technological approaches for addressing translational medicine needs</td>
<td><strong>Paper session</strong> Linking health and social care</td>
<td><strong>Paper session</strong> Trials and big data</td>
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<tr>
<td>10:00</td>
<td><strong>Coffee break, Exchange Hall</strong></td>
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<tr>
<td>10:30</td>
<td><strong>Workshop</strong> IP commercialisation and exploitation from health informatics research</td>
<td><strong>Paper session</strong> Longitudinal and temporal data analysis</td>
<td><strong>Panel</strong> Informatics for suicide risk detection and prevention</td>
</tr>
<tr>
<td>12:00</td>
<td><strong>Keynote Plenary: Exchange Auditorium</strong> Crossing the river by feeling the stones Sally Okun, Vice President for Advocacy, Policy and Patient Safety, PatientsLikeMe</td>
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<td></td>
<td><strong>Closing Ceremony</strong></td>
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<td>13:30</td>
<td><strong>Lunch, Exchange Hall</strong></td>
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<td>Exchange 3</td>
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<tr>
<td><strong>Paper session</strong>&lt;br&gt;Diabetes and ageing</td>
<td><strong>Paper session</strong>&lt;br&gt;Barriers and facilitators of informatics interventions</td>
<td><strong>Paper session</strong>&lt;br&gt;Care pathways and data linkage</td>
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**Coffee break, Exchange Hall**

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<tr>
<th>Exchange 3</th>
<th>Exchange 4</th>
<th>Exchange 5</th>
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<tbody>
<tr>
<td><strong>Paper session</strong>&lt;br&gt;Design, co-design and development</td>
<td><strong>Workshop</strong>&lt;br&gt;Reinventing heuristic evaluations: exploring methods to engage clinicians in usability evaluations</td>
<td><strong>Workshop</strong>&lt;br&gt;Using patient-reported data for research and to improve health outcomes and services: identifying opportunities and challenges</td>
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**12:00**

**Lunch, Exchange Hall**

**13:30**

**Close**

**14:15**
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<th>Time</th>
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<tbody>
<tr>
<td>08:30</td>
<td>Panel</td>
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<td>Paper session</td>
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<td></td>
<td>Diversity in health informatics – Empowering women in health IT</td>
<td>Making the LHS a reality with data standards: what do we have and what do we need?</td>
<td>Population health and epidemiology</td>
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<td>Panel</td>
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<td>Paper session</td>
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<td>What does the public think about the commercial use of health data?</td>
<td>Connected Health Cities: creating learning health systems in North England</td>
<td>Diabetes and long-term conditions</td>
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<td>12:00</td>
<td>Lunch, Exchange Hall</td>
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Local data, better health
Developing learning health systems for patient benefit in Northern England

www.connectedhealthcities.org
@CHCNorth • #datasaveslives

Find out more at stand 17 in the exhibition
<table>
<thead>
<tr>
<th>Time</th>
<th>Location</th>
<th>Session/Activity</th>
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<tbody>
<tr>
<td>08:30</td>
<td>Exchange 10</td>
<td>Paper session: Text processing</td>
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<td>Demo Area 1 Exchange Hall</td>
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<td>10:30</td>
<td></td>
<td>Paper session: Natural language processing</td>
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<td>Demo Area 1 Exchange Hall</td>
<td>Demonstration: MUJO predictive analytics demonstration</td>
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<td>Demo Area 2 Exchange Hall</td>
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**ELIXIR Human Genomics and Translational Data**
*Store, discover, access, analyse and share data of multiple types and origin*

ELIXIR brings together experts from ELIXIR’s Nodes and external partners to develop a long-term management policy for human data.

For common complex disorders and rare diseases data ELIXIR provides:
- Sustainable infrastructure for the storage, coordination and distribution of human data
- Standardised tools to discover and securely access this data

*Visit us at booth 7 to learn more!*

(shader page)

**Accelerating innovations which will transform health and social care in Greater Manchester.**

*Health Innovation Manchester*

*Find us at Stand 8*

*Discovering | Developing | Delivering*

(shader page)
The Doctoral Symposium is an opportunity for PhD students from across Europe and further afield to explore their research interests and disseminate their research work in an interdisciplinary workshop under the guidance of senior academics.

The Symposium aims to:

- Provide a platform for PhD candidates to present their on-going work and receive feedback on participants current research and guidance on future research directions.
- Provide participants’ the opportunity to identify their existing skills and also future training needs through a wide ranging discussion on careers in data science.
- Explore the skills necessary to operate and build a data science team linked to the research environment.
- Promote the development and work of early career researchers.

The Doctoral Symposium is comprised of 14 longer in-depth research talks; three rapid fire talks and eight eposter presentations by PhD students from across Farr and EFMI communities. These are complemented by group activities to discuss further training requirements as they develop their career and exploration of how to build a data science environment and team for specified research. Please see the programme below.

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Chair/Lead</th>
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<tbody>
<tr>
<td>09.30-09.50</td>
<td>Introductions and ice-</td>
<td>George Moulton / Colin McCowan</td>
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<tr>
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<td>breaker</td>
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<tr>
<td>09.50 – 11.00</td>
<td>Talks</td>
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<tr>
<td>09.50-10.00</td>
<td>Harry Ahmed</td>
<td>Using linked electronic health records to understand</td>
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<td>Cardiff University</td>
<td>trends in incidence and antibiotic prescribing for</td>
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<td>urinary tract infection in older people</td>
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<tr>
<td>Time</td>
<td>Speaker</td>
<td>Institution</td>
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<tr>
<td>10.00-10.10</td>
<td>Samantha Crossfield</td>
<td>University of Leeds</td>
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<tr>
<td>10.10-10.20</td>
<td>Samantha Sykes</td>
<td>University of Leeds</td>
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<tr>
<td>10.20-10.30</td>
<td>Sarah Day</td>
<td>University of Strathclyde</td>
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<tr>
<td>10.30-10.40</td>
<td>Clair Gamble</td>
<td>University of Dundee</td>
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<tr>
<td>10.40-10.50</td>
<td>Alex Pate</td>
<td>The University of Manchester</td>
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<tr>
<td>10.50-11.00</td>
<td>Alex Marshall</td>
<td>University of Glasgow</td>
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<tr>
<td>11.00-11.30</td>
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<tr>
<td>11.30-11.45</td>
<td>Rapid-Fire Talks</td>
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<td>Glen Martin</td>
<td>The University of Manchester</td>
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<td>William Hulme</td>
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<td>Time</td>
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<td>11.40</td>
<td>Ben Brown</td>
<td>The University of Manchester</td>
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<td>11.45-12.05</td>
<td>Talks</td>
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<tr>
<td>11.45-11.55</td>
<td>Mohammad Al Sallakh</td>
<td>Swansea University</td>
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<tr>
<td>11.55-12.05</td>
<td>Tanja Mueller</td>
<td>University of Strathclyde</td>
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<td>12.05-12.15</td>
<td>Break</td>
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<tr>
<td>12.15-13.15</td>
<td>Group Session Part 1</td>
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<td>13.15-14.00</td>
<td>Lunch</td>
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<tr>
<td>14.00-15.00</td>
<td>Group Session Part 2</td>
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<tr>
<td>15.05-15.40</td>
<td>e-Poster presentations</td>
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<tr>
<td>15.05</td>
<td>Haifa Alradhi</td>
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<tr>
<td>15.09</td>
<td>Matea Deliu</td>
<td>The University of Manchester</td>
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<tr>
<td>15.13</td>
<td>Angelina Kuriati</td>
<td>University of Leeds and Telkonm University</td>
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<tr>
<td>Time</td>
<td>Name</td>
<td>Affiliation</td>
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<td>15.17</td>
<td>Guntur Kusuma</td>
<td>University of Leeds and Telkonm University</td>
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<td>15.21</td>
<td>Kristina Livitckaia</td>
<td>University of Thessaloniki</td>
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<tr>
<td>15.25</td>
<td>Athanasios Pavlopooulos</td>
<td>The University of Manchester</td>
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<td>15.29</td>
<td>Paolo Fraccaro</td>
<td>The University of Manchester</td>
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<tr>
<td>15.33</td>
<td>Bushra Javed</td>
<td>The University of Manchester</td>
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<tr>
<td>15.40</td>
<td>Coffee/Tea break</td>
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</tr>
<tr>
<td>16.00</td>
<td>Talks</td>
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<tr>
<td>16.00</td>
<td>Jan Gaebal</td>
<td>Universität Leipzig</td>
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<tr>
<td>16.10</td>
<td>Kirstin Leslie</td>
<td>University of Glasgow</td>
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<tr>
<td>16.20</td>
<td>Sarah Masefield</td>
<td>University of York</td>
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<tr>
<td>Time</td>
<td>Speaker and Affiliation</td>
<td>Topic</td>
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<tr>
<td>16.30-16.40</td>
<td>Nik Mohd Farid, University of Leeds</td>
<td>A case study on process mining in neonatal care: analysis and process modelling</td>
</tr>
<tr>
<td>16.40-16.50</td>
<td>Rachel Zhang, University of Glasgow</td>
<td>Linking hospital patient episodes for a suspected or established acute coronary syndrome in a complex secondary care system: a proof-of-concept e-registry in NHS Scotland</td>
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<tr>
<td>17.00-17.30</td>
<td>Feedback from Group Sessions</td>
<td>Feedback from Group Sessions, reviewing learning outcomes, wrap up</td>
</tr>
<tr>
<td>18.00 onwards</td>
<td>Tour of The Runaway Brewery, Manchester</td>
<td>Tour of The Runaway Brewery, including beer tasting and bar meals</td>
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</table>

2016 - 2018 Secretariat

UNIVERSITY OF CALGARY
O’Brien Institute for Public Health
www.obrieniph.ucalgary.ca

ICES
Data Discovery Better Health
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pre-conference tutorials

Saturday 22nd April 2017

09:30 - 13:00
Introduction to DataSHIELD
Brodick and Cawdor

Overview
DataSHIELD provides a novel technological solution that can circumvent some of the most basic challenges in facilitating the access of researchers and other healthcare professionals to individual level data. Although initially developed for work in the biomedical and social sciences, DataSHIELD can be used in any setting where microdata (data on individual subjects) must be analysed but cannot be physically shared with the research users.

DataSHIELD permits privacy-protected (disclosure-shielded) analysis of data from a single study, or from several sources/studies simultaneously without physically sharing or pooling the data. It can be used when data are particularly sensitive because of important governance constraints or concerns about losing control of intellectual property. It is a flexible, modular, free, open-source solution ideally placed to grow a broad user and development community. For more details on DataSHIELD please visit the website: www.datashield.ac.uk

Instructors
Professor Paul Burton, Professor of Data Science for Health, Newcastle University
Dr Rebecca Wilson, Data Scientist and Science Communicator, Data to Knowledge (D2K) research group, Newcastle University
Dr Demetris Avraam, Data Science Statistician, Data to Knowledge (D2K) research group, Newcastle University

Venue:
Doubletree by Hilton Manchester Piccadilly

09:30 - 13:00
Healthcare text analytics – analysing free-text health data
Inverary and Balmoral

Overview
Vast amounts of healthcare data is in free text (clinical notes, letters, prescription extraction, healthcare social media): harnessing that data space has potential to change, streamline and personalise service delivery. Typical examples include automated coding to a standard vocabulary (e.g. SNOMED CT or ICD-10) or identification of adverse events as reported in social media.
However, free text brings a number of challenges in identification of key clinical variables, including intense terminological variability and ambiguity. Healthcare text analytics provides technologies for automated, large-scale extraction of information from healthcare free-text.

**Instructors**

Dr Goran Nenadic, Reader in Text Analytics, The University of Manchester and The Farr Institute’s Health eResearch Centre (HeRC)

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**14:00 – 17:30**

**Sonification – a new method for representation of medical data. Adding sound to data? How? Come and see-hear!**

**Scone**

**Overview**

The term “sonification” is defined as “the use of non-speech audio to transform data into an acoustic signal, comprising “any technical solution necessary to obtain sound in response to data – medical data in our case”. Present permeation into medical field is still limited and had a reduced publicity. This tutorial will try to reveal the high potential of sonification to add valuable information in certain cases, which will be presented and discussed.

**Instructors**

Professor George Mihalas, Professor of Medical Informatics, Biophysics and Bioinformatics, The Victor Babeş University of Medicine and Pharmacy, Timișoara

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**14:00 – 17:30**

**Data provenance: Principles and why it matters for biomedical applications**

**Glamis**

**Overview**

Data provenance refers to information on past processes which produce and modify some data resource, e.g. analysis chart, result dataset, patient cohort. The Office of the National Coordinator (ONC) for Health IT describes it as “attributes about the origin of health information at the time it is first created and tracks the uses and permutations of the health information over its lifecycle.”

As the importance of computable data in scientific research increases so does the need to establish the veracity of that data. In this regard, in recent
years provenance has become highly sought-after as a type of metadata that can be used to infer data quality, trustworthiness or establish transparency of analytical processes therefore contributing to their reproducibility. Within the context of the Learning Health System (LHS), this reproducibility is seen as a means of achieving trust in the LHS, by exposing, in a standard form, information about clinical research and practice, e.g. the nature of data collection, evidence of the methods applied in producing scientific experiment conclusions, or adding transparency to decisions made by some clinical software on a user’s behalf.

In response to growing interest, informatics research is delivering models for representing data provenance as well as techniques for collecting, storing and querying this information. These techniques are studied for different computational platforms such as databases, command-line applications, scripting languages and web services. The existing know-how on provenance has accumulated to a degree that given the architectural and technological make-up of an application; we can prescribe ways to add provenance capabilities to it.

The take-up of provenance in user-domains has started with early prototypes and is currently moving to a phase, particularly in scientific domains, where provenance features are natively built into tools and applications, such as Scientific Workflow Engines, Digital Lab Notebooks, and certain Biological Data Repositories. In the context of medical research, data provenance is particularly attractive as a means of providing an automated audit trail to clinical trial management software and decision support systems.

**Instructors**

**Vasa Curcin,** Lecturer in Health, Division of Health and Social Care Research, King’s College London

**Pinar Alper,** Post-Doctoral Researcher, Division of Health and Social Care Research, King’s College London

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14:00 – 17:30

**mHealth: developing mobile applications for health**

**Brodick and Cawdor**

**Overview**

The potential for mobile applications to support better healthcare has been widely documented. The increasing affordability and accessibility of mobile devices coupled with their enhanced technical capacity has given rise to an expanding mHealth app marketplace. However, the processes involved in
taking an mHealth app from a clinically relevant idea to a widely usable and engaging app is often unclear to clinicians and/or health researchers. This tutorial will foster a mutually beneficial link between those with ideas about a clinical application for a mobile app, and those who have experience in designing and developing such apps across multiple health domains.

**Instructors**

**Dr Pauline Whelan,** mHealth Applications Manager, Health eResearch Centre, The University of Manchester

**Dr Lamiece Hassan,** Public Engagement and Involvement Manager, Health eResearch Centre, The University of Manchester

**Dr Demetris Avraam,** Data Science Statistician, Data to Knowledge (D2K) research group, Newcastle University

**Dr Sarah Fox,** Public Engagement and Involvement Research Officer, Health eResearch Centre, The University of Manchester

**Kathleen Haigh-Hutchinson,** Software Support Engineer, Health eResearch Centre, The University of Manchester

**Edward Tempest,** mHealth Software Developer, Health eResearch Centre, The University of Manchester

**Matt Machin,** mHealth Applications Manager, Health eResearch Centre, The University of Manchester

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**14:00 – 17:30**

*Multi-dimensional data visualisation techniques*

*Inverary and Balmoral*

**Overview**

How do you squeeze >>six dimensional data on a two dimensional piece of paper / screen?

As human beings, we are “taught” from a very young age to think at most in three spatial dimensions: width, height, depth. In a typical scatter plot setting, these three dimensions can be augmented with another three by modifying the size of the plot’s data markers, their colour and even the marker itself.
But the number of attributes in a typical application could be well exceeding six dimensions easily and in that case there seems to be no obvious way to fit them on a diagram.

Or is there?

The tutorial focuses on Principal Component Analysis, Multidimensional Scaling and Sammon Mapping techniques to reduce the dimensionality of a dataset but PRESERVE relative structure. The key concept in achieving this objective is that of “Distance” and “Space”.

Attendees will expand their notion of Cartesian space and typical three dimensional thinking to higher dimensions with the key objective of creating a mental picture of the shape of data.

The tutorial culminates with a Virtual Reality demonstration that immerses viewers in two different datasets and allows them to review large quantities of data at a glance.

**Instructors**

**Athanasios Anastasiou**, Lecturer in Health Data Science, Swansea University Medical School

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14:00 – 17:30

**Tips and tricks for your next digital health project: How to develop clinical content specifications and achieve interoperability**

**Atholl**

**Overview**

In this tutorial the audience will explore the eStandards clinical content development guideline and quality management system for interoperability testing. Real examples from the national context of Denmark, Norway, the UK, and Europe as a whole will be the topic of hand-on exercises.

The emerging data driven economy has a strong impact on health care. Precision medicine, population health, learning health systems are keywords that aim to capture the potential of using clinical data in healthcare for higher quality, access, and productivity in healthcare. However, for this promise to materialise, developing interoperable clinical content specifications and
standards of high quality is of paramount importance. eStandards (www.estandards-project.eu) has developed a guideline for clinical content development and a quality management system for interoperability testing. In a hands-on workshop the audience will explore the guideline through real examples from the national context of Denmark, Norway, the UK, and Europe as a whole.

eStandards is an initiative bringing together Standards Developing Organizations, competence centers, and healthcare experts with the vision of a global eHealth ecosystem where people (digital natives and immigrants) receive timely, safe and informed healthcare. Anywhere around the globe interoperability assets fuel creativity, entrepreneurship, and innovation. In this global ecosystem eStandards, standards for the digital age, nurture large-scale eHealth deployments and strengthen Europe’s voice and impact enable co-creation on a trusted provider-vendor dialogue on costs, plans, and great expectations.

Instructors
Dipak Kalra, President, EuroRec
Morten Bruun-Rasmussen, Senior Partner, MEDIQ
Philip Scott, Chair, HL7 UK and technical assurance lead for the Professional Records Standards Body (PRSB)
Catherine Chronaki, Scientific Coordinator, eStandards Project
Eirik Nikolai Arnesen, Physician, Norwegian Medical Association

14:00 – 15:30
Introduction to machine learning in health
Linlithgow

Overview
Analysing and identifying meaningful interpretations of big health data present a major challenge. Big Data refers to both the scale and complexity of this data, which is evident in the amplified scale of biological, genetic,
environmental, and phenotypic data. Such data provide the potential for “learning” patterns or predicting health outcomes and optimal treatment strategies based on prior information. The scale of these data often makes handling, management, and analysis challenging. This course presents an introduction to machine learning as a framework to develop models to understand data and evaluate predictive models within the healthcare domain.

**Instructors**

**Magnus Rattray**, Professor of Computational and Systems Biology, The University of Manchester and Director of The University of Manchester Data Science Institute

**Danielle Belgrave**, Research Fellow, Imperial College London

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**16:00 – 17:30**

**Process analytics for care pathways**

**Linlithgow**

**Overview**

Care pathway improvement is a key focus of attention in healthcare. In other industries, business process analytics has been well established for many decades but healthcare has lagged behind. Process Analytics approaches combine four sets of skills – process modelling, process simulation, workflow support and, more recently, process mining (the use of data mining technologies that use temporal data features to reconstruct generalised pathways). Informatics creates opportunities to develop new approaches to process analytics that directly address the unique nature of healthcare care pathways. Such work is novel in healthcare but ongoing research within the Connected Health Cities (CHC) programme is successfully applying process analytics methods to care pathways as diverse as musculoskeletal disease, diabetes, cancer, childhood obesity, A&E and frailty.

**Instructors**

**Owen Johnson**, Computer Scientist, Leeds Institute for Data Analytics (LIDA)
Overview
Therapeutic decision-making is a highly complex task. It frequently involves multiple experts from different domains. Large amounts of fragmented patient data, a multitude of clinical guidelines, and a vast number of clinical studies need to be considered. Furthermore, the information integration into a model is currently performed mentally by each expert in the course of therapeutic decision-making. Altogether, this leads to a series of problems such as incomplete models due to only partial access to data and limited temporal as well as cognitive facilities, biased models due to the different background and interest of each expert, and obviously, multiple different models that need to be communicated and interrelated in expert meetings. The most critical problem in therapeutic decision-making is the weighting of therapeutic options under consideration of the respective hypothetical patient outcome and the mental patient model.

Instructors
Alejandro F. Frangi, Professor of Biomedical Image Computing, University of Sheffield (USFD), Sheffield

Steffen Oeltze-Jafra, Head, Research group digital patient and process model at the Innovation Center Computer Assisted Surgery (ICCAS), University of Leipzig

Mario Cypko, Research Associate and PhD candidate, Research group digital patient and process model at the Innovation Center Computer Assisted Surgery (ICCAS), University of Leipzig
This tutorial explains the general principles of patient-reported outcome measures (PROMs). The focus is on generic measures, which are independent of the patient’s condition or treatment. We cover a broad scope including health status, wellbeing, health confidence and patient experience. Any project involves (1) selection of measures, (2) data collection workflow, (3) analysis, reporting and use of the results. The tutorial is structured around these three topics, using practical examples from our work in using PROMs to evaluate new care models.

**Instructor**

**Tim Benson**, Founder, R-Outcomes Ltd

This tutorial explains the general principles of health interoperability. It is organised into four sections: (1) Why interoperability is hard, (2) Digital identifiers and SNOMED CT, (3) Information models and HL7, (4) The next new thing, FHIR. The content is based substantially on the book: “Principles of Health Interoperability: SNOMED CT, HL7 and FHIR”, Springer 2016.

**Instructor**

**Tim Benson**, Founder, R-Outcomes Ltd
Practical techniques to incorporate human factors engineering into interactive health information technology development
Holyrood and Borthwick

Overview
Successful Health Information Technology (HIT) design requires a timely consideration of Human Factors, covering broadly the capabilities and limitations of all users at every stage of HIT development, along with the organizational and social aspects of the work system in which the HIT is intended to be implemented. The benefits of incorporating Human Factor Engineering (HFE) in HIT development are: increased productivity, improved acceptance by users, decreased risks of user errors and patient safety issues, reduced needs for user training and support. However, although those benefits are clear, to incorporate HFE within every stage of HIT development is not widely undertaken yet due to a lack of expertise, resources, and time during the development and design process. A practical approach which applies the main stages of HFE and acknowledges physical and cognitive characteristics related to HIT’s usage, is needed to facilitate implementing HFE during HIT development.

Instructors
Professor Dr Monique Jaspers, Full professor and Director of the Center for Human Factors Engineering of Health Information Technology (HIT-lab), University of Amsterdam

Dr Linda Peute, Assistant Professor in Human Factor methods in Health Informatics, Department of Medical Informatics at the Academic Medical Center of Amsterdam

Dr Romaric Marcilly, Researcher in Human Factors Principles and Design at INSERM CIC-IT 1403, Lille Academic Hospital.

Gaby Anne Wildenbos, Msc. MA, PhD Student in Human Factor Design of (mobile) health applications for patients, Academic Medical Center in Amsterdam
Fast Healthcare Interoperability Resources (FHIR®) from HL7® is now well established as an implementation standard of choice for interoperability requirements in healthcare. Globally, FHIR-based solutions have been developed and piloted for EHR, public health, Precision Medicine and genomics, BioPharma and basic research, mobile health and healthcare payers.

FHIR has rapidly been adopted by suppliers and care providers to lower the barriers to effective information sharing. FHIR is already being used in the UK for several regional and local implementations. NHS Digital is considering FHIR as its default option for new projects. INTEROPen is working to energise the supplier community to converge on common standards. The Professional Record Standards Body (PRSB) has brought together care practitioners from various disciplines to validate the content of FHIR profiles for the UK.

Familiarity with FHIR is becoming increasingly important both for frontline operational deployments and research projects that need secondary use of EHR data.

Instructors
Dr Philip Scott, Senior Lecturer in Information Systems, School of Computing, University of Portsmouth and Chair of HL7 UK

Ann Wrightson

11:30 - 13:00
Publishing connect workshop
Inverary and Balmoral

Learn more about authorship, ethics, and more in general how to navigate the journal publishing world.

Researchers, especially early in their career, are operating in an increasingly competitive and uncertain environment, while the role of researchers is
continuously developing. Among other challenges, researchers need to secure funding, collaborate internationally, share data, publish results, commercialise research and demonstrate impact.

With the Elsevier Publishing Campus, we want to give them the skills and knowledge they need to publish a world-class journal article or book proposal, write a successful grant application, and ultimately succeed on their chosen career path.

Elsevier has been offering its onsite training workshop programme called Publishing Connect for several years, educating around 35,000 researchers annually. To meet the growing demand for skills and publishing training, the Elsevier Publishing Campus also provides online versions of the Publishing Connect training material to researchers around the world.

14:00 – 17:30
Introduction to advanced types of predictive models for population health management
Scone

Overview
Healthcare systems around the world are beginning a major data and analytic transformation, analogous to the transformation the finance and telecommunication industries underwent during the 80s and 90s. As part of this evolution, the data that is becoming available to use for understanding and predicting patient health outcomes is evolving to become richer and more interoperable.

Instructors
Taylor R. Pressler, d-Wise Technologies
Overview
In recent years, health systems around the world have faced persistent challenges including the underutilization of necessary care, the overutilization of inappropriate care, rising costs, disparities in access to care, patient safety concerns, outdated public health infrastructures, and an oft-cited multi-year latency between bench and bedside. This well-documented state of the health of individuals and populations generates an imperative to improve human health, worldwide, through system-level innovations to address system-level problems. In addition, a rapidly growing health knowledge base, digital documentation of care delivery, a better understanding of how to inculcate behaviour that promotes health, and the interest of a trans-disciplinary scientific community support growing efforts to bring about learning health systems.

Instructors
Dr Charles P. Friedman, Josiah Macy Jr. Professor of Medical Education and Chair of the Department of Learning Health Sciences, University of Michigan Medical School

Dr Allen J. Flynn, Doctoral Candidate, University of Michigan School of Information

Overview
Healthcare systems cannot work without people. They require a robust supply of highly skilled and proficient eHealth/IT professionals to use, operate and maintain them. Unfortunately, there is a global shortage of skilled eHealth workers due to a variety of reasons.
The European Commission and United States have partnered to address the lack of skilled eHealth workers, along with interoperability of those eHealth systems, through a collaborative cooperation formed in 2010: The EU-US eHealth Cooperative Initiative. One of the ongoing work streams of this cooperative is eHealth Workforce Development, and a recently launched Horizon 2020 initiative called the EU*US eHealth Work Project.

The goal of the EU*US eHealth Work project, spanning 18 months, which began in Fall 2016, is to address this workforce shortage and lack of full access to eHealth skills and competence. We will use the following mechanisms to accomplish our goals:

- **Measuring**: mapping skills, competencies, and outcome models of eHealth, including performing a comprehensive survey of eHealth skills needs, patterns, trends and gaps within all EU states, and synthesis and harmonization of informatics competencies.

- **Informing**: providing access to knowledge tools, platforms, and resources to assess and improve eHealth skills including developing an interactive web platform for eHealth skills analysis and assessment.

- **Educating**: increasing eHealth educational and training opportunities, including developing foundational curriculum.

- **Advancing**: promoting knowledge and development in the field by strengthening, disseminating and exploiting success outcomes for a skilled Transatlantic eHealth workforce, including several stakeholder engagement events/conferences.

**Instructors**

**Rachelle Blake**, PA, CEO Omni Micro Systems und Omni Med Solutions GmbH, Hamburg, Germany and San Francisco USA, Adjunct Professor of Healthcare Information Technology, Renton Technical College, Renton, Washington, USA

**Ursula Hübner**, PhD, Professor of Medical and Health Informatics, Head Health Informatics Research Group, University AS Osnabrück, Osnabrück Germany

**Siobhan O’Connor**, B.Sc., CIMA CBA, B.Sc., RN, FHEA. School of Health and Social Care, Edinburgh Napier University, Edinburgh, UK

**Venue:**
Doubletree by Hilton Manchester Piccadilly
Evidence based health informatics: what is it, why do we need it now, and how do we achieve it?
Inverary and Balmoral

Overview
Evidence based health informatics (EBHI) is a new health informatics movement which aims to identify, test and share generic design principles for interactive health information systems for use by patients, professionals or the public. The aim of EBHI is to make these systems easier to develop, more usable, safer and more effective. EBHI is thus a solution to the many technology-led software projects we see in healthcare, will support system developers who fail to learn from previous work and addresses the impossibility of carrying out randomised trials of every version of every new app or other digital tool as these appear.

Instructors
Dr Jeremy Wyatt DM FRCP ACMI Fellow, Professor of Digital Healthcare and Director, Wessex Institute of Health, University of Southampton, UK
keynote speakers

Riccardo Bellazzi
Professor of Bioengineering and Biomedical Informatics, University of Pavia, Italy

Riccardo Bellazzi is Full Professor of Bioengineering and Biomedical Informatics at the Department of Electrical, Computer and Biomedical Engineering of the University of Pavia. Moreover, he is the Director of the Laboratory of Medical Informatics “Mario Stefanelli” and the chair of the PhD programme of Bioengineering and Bioinformatics, University of Pavia. He leads the Laboratory of Biomedical Informatics at the hospital “Salvatore Maugeri” in Pavia. Last year he also became the Chair of the Interdepartmental Centre for Health Technologies (CHT) of the University of Pavia.

Professor Bellazzi has a wide and internationally recognised research activity. His scientific interests are highly interdisciplinary and are aimed at applications of informatics to medicine and life sciences, comprising data mining, temporal data analysis, decision support and clinical research informatics. In 2009 he became a Fellow of the American College of Medical Informatics (ACMI), and he was Vice-President of the International Medical Informatics Association (IMIA) in the period 2011-2014.

Finally, he is co-founder of the academic spin-off Biomeris, which implements software to support clinical research and Engenome, which specialises in the analysis of Next Generation Sequencing data.

Frank van Harmelen
Professor of Knowledge Representation and Reasoning, Vrije Universiteit Amsterdam, The Netherlands

Frank van Harmelen is Professor in Knowledge Representation and Reasoning at the VU University Amsterdam. He is one of the co-designers of the W3C ontology representation language (OWL), and was involved in the design of Sesame, one of the most widely used RDF repositories worldwide. He is co-author of the Semantic Web Primer, the first textbook on Semantic Web technologies, now translated into five languages. He was scientific director of the Large Knowledge Collider (LarKC), which aimed to build a platform for very large scale distributed reasoning. Besides research into the fundamental questions such as inconsistency, scalability, heterogeneity, and dynamicity, he is also involved in a wide variety of applications of semantic technologies, among others in medicine, the pharmaceutical industry, scientific publishing and e-Science. His work on the Sesame triplestore received the ten year impact award of the International Semantic Web Conference, and he was elected member of the European Academy of Science in 2014.
keynote speakers

Susan Michie
Professor of Health Psychology, University College London, UK

Susan Michie is Professor of Health Psychology at University College London, UK. She studied Experimental Psychology at Oxford University, followed by Clinical Psychology at the Institute of Psychiatry, London University and a DPhil in Developmental Psychology. She is a chartered clinical and health psychologist, and elected Fellow of the Academy of Social Sciences, the US Society of Behavioural Medicine, the US Academy of Behavioural Medicine Research, the European Health Psychology Society and the British Psychological Society.

Professor Michie is Director of the Centre for Behaviour Change and of the Health Psychology Research Group at UCL. She leads an extensive programme of research developing the science of behaviour change interventions and applying that science to intervention development and evaluation. Areas of application focus on prevention of ill health and implementation of evidence-based practice. Methodological projects include the Wellcome Trust-funded Human Behaviour-Change Project and the MRC-funded Theory and Techniques project.

Sally Okun
Vice President for Advocacy, Policy and Patient Safety, PatientsLikeMe, USA

Sally Okun is Vice President for Advocacy, Policy and Patient Safety at PatientsLikeMe, an online patient powered research network. She is responsible for bringing patient voice and insight to diverse advocacy and policy discussions at national and global levels, and is the company's liaison with government and regulatory agencies. Sally joined the company in 2008 as the Manager of Health Data Integrity and Patient Safety overseeing the medical ontology and development of the Drug Safety Platform. She is a member of numerous advisory and expert panels. Sally, an RN palliative care specialist, received her Master's degree from The Heller School for Social Policy and Management, was a fellow at NLM Programme in Biomedical Informatics and a Salzburg Global Fellow.
scientific programme

Monday 24th April | Manchester Central

09:00 – 10:00 Opening Ceremony

Welcome address from the Local Organising Committee
Dr Niels Peek

Welcome to Manchester
Tony Lloyd, Interim Mayor for Greater Manchester

Welcome address from the European Federation for Medical Informatics
Professor Christian Lovis

Welcome address from The Farr Institute of Health Informatics Research
Professor Iain Buchan

Overview of scientific programme
Professor Colin McCowan and Dr Ronald Cornet

10:00 – 11:00 Keynote Plenary: The value of variety: methods, strategies and architectures to deal with the most intriguing “V” of biomedical big data

Riccardo Bellazzi, Professor of Bioengineering and Biomedical Informatics, University of Pavia, Italy

Biomedical research and clinical practice have become ‘data intensive’ fields in the last 20 years, thus giving biomedical informatics a progressively central role. A key aspect of biomedical data is represented by their variety, i.e. the diversity of data types available that require different knowledge and approaches to manage and interpret them. Being able to take advantage of variety can be a crucial enabling factor for translational and clinical research, as well as for the more effective care of patients. The talk will report some recent research efforts to deal with variety and discuss some experiences carried out at the University of Pavia, Italy, ranging from the definition of IT architectures and infrastructures to the design and implementation of novel data analytics algorithms, oriented to data integration and fusion.

11:00 – 11:30 Coffee break

Exchange Hall
**scientific programme**

**Monday 24th April | Manchester Central**

<table>
<thead>
<tr>
<th>11:30 – 12:30</th>
<th>Paper session: Global health</th>
<th>Exchange Auditorium</th>
</tr>
</thead>
<tbody>
<tr>
<td>11:30 – 11:45</td>
<td>Global eHealth, social business and citizen engagement</td>
<td>Liaw ST, Ray PK</td>
</tr>
<tr>
<td>11:45 – 12:00</td>
<td>Competency gap analysis in health information systems among health staff in a peri-urban health district in the Ashanti region of Ghana</td>
<td>Okyere Boadu R, Akosua Addy E, Agyei-Baffour P</td>
</tr>
<tr>
<td>12:00 – 12:15</td>
<td>Patients’ experiences of using a smartphone app for remote monitoring of rheumatoid arthritis, integrated into the electronic medical record, and its impact on consultations</td>
<td>Austin L, Sanders C, Dixon W</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>11:30 – 12:30</th>
<th>Paper session: Genome informatics</th>
<th>Exchange 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>11:30 – 11:45</td>
<td>Generation Scotland: genetic analysis of routine lab tests</td>
<td>Campbell A, Boekel L, Hayward C, Porteous D</td>
</tr>
<tr>
<td>11:45 – 12:00</td>
<td>Predicting the pathogenic impact of sequence variation in the human genome</td>
<td>Campbell C, Rogers M, Ferlaino M, Gaunt T, Shihab H</td>
</tr>
<tr>
<td>12:00 – 12:15</td>
<td>Learning healthcare system for the prescription of genetic testing of the gynaecological cancer risk</td>
<td>Suárez-Mejías C, Martínez-García A, Martinez MÁ, Silvan JM, Moreno J, Parra C</td>
</tr>
<tr>
<td>12:15 – 12:30</td>
<td>Use of National Health Service (NHS) electronic dental treatment records in dental public health genetics research</td>
<td>Bermingham M, Campbell A, Porteous D, Walls A</td>
</tr>
</tbody>
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<thead>
<tr>
<th>11:30 – 12:30</th>
<th>Paper session: Machine learning</th>
<th>Exchange 2</th>
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</thead>
<tbody>
<tr>
<td>11:30 – 11:45</td>
<td>A data-driven approach for identifying falls subgroups through semantic similarity analysis</td>
<td>Almohaimeed M, Ba-Dhfari T, Brass A</td>
</tr>
</tbody>
</table>
### Monday 24th April | Manchester Central

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>11:45 – 12:00</td>
<td>Exploratory clustering for patient subpopulation discovery</td>
<td>Gamberger D, Zenko B, Lavrac N</td>
</tr>
<tr>
<td>12:00 – 12:15</td>
<td>Understanding the true correlation between conditions using electronic health records and probabilistic programming</td>
<td>Rooney P, Ford E</td>
</tr>
<tr>
<td>12:15 – 12:30</td>
<td>Causal inference in observational clinical studies using Bayesian additive regression trees</td>
<td>Wendling T, Jung K, Shah N, Gallego Luxan B</td>
</tr>
</tbody>
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#### Paper session: Mobile and wearable health | Exchange 3

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>11:30 – 11:45</td>
<td>Design and validation of a platform to evaluate mHealth apps</td>
<td>Philpott D, Keshavjee K, Guergachi A</td>
</tr>
<tr>
<td>12:00 – 12:15</td>
<td>Multidimensional characterization of mobile apps for hearing health care by using the ALFA4Hearing (At-a-glance Labelling for Features of Apps for Hearing health care) model combined with data visualisation methods</td>
<td>Paglialonga A, Barbieri R, Malgara F, Rosati R, Pinciroli F, Tognola G</td>
</tr>
<tr>
<td>12:15 – 12:30</td>
<td>BrainLab – towards mobile brain research</td>
<td>Fink IB, Hankammer B, Stopinski T, Ramos R, Kutafina E, Bitsch Link JÁ, Jonas SM</td>
</tr>
</tbody>
</table>

#### Paper session: Education in health informatics | Exchange 4

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Authors</th>
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</thead>
<tbody>
<tr>
<td>11:30 – 12:30</td>
<td>Health informatics in the undergraduate medical curriculum: a survey of current practice</td>
<td>Walpole S, Banerjee A, Taylor P</td>
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<tr>
<td>11:30 – 11:45</td>
<td>Project PEACH at UCLH: student projects in healthcare computing</td>
<td>Taylor P, Mohamedally D, Ramachandran N</td>
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<tr>
<td>Time</td>
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<td>Authors</td>
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<tr>
<td>12:00 – 12:15</td>
<td>Monitoring of students’ interaction in online learning settings by structural network analysis and indicators</td>
<td>Ammenwerth E, Hackl W</td>
</tr>
<tr>
<td>11:30 – 12:30</td>
<td>Paper session: Decision support methods</td>
<td></td>
</tr>
<tr>
<td>11:30 – 11:45</td>
<td>Reasoning and data representation in a health and lifestyle support system</td>
<td>Hanke S, Kreiner K, Kropf J, Scase M, Gossy C</td>
</tr>
<tr>
<td>12:00 – 12:15</td>
<td>The development and implementation of a Stroke risk prediction model in National Health Insurance’s Personal Health Record</td>
<td>Cho K, Lee J</td>
</tr>
<tr>
<td>12:15 – 12:30</td>
<td>A method for estimating the risk associated with delaying initial treatment in breast cancer</td>
<td>Lenchner J, Wayua C</td>
</tr>
<tr>
<td>11:30 – 12:30</td>
<td>Paper session: Innovative information governance</td>
<td></td>
</tr>
<tr>
<td>11:30 – 11:45</td>
<td>Distributed ledgers and smart contracts for controlling data sharing in healthcare: a proof of concept implementation</td>
<td>Ainsworth J, Cunningham J</td>
</tr>
<tr>
<td>11:45 – 12:00</td>
<td>A lens for evaluating genetic information governance models: balancing equity, efficiency and sustainability</td>
<td>Skorve E, Vassilakopoulou P, Aanestad M, Grünfeld T</td>
</tr>
<tr>
<td>12:00 – 12:15</td>
<td>Business rules to improve secondary data use of electronic healthcare systems</td>
<td>Blaisure J, Ceusters W</td>
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</tbody>
</table>
## Scientific Programme

### Monday 24th April | Manchester Central

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Exchange</th>
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<tbody>
<tr>
<td><strong>11:30 – 12:30</strong></td>
<td><strong>Paper session: Pharmacoepidemiology</strong></td>
<td>7</td>
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<tr>
<td><strong>11:30 – 12:30</strong></td>
<td><strong>Paper session: Risk assessment and prediction</strong></td>
<td>9</td>
</tr>
<tr>
<td>11:30 – 11:45</td>
<td>Can we identify people with higher cancer risk who present at GP surgeries with T2D?&lt;br&gt;Badrick E, Lennon H, Sperrin M, van Staa T, Buchan I, Renehan A</td>
<td></td>
</tr>
<tr>
<td>11:45 – 12:00</td>
<td>Informatics in clinical practice: developing an approach to identify ‘at risk’ COPD patients using clinical records&lt;br&gt;Johnson M, Rigge L, Culliford D</td>
<td></td>
</tr>
<tr>
<td>12:15 – 12:30</td>
<td>Dermatology disease prediction based on two step cascade genetic algorithm optimization of ANFIS parameters&lt;br&gt;Avdagic A, Begic Fazlic L</td>
<td></td>
</tr>
</tbody>
</table>
In this focus group, IMO clinicians and informaticists will engage participants in discussion of the value of deriving structured data from unstructured content, and ways in which structured data can be used during acute care to drive clinical and financial decision making. We will look at ways in which the new IMO 2.0 Enhanced Terminology Platform (ETP) can be used as a trusted platform for developing innovations in clinical care, research and life sciences. Use cases will illustrate how coding clinical data with IMO allows users to group data by multiple reference and reimbursement code sets, “colorizing” the data to enable secondary use in analytics and other big data applications. We will show how IMO-enabled natural language processing (NLP) allows harvesting of the wealth of information in free text by automatically capturing and preserving clinical intent via the IMO code while mapping to reference and reimbursement codes.

Such data can be used to create intelligent problem lists that can be more readily curated and reconciled to produce high-value longitudinal data on each patient for population management applications. Other population health use cases will demonstrate how groupers can be used to streamline clinical workflow and facilitate risk stratification. We will also demonstrate use cases for revenue cycle management reporting for SNOMED, diagnosis-related groups (DRGs), and ICD-10, and discuss the importance of timely updates and the need for the synchronization between grouper content using the rules and dictionary content in the EHR. We will show how the new Fast Healthcare Interoperability Resource (FHIR) standard, coupled with terminology solutions, can play a
role in implementing and maintaining grouper solutions usable within clinical and non-clinical workflows.

**Presenter:**
Andrew S. Kanter, MD MPH FACMI
Chief Medical Officer
Intelligent Medical Objects, Inc.

### 14:00 – 15:30 Panel: Implementing eHealth systems in low-income countries

Low-income countries such as Rwanda, Kenya and Tanzania have been adopting a range of clinical eHealth systems in recent years. Many of these systems are funded by international donors and have been designed for collecting data on disease-targeted aid programmes. Others have been developed locally by IT companies and new eHealth start-ups, often in partnership with government and local authorities. This panel will discuss the experience of the panellists with implementing and evaluating eHealth solutions in East Africa with a focus on key lessons in overcoming technical, organisational and human barriers to successful adoption of new technologies.

- Dr Hamish Fraser; University of Leeds: OpenMRS Implementation in Rwanda
- Mathew Mndeme; University of Leeds: Clinical data collection for notifiable disease surveillance in Tanzania
- Dr Chris Paton; University of Oxford: Survey of eHealth Systems in Kenya

### 14:00 – 15:30 Paper session: Information retrieval

- **14:00 – 14:15** Towards a structured lexicon for the automated extraction of clinical audiology concepts from the multisource medical records of aged people with hearing disabilities

- **14:15 – 14:30** Querying EHRs with a semantic and entity-oriented query language
  Lelong R, Soualmia LF, Dahamna B, Griffon N, Darmoni S

- **14:30 – 14:45** Evaluation of the terminology coverage in the French corpus LiSSa
  Cabot C, Soualmia LF, Grosjean J, Griffon N, Darmoni S
### Monday 24th April | Manchester Central

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Presenters</th>
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</thead>
<tbody>
<tr>
<td>14:45 – 15:00</td>
<td>Linked data applications through ontology based data access in clinical research</td>
<td>Kock-Schoppenhauer AK, Kamann C, Ulrich H, Duhm-Harbeck P, Ingenerf J</td>
</tr>
<tr>
<td>15:15 – 15:30</td>
<td>Establishment of requirements and methodology for the development and implementation of GreyMatters, a memory clinic information system</td>
<td>Tapuria A, Matt E, Curcin V, Austin T, Lea N, Kalra D</td>
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<thead>
<tr>
<th>14:00 – 15:30</th>
<th><strong>Paper session: Predictive modelling</strong></th>
<th>Exchange 2</th>
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<tbody>
<tr>
<td>14:15 – 14:30</td>
<td>Predictive validity of measured obesity versus obesity ascertained from administrative health data for osteoporotic fractures</td>
<td>Lix L, Yang S, Yan L, Hinds A, Leslie W</td>
</tr>
<tr>
<td>14:30 – 14:45</td>
<td>Epidemiological models lacking process noise can be overconfident</td>
<td>Shpigelman L, Chorev M, Waks Z, Goldschmidt Y, Michael E</td>
</tr>
<tr>
<td>14:45 – 15:00</td>
<td>Disentangling prognostic and predictive biomarkers through mutual information</td>
<td>Sechidis K, Turner E, Metcalfe PD, Weatherall J, Brown G</td>
</tr>
<tr>
<td>15:00 – 15:15</td>
<td>Knowledge graph prediction of adverse drug reactions</td>
<td>Bean D, Wu H, Dzahini O, Dobson R</td>
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</tbody>
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<tr>
<th>14:00 – 15:30</th>
<th><strong>Paper session: Healthy ageing</strong></th>
<th>Exchange 3</th>
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</thead>
<tbody>
<tr>
<td>14:00 – 14:15</td>
<td>Community reports to capture older people’s views on health data</td>
<td>Taylor J, Tay T, Hassan L, Holmes K, van der Veer S</td>
</tr>
</tbody>
</table>
### Workshop: Developing a maximum framework for teaching nursing informatics internationally

Information technology systems in healthcare have resulted in transformation of work practices. Nurses need knowledge, skills, judgment and understanding of the importance of informatics from the commencement of their training. This interactive workshop will look at the development of a framework for common core content, teaching methodologies and programme structures in the integration of nursing informatics in undergraduate programmes. The workshop format will provide a forum for international discussion on this serious challenge faced by nursing schools everywhere.

The outcome of this workshop will be the development of a MAXIMUM framework that may be applied in teaching nursing informatics internationally.

Professor Inge Madsen; VIA University, Faculty of Health Sciences  
Paulette Lacroix; PC Lacroix Consulting  
Dr Paula Procter; Department of Nursing and Midwifery Faculty of Health and Wellbeing, Sheffield Hallam University  
Professor Elizabeth Borycki; University of Victoria
### Scientific Programme

**Monday 24th April | Manchester Central**

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Exchange 5</th>
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<tr>
<td>14:00 – 15:30</td>
<td><strong>Panel: Making it happen: Implementing new approaches to patient outcomes and clinical trials in the Northern Powerhouse: “Ensuring that patients are at the front and centre of the data revolution”</strong>&lt;br&gt;The Northern Powerhouse is home to some of the most innovative public and private collaborations in the country to connect and utilise patient data for better patient outcomes and more insightful clinical studies. This panel brings together representatives from industry and the clinical academic arena to outline how they are working together on implementing patient focused solutions to address the health outcome and economic challenges facing the North. This broad panel focuses on implementation approaches to a range of aspects concerned with clinical trials, patient monitoring and accessibility and use of patient data in an integrated health ecosystem.&lt;br&gt;Chair: Martin Gibson; North West eHealth&lt;br&gt;Mark Brincat; McLaren Applied Technologies&lt;br&gt;Sumit Nagpal; LumiraDx&lt;br&gt;Bruce Hellman; uMotif&lt;br&gt;Professor Derek Hill; IXICO</td>
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<tr>
<td>14:00 – 15:30</td>
<td><strong>Paper session: Security and privacy</strong></td>
<td>Exchange 6</td>
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<tr>
<td>14:00 – 14:15</td>
<td>Preventing unintended disclosure of personally identifiable data following anonymisation&lt;br&gt;Smith C</td>
<td></td>
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<tr>
<td>14:15 – 14:30</td>
<td>General public views on various uses and users of administrative health data in Ontario, Canada&lt;br&gt;Paprica PA, Nunes de Melo M, Schull M</td>
<td></td>
</tr>
<tr>
<td>14:30 – 14:45</td>
<td>Protecting privacy of genomic information&lt;br&gt;Delgado J, Llorente S, Naro D</td>
<td></td>
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<tr>
<td>14:45 – 15:00</td>
<td>Clinical data warehouse watermarking: impact on syndromic measure&lt;br&gt;Bouzille G, Pan W, Franco-Contreras J, Cuggia M, Coatrieux G</td>
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</tbody>
</table>
## Scientific Programme

**Monday 24th April | Manchester Central**

<table>
<thead>
<tr>
<th>Time</th>
<th>Session Title</th>
<th>Presenter(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15:00 – 15:15</td>
<td>Public attitudes to linkage and sharing of health data</td>
<td>Given J, Dolk H, Robinson G</td>
</tr>
<tr>
<td>14:00 – 15:30</td>
<td><strong>Workshop: Biomedical informatics: Far more than big data for research</strong></td>
<td>Exchange 7</td>
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<td></td>
<td>This workshop challenges the narrow UK view that informatics refers to the collection, management, analysis and combination of large, and often complex, datasets. We argue that, while big data offers part of the foundation for learning health systems, it is not the whole story. It is unwise to let research uses of big data dominate UK health informatics priorities at the expense of wider informatics issues. We propose that getting biomedical informatics right is more about people than it is about technology or data. As Coiera said, health informatics is “as much about computers as cardiology is about stethoscopes”.</td>
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<td>Dr Philip Scott; University of Portsmouth</td>
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<td>Professor Jeremy Wyatt; University of Southampton</td>
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<td></td>
<td>David Evans; British Computer Society</td>
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<td></td>
<td>Mome Mukherjee; University of Edinburgh</td>
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<td>Rachel Dunscombe; Salford Royal NHS Foundation Trust</td>
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<tr>
<td>14:00 – 15:30</td>
<td><strong>Paper session: Population health and clinical data resources</strong></td>
<td>Exchange 9</td>
</tr>
<tr>
<td>14:00 – 14:15</td>
<td>Designing the ASPREE Web Accessible Relational Database (AWARD) suite: turning clinical concepts into health data</td>
<td>Lockery JE, Collyer TA, Orchard SG, Woods RL, McNeil JJ</td>
</tr>
<tr>
<td>14:15 – 14:30</td>
<td>IntegrIT – towards utilizing the Swedish national health information exchange platform for clinical research</td>
<td>Hagglund M, Scott Duncan T, Kai-Larsen K, Hedlin G, Krakau I</td>
</tr>
<tr>
<td>Time</td>
<td>Session</td>
<td>Speaker(s)</td>
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<tr>
<td>14:30 – 14:45</td>
<td>The safe share project, and forthcoming service for research with sensitive data</td>
<td>Teague M</td>
</tr>
<tr>
<td>14:45 – 15:00</td>
<td>Use of a nationwide personally controlled electronic health record by healthcare professionals and patients: a case study with the French DMP</td>
<td>Seroussi B, Bouaud J</td>
</tr>
<tr>
<td>15:00 – 15:15</td>
<td>Design, implementation and operation of a reading centre platform for clinical studies</td>
<td>Clin L, Leitritz MA, Dietter J, Dynowski M, Burgert O, Ueffing M, Thies C</td>
</tr>
</tbody>
</table>

### Paper session: Information modelling

<table>
<thead>
<tr>
<th>Time</th>
<th>Paper session</th>
<th>Speaker(s)</th>
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<tbody>
<tr>
<td>14:00 – 15:30</td>
<td>HEMIC project: design of a clinical information modelling tool based on ISO13972 technical specification</td>
<td>Moreno Conde A, Sanchez-Laguna F, Marin Bastida B, Romero Tabares A, Martín Sanchez EM, Kalra D, Parra C</td>
</tr>
<tr>
<td>14:15 – 15:00</td>
<td>Evaluating openEHR for defining machine-readable electronic health record phenotypes: lessons from the CALIBER resource</td>
<td>Papez V, Denaxas S</td>
</tr>
<tr>
<td>14:30 – 15:15</td>
<td>Reference architecture model enabling standards interoperability</td>
<td>Blobel B, Kalra D</td>
</tr>
<tr>
<td>14:45 – 15:00</td>
<td>Querying archetype-based Electronic Health Records using Hadoop and Dewey encoding of openEHR models</td>
<td>Sundvall E, Wei-Kleiner F, Freire SM, Lambrix P</td>
</tr>
<tr>
<td>15:00 – 15:15</td>
<td>Combining archetypes, ontologies and formalization enables automated computation of quality indicators</td>
<td>Legaz-Garcia Md, Dentler K, Fernandez-Breis JT, Cornet R</td>
</tr>
</tbody>
</table>
### Demonstration: TRANSFoRm platform for collecting patient reported outcome measures in clinical trials

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Location</th>
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<tbody>
<tr>
<td>14:00 – 15:30</td>
<td>Demonstration: TRANSFoRm platform for collecting patient reported outcome measures in clinical trials</td>
<td>Demo Area 1 Exchange Hall</td>
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</table>

The TRANSFoRm PROM technology is based on the CDISC SDM and ODM (Study and Operational Data Model) XML-based standards, that are a part of the CDISC Data Exchange structure.

In this demonstration, we shall be focusing on how a mobile data collection can be defined in a TRANSFoRm study, using CDISC standards and deployed to the mobile application via the Study System. We shall then demonstrate the task of patient logging in through the app, or the website to fill in the PROMs, and passing them through a simulated RCT process.

Dr Samhar Mahmoud; King's College London

### Demonstration: WISH: Web improvement support in healthcare

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<tr>
<th>Time</th>
<th>Event</th>
<th>Location</th>
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<tbody>
<tr>
<td>14:00 – 15:30</td>
<td>Demonstration: WISH: Web improvement support in healthcare</td>
<td>Demo Area 2 Exchange Hall</td>
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</table>

This session is targeted at quality improvement teams in a healthcare setting, with the following aims:

- Introduce the role of continuous data collection and analysis in improvement projects.
- Recognise the need for bespoke data collections and tailored measurement to support improvements.
- Understand key facilitators and barriers to successful measurement in an improvement project.
- Appreciate how measurement fits into and supports a broader quality improvement approach.
- Review WISH features supporting these goals, from design stage, via implementation, showing the model details and authoring tooling available, to deployment into the live system.

Dr Vasa Curcin; King’s College London  
Dr Thomas Woodcock; Imperial College London  
Dr Alan Poots; Imperial College London  
Professor Derek Bell; Imperial College London
## scientific programme

### Monday 24th April | Manchester Central

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Location</th>
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<tbody>
<tr>
<td>15:30 – 16:00</td>
<td>Coffee break</td>
<td>Exchange Hall</td>
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<tr>
<td>16:00 – 17:30</td>
<td>Paper session: Data integration</td>
<td>Exchange 1</td>
</tr>
<tr>
<td>16:00 – 16:15</td>
<td>Switching medical terminologies should be easy</td>
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<td></td>
<td>Liang SF, Porat T, Tapuria A, Ethier JF, Delaney B, Curcin V</td>
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<tr>
<td>16:15 – 16:30</td>
<td>Introducing a method for transformation of paper-based research data</td>
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<td>into concept-based representation with openEHR</td>
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<td></td>
<td>Saalfeld B, Tute E, Wolf KH, Marschollek M</td>
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<tr>
<td>16:30 – 16:45</td>
<td>The ‘PEARL’ data warehouse: initial challenges faced with semantic and</td>
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<td></td>
<td>syntactic interoperability</td>
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<td></td>
<td>B, Macleod J</td>
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<tr>
<td>16:45 – 17:00</td>
<td>Combining different privacy-preserving record linkage methods for</td>
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<td></td>
<td>hospital admission data</td>
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<td></td>
<td>Stausberg J, Waldenburger A, Borgs C, Schnell R</td>
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<tr>
<td>17:00 – 17:15</td>
<td>Utilising identifier error variation in linkage of large administrative</td>
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<td>data sources</td>
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<td>Harron K, Hagger-Johnson G, Gilbert R, Goldstein H</td>
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<tr>
<td>17:15 – 17:30</td>
<td>Results from a linkage consent campaign: do respondents differ from</td>
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<td>non-respondents and do consenters differ from non-consenters?</td>
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<td></td>
<td>Johnson L, Boyd A, Cornish R, Macleod J</td>
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<tr>
<td>16:00 – 17:30</td>
<td>Workshop: Process analytics for care pathways</td>
<td>Exchange 2</td>
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<tr>
<td></td>
<td>Delegates attending this session will need to bring a laptop.</td>
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<tr>
<td></td>
<td>Care pathway improvement is a key focus of attention in healthcare.</td>
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<td>Pathways can be analysed as business processes and well established</td>
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<td>methods are available. This workshop focuses on Process Analytics.</td>
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</table>
3. Workflow support.

4. And, more recently, process mining – data mining of temporal data features to reconstruct generalised pathways. Informatics creates opportunities to develop new approaches to process analytics that directly address the unique nature of healthcare care pathways. The workshop will use a hands-on case study and a range of examples of recent work in diabetes, cancer, childhood obesity, A&E and frailty.

Delegates will model a care pathway through a PostIt note exercise, use this to create a pathway simulation model using the NETIMIS simulation tool (www.netimis.co.uk) and create a simulated event log for a process mining exercise.

Owen Johnson; Leeds Institute for Data Analytics, University of Leeds

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### Workshop: Longitudinal mHealth studies – maximising recruitment and understanding attrition

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
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<tbody>
<tr>
<td>16:00 – 17:30</td>
<td>Seven in ten people now own a smartphone, which provides major opportunities for health research. Smartphone applications, however, typically have poor sustained engagement, possibly leading to high dropout rates when used for research. It is therefore important to employ strategies that engage recruited participants. The organisers will share experiences in recruiting and engaging participants, gained during the study Cloudy with a Chance of Pain. This is an innovative population smartphone study to investigate the association between the weather and symptoms in people with arthritis and other chronic pain. Over 13,000 participants have been recruited since January 2016, amassing over four million symptom scores.</td>
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**Exchange 3**

Professor Will Dixon; Arthritis Research UK Centre for Epidemiology, The University of Manchester
Dr Caroline Sanders; Centre for Primary Care, The University of Manchester
Anna Beukenhorst; Arthritis Research UK Centre for Epidemiology, The University of Manchester
Dr Jamie Sergeant; Arthritis Research UK Centre for Epidemiology, The University of Manchester
scientific programme

Monday 24th April | Manchester Central

<table>
<thead>
<tr>
<th>16:00 – 17:30</th>
<th>Paper session: Supporting education for health professionals</th>
<th>Exchange 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>16:00 – 16:15</td>
<td>Use and adaptation of open source software for capacity building to strengthen health research in low – and middle-income countries Hochwarter S, Atkins S, Diwan VK, Zary N</td>
<td></td>
</tr>
<tr>
<td>16:30 – 16:45</td>
<td>Connecting the links: narratives, simulation and serious games in pre-hospital training Heldal I, Backlund P, Johannesson M, Lebram M, Lundberg L</td>
<td></td>
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<tr>
<td>16:45 – 17:00</td>
<td>Designing an e-learning platform for postoperative arthroplasty adverse events Krumsvik OA, Babic A</td>
<td></td>
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<tr>
<td>17:00 – 17:15</td>
<td>Understanding the context of learning in an online social network for health professionals' informal learning Li X, Gray K, Verspoor K, Barnett S</td>
<td></td>
</tr>
<tr>
<td>17:15 – 17:30</td>
<td>Ubiquitous adoption of innovative and supportive information and communications technology across health and social care needs education for clinicians Procter P</td>
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<thead>
<tr>
<th>16:00 – 17:30</th>
<th>Workshop: Medication reconciliation – time to rethink informatics support?</th>
<th>Exchange 5</th>
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<tbody>
<tr>
<td>16:00 – 17:30</td>
<td>When a patient sees many providers, information flow or transfers between health facilities is challenging. Lack of updated and correct medication information is a key concern for patient safety during a health and illness trajectory. Errors, near misses and adverse medication events are too common, particularly at transfers between hospitals, nursing homes and home, or if seeing many specialties. Lack of adequate informatics support can be harmful to a person's health, leading to suffering, increased use of health care resources and increased costs. We combine practical, experiential and research insights to unpack the chain of activities in medication management and reconciliation.</td>
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</table>
Workshop: EFMI WG SSE 2017: security and privacy standardisation in healthcare – impact on patients’ new roles

The EFMI Working Group (WG) on Security, Safety and Ethics (SSE) organizes this workshop, whose topic will go around standards and related initiatives on security and privacy in healthcare and will focus on their connection to patients’ security, taking into account the clear current trend towards patient empowerment.

Before a discussion session, the workshop will include four presentations:

- Information Security Management Standardisation (ISO 27000 family) related to healthcare
- Security issues in the use of the HSSP approach in EHR Management
- Representation of patients’ policies
- Secure access and download of patients’ clinical documents

Panel: Learning population health systems: The role of local whole population linked datasets

Learning population health systems (LPHS) take concepts developed to describe learning healthcare systems and apply them to whole populations.
We will provide a general introduction to the concept of a LPHS, describe theoretical aspects of such systems which help to explain their development, and practical challenges to their implementation such as workforce. We will demonstrate the importance of emerging local whole population multi-sector data platforms to support LPHS by showcasing the ways in which such platforms are currently being used to improve the health of local populations in different parts of England.

Dr Julie George; Surrey County Council and UCL (Panel chair): Introduction to a Learning Population Health System
Professor Iain Buchan; The University of Manchester: Tests of maturity for a Learning Population Health System
Dr Martin Bardsley; The Health Foundation and Nuffield Trust: Developing the workforce to deliver a Learning Population Health System
Dr Sarah Dougan; Camden and Islington Local Authorities: Using local linked data to deliver localised intelligence across the health and care system
Professor John Ainsworth; The University of Manchester: Civic Partnerships and the Diameter of Trust
Dr Abraham George; Kent County Council: System modelling to inform service reconfiguration: Using local linked data to inform service change

Panel: Making a difference together: How can public involvement improve the relevance, acceptability, quality and impact of health informatics research?

In the UK, public involvement in research is defined as research conducted ‘with’ or ‘by’ members of the public, rather than ‘to’, ‘about’ or ‘for’ them. This panel will review approaches to developing meaningful collaborations with patients, carers and members of the public to improve health informatics research.

Researchers will present alongside public contributors to describe methods, challenges, impact and lessons learned within their projects. The audience will then be invited to join in discussions to explore how collaborative ways of working may be fostered to improve the quality, relevance, acceptability and impact of health informatics research.

Chair: Dr Lamiece Hassan; The University of Manchester
Chair: Rob Finnigan; The University of Manchester
Dr Lynn Austin and Karen Staniland; The University of Manchester: Codesigning research into remote monitoring of patient reported outcomes in rheumatoid arthritis

Dr Chris Gale and Sophia Kotzamanis; Imperial College London: Involving parents in the neonatal care and research in the Better Use of Data to improve parent Satisfaction (BUDS) project

Dr Paolo Fraccaro and Rob Finnigan; The University of Manchester: Involving patients in research to enhance online patient portals for managing chronic kidney disease

Dr Ann John; Swansea University: Public involvement in data linkage research into young people’s mental health

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**16:00 – 17:30**  
**Paper session: Ontologies and health information exchange**

<table>
<thead>
<tr>
<th>Time</th>
<th>Session Title</th>
<th>Presenters</th>
</tr>
</thead>
<tbody>
<tr>
<td>16:00 – 16:15</td>
<td>Preliminary analysis of the OBO Foundry ontologies and their evolution using OQuaRE</td>
<td>Quesada M, Duque-Ramos A, Iniesta-Moreno M, Fernandez-Breis JT</td>
</tr>
<tr>
<td>16:15 – 16:30</td>
<td>Ontological realism for the research domain criteria for mental disorders</td>
<td>Ceusters W, Jensen M, Diehl A</td>
</tr>
<tr>
<td>16:30 – 16:45</td>
<td>Bridging the semantic gap between diagnostic histopathology and image analysis</td>
<td>Traore L, Kergosien Y, Racoceanu D</td>
</tr>
<tr>
<td>16:45 – 17:00</td>
<td>The BioTop family of biomedical upper level ontologies</td>
<td>Schulz S, Martínez-Costa C, Boeker M</td>
</tr>
<tr>
<td>17:00 – 17:15</td>
<td>Building SNOMED CT post-coordinated expressions from annotation groups</td>
<td>Minarro-Gimenez JA, Martínez-Costa C, López-García P, Schulz S</td>
</tr>
<tr>
<td>17:15 – 17:30</td>
<td>Adoption and level of use of health information exchange in the province of Québec, Canada</td>
<td>Motulsky A, Weir D, Girard N, Sicotte C, Gagnon MP, Buckeridge DL, Tamblyn R</td>
</tr>
</tbody>
</table>
Demonstration: Safety modelling, assurance and reporting toolset (SMART) for digital health

SMART was developed jointly by the University of York and NHS Digital, in order to help clinicians and engineers construct a clear and compelling safety case for digital health interventions. SMART helps integrate the design of the technology, the modelling of the care setting and the safety analysis evidence in a self-contained and partially-automated assurance environment. As part of the process of developing and evolving the safety case, SMART prompts users to provide the rationale behind their risk-based decisions. A prototype of SMART is currently being evaluated against different national and local systems, including mobile health apps.

Ibrahim Habli; University of York
George Gabriel; University of York
Hannah McCann; NHS Digital, Leeds
Sean White; NHS Digital, Leeds

Demonstration: The Knowledge Grid platform supporting a knowledge-to-practice service for learning health systems

The Knowledge Grid knowledge management and deployment platform for learning health systems will be demonstrated. Key components of the Knowledge Grid to be shown include:

- Digital knowledge objects holding machine-interpretable knowledge payloads

- A digital library to store, manage, and enable corroboration of knowledge objects

- Knowledge object payload execution stacks to connect machine-interpretable knowledge directly to practice via webservices

- Health IT client application exemplars that make use of knowledge objects
As infrastructure, the Knowledge Grid has the potential to facilitate widespread implementation of lessons learned within sociotechnical learning health systems.

Dr Allen Flynn; University of Michigan
Dr Charles P. Friedman; University of Michigan

17:30 – 19:30 Welcome reception and poster session
Exchange Hall

Professor Dame Nancy Rothwell
President and Vice Chancellor, The University of Manchester

Tuesday 25th April | Manchester Central

08:30 – 09:30 Keynote Plenary: Machine learning meets behavioural science: the human behaviour-change project
Exchange Auditorium

Susan Michie, Professor of Health Psychology, University College London, UK

Behaviour change is essential if major health problems such as obesity and cancer are to be tackled. Evidence is needed by researchers, policy-makers and practitioners about intervention effectiveness across contexts, and about mechanisms of action. Such evidence is currently produced on a vast but fragmented scale and more rapidly than humans can synthesise and access. Computers have the capacity and speed to do this task but cannot access unstructured information in reports directly. Progress in this area requires a collaboration between computer and behavioural scientists to develop a knowledge structure (‘ontology’) and apply it to the evidence, and requires information science to support the curation and access of evidence.

The Human Behaviour Change Project brings together behavioural, computer and information scientists to build an Artificial Intelligence system to continually scan the world literature on behaviour change, extract key information and use this to build and update the scientific understanding of human behaviour to answer variants of the ‘big question’.
'What works, compared with what, how well, for whom, in what settings, for what behaviours, for how long and why?’

The project involves an iterative process including:

1. Develop an ontology (structure for organising knowledge) of features of behaviour change intervention evaluations using a consensus process with international experts.

2. Annotate published literature using the ontology.

3. Build an automated feature extraction system.

4. Build a Machine Learning and Reasoning system to synthesise evidence.

5. Develop an interactive user interface to interrogate and update the knowledge system created.

The project builds on taxonomies of behaviour change already developed, and existing ontologies (e.g. the Cochrane PICO ontology) and feature extraction systems (e.g. EPPI-Reviewer). It will focus initially on the use-case of smoking cessation but the project team will make available resources, products and findings throughout the life of the project to encourage collaboration.
Tuesday 25th April | Manchester Central

10:00 – 10:15
Serotonin reuptake inhibitor use and mortality in epilepsy: findings from a contemporary linked electronic health records cohort study

10:15 – 10:30
Herbert A, Abel G, Johnson S, Lyratzopoulos G

10:30 – 10:45
Adversity and risk of poor birth and infant outcomes for young mothers: a population-based data linkage cohort study
Harron K, Gilbert R, Oddie S, Cromwell D, van der Meulen J

10:45 – 11:00
A standardised and data quality assessed maternal-child care integrated data repository for research and monitoring of best practices: a pilot project in Spain

09:30 – 11:00
Paper session: Data quality assessment methods

09:30 – 09:45
Web validation service for ensuring the quality of medical imaging data
Silva JM, Marques Godinho T, Silva D, Costa C

09:45 – 10:00
An automated technique for assessing inpatient administrative health data quality – development and validation
Peng M, Quan H, Williamson T

10:00 – 10:15
Misclassification of glucocorticoid use within UK primary care electronic health records
Joseph R, van Staa T, Abrahamowicz M, Dixon W

10:15 – 10:30
Development of a data quality taxonomy: case study with an anaesthesia database
Lamer A, Degoul S, Périchon R, Soula J, Marcilley R
Free text remains the main means of communication within healthcare, with its written accounts becoming increasingly available in an electronic form. The capacity to effectively utilise free text to extract evidence to support clinical practice and epidemiological research is lagging behind structured and coded information, while arguably it contains the vast majority of actionable information. The workshop will bring together representatives of several European networks to identify and discuss key opportunities and challenges in clinical text analytics, focusing on technical, ethical and legal barriers and unmet needs across Europe, and aligning those with other efforts in healthcare sciences.

Dr Goran Nenadic; The University of Manchester, Health eResearch Centre, Farr Institute
Professor Robert Stewart; King’s College London
Dr Johannes Starlinger; Humboldt-Universität zu Berlin
Dr Sumithra Velupillai; KTH

With the ability to combine passively and actively collected health information, wearable and smartphone technologies present the possibility to revolutionise how we understand and manage health.

Our chosen panel will provide a dynamic insight into the application of mHealth and wearable technology in the field of Dementias and mental health, highlighting current studies, cutting edge new technology and patient benefits along with discussion into linking this through to routine health data.

Chair: Charlotte Stockton-Powdrell; The University of Manchester

Professor Shôn Lewis; The University of Manchester: ClinTouch – Digital self-management and early intervention for people with psychosis; randomised controlled evidence.
09:30 – 11:00

**Workshop: Activating and motivating students in online courses of health informatics**

Online learning offers many advantages such as self-directed and self-paced learning as well as learning “anywhere” and “anytime”. However, online learning also poses several challenges such as time management and self-discipline. The online teacher thus has to carefully plan how to activate and motivate the students, to facilitate learning and retention.

In this workshop, we will discuss frameworks and techniques from the field of instructional design to activate and motivate students in online courses. We will draw both from literature as well as from own experiences in conducting online courses in health informatics at three European universities.

Professor Elske Ammenwerth, UMIT; University for Health Sciences, Medical Informatics and Technology
Professor Nicolet de Keizer; Academic Medical Center, Amsterdam
Professor Sabine Koch; Karolinska Institute
### Paper session: Clinical decision support systems

**09:30 – 09:45**  
Clinical decision support for diabetes in Scotland: evaluation of clinical processes and outcomes  
Conway N, Cunningham S, Wales A, Wake D

**09:45 – 10:00**  
A protocol for integrating between decision support systems and electronic health records  
Mahmoud S, Curcin V, Corrigan D, Delaney B

**10:00 – 10:15**  
Using the MRC framework for complex interventions to develop clinical decision support: a case study  
Dowding D, Lichtner V, Closs J

**10:15 – 10:30**  
A decision support system for cardiac disease diagnosis based on machine learning methods  
Gharehbaghi A, Lindén M, Babic A

**10:30 – 10:45**  
Severity summarization and just in time alert computation in mhealth monitoring  
Pathinarupothi RK, Alangot B, Rangan E

### Paper session: Quality assessment and improvement

**09:30 – 09:45**  
Validation and psychometric analysis of a questionnaire for measuring teleconsultation services quality from the patients’ perspective  
Tensen E, Thijssing L, Jaspers M

**09:45 – 10:00**  
Evaluation approach for the diabetes digital coach NHS testbed project  

**10:00 – 10:15**  
National therapeutic indicators for Scotland – a retrospective analysis (NTIS – RA)  
MacBride-Stewart S, Marwick C, Hurding S, Guthrie B
Using informatics to improve the quality of kidney disease management in primary care
Xu G, Major R, Shepherd D, Brunskill N

Square² – A web application for data monitoring in epidemiological and clinical studies
Schmidt CO, Krabbe C, Schössow J, Albers M, Henke J, Radke D

Exploring the notion of hazards for health IT
Habli I, White S, Harrison S, Pujara M

The session will focus on challenges and approaches in cross-centre research using anonymised person-based data in safe havens to inform solutions so that such research can take place safely. It invites an international group of multidisciplinary participants to come together for an opportunity to contribute their expertise to the discussion on the barriers, pitfalls, drivers and examples of good practice in cross-centre research.

If you want to participate in this workshop, please share examples from your own experience with the organisers:

- Experiences of successful or attempted cross-centre research
- Challenges, barriers and pitfalls in cross-centre research
- Drivers for cross-centre research – who/what makes it happen?
- Examples of good practice in cross-centre research

Please send this to Kerina Jones, k.h.jones@swansea.ac.uk, in advance of the workshop.

Dr Kerina Jones, Swansea University
Sharon Heys, Swansea University
Dr Helen Daniels, Swansea University
### Scientific Programme

**Tuesday 25th April | Manchester Central**

#### Paper session: Children’s and adolescents’ health

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Authors</th>
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</thead>
<tbody>
<tr>
<td>09:30 – 09:45</td>
<td>The prevalence of adverse childhood experiences in the general population of Scottish children in the first eight years of life: identification through a birth cohort study</td>
<td>Marryat L, Frank J</td>
</tr>
<tr>
<td>09:45 – 10:00</td>
<td>Disparities in the prevalence of autism spectrum disorder in Western Australia: opportunities for intervention in Aboriginal children and all children from regional and remote areas</td>
<td>Fairthorne J, Leonard H, Bourke J, de Klerk N, Whitehouse A, Shepherd C</td>
</tr>
<tr>
<td>10:15 – 10:30</td>
<td>Investigating educational attainment at age 16yrs in adolescents who are looked after or in need using record linkage and a birth cohort study</td>
<td>Teyhan A, Boyd A, Macleod J</td>
</tr>
<tr>
<td>10:30 – 10:45</td>
<td>Towards safe and efficient child primary care – gaps in the use of unique identifiers in Europe</td>
<td>Kühne G, Rigby MJ, Majeed A, Blair ME</td>
</tr>
<tr>
<td>10:45 – 11:00</td>
<td>Why are children’s interests invisible in European national eHealth strategies?</td>
<td>Kühne G, Rigby MJ, Majeed A, Blair ME</td>
</tr>
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</table>

#### Paper session: Terminological systems

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>09:30 – 09:45</td>
<td>Clinical code set management: A review of methods reported in the literature</td>
<td>Williams R, Kontopantelis E, Buchan I, Peek N</td>
</tr>
<tr>
<td>09:45 – 10:00</td>
<td>HL7 FHIR: ontological reinterpretation of medication resources</td>
<td>Martínez-Costa C, Schulz S</td>
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<td>Time</td>
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<tr>
<td>10:00 – 10:15</td>
<td>Communication of child symptoms in emergency: classification of the terminology&lt;br&gt;Rochat J, Siebert J, Galetto A, Lovis C, Ehrler F</td>
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<tr>
<td>10:30 – 10:45</td>
<td>Piloting a collaborative web-based system for testing ICD-11&lt;br&gt;Donada M, Kostanjsek N, Della Mea V, Celik C, Jakob R</td>
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</tbody>
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**Demonstration: Virtual reality: Visualising complex cohort study data in new dimensions**

Collaborating with industry partners in computer games development (Masters of Pie and Lumacode) we have developed virtual reality (VR) software for visual analytics. We demonstrate the prototype using simulated data from the ALSPAC birth cohort, showing the capability to explore, visualise and analyse such complex datasets by exploiting the multidimensionality of the VR environment. We envisage such software could be used flexibly by: researchers as a data exploration or training tool; cohort participants as an engagement mechanism and by the public for engagement with public health issues.

Dr Becca Wilson; Newcastle University  
Dr Demetris Avraam; Newcastle University  
Dr Olly Butters; Newcastle University  
Hugh Garner; MRC Integrated Epidemiology Unit  
Professor Paul Burton; Newcastle University

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
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| 11:00 – 11:30 | Coffee break  

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<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Location</th>
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</thead>
<tbody>
<tr>
<td>11:30 – 13:00</td>
<td>Farr Institute Annual Meeting</td>
<td></td>
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</tbody>
</table>

**Powering Population Health Science with Informatics**  
Professor Iain Buchan, Farr Institute, Health eResearch Centre

**Understanding and Improving Complex Interventions through Linked Data**  
Dr Sarah Rodgers, Farr Institute, CIPHER

**Exploring Infant Outcomes and Service Provision at an International Scale with Administrative Data**  
Dr Katie Harron, Farr Institute, London

**Rethinking Trajectories of Child BMI: Communities Inviting Data Science**  
Dr Lamiece Hassan, Farr Institute, Health eResearch Centre

**Novel Computational Methods to Enrich Research with Routine Healthcare Data**  
Dr Spiros Denexas, Farr Institute, London

**Understanding Kidney Function across Time, Place and Person**  
Professor Corri Black, Farr Institute, Scotland

**UK Health Data Analytics Roadmap**  
Dr Niels Peek, Farr Institute, Health eResearch Centre

**Health Data Research UK**  
Professor Andrew Morris, Farr Institute, Scotland
<table>
<thead>
<tr>
<th>Time</th>
<th>Paper Session: Interactive and Visualisation Tools for Health Data</th>
<th>Exchange 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>11:30 – 11:45</td>
<td>Application of correspondence analysis to graphically investigate associations between foods and eating locations</td>
<td>Chapman A, Beh E, Palla L</td>
</tr>
<tr>
<td>11:45 – 12:00</td>
<td>Data driven quality improvement of health professions education: Design and development of CLUE – an interactive curriculum data visualization tool</td>
<td>Canning CA, Loe A, Gangnon P, Zary N</td>
</tr>
<tr>
<td>12:00 – 12:15</td>
<td>The health data ingestion stack</td>
<td>Sinaci AA, Laleci Erturkmen GB, NAMLI T</td>
</tr>
<tr>
<td>12:15 – 12:30</td>
<td>Developing healthcare data analytics apps with open data science tools</td>
<td>Hao B, Sun W, Yu Y, Xie G</td>
</tr>
</tbody>
</table>

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<thead>
<tr>
<th>Time</th>
<th>Paper Session: Electronic Phenotyping</th>
<th>Exchange 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>11:30 – 11:45</td>
<td>Which variables are useful for phenotyping dementia in primary care records? A meta-analysis</td>
<td>Ford E, Greenslade N, Rooney P, Paudyal P, Oliver S, Cassell J</td>
</tr>
<tr>
<td>11:45 – 12:00</td>
<td>Fast and efficient feature engineering for multi-cohort analysis of EHR data</td>
<td>Ozery-Flato M, Yanover C, Gottlieb A, Weissbrod O, Parush N, Goldschmidt Y</td>
</tr>
</tbody>
</table>
Tuesday 25th April | Manchester Central

12:15 – 12:30
Profiling primary care patients on sub-domains of frailty using the Clinical Practice Research Datalink (CPRD)
Pye S, Kontopantelis E, Van Marwijk H, Ashcroft D, Clegg A, Reeves D

12:30 – 12:45
Multimorbidity patterns in older adults: An analysis of the UK Biobank data
Dhalwani N, Zemedikun D, Gray L, Davies M, Kunti K

12:45 – 13:00
Evolution of IgE responses to multiple allergen components throughout childhood
Howard R, Belgrave D, Papastamoulis P, Simpson A, Rattray M, Custovic A

11:30 – 13:00
Panel: Internet of Things for smart, healthy cities

CityVerve, the UK Internet of Things city demonstrator, brings together the brightest minds to create a blueprint for smart cities worldwide. We are pioneering the use of IoT technologies, linking up smart applications in a range of areas and creating smart platforms to capture, analyse and deliver appropriate data. Our aim is to deliver a smarter, more connected, healthier Manchester.

This session will explore how IoT technology can support cities in more effective delivery of health and social care, help citizens to co-create care plans with their health providers and to be engaged and empowered to manage their own health and wellbeing.

Chair: Carmel Dickinson; The University of Manchester

Nick Chrissos; CISCO, IoT for Smart, Healthy Cities
Julie Harrison; Central Manchester Foundation Trust: IoT for Patient Self-Management: Chronic Conditions
Gary Leeming; Greater Manchester Academic Health Science Network: Joining up the Data
Andrew Beechener; Republic of Things Ltd: IoT for Healthier Citizens
Digitalisation has been hailed as a cure for growing disparities between needs for services and available resources. The increasingly digitalised healthcare can empower clients, change work processes, division of work, even written or silent rules of work. We argue that coupled with ageing and increasingly multicultural population, the existing knowledge and skills of the health care professionals are not sufficient to master new, digital work practices in healthcare. This workshop explores the new competences required from the healthcare professionals and the management in the digital era of healthcare.

Dr Hannele Hyppönen; National Institute for Health and Welfare, Finland
Dr Outi Ahonen; Laurea University of applied sciences, Finland
Dr Philip Scott; University of Portsmouth
Dr Sari Kujala; Aalto University
Dr Tarja Heponiemi; National Institute for Health and Welfare, Finland
Dr Elina Rajalahti; Laurea University of Applied Sciences, Finland

Frailty is a condition that predisposes individuals to progressive decline in different functional domains, leading to falls and fractures, disability and dependency on others, hospitalization, institutional placement and ultimately death. Through discussion and active participation, the audience to this panel will gain insights in the problems of managing frail elderly patients in the absence of condition-related decision support and reach concrete proposals in the form of a call for action, on the main question: What data would be necessary to drive the strategic and operational agenda and facilitate coordination across technological, professional and organizational strands to ensure active healthy ageing?

Silvina Santana; University of Aveiro: Frail elder citizen trajectories: user story as starting point and reflection opportunity

Maria Bujnowska; University of Wroclaw: Aspects of coordinated, holistic service approach to frailty management
## Paper session: Patient safety

### 11:30 – 11:45
**Mobile medical apps and mHealth devices: a framework to build medical apps and mHealth devices in an ethical manner to promote safer use – a literature review**
Sharp M, O’Sullivan D

### 11:45 – 12:00
**EHR improvement using incident reports**
Teame T, Stålhane T, Nytrø Ø

### 12:00 – 12:15
**Improving handovers between hospitals and primary care: implementation of e-messages and the importance of training**
Netteland G

### 12:15 – 12:30
**The association between the STOPP/START criteria and gastro-intestinal track bleedings in elderly patients**
Veldhuis A, Sent D, Bruin-Huisman L, Beers E, Abu-Hanna A

### 12:30 – 12:45
**Adoption of an electronic medication reconciliation tool and its impact on the quality of discharge prescriptions**
Tamblyn R, Winslade N, Lee TC, Motulsky A, Couture I, Bonnici A, Qian CJ, Moraga T

### 12:45 – 13:00
**Can hospital datasets be integrated to inform decision-making for quality and safety?**
Anderson J, Kirby T, Ross A, Murrells T
Panel: Maximising ‘depth of field’ for health data

This panel considers issues of granularity in health informatics, and outlines strategies for bridging between different levels: making use of big data to support precision approaches to health (focusing in), and making sense of ‘small’ data through data visualisation (focusing out). Formal presentations will be followed by facilitated questions from the floor to the panel.

Dr Eneida Mendonca; University of Wisconsin: Big data from the perspective of integration of EHR, genomic data, and external factors as well as the role of big data in clinical decision support and precision approaches to health.

Dr Suzanne Bakken; Columbia University: Precision approaches in 1) characterizing phenotype, genotype, and environment; 2) discovery of intervention targets for care and public health; and 3) intervention delivery.

Dr Nick Hardiker; University of Salford School: Contemporary approaches to facilitating multiple use of health data and integration of primary health data with other data sources and aggregated for reuse.

Dr Dawn Dowding; Columbia University: Leveraging and visualizing data at the point of care to help support clinical decision-making; the importance of considering user characteristics when designing data visualisations; the challenges of integrating visualized data into existing EHR systems and approaches to evaluation of data visualisation technology, such as clinical dashboards.

Paper session: Biosurveillance and population health monitoring

Using food purchase data to identify areas where people cannot afford healthy food
Jahagirdar D, Quesnel-Vallee A, Buckeridge DL

Real-time research and surveillance in companion animals; integrating electronic health records to provide one health informatics messaging and feedback loops to practice
Radford A, Noble P, Jones P, Vizcaino F
<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
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</thead>
<tbody>
<tr>
<td>12:00 – 12:15</td>
<td>An information system for real-time gastro-intestinal surveillance monitoring&lt;br&gt;Rowlingson B, Diggle P, Hale A</td>
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<tr>
<td>12:15 – 12:30</td>
<td>Incorporating previous addresses into environmental epidemiology using routine data&lt;br&gt;John G</td>
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### Paper session: Semantic technology and research objects

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>11:30 – 13:00</td>
<td><strong>Paper session: Semantic technology and research objects</strong></td>
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<tr>
<td>11:30 – 11:45</td>
<td>Computable information governance contracts&lt;br&gt;Cunningham J, Ainsworth J, Leeming G</td>
</tr>
<tr>
<td>11:45 – 12:00</td>
<td>A semantic framework for logical cross-validation, evaluation and impact analyses of population health interventions&lt;br&gt;Shaban-Nejad A, Okhmatovskaia A, Shin EK, Davis RL, Franklin BE, Buckeridge DL</td>
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<tr>
<td>12:00 – 12:15</td>
<td>Discovering central practitioners in a medical discussion forum using semantic web analytics&lt;br&gt;Rajabi E, Abidi SS</td>
</tr>
<tr>
<td>12:15 – 12:30</td>
<td>Towards an open infrastructure for relating scholarly assets&lt;br&gt;Munro C, Couch P, Johnson J, Ainsworth J, Buchan I</td>
</tr>
<tr>
<td>12:30 – 12:45</td>
<td>Architecture and initial development of a digital library platform for computable knowledge objects for health&lt;br&gt;Flynn A, Bahulekar N, Boisvert P, Lagoze C, Meng G, Rampton J, Friedman C</td>
</tr>
<tr>
<td>12:45 – 13:00</td>
<td>An approach for the support of semantic workflows in electronic health records&lt;br&gt;Schweitzer M, Hörbst A</td>
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</tbody>
</table>
We present GP-ACT, a prototype tool for rapid, versatile and scalable implementation of cohort selection and characterisation algorithms using primary care databases. Through a graphical user interface, users can build algorithms including complex clinical variables based on combinations of elementary variable types. The tool integrates with a Read Codes dictionary and a sharable codeset repository. Algorithms are saved on a web server as versioned and sharable objects, and can then be exported to SQL queries to be run against the database.

Mohammad Al Sallakh, MD; Swansea University Medical School

In this live demonstration, the HealthyR team will present visualisations of the well-known Gapminder dataset. Any R installation and internet connection has built-in access to this dataset. This means the attendees can reproduce the demonstrated plots by just copying our code: take-home handouts and weblinks will be provided.

HealthyR is a quick-start training course that focuses specifically on health-related data analysis and statistics. HealthyR is a hands-on course, where the attendees create several R plots within the first hour of the two and a half day course. HealthyR feedback shows that this approach empowers busy clinicians and researchers to successfully take up R.

Dr Riinu Ots; University of Edinburgh
Ewen Harrison; University of Edinburgh
Dr Thomas Drake; University of Edinburgh
Frank van Harmelen, Professor of Knowledge Representation and Reasoning, Vrije Universiteit Amsterdam, The Netherlands

A steady progress in semantic technologies over the past decade and a half has resulted in stable syntactic and semantic models for publishing and interlinking datasets on the web. Such interlinked and interoperable datasets have had a significant impact on a large number of technology sectors: e-commerce, cultural heritage, science, media and publishing, just to name a few.

However, the impact of linked data on healthcare information systems has been limited so far in comparison with these other sectors. In this talk, Frank will argue that Linked Data technologies can also be very useful for a variety of applications in healthcare information systems, and that this is even true (perhaps surprisingly) for Linked *Open* Data.

In this year’s EFMI special session, we will introduce AC2, and Accreditation and Certification of Competencies initiative in EFMI. We will present the EFMI – IMIA initiative for accreditation of Health informatics programs, and invite to a discussion of opportunities for and feasibility of international scientific – professional accreditation of Health Informatics program in Europe. We like to explore if a complementing accreditation by EFMI – IMIA would support comparable standards, certification, workforce mobility and employability across Europe? The initiative complement national accreditation processes and should comply with the Bologna framework.

Christian Lovis, John Mantas, Monique Jaspers, Nicolette de Keizer

Moderator: Anne Moen
Attempts to develop a national integrated electronic health record for the UK in the mid 1990s and 2000s were largely unsuccessful. Consequently, specific regions of the UK responded by developing local projects with a smaller footprint. A variety of different approaches have been adopted by these regional programmes, based on local requirements.

Chaired by Sarah Thew from the Greater Manchester Academic Health Science Network, the panel members will describe their local projects and the different technical approaches adopted. They will discuss the growing need and mechanisms for interoperability between regions, in particular the use of open standards.

Declan Hadley; Lancashire Care NHS Foundation Trust: The Lancashire Patient Record Exchange Service – Creating an Information Exchange Platform to support health and social care across Lancashire

Andy Kinnear; Connecting Care, Bristol and British Computer Society: Connecting Care – Enabling health and social care professionals to share a summary patient record for direct care in Bristol

Gary Leeming; Greater Manchester Academic Health Science Network: DataWell – Connecting 39 health and social care organisations within Greater Manchester to enable direct care, audit and research

Tony Shannon; Ripple Foundation: The Ripple Foundation – Working to develop an open source, standards-based integrated digital care platform

Rachel Dunscombe; Salford Royal Foundation Trust: Regional records integration for secondary care provision – Perspectives from an NHS Centre of Digital Excellence
### Paper session: Translational bioinformatics

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Authors</th>
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</thead>
<tbody>
<tr>
<td>16:45 – 17:00</td>
<td>Development and evaluation of a case-based retrieval service</td>
<td>Pasche E, Chinali M, Gobeill J, Ruch P</td>
</tr>
<tr>
<td>17:00 – 17:15</td>
<td>Mining and classification of a large collection of in vivo bioassay descriptions</td>
<td>Zwierzyna M, Overington J</td>
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<tr>
<td>17:15 – 17:30</td>
<td>Learning differentially expressed gene pairs in microarray data</td>
<td>Zhou SM, XIA XL, Brophy S</td>
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### Paper session: Patient and public engagement in health informatics

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<tr>
<th>Time</th>
<th>Title</th>
<th>Authors</th>
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<tbody>
<tr>
<td>16:00 – 16:15</td>
<td>A method for co-designing theory-based behaviour change systems for health promotion</td>
<td>Janols R, Lindgren H</td>
</tr>
<tr>
<td>16:30 – 16:45</td>
<td>Persona development and educational needs to support informal caregivers</td>
<td>Al Awar Z, Kuziemskey C</td>
</tr>
<tr>
<td>16:45 – 17:00</td>
<td>Public benefits: a central justification and problematic dimension of health informatics</td>
<td>Aitken M, Porteous C, Cunningham-Burley S</td>
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</table>
Due to the importance of health IT in providing patient care, many professional and scientific organisations have issued recommendations on informatics competencies. These recommendations share many similarities, yet they also differ. The main objective of this panel is to raise awareness amongst the members of the scientific community for the need of defining a common ground for classifying and comparing recommendations. It is also the objective of the panel to initiate a dialogue in the scientific community about a tentative reference scheme. The main outcome of this panel will be a draft of a reference scheme for informatics competency recommendations.

Professor Ursula Hübner; University AS Osnabrück: Introduction, TIGER recommendation framework

Mervat Abdelhak; School of Health and Rehabilitation Sciences, University of Pittsburgh: Recommendations from AHIMA’s Global Health Workforce Council (GHWC)

Angelika Händel; University Hospital of Erlangen: Recommendations from AHIMA’s Global Health Workforce Council (GHWC)

Rachelle Blake; Omni Micro Systems und Omni Med Solutions GmbH and Renton Technical College: Health IT Competencies (HITCOMP) Tool and Database, Horizon2020 EU*US_eHealth_Work

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<tr>
<th>16:00 – 17:30</th>
<th>Paper session: Health outcomes and health services research</th>
<th>Exchange 5</th>
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<tr>
<td>16:00 – 16:15</td>
<td>Evaluating the impacts on health outcomes of Welsh government funded schemes designed to improve the energy efficiency of the homes of low income households</td>
<td>Morrison-Rees S</td>
</tr>
<tr>
<td>16:15 – 16:30</td>
<td>Hospital admissions and ED presentations for dental conditions indicate access to hospital, not health inequality</td>
<td>Yap M, Kok MR, Nanda-Paul S, Vickery A, Whyatt D</td>
</tr>
</tbody>
</table>
### Needles in a haystack: screening and healthcare system evidence for homelessness
Fargo J, Montgomery AE, Byrne T, Brignone E, Cusack M, Gundlapalli A

### Evidence for business intelligence in health care: a literature review
Loewen L, Roudsari A

### Limitations for health research with restricted data collection from UK primary care: a systematic review
Campbell J, Dedman D, Gallagher A, Meeraus W, Murray-Thomas T, Oyinlola J, Strongman H, Williams R

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<tr>
<th>Time</th>
<th>Session Title</th>
<th>Presenters</th>
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<tbody>
<tr>
<td>16:00 – 17:30</td>
<td><strong>Paper session: Dashboards and feedback</strong></td>
<td>Exchange 6</td>
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</tbody>
</table>
| 16:00 – 16:15 | Development of a web-based quality dashboard including a toolbox to improve pain management in Dutch intensive care
Roos-Blom MJ, Gude W, de Jonge E, Spijkstra JJ, van der Veer S, Dongelmans D, de Keizer N |
| 16:15 – 16:30 | Understanding the utilisation of a novel interactive electronic medication safety dashboard by pharmacists and clinicians in general practice: a qualitative study
| 16:30 – 16:45 | Associations between medication safety and use of an electronic medication safety dashboard in primary care
| 16:45 – 17:00 | Development and testing of clinical performance feedback theory in UK primary care: a meta-synthesis and pilot study
| 17:00 – 17:15 | Using feedback intervention theory to design clinical dashboards
Dowding D, Onorato N, Rosati R, Barron Y, Merrill J, Russell D |
| 17:15 – 17:30 | A digital framework to support providers and patients in diabetes related behavior modification
Abidi S, Vallis M, Piccinini H, Imran SA, Abidi SS |
The panel will focus on the opportunities for the transatlantic scaling of health informatics research and will explore the challenges and rewards of working across regional and international borders. After introducing the panel members, the discussion will explore challenges of regulation, scale, variations in the types of data available, harmonization, curation, standards, user management, and evaluation, and how they have overcome these challenges. There will be significant time devoted to questions from the floor to enable the audience to get maximum feedback on these issues from the panel.

Chair: Professor Iain Buchan; The University of Manchester
Professor Mahmood Adil; Public Health Intelligence, Health Protection Scotland, and Medical Information Services Division, NHS National Services Scotland
Professor Michael Schull; Institute for Clinical Evaluative Sciences, Ontario, Canada
Dr Brendan Krause; Optum Labs
Professor Umberto Tacchinardi; School of Medicine and Public Health at University of Wisconsin-Madison

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<tr>
<th>16:00 – 17:30</th>
<th>Paper session: Clinical epidemiology</th>
<th>Exchange 9</th>
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<tr>
<td>16:00 – 16:15</td>
<td>Which outcomes matter to patients? Comparing the relationship between patient-reported and traditional outcome measures on patient satisfaction in surgery</td>
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<td></td>
<td>Jones C, Drake T, O’Neill S, McLean K, Shaw C, Wigmore S, Harrison E</td>
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<tr>
<td>16:30 – 16:45</td>
<td>Respiratory infections as vascular triggers: self-controlled case series analysis of linked Scottish hospital and laboratory data</td>
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</table>
### Paper session: Text mining

**16:00 – 16:15**  
Developing a manually annotated corpus of clinical letters for breast cancer patients on routine follow-up  
Pitson G, Banks P, Cavedon L, Verspoor K

**16:15 – 16:30**  
Identifying emerging trends in medical informatics: a synthesis approach  
vvan Kasteren Y, Williams P, Maeder A

**16:30 – 16:45**  
Automated diagnosis coding with combined text representations  
Berndorfer S, Henriksson A

**16:45 – 17:00**  
Using statistics and data mining approaches to analyze male sexual behaviors and use of erectile dysfunction drugs based on large questionnaire data  

**17:00 – 17:15**  
Automated identification of national health survey research topics in the academic literature  
Yergens D, Dutton D, Fiest K

**17:15 – 17:30**  
Prevalence estimation of protected health information in Swedish clinical text  
Henriksson A, Kvist M, Dalianis H
### Science slam: Science in 8 minutes

Research as a Haiku, discussing big data issues with Princess Leia, and David Beckham as a metaphor for older people using patient portals. Curious? Come and attend the Science Slam.

The Science Slam gives participants eight minutes to present their research and ideas in an entertaining or unusual way. Stand-up comedy, live music, a live experiment, or something else completely: anything is possible! The audience forms the jury that will decide who wins.

#### Participants

**Why everybody should become a data scientist**
Anna Beukenhorst, The University of Manchester

**DataWars: Big data strikes back**
Chris Gibbons, University of Cambridge

**What’s the point!?**
Benjamin Green, The University of Manchester

**Rhythm, rhyme, research**
Maxine Mackintosh, University College London

"That was surprising" - How unexpected focus group participant reactions to general background information was incorporated into a public-facing video about ICES
Alison Paprica and Michael Schull, University of Toronto

**David Beckham: Real or legend?**
Gaby Wildenbos, University of Amsterdam

#### Prizes

Prizes will be awarded to the best presentations sponsored by the BCS Health, the specialist group of the Chartered Institute for IT. The winner receives 400 GBP, second place 200 GBP, and third place 100 GBP.
### Workshop: EFMI working group on translational health informatics – workshop about emerging technological approaches for addressing translational medicine needs

Translational medicine is a field focused on removing barriers in utilizing new scientific discoveries in healthcare, moving from bench to bedside. The increased adoption of new open source tools such as TranSMART and i2b2 is complemented with the initiatives carried out for standardising Genetic Testing Report and OMICS information. This workshop will analyse existing approaches adopted by open source initiatives and standard technologies in order to identify common strategies for addressing challenges associated with management of information, data privacy and access control in order to promote the adoption of Translational Medicine in healthcare providers and research centres.

Dr Alberto Moreno-Conde; Institute of Biomedicine of Seville  
Dr Mauro Giacomini; University of Genoa  
Jesús Moreno-Conde; Institute of Biomedicine of Seville  
Dr Riccardo Bellazzi; University of Pavia  
Carlos Luis Parra-Calderón; Institute of Biomedicine of Seville  
Dr Amnon Shabo; Philips

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
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<tr>
<td>08:30 – 10:00</td>
<td><strong>Paper session: Linking health and social care</strong></td>
<td>Exchange 1</td>
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<tr>
<td>08:30 – 08:45</td>
<td>Generation Scotland: electronic health record linkage in practice</td>
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<td></td>
<td>Campbell A, Boekel L, Porteous D</td>
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<tr>
<td>08:45 – 09:00</td>
<td>Data linkage in social care: a pilot project</td>
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<td>Orrell A, Heaven M, Roberts D, Parry M, Robinson C</td>
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<tr>
<td>09:00 – 09:15</td>
<td>Linking mental health to social network data</td>
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<td>Wongkoblap A, Vadillo MA, Curcin V</td>
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<tr>
<td>09:15 – 09:30</td>
<td>The effect of improved identifiers on linkage of electronic health data for neonatal bloodstream infection surveillance</td>
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<td>Fraser C, Gilbert R, Muller-Pebody B, Harron K</td>
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<td>Time</td>
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<tr>
<td>08:30 – 10:00</td>
<td>Paper session: Trials and big data</td>
<td>Exchange 2</td>
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<tr>
<td>08:30 – 08:45</td>
<td>The effects of heterogeneity in the comparative effectiveness of individual treatments in randomised trials</td>
<td>Pericleous P, van Staa T, Sperrin M</td>
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<tr>
<td>08:45 – 09:00</td>
<td>IT infrastructure of an oncological trial where xenografts inform individual second line treatment decision</td>
<td>Lindoerfer D, Mansmann U</td>
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<tr>
<td>09:00 – 09:15</td>
<td>Methods for analysing large routine clinical datasets, with applications to electronic health records from the Clinical Practice Research Datalink</td>
<td>Rhodes K, Turner R, Payne R, White I</td>
</tr>
<tr>
<td>09:15 – 09:30</td>
<td>Medical and healthcare curriculum exploratory analysis</td>
<td>Komenda M, Karolyi M, Pokorná A, Vaitsis C</td>
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<tr>
<td>09:30 – 09:45</td>
<td>Chart-adapt: bringing the benefits of big data technologies to the critical care unit</td>
<td>Brankin P, Moss L, Piper I, Hawthorne C, Kinsella J, Shaw M, Elliot R</td>
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<tr>
<td>08:30 – 10:00</td>
<td>Paper session: Diabetes and ageing</td>
<td>Exchange 3</td>
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<tr>
<td>08:30 – 08:45</td>
<td>My diabetes my way: user experiences of an electronic personal health record for diabetes</td>
<td>Cunningham S, Allardice B, Wake D</td>
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<tr>
<td>08:45 – 09:00</td>
<td>Involving physical activity in insulin recommender systems with the use of wearables</td>
<td>López B, Pozo A, Torrent-Fontbona F</td>
</tr>
<tr>
<td>09:00 – 09:15</td>
<td>Shared decision-making via personal health record technology for routine use of diabetic youth: a study protocol</td>
<td>Davis S, Roudsari A, Courtney K</td>
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### 09:15 – 09:30
**POWER2DM: Predictive model-based decision support for diabetes patient empowerment**  
Namli T, Gönül S, De Graaf A

### 09:30 – 09:45
**Increasing access to healthcare in rural Africa using telemedicine: using an mHealth system for diabetes patients in Cameroon as a case study**  
Holl F, Munteh P, Burk R, Swoboda W

### 09:45 – 10:00
**A medication reminder mobile app: does it work for different age ranges?**  
Fallah M, Yasini M

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<th>Time</th>
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<tr>
<td><strong>08:30 – 10:00</strong></td>
<td><strong>Paper session: Barriers and facilitators of informatics interventions</strong></td>
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</table>
| 08:30 – 08:45 | **An approach for enhancing adoption, use and utility of shared digital health records in rural Australian Communities**  
Almond H, Cummings E, Turner P |
| 08:45 – 09:00 | **Documentation time during outpatient consultations with a new EHR: fears and figures**  
Joukses E, Cornet R, Abu-Hanna A, de Keizer N |
| 09:00 – 09:15 | **Exploring innovation capabilities of hospital CIOs: an empirical assessment**  
Esdar M, Liebe JD, Weiß JP, Hübner U |
| 09:00 – 09:15 | **The invisibility of disadvantage: why do we not notice?**  
Showell C, Cummings E, Turner P |
| 09:30 – 09:45 | **Using healthcare work process modelling in hospitals to increase the fit between the healthcare workflow and the electronic medical record**  
Morquin D, Ologeanu-Taddei R, Watbled L |

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<th>Time</th>
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<tr>
<td><strong>08:30 – 10:00</strong></td>
<td><strong>Paper session: Care pathways and data linkage</strong></td>
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| 08:30 – 08:45 | **A study investigating the use of routinely collected health data to identify current treatment pathways among people with age-related hearing loss**  
Evans HE, Costafreda Gonzalez S, Denaxas S, Hayward A, Livingston G, Schilder A |
<table>
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<tr>
<th>Time</th>
<th>Session</th>
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</table>
| 08:45 – 09:00 | Using linked data from health and social care to understand patient pathways and high resource users in Scotland  
Ward H, Baird D, Lee A, Mooney A, Munro J |
| 09:00 – 09:15 | Improving the accessibility and interpretation of advanced analytics when monitoring the quality and safety of patient outcomes  
Dawe H |
| 09:15 – 09:30 | Care pathways related to Scottish Ambulance Service contacts for people with psychiatric or self-harm emergencies  
| 09:30 – 09:45 | Development of a questionnaire for determining important information needed in hospital care coordination  
| 09:45 – 10:00 | Appraising healthcare delivery provision: A framework to model business processes  
Luzi D, Pecoraro F, Tamburis O |

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<tr>
<th>Time</th>
<th>Panel: Diversity in health informatics – empowering women in health IT</th>
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| 08:30 – 10:00 | Exchange 6  
Diversity drives innovation. The healthcare workforce is predominately female, while health informatics development force is largely male; an imbalance that hinders diffusion of innovation. This panel will initiate a conversation on whether constrains and traditions impede necessary advancement, and propose strategies for equal opportunities. We seek answers to the following questions; how can health informatics effectively use diversity to drive change, innovation and transformation? Can stories by female entrepreneurs, change makers and leaders bring perspectives that improve working conditions and shape patient care? The audience will be invited to share ideas and suggest tools and strategies to further foster diversity.  
Professor Anne Moen; Institute for Health and Society; University of Oslo |
Panel: Making the LHS a reality with data standards: what do we have and what do we need?

The Learning Health System (LHS) has been seen as a potential solution to many of the problems of early 21st century evidence-based medicine. To deliver on this promise, the LHS needs to be ubiquitous, and capable of operating within the context of legacy EHR and other health and social care related systems. Yet the LHS requires much greater management of clinical meaning than has been the case in most healthcare interoperability projects. This panel will discuss existing data standards and their readiness to maintain knowledge in machine-readable forms, what additional standards may be required, and the role of asset registers.

Chair: Professor Brendan Delaney; Imperial College London

Professor Charles Friedman; University of Michigan: Data standards and knowledge representation in the LHS
Dr Michael Ibara; Collaborative Data Interchange Standards Consortium: eSource and linking with registries, clinical trials and mobile health
Dr Vasa Curcin; King’s College London: The EU FP7 TRANSFoRm project and using ontologies to add context to standards
Professor Dipak Kalra; EuroRec: The European Institute for Innovation Though Health Data (I~HD) Interoperability Asset Register
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<th>Time</th>
<th>Session</th>
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<tbody>
<tr>
<td>08:45 – 09:00</td>
<td>Using electronic health records to assess depression and cancer comorbidities Mayer MA, Gutierrez A, Leis A, De la Peña S, Sanz F, Furlong LI</td>
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<tr>
<td>09:00 – 09:15</td>
<td>Implementation of a Charlson comorbidity index for the SAIL databank Rees A, Wang T, Thayer D, Atkinson M</td>
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<tr>
<td>09:15 – 09:30</td>
<td>Patient activation is associated with fewer visits to both general practice and emergency departments: a cross-sectional study of patients with long-term conditions Deeny S, Barker I, Steventon A</td>
</tr>
<tr>
<td>09:30 – 09:45</td>
<td>Identifying anonymous residence types using administrative datasets Tingay K, Roberts M, Musselwhite C</td>
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<tr>
<td>09:45 – 10:00</td>
<td>Impact of age on relative survival following transcatheter aortic valve implantation Martin G, Sperrin M, Hulme W, Buchan I, Mamas M</td>
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<tr>
<th>Time</th>
<th>Paper session: Text processing</th>
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<tr>
<td>08:30 – 08:45</td>
<td>Improving terminology mapping in clinical text with context-sensitive spelling correction Dziadek J, Henriksson A, Duneld M</td>
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<tr>
<td>08:45 – 09:00</td>
<td>Medical text classification using convolutional neural networks Hughes M, Li I, Kotoulas S, Suzumura T</td>
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<tr>
<td>09:00 – 09:15</td>
<td>Acronym disambiguation in Spanish electronic health narratives using machine learning techniques Rubio Lopez I, Costumero R, Ambit H, Gonzalo C, Menasalvas E, Rodriguez González A</td>
</tr>
<tr>
<td>09:30 – 09:45</td>
<td>Automated classification of semi-structured pathology reports into ICD-O using SVM in Portuguese Oleynik M, Patrão DF, Finger M</td>
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</tbody>
</table>
Internet of Things in health trends through bibliometrics and text mining
Konstantinidis S, Billis A, Wharrad H, Bamidis P

Coffee break
Exchange Hall

Workshop: IP commercialisation and exploitation from health informatics research
Exchange Auditorium

The purpose of this workshop is to discuss the challenges faced by researchers in protecting new technologies and solutions arising from health data research, and to present some clear routes for the protection of new technologies. IP specialists from Maucher Jenkins will outline considerations that need to be made in the protection and exploitation of health data research, and will provide advice and guidance as we explore a range of potential scenarios.

Reuben Jacob, Partner; Maucher Jenkins
Fiona Kellas, Associate; Maucher Jenkins

Paper session: Longitudinal and temporal data analysis
Exchange 1

Informative observation in health data: association of past level and trend with time to next measurement
Sperrin M, Petherick E, Badrick E

From single cells to populations: modelling and analysing the dynamics of disease progression from cross-sectional studies using phenotypically-driven pseudotime ordering
Campbell K, Yau C

Multivariate and longitudinal health system indicators

Precision epidemiology for kidney disease in the East Midlands
Major R, Xu G, Shepherd D, Brunskill N
### Scientific Programme

**Wednesday 26th April | Manchester Central**

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
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| 11:30 – 11:45 | Patient stratification in psoriasis using large-scale patient-level data  
|             | Geifman N, Peek N, Buchan I, the PSORT Executive Committee              |
| 11:45 – 12:00 | Latent profile analysis to learn subgroups of lung function for        |
|             | personalised medicine                                                    
|             | Belgrave D, Granell R, Simpson A, Lowe L, Buchan I, Henderson J,        |
|             | Custovic A                                                               |

**10:30 – 12:00**  
**Panel: Informatics for suicide risk detection and prevention**  
**Exchange 2**

We will explore the benefits and challenges of using informatics for suicide risk detection and prevention. How far is informatics likely to help in clinical risk detection? What are the obstacles that need to be overcome to develop decision support tools usable by clinicians? Is there scope to feedback patterns of behaviour to patients or to collaborate with patients in devising self-management tools? Could health informatics in the form of interactive software or educational apps be used as successfully as face-to-face strategies to reduce suicide attempts? Or will there be technical, psychological, ethical, organisational, cultural, economic or other reasons why these are difficult to adopt?

Professor Enrique Baca-García; Department of Psychiatry, Fundación Jiménez Díaz Hospital, Madrid: Emerging trends for studying suicide attempts using data mining to predict future behaviour

Dr Rina Dutta; King’s College, London: Different strategies for natural language processing of free text written by clinicians to identify subtle markers of suicide risk

Dr Gergö Hadlaczy; Stockholm County Council Centre for Suicide Research and Prevention: Challenges in suicide risk assessment using statistical methods
**Usability evaluations are essential to the success of health information system implementation, but are often costly and dependent on right expertise being available. Heuristic Evaluation (HE) is considered a straightforward method consisting of clear stages. Involving clinicians in HE may facilitate usability evaluations in healthcare, yet there are challenges. Many questions remain unanswered regarding how to implement user involvement in HE; where and how could clinicians best be involved in this process? To what level of autonomy and with what added benefit? In this workshop, we will explore experiences of involving clinical users in HE, discuss challenges and best practice.**

Dr Maria Hägglund; Health Informatics Centre, Karolinska Institutet
Dr Romaric Marcill; INSERM CIC-IT Lille
Dr Sylvia Pelayo; EVALAB INSERM CIC-IT Lille
Dr Isabella Scandurra; Örebro University
Workshop: Using patient-reported data for research and to improve health outcomes and services: identifying opportunities and challenges

The advent of new information technologies, such as smartphones, wearables and social media, has created an unprecedented opportunity for acquiring health data directly from patients. Patient-reported data have the potential to enrich population-based research, improve disease management, and guide redesign of healthcare services. To unlock this potential, we need to understand the main opportunities and challenges of patient-reported data. This workshop aims to identify these opportunities and challenges, and to explore whether there is an appetite for establishing a special interest group around patient-reported data within the health informatics community.

Dr Sabine van der Veer; The University of Manchester
Professor Will Dixon; The University of Manchester
Dr Chris Gibbons; University of Cambridge
Dr Goran Nenadic; The University of Manchester
Dr Retha Steenkamp; UK Renal Registry

Panel: What does the public think about the commercial use of health data?

The commercial use of health data is a controversial topic, whether in collaboration with the public sector or for internal use by the company. Over the past few years, there has been a consistent message that many citizens do not support the idea of “their” health data being used by commercial companies. Citizens may be more accepting of commercial uses that have explicit public benefit and less so for company profit. Four presentations and discussions will describe the nuanced public views and consider how public authorities should decide who gets access to health data and for which commercial uses.

Chair: Dr Mary Tully; The University of Manchester: Introduction

Dr Natalie Banner; Wellcome Trust: The One-Way Mirror: Public attitudes to commercial access to health data
Dr Mhairi Aitken; Farr Institute Scotland: Discrete choice experiment on commercial use of health data
Kyle Bozentko; Jefferson Center, Minnesota: Citizen’s juries on the commercial use of health data
Dr Malcolm Oswald; The University of Manchester: So What Should Public Authorities Do?
The Connected Health Cities (CHC) programme aims to develop learning health systems in four city regions in North England over a 3-year time period (2016-2019). In particular, the programme seeks to create civic partnerships exploiting data to:

- drive public sector reform by deriving actionable information from routinely-collected health data
- fuel region-wide health science that citizens trust; and
- accelerate business growth for the digital health revolution.

Central to each CHC is a combinatorial health innovation centre ("Ark") that assembles data, experts and technology. To apply and evaluate the methodology, each CHC has selected several care pathways that represent a specific regional need.

Professor John Ainsworth; The University of Manchester: Overview of the Connected Health Cities programme and information governance
Dr Niels Peek; The University of Manchester: Clinical and behaviour change
Dr Stefan Williams; Bradford Institute for Health Research: Practical application of data analytics
Dr Dennis Kehoe; AIMES Grid Services: Technical infrastructure

<table>
<thead>
<tr>
<th>10:30 – 12:00</th>
<th>Paper session: Diabetes and long-term conditions</th>
<th>Exchange 9</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:30 – 10:45</td>
<td>Co-morbid determinants of chronic disease progression: three explorations using biomarkers and health records</td>
<td></td>
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<td></td>
<td>Kiddle S, Baker E, Quint J, Stewart R, Buchan I, Dobson R</td>
<td></td>
</tr>
<tr>
<td>10:45 – 11:00</td>
<td>Exposure to diabetes drugs and cancer incidence in a nationwide observational data linkage study</td>
<td></td>
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<tr>
<td></td>
<td>Farran B, McGurnaghan S, Colhoun H</td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>Session</td>
<td></td>
</tr>
<tr>
<td>--------------</td>
<td>-------------------------------------------------------------------------</td>
<td></td>
</tr>
</tbody>
</table>
| 11:00 – 11:15 | Using Lambeth DataNet to identify ethnic variation in the control of hypertension  
Ashworth M, Curcin V, Molokhia M |
| 11:15 – 11:30 | LDL-cholesterol is inversely associated with risk of heart failure: a replication study of two national databases of linked electronic health records  
| 11:30 – 11:45 | An algorithm to identify end stage renal disease in the UK biobank cohort  
Nolan J, Zhang Q, Herrington W, Sudlow C |
| 11:45 – 12:00 | Dementia case ascertainment in population-based cohort studies: lessons from the Whitehall II study  

<table>
<thead>
<tr>
<th>Time</th>
<th>Paper session: Natural language processing</th>
<th>Exchange 10</th>
</tr>
</thead>
</table>
| 10:30 – 10:45 | Acquisition of expert/non-expert vocabulary from reformulations  
Antoine E, Grabar N |
| 10:45 – 11:00 | Fast and simple text classification gets things done  
de Bruijn B, Marshall MS, Dekker A |
| 11:00 – 11:15 | Personalized guideline-based treatment recommendations using natural language processing techniques  
Becker M, Böckmann B |
| 11:15 – 11:30 | HTP-NLP: A new NLP system for high throughput phenotyping  
Schlegel D, Crowner C, LeHoullier F, Elkin P |
| 11:30 – 11:45 | Natural language processing pilot study for clinical trial pre-screening through to enrolment  
Thompson S |
| 11:45 – 12:00 | Temporal expression extraction and normalization in Italian clinical reports  
Viani N, Napolitano C, Priori SG, Bellazzi R, Sacchi L |
Recently, two ‘smart’ shoulder rehabilitation devices have been engineered to address the lack of data driven, objective and targeted care in the field of shoulder rehabilitation. The technology has captured patient details, prescribed exercises, compliance and patient progress at The Royal National Orthopaedics Hospital and Bedford Hospital in 2016.

An analytical dashboard will be demonstrated. It has been developed for clinicians to explore summary statistics and visualisations of the data captured. This dashboard also includes a predictive model, where the inputs are patient details and outputs include likelihood of compliance, most frequently prescribed exercises and most frequently used assessments.

Dr Asim Ismail Bhuta, MUJO Mechanics Ltd.
Mr. Richard Williams, The University of Manchester
Dr Niels Peek, The University of Manchester
Mr. Douglas Alasdair Goodwin Higgins, MUJO Mechanics Ltd.

Sally Okun, Vice President for Advocacy, Policy and Patient Safety, PatientsLikeMe

The journey of illness brings many uncertainties, unexpected events, raw emotions and endless questions. Often we find ourselves moving from one experience to the next in unfamiliar environments surrounded by strangers using their specialized language, inherited cultural norms and standardized approaches to our care and treatment. While the journey is uniquely our own, we have much to learn from those who have been on this path before us. Deng Xiaoping’s quote, ‘crossing the river by feeling the stones’, aptly describes the potential of digitized health informatics to harness the power of our collective knowledge and experiences to build a continuously learning health network that enables our personalized journeys towards health and thriving.
<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>13:00 – 13:30</td>
<td>Closing Ceremony</td>
<td>Exchange Auditorium</td>
</tr>
<tr>
<td></td>
<td>EFMI and Farr Awards Ceremony</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Professor Anne Moen, Professor Damon Berridge</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Invitation to MIE 2018</td>
<td></td>
</tr>
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<td>Dr Maria Hägglund</td>
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<td></td>
<td>Closing by the Local Organising Committee</td>
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<tr>
<td></td>
<td>Dr Niels Peek</td>
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<tr>
<td>13:30 – 14:15</td>
<td>Lunch</td>
<td>Exchange Hall</td>
</tr>
</tbody>
</table>
Poster sessions will take place at the following times throughout the conference:

**Monday 24th April**
- **12:30 – 14:00 (Lunch)** – All odd numbered posters
- **17:30 – 19:30 (Welcome reception)** – All posters

**Tuesday 25th April**
- **13:00 – 14:30 (Lunch)** – All even numbered posters

### Big data platform and methods

<table>
<thead>
<tr>
<th></th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The eLab platform: realising reproducible collaborative analyses of harmonised data</td>
</tr>
<tr>
<td>2</td>
<td>Obesity and Cancer TOgether imPact Upon Survival (OCTOPUS) consortium</td>
</tr>
<tr>
<td></td>
<td>‘Cancer e-lab’: a federation meta-analysis of trial data</td>
</tr>
<tr>
<td>3</td>
<td>Big data platform for comparing data-driven pathways for warning potential complications in patients with diabetes</td>
</tr>
<tr>
<td></td>
<td>Pardo-Mas JR, Tortajada S, Sáez C, Garcia-Gomez JM, Valdivieso B</td>
</tr>
<tr>
<td>4</td>
<td>Facebook ‘Likes’ do not accurately predict symptom reports: a machine learning study</td>
</tr>
<tr>
<td></td>
<td>Gibbons C</td>
</tr>
<tr>
<td>6</td>
<td>Big difference? Harnessing big data for two of the world’s largest biobanks</td>
</tr>
<tr>
<td></td>
<td>Sansome S, Adamska L</td>
</tr>
<tr>
<td>7</td>
<td>The ELASlC (electronic longitudinal alcohol study in communities) project</td>
</tr>
<tr>
<td>8</td>
<td>GlobalSurg: enabling global health research in surgery</td>
</tr>
<tr>
<td></td>
<td>Drake T, Ots R, Shaw C, Harrison E</td>
</tr>
<tr>
<td>Conference Posters</td>
<td>Title</td>
</tr>
<tr>
<td>-------------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>9</td>
<td>Promoting the reproducibility of team health science – distributed analytics under restrictive data policies</td>
</tr>
<tr>
<td>10</td>
<td>Using the Nextflow framework for reproducible in-silico omics analyses across clusters and clouds</td>
</tr>
<tr>
<td></td>
<td><strong>Data and text mining, machine learning, predictive modelling</strong></td>
</tr>
<tr>
<td>11</td>
<td>Design, construction, acquisition and targeting of resources in the domain of cognitive impairment</td>
</tr>
<tr>
<td>12</td>
<td>Predictive modelling with machine learning based variable selection: a study on 30-day readmission prediction</td>
</tr>
<tr>
<td>13</td>
<td>Decision support systems in healthcare – velocity of apriori algorithm</td>
</tr>
<tr>
<td>14</td>
<td>Automated PDF highlights for faster curation of neurodegenerative disorder literature</td>
</tr>
<tr>
<td>15</td>
<td>Steps to modelling of physical-activity-related adherence in patients with heart disease literature review on adherence influence factors</td>
</tr>
<tr>
<td>17</td>
<td>Using consensus clustering and resampling to identify stable subclasses of disease</td>
</tr>
<tr>
<td>18</td>
<td>Using machine learning methods to create chronic disease case definitions in a primary care electronic medical record</td>
</tr>
</tbody>
</table>
## Predicting diabetic foot ulcer outcome: the potential use of on-site observations
Schaarup C

### Predicting asthma at age 8: the application of machine learning methods

### A precision medicine approach to the prediction of kidney stones formation for an at-risk population of individuals admitted to the ER
Chen Z, Bird V, Prosperi M

### Patient flow networks and emergency department performance
Bean D, Dobson R, Stringer C, Teo J

### Data quality issues with using the MIMIC-III dataset for process mining in healthcare
Kurniati AP, Johnson O, Hogg D, Hall G

### Process analysis in cardiovascular disease using process mining
Kusuma GP, Johnson O, Bennett B

### Mapping reporting checklist questions against biomedical literature
Alrdahi H, Nenadic G, Brass A, Sattler U

### Exploring multimorbidity using Bayesian models with time-based abstractions
Silva C, Lobo M, Rodrigues PP

### Data integration and electronic phenotyping

#### Impact of linkage error in a national mother-baby data linkage cohort
Harron K, Gilbert R, van der Meulen J

#### Datasets of interest to researchers studying UK primary care and related topics
McDonnell L, Sullivan F, Delaney B

#### Challenges and results with the record linkage of Austrian health insurance data of different sources
Glock B, Endel F, Endel G, Popper N
<table>
<thead>
<tr>
<th></th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>A tool to improve the efficiency and reproducibility of research using electronic health record databases</td>
<td>Al Sallakh M, Rodgers S, Lyons R, Sheikh A, Davies G</td>
</tr>
<tr>
<td>33</td>
<td>Genealogical information from co-insurance networks in pseudonymised administrative claims data in Austria</td>
<td>Endel F</td>
</tr>
<tr>
<td></td>
<td><strong>Epidemiology and biostatistics</strong></td>
<td></td>
</tr>
<tr>
<td>34</td>
<td>Motor vehicle crashes and dementia: a population-based study</td>
<td>Meuleners L, Hobday M</td>
</tr>
<tr>
<td>35</td>
<td>Validation of the recording of asthma diagnosis in UK electronic health records (Clinical Practice Research Datalink)</td>
<td>Nissen F, Douglas I, Smeeth L, Morales D, Muellerova H, Quint J</td>
</tr>
<tr>
<td>36</td>
<td>Misdiagnosis of COPD in asthma patients in the UK using the Clinical Practice Research Datalink</td>
<td>Nissen F, Douglas I, Smeeth L, Muellerova H, Morales D, Quint J</td>
</tr>
<tr>
<td>37</td>
<td>Prescriptions dispensed in the community pre - and post-cancer diagnosis in England</td>
<td>Henson K, Coupland V, Shand B, Hunter K, Godfrey P, Brock R</td>
</tr>
<tr>
<td>No.</td>
<td>Title</td>
<td>Authors</td>
</tr>
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<td>-----</td>
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<td>---------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>39</td>
<td>A systematic root cause analysis into the increase in Escherichia coli bacteraemia in Wales over the last 10 years</td>
<td>Song J, Walters A, Akbari A, Heaven M, Lyons R, Berridge D, Heginbothom M, Arnott J</td>
</tr>
<tr>
<td>41</td>
<td>Comorbidities and categorical alcohol intake in relation to upper gastro-intestinal (GIB) and intracerebral (ICB)</td>
<td>Shukla S, Amarilla Vallejo A, Durbaba S, Cornelius V, Ashworth M, Molokhia M</td>
</tr>
<tr>
<td>42</td>
<td>Challenges in using hierarchical clustering to identify asthma subtypes: choosing the variables and variable transformation</td>
<td>Deliu M, Yavuz T, Sperrin M, Sahiner U, Belgrave D, Sackesen C, Custovic A, Kalayci O</td>
</tr>
<tr>
<td>43</td>
<td>High-dimensional statistical approaches for heterogeneous molecular data in cancer medicine</td>
<td>Staedler N, Dondelinger F, Mukherjee S</td>
</tr>
<tr>
<td>44</td>
<td>Regional administrative health databases in Italy: A census and practical remarks</td>
<td>Gesuita R, Guardabasso V, Villani S, Zambon A, Borrelli P, Skrami E, Trerotoli P</td>
</tr>
<tr>
<td>45</td>
<td>Demonstrating the feasibility of using electronic health records in genome-wide association studies: a case study in the UK biobank</td>
<td>Fatemifar G, Katsoulis M, Patel R, Hemingway H, Denaxas S</td>
</tr>
<tr>
<td>46</td>
<td>Can primary care electronic health records facilitate the prediction of early cognitive decline associated with dementia? A systematic literature review</td>
<td>Mackintosh M</td>
</tr>
<tr>
<td>47</td>
<td>Assessing the association between different patient indexing strategies and effective indexing during the implementation of an electronic medical records system in the public health system of Buenos Aires, Argentina</td>
<td>Esteban S, Alassia L, Baum A, Palermo C, Gonzalez Bernaldo de Quiros F</td>
</tr>
<tr>
<td>48</td>
<td>Assessing the association between age and the probability of being indexed in a master patient index within the process of implementing an electronic medical records system in the public health system of Buenos Aires, Argentina.</td>
<td>Esteban S, Rodriguez Tablado M, Recondo F, Baum A, Gonzalez Bernaldo de Quiros F</td>
</tr>
<tr>
<td></td>
<td>Conference Posters</td>
<td></td>
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<tr>
<td>---</td>
<td>-------------------</td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>A new data opportunity for community nutrition surveillance: estimating spatial patterning of dietary behaviours using grocery transaction data. Mamiya H, Moodie E, Buckeridge DL</td>
<td></td>
</tr>
<tr>
<td>51</td>
<td>Capturing provenance of visual analytics in social care needs. Xu S, Rogers T, Curcin V</td>
<td></td>
</tr>
<tr>
<td>52</td>
<td>Exploring the extent to which prescribing and dispensing dose instructions differ. Nangle C, McTaggart S, Caldwell J, Bennie M</td>
<td></td>
</tr>
<tr>
<td>53</td>
<td>The Biomedical Informatics Network for Education, Research and Industry (BINERI) at the University of Leicester. Beck T, Brookes A</td>
<td></td>
</tr>
<tr>
<td>56</td>
<td>Mapping clinical care and research data to HL7 FHIR to improve sharing and reuse. Ulrich H, Kock-Schoppenhauer AK, Andersen B, Duhm-Harbeck P, Ingenerf J</td>
<td></td>
</tr>
<tr>
<td>58</td>
<td>A ‘One Health’ antibacterial prescription surveillance approach developed through the use of health informatics. Sanchez-Vizcaino F, French N, Hungerford D, Singleton D, Christley R, Radford A</td>
<td></td>
</tr>
</tbody>
</table>
### conference posters

<table>
<thead>
<tr>
<th></th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>59</td>
<td>Validation of a case definition for depression in administrative data using a chart review reference standard</td>
<td>Doktorchik C, Eastwood C, Peng M, Quan H</td>
</tr>
<tr>
<td>60</td>
<td>Differential impact on presentations types and equity following the relocation of a metropolitan emergency department.</td>
<td>Kok MR, Tuson M, Boruff B, Vickery A, Whyatt D</td>
</tr>
<tr>
<td>61</td>
<td>A methodology for optimising spatial accessibility to inform rationalisation of specialist health services</td>
<td>Smith C, Hayward A</td>
</tr>
<tr>
<td>62</td>
<td>Is hearing loss an early complication of diabetes?</td>
<td>Cichosz S, Hejlesen O</td>
</tr>
<tr>
<td>65</td>
<td>The Manitoba meta-data mapping project</td>
<td>Lix L, Srisakuldee W</td>
</tr>
<tr>
<td>66</td>
<td>Linguistic phenotypes and early cognitive impairment: complementary diagnostic tools with potential for dementia diagnosis</td>
<td>Lundholm Fors K, Kokkinakis D</td>
</tr>
<tr>
<td>67</td>
<td>Health data visualisation for consumer / patient, clinician, and researcher insights</td>
<td>Bakken S, Arcia A, Dowding D, Yoon S, Merrill J</td>
</tr>
<tr>
<td>68</td>
<td>GIS Mapping of dengue incidence in Punjab, Pakistan</td>
<td>Atique S, Hsu CY, Shabbir SA</td>
</tr>
</tbody>
</table>

#### Connected and digital health

<table>
<thead>
<tr>
<th></th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>69</td>
<td>Identifying key variables for inclusion in a smartphone app to support clinical care and research in patients with rheumatoid arthritis</td>
<td>Austin L, Sanders C, Dixon W</td>
</tr>
</tbody>
</table>
| 70 | Electromagnetic interference with medical devices by high-speed power line communication  
Hanada E, Ishida K, Hirose M, Kano T |
| 71 | Integrating a mHealth application into the EHR ecosystem of Andalusian health public system  
Martínez-García A, Ordoñez-Benavente R, Rodríguez-Suarez S, Barrera-Benitez S, Grande-Navarro JA, Parra C |
| 72 | Presentation of laboratory test results in patient portals: effect on risk interpretation and patient interaction  
| 73 | A secured architecture enabling to link clinical information system with consumer health mobile applications  
Ehrler F, Duret C, Collin T, Lovis C |
| 74 | Automatic detection of nursing activities in home care with portable and ambient sensors  
| 75 | The features patients ‘want’ in a smartphone app to support asthma self-management and their clinical effectiveness: a systematic review of the telehealth interventions and online discussion forums  
Hui CY, Walton R, McKinstry B, Parker R, Jackson T, Vasileiou E, Pinnock H |
| 76 | The RADAR platform: an open source generalised mHealth data pipeline  
| 77 | Quanti-Kin Web: a web tool for ELISA assay processing  
Giacomini M, Bertolini S, Martini I, McDermott J, Lazarova E, Gazzarata G, Gazzarata R, Varnier O |
| 78 | A CTS2 compliant solution for semantics management in laboratory reports at regional level  
| 79 | SleepyLab: An extendable mobile sleeplab based on wearable sensors  
Burgdorf A, Agila Bitsch J, Jonas SM |
<table>
<thead>
<tr>
<th>No.</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>80</td>
<td>Impact of large flash memory and thin – client infrastructure for the EHR and PACS sharing system with XDS/XDS-I</td>
<td>Kondoh H, Mochida M, Kawai T, Nishimuara M, Yamaguchi T, Ide D</td>
</tr>
<tr>
<td>81</td>
<td>When do people read their health record? – Analysis of usage data of a national eHealth service giving patients access to their electronic health record</td>
<td>Scandurra I, Pettersson M, Hagglund M</td>
</tr>
<tr>
<td>82</td>
<td>Importing patient generated health data from wearable devices to multiple sclerosis quality register</td>
<td>Fardis M, Zary N</td>
</tr>
<tr>
<td>83</td>
<td>Implementation of mHealth interventions in low income settings: overcoming the risk for prioritising up-scaling over evidence</td>
<td>Mndeme M, Fraser H, Clamp S, Mirzoev T</td>
</tr>
<tr>
<td>84</td>
<td>PhysioDom HDIM</td>
<td>Franco M, Sánchez S, Jovell E, Roca R, Ferry M, Pilichowski P</td>
</tr>
<tr>
<td>85</td>
<td>The application of a web-based decision support aid to the selection of treatment options for osteoarthritis</td>
<td>Wortley S, Salkeld G, Dowie J, Umapathy H, Hunter D</td>
</tr>
<tr>
<td>86</td>
<td>Factors affecting patients’ use of electronic personal health records</td>
<td>Abd-alrazaq A, Gardner P, Fraser H</td>
</tr>
<tr>
<td>87</td>
<td>Main usability problems of a home monitoring tool for heart failure patients and COPD patients: connecting medical hardware with app interface</td>
<td>Albers H, Wildenbos GA, Breteler MJ, Peute L, Jaspers M</td>
</tr>
<tr>
<td>88</td>
<td>Design of a BPM model for Crohn’s clinical process</td>
<td>De Ramon Fernandez AA, Ruiz-Fernández D, Gilart V, Marcos Jorquera D</td>
</tr>
<tr>
<td>90</td>
<td>A intelligence application of health information monitoring and telehealthcare for surgical operations on elderly patients</td>
<td>Wu JM, Ho TW, Chang YT, Hsu CC, Lai F</td>
</tr>
</tbody>
</table>
| 91 | Nurses' needs on the adoption of hospital IoT-based service  
Kang Sj, Baek Hy, Jung Ej, Hwang H, Yoo S |
| 92 | The quantified outpatient – challenges and opportunities in 24hr patient monitoring  
| 93 | Solution for work flow management of surgical operation  
Park MW, Kim JK, Lee SH |
| 94 | Tech-no or tech-yes? Insights from older adults on digital monitoring for physical and cognitive health  
Stringer G, Jury F, Branson A, Poliakoff E, Leroi I, Couth S |
| 95 | MoveFit: a healthy lifestyle application  
Tufte T, Babic A |

Human, organisational, and social aspects

| 96 | Developing a genetic analysis system for clinical purposes  
Skorve E, Eike MC, Håndstad T, Grünfeld T |
| 97 | Literature review of potential use errors of adrenaline auto-injection pens  
Weinhold T, Del Zotto M, Rochat J, Lovis C, Schiro J, Pelayo S, Marcilly R |
| 98 | Large-scale hospital IT service desk process implementation success analysis  
Turkeli S, Aydın T |
| 99 | Intelligent assistance services and personalised learning environments for support of knowledge and performance in interdisciplinary emergency care  
| 100 | A literature review to define concepts and dimensions of ecological validity/fidelity for usability validation  
| 101 | Potential use errors of ANI Monitor to evaluate patient pain and discomfort  
## Conference Posters

<table>
<thead>
<tr>
<th>#</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>102</td>
<td>Simulated data: an object oriented approach</td>
<td>Anastasiou A</td>
</tr>
<tr>
<td>103</td>
<td>User-oriented oncological wiki through requirements prioritisation based on kano-classification</td>
<td>Schlue D, Breil B, Haier J</td>
</tr>
<tr>
<td>104</td>
<td>Design for governing the flow of data in a complex, multi-stakeholder and multi-jurisdictional health informatics project across Canada</td>
<td>Keshavjee K, Sullivan F, Greiver M, Willison D</td>
</tr>
<tr>
<td>105</td>
<td>EyeDraw Pedigrees: a case study in applying user-centred design to open source, clinical software development</td>
<td>Cross M, Aylward G, Rahi J</td>
</tr>
<tr>
<td>106</td>
<td>Usability across health information technology systems: searching for commonalities and consistency</td>
<td>Koppel R, Kuziemsky C</td>
</tr>
<tr>
<td>107</td>
<td>Using Massive open online courses for medical initial training</td>
<td>Douali N, Jaulent MC</td>
</tr>
<tr>
<td>108</td>
<td>Perceptions of barriers and facilitators to the sharing and linkage of health related data – How the DASSL model responds</td>
<td>Moran R</td>
</tr>
<tr>
<td>109</td>
<td>Towards a medical informatics curricula visualisation and analysis tool</td>
<td>Broens T, Wiesman F, Jaspers M</td>
</tr>
<tr>
<td>110</td>
<td>Establishing safe and efficient “read-through” indexes for Scottish informatics and linkage collaboration</td>
<td>Clark D, Donnelly G, King A</td>
</tr>
<tr>
<td>111</td>
<td>Flipped versus traditional classroom in a small-scale programming course</td>
<td>Wiesman F, Broens T, Jaspers M</td>
</tr>
<tr>
<td>112</td>
<td>Automating clinical pathways using executable business process model and notation</td>
<td>Chandrabalan VV, Shanmugham M</td>
</tr>
</tbody>
</table>
### Knowledge management

113. Making the complex data model of a clinical research platform accessible for teaching  
Rinner C, Duftschmid G, Wrba T, Gall W

114. The case for a more efficient and effective EHR system: the Portuguese files  
Oliveira BM, Guimarães RV, Antunes LF, Rodrigues PP

115. Governance of shared health information in Canada  
Keshavjee K, Dong L, Anderson S, Edlund D, Brien C, Davis S

116. Towards a clearer vocabulary for clinical knowledge representations: being more precise than “Ontology”  
Rector A, Rodrigues JM, Chute C

117. Methods for enhancing biomedical research data discoverability  
McMahon C, Denaxas S, Gregory A, Castillo T

118. Patient flow modelling and scheduling using point interval temporal logic  
Chishti I, Basukoski A, Chaussalet T

119. Moving WHO International Classification of Health Interventions (ICHI) towards semantic interoperability  
Rodrigues Jm, Kim S, Trombert-Paviot B

120. Release of the standard export data format by the Japanese circulation society for standardised structured medical information exchange extended storage  
Nakayama M

121. Addressing SNOMED CT description logic modelling errors in issues with finding site  
Dewenter H, Heitmann KU, Thun S

122. Application and reuse of metadata for healthcare quality indicators  
White P, Roudsari A

123. XML representation of WHO International Classification of Health Interventions (ICHI)  
Kim S, Lee JJ, Rodrigues JM, Trombert B, Ten Napel H
### conference posters

| 124 | Developing a standardised minimum dataset for mitochondrial research data – a project outline  
Neururer SB, Gnaiger E, Laner V, Goebel G |
| 125 | Discharge abstract data quality changes over time: comparing validity of 2003 and 2015 ICD-10 CA coding of Charlson and Elixhauser conditions, and adverse events  
Eastwood C, Southern D, Fox D, Grosu O, Kim E, King C, vanKampen N, Wiebe N, Quan H |
| 126 | Developing a set of administrative case definitions for identifying sleep disorders in ICD-coded data  
Jolley R, Liang J, Chen G, Southern D, Quan H |

### Quality, safety and patient outcomes

| 127 | How to teach health IT evaluation: recommendations for health IT evaluation courses  
| 128 | Supporting utility coefficient elicitation in a shared-decision making context  
Salvi E, Parimbelli E, Quaglini S, Sacchi L |
| 129 | The MultiMorbidity model for care coordination by general practitioners  
Beukenhorst A, Sent D, Mosis G |
| 130 | C3-Cloud: a federated collaborative care and cure cloud architecture for addressing the needs of multi-morbidity and managing poly-pharmacy  
Laleci Erturkmen GB, Yuksel M, Arvanitis T |
| 131 | Comparative effectiveness of non-vitamin K antagonist oral anticoagulants and warfarin in the Scottish atrial fibrillation population: the value of real world evidence  
Ciminata G, Claudia Geue C, Wu O, Langhorne P |
| 132 | Determining the accuracy of routinely-collected health datasets for identifying neurodegenerative disease cases: UK Biobank approach  
Wilkinson T, Ly A, Harding Z, Schnier C, Sudlow C |
<table>
<thead>
<tr>
<th>No.</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>133</td>
<td>Towards quality health data: defining the health data pyramid</td>
<td>Lockery JE, Collyer TA, McNeil JJ</td>
</tr>
<tr>
<td>134</td>
<td>Use of cognitive and behavioural theory in clinical decision support systems: systematic review</td>
<td>Medlock S, Abu-Hanna A</td>
</tr>
<tr>
<td>137</td>
<td>Designing a bedside application for adverse event reporting</td>
<td>Aserod H, Babic A</td>
</tr>
<tr>
<td>138</td>
<td>PITeS-TiiSS: complex chronic patient personalised decision support</td>
<td>Cruz Díaz NP, Martínez-García A, Garcia Lozano MJ, Barón Franco B, Moreno Gaviño L, Parra C</td>
</tr>
<tr>
<td>139</td>
<td>Canadian primary care EMRs as the basis for a registry RCT</td>
<td>Sullivan F, Keshavjee K, OO’Neill B, Greiver M</td>
</tr>
<tr>
<td>140</td>
<td>User-centred design of eHealth technology for patients and professionals in productive teams – multidisciplinary work across organisational borders</td>
<td>Smaradottir B, Martinez S, Fensli R</td>
</tr>
<tr>
<td>141</td>
<td>Blood pressure data quality assessment in Canadian and UK Edata: How blood pressure is recorded?</td>
<td>Peng M, Wagle S, Quan H, Williamson T, Chen G</td>
</tr>
<tr>
<td>142</td>
<td>Measuring quality of teleconsultation services from the patients’ perspective: development of a questionnaire</td>
<td>Thijssing L, Tensen E, Horenberg F, Jaspers M</td>
</tr>
</tbody>
</table>
## Conference Posters

<table>
<thead>
<tr>
<th>Number</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>144</td>
<td>Survival following discharge from critical care</td>
<td>Walters A, Lyons R, Berridge D, Pugh R, Battle C, Hope D, Rawlinson D, Szakmany T</td>
</tr>
<tr>
<td>145</td>
<td>Real time capture of routine clinical data in the hospital electronic health record using a purpose built power-form</td>
<td>Bodagh N, Archbold A, Weerackody R, Barnes M, Robson J, Timmis A</td>
</tr>
<tr>
<td>146</td>
<td>Sharing medical images: challenging issues and lessons learned from pilot implementation at a tertiary University hospital in South Korea</td>
<td>Kim T, Yoo S, Baek Hy, Heo E, Kim Jw, Hwang H</td>
</tr>
<tr>
<td>147</td>
<td>Feasibility of electronic quality indicators for inpatient falls based on data from ENRs</td>
<td>Cho I, Boo EH, Kim YH, Lee SY</td>
</tr>
<tr>
<td>150</td>
<td>REACT (REal-time Analytics for Clinical Trials) supporting clinical trials at the Christie hospital through the iDEcIDE framework</td>
<td>Bradford J, Landers D</td>
</tr>
<tr>
<td>151</td>
<td>ePrescribing – how does it affect reported medication errors?</td>
<td>Thompson C, Evans R</td>
</tr>
<tr>
<td>152</td>
<td>European comparison of spinal surgery hospitalisations from 2010 to 2013 according to patient profiles</td>
<td>Brasseur P, Blein C, Deleotoing L, Amaz C, Tournier C, Vainchtock A</td>
</tr>
<tr>
<td>153</td>
<td>Audit and feedback in primary care; effectiveness and informatics</td>
<td>Lavigne M, Buckeridge DL, Hughes JB</td>
</tr>
<tr>
<td>154</td>
<td>Predicting 90-day hospital readmission risk for chronic obstructive pulmonary disease (COPD) patients using health administrative data from Quebec, Canada</td>
<td>Liu EY, Verma A, Jahagirdar D, Bourbeau J, Buckeridge DL</td>
</tr>
<tr>
<td>155</td>
<td>On the variability patterns in general practitioners prescribing behaviour</td>
<td>Bucholc M, O’Kane M, Wong-Lin K</td>
</tr>
</tbody>
</table>
Pre-Conference City Tours – Sunday 23 April
Ticketed events must be pre-booked

Science and Engineering Walking Tour
14:30 – 16:30
£15
Meeting Point: Exchange Foyer, Manchester Central, Windmill Street, Manchester, M2 3GX.

Manchester is one of the first cities of the industrial revolution and the original modern city. Much of the city’s success over the years has been linked with science and engineering. Early local inventions in textile machinery kick-started the cotton industry here. John Dalton and James Joule worked in the city in the nineteenth century on the principles of modern chemistry and physics. Ernest Rutherford split the atom, Alan Turing helped to build the first modern computer, and most recently, graphene was discovered here. Manchester is a city built on industry and those industries were built on science and engineering.

This walking tour led by a knowledgeable local guide will take in key sites in the city. On this atom splitting, computer coding, transport revolution tour you will see how Manchester led the way.

Runaway Microbrewery Tour and Tasting
15:30 – 18:30
£20
Meeting Point: Exchange Foyer, Manchester Central, Windmill Street, Manchester, M2 3GX.

The Runaway Brewery was founded in 2014 by two old friends who came together to take on a new challenge and join the movement to help modernise British beer and beer culture.

You will be taken on a guided tour of the brewery, which will include a short talk about the origins and an introduction to the
key brewing ingredients and how they are used to make the beer. You will then be given the opportunity to sample the beers in the pop-up bar, served with a variety of cheese and bar snacks.

The ticket price includes a tour of The Runaway Brewery, beer tasting (four beers) followed by a drink and snacks at the brewery bar.

Please note: there will be a walk of approximately 20 minutes (one mile) each way from Manchester Central to the brewery.

Northern Quarter Food Walk
16:00 – 19:00
£30
Meeting Point: Lobby, Doubletree by Hilton, One Piccadilly Place, 1 Auburn Street, Manchester, M1 3DG.

The city’s bohemian district, the Northern Quarter, was once home to busy cotton mills and textiles warehouses. Now, the red brick buildings are regularly used in film sets to double as New York, and the area is teeming with independent cafés, shops, bars, and some of the city’s best street art.

This tour includes a roving feast of six small plates in the best Northern Quarter eateries, accompanied by stories of Manchester’s boho district, old and new.

This Northern Quarter taster tour, centred on the area east of Newton Street, looks at the district’s history, from its historic markets, shops and rag traders to its cultural regeneration, highlights and attitude of today.

The ticket price includes a bottle of water and all food and guiding. Other drinks not included.
Pint of Science – Sunday 23 April
19:00 – 21:00
SOLD OUT
Venue: Terrace Bar, 3 Thomas Street, Manchester M4 1NA.

Join us for a relaxed evening of science – in the pub! Dr Allan Tucker will look at some of the key figures in Artificial Intelligence during the last century through to the state-of-the-art learning machines that are all around us today and asks whether we will ever really have intelligent machines that are comparable to humans.

Welcome Reception and Poster Session – Monday 24 April
17:30 – 19:30
Venue: Exchange Hall, Manchester Central
Open to all Informatics for Health 2017 delegates (badge required)

We would like to invite all participants to join us for the official welcome reception which will take place in the exhibition hall at Manchester Central. Attendees will have the opportunity to listen to presentations from poster authors and network with friends, colleagues and industry partners in a relaxed atmosphere whilst enjoying drinks and canapés.

Stand and Be Counted Theatre Presents: The Nest – Monday 24 April
19:30 (Doors 19:00)
Venue: 53Two, Lawrence House, 8 Albion Street, Manchester, M1 5NZ.
Tickets: £5 + £0.50 booking fee.
Visit http://www.wegottickets.com/event/388745

In a world where information is constantly being exchanged, how much are you willing to share?
The Nest is an interactive drama produced by SBC Theatre exploring how and why people's attitudes towards the sharing of data, health data and patient records can differ and at times conflict.

**Conference Gala Dinner – Tuesday 25 April**

- **19:30 – 00:00**
- **Venue:** Manchester Cathedral
- **Tickets:** £70 + VAT
- **Dress Code:** Smart casual

*A limited number of tickets may be available to purchase onsite – please contact the registration desk to enquire.*

The conference gala dinner will be held at the beautiful Manchester Cathedral, a Grade I listed medieval structure, which dates from 1421 and was built by Henry V.

Located in the heart of the city centre, the Cathedral was extensively refaced, restored and extended in the Victorian period. The building boasts a beautiful interior awash with historical features which offers one of the most breathtaking spaces in Manchester.

The gala dinner promises to be a fantastic night of networking, excellent food, and live music from The New York Brass Band, a 7-piece brass band, with a line-up of percussion, sax, trumpets, trombones and sousaphone.

The band take its inspiration from contemporary New Orleans musicians, but have a repertoire that ranges from Tom Jones to Lady Gaga, from The Beatles to Stevie Wonder, with some funky northern originals thrown in for good measure.
Clinical Practice Research Datalink (CPRD)

Clinical Practice Research Datalink (CPRD) is a governmental, not-for-profit research centre, facilitating and conducting world class public health observational research and interventional real world clinical trials using electronic health records. The richness and depth of its longitudinal data makes CPRD the observational research data provider of choice for regulators, industry and academics across the globe. CPRD also supports patient and physician questionnaire and trial management services, including feasibility studies, patient recruitment brokerage and post-marketing real world pragmatic clinical trials.

Connected Health Cities (CHC)

Connected Health Cities (CHC) is a £20m investment by the Department of Health targeted in the city regions of North England. Delivered on behalf of the Northern Health Science Alliance, CHC is safely and securely combining population data and technology to address chronic disease burdens and reduce early mortality in therapeutic areas most relevant to the local population. Working with the public, CHC is uniting experts from academia, NHS and industry to improve health services.
ELIXIR unites Europe’s leading life-science organisations in managing and safeguarding the massive amounts of data being generated in publicly funded research. It coordinates, integrates and sustains bioinformatics resources across its Member States and enables users in academia and industry to access vital services for their research.

The European Federation for Medical Informatics (EFMI) is the leading nonprofit organization in biomedical and health informatics in Europe. The Federation comprises 28 national societies and includes an exceptional network of experts and stakeholders in health, care, IT and its societal dimensions; supported by more than ten topic working groups ranging from human factors, to security and natural language processing. EFMI is committed to health for all underpinned by information and communication technology.
Health Innovation Manchester (HInM) is a partnership between the region’s academic and research institutions, our NHS and social care providers, and industry. Our purpose is to align the strengths of this partnership to the health and social care needs of our 2.8m citizens, and accelerate the discovery, development, and delivery of innovations which will improve the health and wellbeing of Greater Manchester.

To learn more visit us on stand 8 or online at www.healthinnovationmanchester.com

Institute for Clinical Evaluative Sciences (ICES) Located in Toronto, Ontario, Canada, the Institute for Clinical Evaluative Sciences (ICES) leads cutting-edge population-based health research to evaluate health care delivery and outcomes for Ontario’s more than 13 million residents. ICES researchers access a vast and secure array of health-related data, including population-based health surveys, anonymous patient records, as well as clinical and administrative databases. ICES goes to great lengths to protect privacy and is recognized as an international leader in maintaining the privacy and security of health information.

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Intelligent Medical Objects (IMO)

Intelligent Medical Objects (IMO) is the market leader in terminology services for electronic healthcare records systems. With IMO ProblemIT Terminology, users gain access to over 260,000 clinician-friendly medical terms and concepts seamlessly mapped to all standard international nomenclatures and code sets. IMO provides Clinical Interface Terminology to support the use of ICD-10 and the adoption of SNOMED CT® in recording symptoms, diagnoses, and co-morbidities. Learn more at www.e-imo.com and follow us on Twitter @IMOolutions

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Our mission is to improve quality of care and support health and social care integration, along with promoting financial sustainability. Our solutions reflect our understanding of what is required to accomplish these goals together. They include:

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- Atmolytics, our powerful data discovery and self-service analytics platform
- Over 100 assessment, care and support planning tools for key areas of health and social care
IOS Press publishes more than 100 international journals and approximately 75 book titles each year, ranging from computer sciences and mathematics to medicine and natural sciences.

The book series Studies in Health Technology and Informatics was started in 1990 and over 230 volumes have been published. The series has been accepted by MEDLINE/PubMed, Scopus, Embase, EMCare, Book Citation Index – Science and Thomson Reuters’ Conference Proceedings Citation Index. All the volumes are available as ebooks.

The Manchester Cancer Research Centre was established in 2006 as a partnership between The University of Manchester, Cancer Research UK and The Christie NHS Foundation Trust, and now incorporates other NHS Trusts within Greater Manchester as part of the Manchester Academic Health Science Centre (MAHSC).

The Centre brings together the expertise and resources of our partner organisations, all of which have formidable individual reputations. Unitig scientists and clinical staff, our partnership creates the integrated approach essential to progress.
### Northern Health Science Alliance (NHSA)

The Northern Health Science Alliance (NHSA) is a partnership, established by the leading Universities and NHS Hospital Trusts in the North of England, to improve the health and wealth of the region through its internationally recognised health science system. The NHSA covers a population of 15 million – bringing together research, health science innovation and commercialisation. We work directly with companies to provide benefits for researchers, universities, hospitals, patients and commercial partners. The NHSA leads the £20m Health North: Connected Health Cities project.

Visit [www.theNHSA.co.uk](http://www.theNHSA.co.uk)

### SAIL Databank

SAIL Databank is a world-class complete solution to sourcing, accessing, linking and analysing anonymised health and population data all within a robust, proportionate governed infrastructure that is safe and secure. Researchers can access a broad range of routinely collected data spanning up to 20 years from an entire population. SAIL Databank provides you with pre-linked, anonymised datasets ready for analysis that can be accessed remotely via our unique SAIL Gateway platform, complete with analysis tools.

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Tel: +4 (0)1792 602351
### The Farr Institute of Health Informatics Research

The Farr Institute is a UK-wide research collaboration involving 21 academic institutions and health partners in England, Scotland and Wales. Publicly funded by a consortium of ten organisations led by the Medical Research Council, the Institute is committed to delivering high-quality, cutting-edge research using ‘big data’ to advance the health and care of patients and the public.


### The International Population Data Linkage Network (IPDLN)

The International Population Data Linkage Network (IPDLN) facilitates communication between centres specializing in data linkage and users of linked data. The network is committed to the systematic application of data linkage to produce community benefit in population and health-related domains. For 2016-2018, Directorship is co-led by Dr William Ghali from the O’Brien Institute for Public Health, University of Calgary and by Dr Michael Schull from the Institute for Clinical Evaluative Sciences (ICES). The biennial IPDLN conference is set for September 2018 in Banff, Canada.

### Timberlake Consultants Ltd

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