We are delighted to present the 2018 annual report for the Institute of Infection and Global Health (IGH).

The report looks at some of the major developments over the past 12 months, and also our priorities going forward. It shows how we are making clear progress against the five major research challenges identified through our strategic plan (2016-21). Highlights this year include:

- Continued progress in tackling the Zika epidemic, including major publications and new funding obtained for vaccine development.
- The creation of a new Centre for Sustainable Food Systems, led by the recently appointed N8 Chair of Food Security.
- Major success in securing Global Challenges Research Funding.
- The establishment of the Centre for Excellence in Infectious Diseases Research (CEIDR) bringing together infection expertise from the University and Liverpool School of Tropical Medicine.
- The launch of the Centre for Global Vaccine Research which has already attracted considerable external funding for the development of new vaccines.
- Recognition of the excellence of our research in pneumococcal disease with the award of an MRC programme grant.
- Ongoing support for early career researchers with Henry Dale & Intermediate Fellowships from the Wellcome Trust.

This annual report will be the last as director for Tom Solomon. After seven years leading the institute he is stepping down to focus on his own brain infections research. Professor Nigel Cunliffe, who has been head of our Clinical Infection, Microbiology and Immunology Department, took over as Institute Head from October 2017.

The Institute has seen extraordinary success under Tom’s leadership, growing since 2010 in size, scope and international standing to become a true leader in infection and global health. It is an honour to take over the headship at this exciting time.

Professor Nigel Cunliffe
The Institute is organised into three departments with cross-cutting research themes. Through them we are addressing the five major research challenges identified in our strategic plan.

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Global risk model reveals the role of El Niño 2015 in the spread of Zika virus

- A change in weather patterns brought on by the El Niño of 2015 is believed to have fuelled the Zika outbreak in South America. The findings were revealed by Dr Cyril Caminade and colleagues using a new epidemiological model that looked at how climate affects the spread of Zika virus by both of its major vectors, the yellow fever mosquito (Aedes aegypti) and the Asian tiger mosquito (Aedes albopictus). The model can also be used to predict the risk of future outbreaks, and help public health officials tailor mosquito control measures and travel advice.

Professor Matthew Baylis commented: “Zika is not going away, and so the development of tools that could help predict potential future outbreaks and spread are extremely important.” This work was carried out as part of the NIHR Health Protection Research Unit in Emerging and Zoonotic Infections.


The link between Zika virus infection and neurological disease

- Professor Lisa Ng is leading work that aims to investigate the link between Zika virus infection and neurological disease. She is using in vivo and ex vivo models to investigate whether different virus isolates cause different disease patterns. She is also looking at biomarkers associated with different disease patterns, and ways of improving the diagnosis.


The Institute’s clinical studies in Brazil, led by Professor Tom Solomon, are beginning to define the full spectrum of neurological disease caused by the virus, including encephalitis. In addition, Dr Mike Griffiths has a Wellcome Trust Public Engagement Award to improve awareness around Zika in underprivileged communities in Latin America.

Differentiating survival from fatal outcomes in Ebola cases

Although the Ebola outbreak in West Africa was brought under control in 2016, the disease remains a threat, and there are many unanswered questions. The factors governing why some patients died whilst others survived is one such puzzle. **Professor Julian Hiscox** and colleagues from Public Health England, Boston University and other international partners, have identified a ‘molecular barcode’ in the blood of patients with Ebola that can predict whether they are likely to survive or die from the infection. Further work has suggested that leakage of other pathogens across the gut could contribute to the bad outcome for some Ebola patients.

The team has been working on possible new treatments, and also examining the genetic material of viruses (the genomes) from across the outbreak to help understand the pattern of spread and inform interventions in future epidemics.


Climate change risk to Europe’s most dangerous pathogens revealed

The impact of climate change on the emergence and spread of infectious diseases could be greater than previously thought. Our study, published in Scientific Reports, is the first large-scale assessment of how climate affects bacterium, viruses or other microorganisms and parasites (pathogens) that can cause disease in humans or animals in Europe. **Dr Marie McIntyre**, who led the project explained: “Although there is a well-established link between climate change and infectious disease, we did not previously understand how big the effects will be and which diseases will be most affected”.


Rapid climatic, environmental and societal changes are leading to the emergence of new diseases and the spread of existing ones. The Institute is providing evidence to help predict and mitigate the impacts of climate, environmental, and societal change on human and animal health.

The biobank holds over 50 continuous tick cell lines

**Ticks and Diseases**

- Ticks represent a large global reservoir of disease for both animals and humans. 2017 saw the arrival in the Institute of the Tick Cell Biobank, the world’s largest collection of continuous cell lines derived from ticks and other arthropods, managed by **Dr Lesley Bell-Sakyi** and previously held at the Pirbright Institute. The Biobank holds over 50 continuous tick cell lines derived from both hard and soft tick species, as well as several cell lines from dipteran vectors. **Dr Ben Makepeace** was awarded £916K from the Biotechnology and Biological Sciences Research Council’s Fund through the Global Challenges Research Funding Scheme to develop the programme.

Surveillance for tick-borne diseases can be time and labour intensive, but research led by **Dr Alan Radford** has shown that passive surveillance of companion animal electronic health records, through the Small Animal Veterinary Surveillance Network (SAVSNET), provided a novel method for describing temporal and spatial tick activity. Such approaches can help inform veterinary and public health programmes.

Our work on food security is being consolidated within the new Centre of Excellence for Sustainable Food Systems, which has been established at the University’s Leahurst campus. It is led by the Institute’s Professor Jonathan Rushton who was appointed through the N8 partnership of Liverpool and seven other leading northern universities, and has three core research areas:

- Improving the use of economics and social sciences applied to animal health with a drive to establish the Global Burden of Animal Diseases (GBADs)
- Greater understanding of the food systems and its impacts on infectious disease maintenance, spread and emergence; environmental change and malnutrition (over and under nutrition) leading to non-communicable diseases
- The need to have research and education that is multi-species and multi-sectorial – One Health

These research areas contribute to the three N8 Agrifood themes of: (1) Sustainable Food Production; (2) Resilient Supply Chains; and (3) Improved Consumption and Health.

Potential vaccine for Fasciola hepatica

- Parasitic worms, helminths, can cause long-lived chronic infection in many food-producing animals as well as humans. The liver fluke, Fasciola hepatica, is one such parasite causing global infection of both humans and animals. It exerts an influence over the host immune system to prevent the development of effective immunity.

Dr Robin Flynn and other Institute researchers have characterised a molecule that potentially plays an important role in controlling host immunity, and is now the focus of small scale vaccine trials against Fasciola hepatica.

1 in 10 people globally lack sufficient food for a healthy, active life. Feeding current and future populations requires a secure and safe supply of food. The institute is an international leader in food security research, especially through improved control of infectious disease in food producing animals, and improved food safety.

Livestock in Kenya

- Much of our overseas food security work is based in Kenya, where the Institute’s Professor Eric Fèvre and his team are based at the International Livestock Research Institute, with an additional programme in western Kenya. Our studies in western Kenya, that combine data from porcine slaughterhouses and information on pork distribution and preparation, have quantified the per-meal risk of acquiring the *Taenia solium* tapeworm, the cause of taeniosis and cysticercosis in humans. This work is important in defining key points in the pork supply system where interventions to control disease could be implemented.

In Nairobi we have been mapping livestock commodity value chains, and tracking pathogens in our “Urban Zoo” project. The work is funded by major Medical Research Council and Biotechnology and Biological Sciences Research Council grants, and has underpinned our successful application for major funding to work across the Horn of Africa.


Redefining antigenic variation in African trypanosomes

- Institute scientists are beginning a £2.1M Wellcome Trust funded project to better understand African trypanosomes, a livestock disease that causes widespread economic hardship in sub-Saharan Africa. As part of an international team, with scientists from Edinburgh, Glasgow, Lisbon, Heidelberg and Baltimore, they are studying how trypanosome parasites – spread by biting tsetse flies – cause long term infections in cattle.

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We have spent many years working out the genetic basis for immune evasion in African trypanosome genomes. This new project promises to revolutionize our understanding of immune evasion, and how we might overcome it.

Dr Andrew Jackson

£7.7M has been awarded by the Global Challenges Research Fund to improve the health and wealth of people in the Horn of Africa by increasing local capacity to undertake ‘One Health’ research. The One Health Regional Network for the Horn of Africa (HORN) will bring together partners from Liverpool, Kenya, Ethiopia, Somalia and Eritrea to train local scientists and conduct research. Project lead Professor Matthew Baylis said: ‘A ‘One Health’ research approach focuses on the interfaces between the environment, animals and humans, and in the part of the world that is the most heavily dependent on livestock – the Horn of Africa – it needs a boost. Our hope is to understand better the health links between people, animals and the environment.”

‘One Health’ in the Horn of Africa

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Antimicrobial resistance

Phage therapy shown to kill drug-resistant superbug

- Institute scientists have shown that phage therapy could offer a safe and effective alternative to antibiotics in the treatment of cystic fibrosis lung infections. Chronic lung infections caused by the bacterium *Pseudomonas aeruginosa* are becoming increasingly difficult to treat due to antimicrobial resistance (AMR). Phages, or bacteriophages, are viruses that kill bacteria but are otherwise harmless. Institute researchers, led by Professor Craig Winstanley and Professor Aras Kadioglu, have shown that phage therapy may be highly effective in treating established and chronic respiratory tract infections caused by multi-drug resistant *P. aeruginosa* strains.


Given the increasing problems caused by bacteria that are resistant to treatment with antibiotics, there is an urgent need to develop new approaches. We have shown that phage therapy has the potential to offer a safe and effective alternative for the treatment of such persistent bacterial infections.

Professor Aras Kadioglu

Pseudomonas aeruginosa infections & Bacteriophages

- Phages are not always helpful, however. In a separate study, Professor Craig Winstanley and colleagues have found new evidence to show that bacteriophages drive the evolution of antibiotic resistant *Pseudomonas aeruginosa* strains. Using lung modelling and genome sequencing, bacteriophage driven evolutionary changes in *P. aeruginosa* were determined whereby bacteria evolved to become better adapted to the lung environment, becoming more difficult to treat.

To study this further, Dr Jo Fothergill and colleagues were awarded a grant from Action Medical Research. The £506K three-year project will investigate bacterial niche specific mutations which allow it to adapt and resist both host and anti-microbial killing.

_Davies E, et al. PNAS. 2016;113:8266-8271_

Microbes are gaining resistance to the treatments used to control them, making antimicrobial resistance (AMR) one of the greatest current threats to human and animal health. The Institute is investigating the clinical and environmental factors that drive the evolution and development of AMR, and developing novel antimicrobial treatment strategies.

**Therapeutics and control of antimicrobial resistant tuberculosis**
- The Institute hosts the prestigious multi-million Euro EU funded PreDiCT-TB programme under the leadership of Dr Geraint Davies, and major outputs are now starting to appear with implications for future tuberculosis therapy. Of the 60 papers to date a recent phase II meta-analysis has helped to reset thinking on the approach to tuberculosis drug and combination development. As a consequence of the work undertaken in this area Dr Davies has sat on two WHO tuberculosis taskforces and participated in the UK NICE guidelines for control and treatment. Bonnett L, et al. Clin Infect Dis. 2017;65(1):46-54

**Use of antibiotic by veterinarians**
- The Small Animal Veterinary Surveillance Network (SAVSNET) continues its work looking at antibiotic prescribing by veterinarians. SAVSNET, which is funded by £700K from the Biotechnology and Biological Sciences Research Council hosts two large data resources containing more than 2 million anonymised pet health records and 40 million anonymised test results from a network of diagnostic laboratories and veterinary practices in the UK. One of SAVSNET’s primary research areas is to understand how vets use antibiotics and how this compares to medical doctors, to what extent this is driving the emergence of resistant bacteria, and quantifying the degree of resistance sharing between animals and humans.

**New approach to resistant MRSA**
- Research by Dr Elaine Waters and colleagues has examined new approaches to the use of existing antibiotics to address current antimicrobial resistance problems. Oxacillin was found to significantly reduce the virulence of MRSA despite it being resistant to the drug. Recommendations from the research to include β-lactam antibiotics in treatment regimes could potentially significantly improve outcome for patients with invasive pneumonia and sepsis. Waters E, et al. J Infect Dis. 2016;215(1):80-87

**Centre of Excellence for Infectious Disease Research (CEIDR)**
- In 2016-17 the University of Liverpool and Liverpool School of Tropical Medicine established the Centre of Excellence for Infectious Disease Research (CEIDR). This centre aims to combine the joint expertise in infection across the two institutions to bring a translational focus to addressing major infectious disease problems, particularly antimicrobial resistance. The centre has received funding from Unilever and substantial support from the local council which identified infection research as a core strategy for local development to develop the prosperity of the region.
UK collaborations

Since 2010, the Institute’s work has built on major collaborations in the UK and overseas. Here, major UK collaborating Institutes as determined by collaboration on major grants above £500,000 are shown.
The diagram represents a snapshot of the UK collaborators the Institute is working with on large-scale grants. The thickness of the line relates to the size of the grant, and the font size for each institute reflects the number of awards shared with the Institute of Infection and Global Health.
4 Diagnostic Tests

Detection of devastating equine disease

- Histoplasmosis is a neglected and devastating fungal disease that causes severe sores, lameness and debilitation in horses, mules and donkeys in low-income countries. It currently affects up to one in five horses in Ethiopia, where these working animals are crucial to support family income. Dr Clare Scantlebury and colleagues have developed new rapid methods to detect Histoplasma directly from blood and pus samples, without the long wait needed to grow the fungal organism in a laboratory. The development of these techniques has been a key step supporting a recently funded £990K Wellcome Trust programme on disease spread and control in low-resource settings.


East African hub for cysticercosis serodiagnosis

- Through our partnership with the International Livestock Research Institute (ILRI) we have established a hub for serological diagnosis of *Taenia solium* in eastern Africa. With technical collaboration from the Institute of Tropical Medicine in Antwerp, our new antigen-ELISA is operational both at a hub site in Nairobi and in our field laboratory in Busia. The test is used on both human and porcine material to quantify the burden of infection. It supports the MRC Global Challenges Research Fund project in Rwanda in which we co-lead as well as other regional work.

Fèvre EM, et al. BMC Infect Dis. 2017;17:457

Rapid diagnosis of onchocerciasis using urinary biomarkers

- Onchocerciasis or river blindness is a parasitic disease affecting 17 million people in sub-Saharan Africa (larvae pictured left). It causes visual impairment, sometimes leading to irreversible blindness, and intense itching of the skin. Diagnosis of the disease has been dependent for many decades on microscopic examination of skin snips for the larval stage, which is a painful procedure. Dr Ben Makepeace and team have received £295K from the Medical Research Council to radically improve the diagnosis of onchocerciasis by testing for the presence of adult worms using a patient’s urine sample.
Many people and animals remain untreated for infectious diseases because of a lack of accurate, affordable and available diagnostic tests. The Institute is undertaking research to develop new diagnostic tests for diseases of humans and animals, as well as improving existing diagnostic tests.

Optimising TB diagnostics

- Tuberculosis trials rely on bacteriological endpoints that require prolonged and labour-intensive culture in the laboratory, which slows down real-time assessment and adaptation. Dr Gerry Davies and colleagues carried out an implementation study in four African centres using a novel molecular assay based on amplification of part of the bacterial genome, 16s ribosomal RNA, in patient sputum. All the laboratories adopted and were able to successfully perform the assay with acceptable inter-laboratory variability. These findings suggest that the molecular bacterial load assay can be performed in laboratories in high-burden countries with the potential to accelerate clinical trials in tuberculosis.


New diagnostic tests, developments in treatment and changes in the epidemiology have meant our new national guidelines were very much needed.

Dr Fiona McGill

Diagnostic pathways for brain Infections

- As well as developing new diagnostic tests, one of the biggest issues is ensuring they are used appropriately and in a timely manner. In light of the newer diagnostic tests for adult bacterial meningitis, Dr Fiona McGill and Professor Tom Solomon have led the development of updated national guidelines for the management of the condition. For another brain infection, herpes simplex virus encephalitis, collaboration with social anthropologists is helping to explain why the ideal pathways for diagnosis and treatment are sometimes not followed.


Progress in diagnostics biomarker research

- Bacterial meningitis is a medical emergency that requires urgent antibiotics, but many patients treated for suspected meningitis turn out not to have the condition. This results in unnecessary use of antibiotics, contributing to antimicrobial resistance, and causing prolonged hospital admissions. Dr Mike Griffiths and colleagues have developed a new approach to rapidly diagnosing such patients by looking at RNA transcripts, part of the body’s host response to infection, rather than trying to detect the pathogen, which is often difficult. The “TRIM” (Transcripts Identifying Meningitis) test has been patented and is being developed further in partnership with FastTrack Diagnostics.

Professor Enitan Carrol has been using a similar mRNA biomarker approach to identify children on the intensive care unit at risk of developing hospital acquired infection.

A novel way to detect toxins in patient blood samples using liposomes has been developed and patented by Professor Aras Kadioglu and colleagues, which provides rapid identification of a range of community acquired infecting bacteria. From receiving the blood sample to positive identification takes less than 1hr. The concept is being developed further with £376K from the Medical Research Council and has attracted a MRC Developmental Pathway Funding Scheme.

Major new MRC funding for pneumococcal research

Although vaccines exist for pneumococcus, a major cause of pneumonia, sepsis, and meningitis, their effectiveness is limited, especially in some populations. Professor Aras Kadioglu and colleagues have been awarded a £1.5M Medical Research Council Programme grant to determine the bacterial, host and environmental factors that lead to pneumococcal disease. The new five-year project will allow us to determine the various bacterial factors and host conditions that allow pneumococci to go from harmless nasopharyngeal carriage to life threatening invasive disease and will inform the design of more effective pneumococcal treatments and vaccines. The work is further supported by the award of a £823K five-year Wellcome Trust Henry Dale Fellowship to Dr Dan Neil, to work on identification of niche-specific virulence factors via the experimental evolution of Streptococcus pneumoniae.
Vaccines are the single most effective method to reduce the burden of infectious diseases in humans and animals, but many major diseases lack effective vaccines for their control. The Institute is undertaking research to improve the effectiveness of current vaccines and drive the development of new vaccines for major diseases of humans and animals.

Advancing the world’s first river blindness vaccine

- The parasitic worm which causes river blindness in humans, Onchocerca volvulus, also infects cattle. No vaccine exists for humans or cattle, but Institute investigators are part of a new $3.6M international project funded by National Institutes of Health’s (NIH) National Institute of Allergy and Infectious Diseases to develop a vaccine for river blindness, with the ultimate goal of eliminating the disease from Sub-Saharan Africa. With £680K, Dr Makepeace and partners from the Cameroon Academy of Sciences will be testing the vaccine in cattle. Dr Makepeace commented: “If it works in cattle, we can be much more confident that it will be effective in humans too, contributing to elimination of this terrible disease from Africa.”

Research for better pneumococcal vaccine

- Dr Marie Yang, along with Professor Aras Kadioglu and Dr Dean Everett, have been awarded almost £300K by Meningitis Now to research pneumococcal bacteria which can cause diseases such as meningitis. Dr Yang said: “There are over 90 different strains of pneumococcal bacteria and not all are covered by the current vaccine. We plan to evaluate proteins on the surface of these bacteria to create a new, more effective vaccine that is effective against all strains of pneumococcus.”

- Work by Dr Laura-Bricio Moreno and colleagues shows that the persisting burden of serotype 1 pneumococcal infection in Africa makes this a target for additional vaccine control strategies. This paper provides insight into potential vaccine targets and the potential limitation of current approaches.

- Meanwhile, our recent work from Malawi has shown that although current vaccines cause the expected decline in vaccine-preventable bacteria they may be driving a rise in antimicrobial resistance in other strains, Dr Jen Cornick said: “This is the first study that suggests the pneumococcal vaccine may actually be driving antimicrobial resistance, which could be quite concerning.”

Neonatal rotavirus vaccine

- Building upon the long-term programme of rotavirus research in Malawi led by Professor Nigel Cunliffe, the Institute has received £1.3M from the Bill and Melinda Gates Foundation to evaluate a new neonatal rotavirus vaccine (RV3) developed at the Murdoch Children’s Research Institute (MCRI), in Australia. The trial will be undertaken through the Malawi-Liverpool-Wellcome Trust Clinical Research Programme in Blantyre, and will examine, for the first time in a population in Africa, the immunogenicity of the new vaccine when administered to neonates and infants. The work in Malawi is further supported by Dr Khuzwayo Jere, who received a Wellcome Trust Public Health and Tropical Medicine Training Fellowship to examine the infant host response to human rotavirus vaccine.

- The Centre for Global Vaccine Research continues to support other vaccine work, including a large scale evaluation of the malaria RTSS vaccine funded by the World Health Organisation and GlaxoSmithKline, which will begin in Malawi in early 2018.
Our people

Since 2010 the Institute has supported almost 250 postgraduate research students at PhD and Masters level. Many are now pursuing research careers in their home countries.

Highlights in their annual calendar this year included a careers day and a fascinating workshop on “Tools to succeed in Academia”, which covered aspects such as how your personality affects the way you work. Our postgraduate researchers also have the opportunity to present their work at our annual Infection and Global Health day, pictured above.

“I have been studying at the institute since I started my Masters degree in 2012, and it has provided me with many opportunities for international collaboration, not only for my PhD study but also for the future.

Bardatin Lutfi Aifa, PhD Student
Jen Cornick

Jen is a newly appointed Tenure Track Research Fellow, and was previously a post-doc at the Institute. She has been based in Blantyre, Malawi since 2009 where she is head of the Emerging Antimicrobial Resistance Group at the Malawi-Liverpool-Wellcome Trust. Jen’s research interests include AMR, molecular epidemiology and bacterial genomics.

Carmen Martínez-Rodríguez

Carmen has worked in the institute since June 2014, and took on the role of Technical Manager in November 2016. She is responsible for overseeing all technical work at Ronald Ross and IC2. Prior to that she completed her PhD in molecular biology and biotechnology working in the field of animal reproduction, including the improvement of the sperm cryopreservation and artificial insemination procedures in Cantabrian brown bear.

Stephen Aston

Steve has joined the institute as an Academic Clinical Lecturer in Infectious Diseases. During the course of his lectureship Steve hopes to continue research on the diagnosis and management of severe respiratory tract infections in low-resource settings, as well as develop projects in the UK of respiratory infection in immunocompromised patients.

Lesley Bell-Sakyi

Lesley joined the institute as a Research Fellow, and manages the Tick Cell Biobank, (page 5). Her particular expertise lies in the establishment of continuous tick cell lines (over 50 to date) and the propagation and study of arthropod-borne pathogens in tick cell and organ culture systems.

Bridget Freyne

Bridget is a general paediatrician and paediatric infectious diseases specialist. Recently appointed as a Senior Research Fellow at the Institute, Bridget is based in Blantyre, Malawi, where she is Co-PI on the ABCD trial: AntiBiotic treatment of moderate to severe Childhood Diarrhoea to reduce diarrhoea-related mortality in children.

Fiona McGill

Fiona returned to the Institute as an Academic Clinical Lecturer in April 2017. Her research looks at improving the diagnosis for adults with meningitis, especially viral meningitis. This includes improving existing diagnostic pathways as well as looking at novel molecular methods to further understand the different causes of viral meningitis in adults.

Suzannah Lant

Suzannah is a Clinical Research Fellow at the Institute. She is based in Brazil, working on a study investigating the relationship between Zika virus infection and neurological disease. Her research will also focus on immune responses to Zika, which have significant implications for future vaccine development.

Lance Turtle

Lance is a Wellcome Trust funded Research Fellow, and works on the immune response to Japanese encephalitis virus and related flaviviruses. He is studying cross reaction of the immune system to different flaviviruses, which will underpin development of next-generation vaccines and therapeutic approaches.

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Maryke Neilsen

Maryke is a paediatric trainee who started her Wellcome Trust Clinical PhD in September. She is interested in neonatal sepsis and aims to carry out her research in Malawi from September 2018 onwards.
Public Engagement

Science Festivals
- Institute members took exciting new activities to the Edinburgh International and Cheltenham Science Festivals. The Festivals saw thousands of visitors, with members introducing people to everything from Big Data, to microbiology crafting, brain surgery and parasitic worms.

Training for food vendors in Kenya
- Our researchers were involved in the training of informal food vendors in food safety and hygiene in a number of low income settlements in Kenya, with practical skills in food hygiene being extremely important in reducing the transmission of zoonotic diseases. As well as the training, a video of the event was produced in low bandwidth so it could be shared within a wider group of vendors who are all part of a WhatsApp community of practice.

Outbreak!
- Researchers from the Institute developed a new activity to teach people about the role of epidemiologists. The interactive dramatised workshop challenged participants to identify, cure and stop the spread of an infectious disease, all against the clock. The activity has now been run a number of times on campus for school groups, and the group have received further funding to turn the activity into a resource pack for all to use.
Engaging with vaccines

Vaccinating your children can be a very emotive subject for some, and researchers from the Institute have been awarded a grant to explore people’s knowledge and attitudes in the Liverpool area. It is hoped the engagement project will give an insight into people’s knowledge gaps, and how people would like to receive their information in the future.

Roald Dahl’s Marvellous Medicine at Edinburgh Fringe Festival

Tom Solomon took his sell-out family show to the renowned Edinburgh Fringe Festival. The Festival debut sold over 800 tickets, and provided a whizz-bang hour entertaining both children and adults alike with tales of Dahl’s fascination with medicine.

The show has been a great way to introduce some of our research findings to a new audience. **Professor Tom Solomon**

Pint of Science

This is the first year Liverpool has taken part in Pint of Science, which is an international event that takes place in over 150 cities on three nights in May. The events held in four venues across the three nights were a sell-out, attracting over 500 members of the public. The Institute took part in a special ‘infection’ themed night, with **Professor Bill Paxton** becoming the host with the most for the evening.