Special Edition: Ebola — A Global Response

Editorial

TIME Magazine named the Ebola Fighters as 2014 Person of the Year. Given we are currently facing the most widespread epidemic of Ebola virus disease in recorded history, this edition of pH1 is dedicated to the local and international response efforts.

We begin with a special interview with co-discoverer of the Ebola virus, Professor Peter Piot. David Roberts then writes about how the source of the outbreak was tracked, followed by a series of interviews ranging from the local authority perspective here in Oxfordshire and health protection in Thames Valley, through to responding to the first Ebola case in the USA, the CDC’s emergency operations centre, fieldwork on the ground in West Africa by both the CDC and Public Health England’s Field Epidemiology Training Programme, maintaining public health resilience in Haiti following the 2010 earthquake whilst responding to Ebola, and a journalist’s experience at Dallas Morning News & CNN. We finish our series of Ebola interviews covering Professor Peter Horby’s clinical trials.

Aparnareddy Mummadi shares a Public Health Haiku, before turning to articles on public health at an acute hospital trust, HIV-related stigma and sustainable healthcare. Simon Hailstone offers a handy guide for beginners wishing to get started with mapping and spatial analysis using free software.

Last, but not least, we provide an opportunity for those interested in the interface between public health and film.

Wishing you a healthy, happy and prosperous 2015,

Behrooz Behbod
ST3, Oxford

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In September 1976, Peter Piot, a recently graduated physician, was a junior member of the microbiology lab at the Prince Leopold Institute of Tropical Medicine in Antwerp, Belgium. The lab had received reports of an outbreak of an unusual disease occurring in Zaire (now Democratic Republic of Congo). Initially described as 'yellow fever with haemorrhagic manifestations', it was unusual in that several Belgian nuns had apparently died of the disease, despite being vaccinated against yellow fever. A blood sample from a nun suffering from the disease was sent to the lab in Belgium for analysis. Using no more protection than a pair of latex gloves, Peter and his colleagues, Guido Van Der Groen and Rene Delgadillo, set to work to identify the pathogen. Antibody tests for yellow fever, typhoid, Lassa fever and several others, all came back negative. However, tests in mice and VERO cells (a commonly used laboratory cell line) indicated a pathogenic virus was present. With reports from Zaire of at least 200 fatalities and patients suffering extensive bleeding, high fever, headache and vomiting, concerns for safety rose. At this point the lab received instructions to ship all samples and biological material to Porton Down in the UK (who then sent them to the Center for Disease Control (CDC) in Atlanta), where the samples could be investigated in high containment laboratories. With such an exciting unsolved mystery, the lab held on to some of the infected VERO cells for analysis by electron microscopy. The results came back—a very large, long, wormlike virus, could it be Marburg? With the possibility of such a dangerous virus on their hands, all work in the lab in Belgium was stopped and the remaining samples sent to Atlanta. A few days later results came from back from the CDC—this virus did not react with Marburg antibodies—it was a new virus.¹,²,³

Peter then had the opportunity to investigate the outbreak on the ground. Working with colleagues from the CDC, Belgium and Zaire, he interviewed health workers, patients, their families and the residents of Yambuku, the village at the centre of the outbreak. After careful epidemiological investigations they were able to locate the source of the outbreak to the mission hospital. Repeated use of needles without sterilisation had amplified the infection of one patient to scores of people, and further transmission occurred in those attending funerals and caring for sick relatives.¹,²,³

A full account of the outbreak is detailed here:

What has been the most rewarding part of your career?

I hope my career is not over yet! I have been fortunate in having been presented with unique opportunities, learning and problems throughout my life. Even now, I am busier than ever, and there are many challenges and responsibilities for us at the London School of Hygiene & Tropical Medicine, with 4,000 colleagues and students who are dedicated to improving health in the UK and worldwide. Earlier this year, Heidi and I returned to the Democratic Republic of Congo to celebrate 65 years of life, and to thank the people who played such an important role in my professional and personal development when I was in my 20s and 30s. The trip was very inspiring, because of the many courageous and creative people we met, who try to do their job against all odds, and believe in what they do.

Do you have any advice for trainees who might want to follow in your footsteps?

I wouldn't presume to give advice - especially as I ignored the advice I was given by a professor at medical school who told me there was no future in infectious diseases! It is probably a sign of getting old that I am increasingly asked to give career development talks. I always emphasise that you should not plan your career too much, as life rarely works out as we expect, and being too prescriptive can be a recipe for missed opportunities. However, investing in education and skills, while exploring uncharted horizons and options, is probably the best way to maximise professional opportunities, enjoy an exciting life, and contribute to society. Remember Louis Pasteur: “Chance favours the prepared mind”.

What do you think is the most challenging factor for controlling the current Ebola outbreak, is a vaccine our best hope?

There are many challenging factors - as I have said it is the result of a perfect storm: dysfunctional health services as the result of decades of war, low public trust in government and Western medicine, traditional beliefs and even denials about the cause or existence of the virus, and burial practices that involve contact with contagious Ebola-infected corpses - and governments and the international community were very slow to act. Human trials of vaccines and therapies are under way, but I would not say they are our only or even best hope. We urgently need effective containment and treatment. At the same time, we must accelerate clinical evaluation of experimental therapies, vaccines, and diagnostics, while respecting ethical and scientific standards for such trials. WHO has announced that compassionate use of experimental therapies is ethically justified, even if they have not been tested in humans. An exceptional crisis requires an exceptional response, and one of the lessons from the AIDS response is that prevention has little credibility if treatment for those infected is not available. Let us hope that this is the last Ebola outbreak where all we have to offer is isolation and quarantine, instead of a vaccine and treatment.

1. A full account of the discovery of Ebola and Peter’s experiences in Zaire can be found in his book: No Time to Lose: A Life in Pursuit of Deadly Viruses by Peter Piot.
2. A couple of excerpts from the book were recently published in Science magazine:
3. A podcast interview with Professor Piot, discussing how he co-discovered the Ebola virus and his views on the current outbreak is available here:
The earliest confirmed cases of the Ebola virus disease outbreak were detected in the Guinean region of Gueckedou in March 2014, prompting the WHO to publish formal notification of an outbreak on its website on March 23rd. Investigation of these early cases revealed the outbreak had remained undetected for months, starting in a small village in the region in December.

By David Roberts MBChB BMedSci MSc MRCP DFPH
Specialty Registrar in Public Health Medicine, ST2, Oxford Deanery

Ebola - Tracking the Source of the Outbreak

An epidemiologic investigation of the confirmed and suspected cases was begun. Cases, their relatives, friends and neighbours were interviewed about recent illnesses, travel and funeral attendance in the months leading up to the outbreak. Other suspected cases were also identified from hospital records. In early February, a health care worker from Gueckedou hospital suffering from fever and diarrhoea (known as ‘suspected case 14’, S14), sought care and died in Macenta hospital. Health care workers and relatives who tended S14 later developed Ebola, themselves taking the virus to two other towns, Macenta and Kissidougou, in their own quest for treatment. Looking backwards, S14 had cared for a midwife (‘suspected case 6’, S6) who had died in similar circumstances in Gueckedou hospital, after being admitted in January.

January 2014

The mid-wife was one of 6 suspected cases in Meliandou village, Gueckedou, to die from an illness characterised by fever, diarrhoea, vomiting and, in some cases, gastrointestinal bleeding. Four of the cases were from the same family, the other suspected case a nurse. The earliest case was in a young child, who first developed symptoms in December.

December 2013

On December 2nd 2013, ‘suspected case 1’, a 2 year old child, developed symptoms of fever, vomiting and black stools (indicating likely gastrointestinal bleeding); they died 4 days later. Their sister, mother and grandmother all died within a month. No earlier cases were identified.

Taken together, the genomic and epidemiologic analyses suggested a single point of introduction of the virus into the human population. Origins of other Ebola outbreaks have been strongly linked to the consumption of infected bush meat, a common source of food in this part of Guinea, and fruit bats, potential reservoirs of Ebola virus that allow its spread to other mammals hunted for bush meat, are present in large parts of West Africa to facilitate this transmission. It is highly likely S1, or someone close to him, was infected after contact...
What has been the local authority's role in Ebola preparedness activities in Oxfordshire?

The response to Ebola is a health led response. Any suspected or confirmed case of Ebola will have a response which is led by Public Health England and the mobilisation of the health services to provide the response will be led by NHS England. The role of Local Authority and in particular Public Health is on of strategic oversight and assurance. The Director of Public Health has a statutory function to ensure that the local population’s health is protected and that local plans and resources are in place to ensure this. My role as the lead for health protection in the Directorate is facilitating the Director in exercising his statutory role. Basically I have checked and assessed all local plans and advise the Director on any gaps in the plans and seek assurance everything is in place.

In addition my Director is the Co-Chair of the Local Health Resilience Partnership (LHRP) so he has a regional role in ensuring that the appropriate plans are in place across Thames Valley. As a consequence I have a wider view and exposure to the relationships across the region.

Within the County Council I also work with emergency planners to advise them on Ebola and what the social support function could be. At this time Ebola is a health led issue, however if cases begin to be identified in the UK this could rapidly change as public concern increases.

As a Consultant in Public Health at Oxfordshire County Council, you are regularly third on call for health protection. What would be your personal role in this capacity when responding to Ebola incidents?

In reality we would be contacted if an Incident Control Team were convened. If I were on call this would most likely involve joining a teleconference in the first instance and would be representing the DPH. My response would involve informing the relevant officers on call in the Local Authority, notifying the DPH and providing local intelligence to the ICT to respond to the incident. If there were any conflicts in agreeing the appropriate response I may be called on as the DPH representative to arbitrate or decide a resolution between organisations - but only as far as the borders of Oxfordshire. Our team are very aware that our role is local and extends only as far as the County borders.

You have now just completed your first year as a Consultant. What do you feel you have learned during this time that you wish you had experienced earlier as a trainee?

My training was when Public Health was in the NHS. Local Authority is a different environment and I have spent quite a bit of time in commissioning services. Also you move from being a trainee to a senior manager so all of a sudden you have management and budgetary responsibilities that you never really get to experience as a trainee.

Finally, is there anything else you wish to add that would be useful for public health registrars / trainees, particularly with respect to Ebola preparedness?

Personally it is reassuring that planning and preparation goes on in the background and the public are pretty unaware of the work that goes on in the background. I would recommend that trainees look for the opportunity to gain experience of something which is a rare event. I would also caution that trainees also have to fulfil a range of competencies and not to get monopolised by senior staff to work on Ebola at the expense of losing other necessary training opportunities.

Also as my Director of Public Health reminded me “The first casualty of any battle is the plan!”

Sources


Please describe the Ebola protocols in place at Thames Valley Public Health England Centre (TVPHEC)?

Ebola has slowly but surely become an integral part in the day to day business of TVPHEC. Our twice daily sit-rep meetings now include a section on Ebola – recording enquiries received, how many “exposed persons” we are managing and if any returning humanitarian workers are expected. Specific management is based on the extensive PHE guidance that has been published, although there are some local adaptations. For example, patients who are classified as “low possibility of VHF” will be managed by their local hospital however, any individual initially classified as “high possibility of VHF” will be directly admitted to the John Warin ward at the Churchill Hospital, the tertiary centre for infectious diseases within Thames Valley.

What has been your role as a specialty registrar?

My role has primarily been through responding to enquiries in the duty room and more recently assisting with the surveillance of returning healthcare workers. I was also fortunate to have the opportunity to take part in both the table top Ebola Exercise undertaken by the Local Resilience Forum (LRF) and the Local Authority Assurance Exercise. These gave a valuable insight into the roles and responsibilities of both TVPHEC and wider stakeholders if a case of Ebola were to occur locally.

What have been the main reasons for the calls to TVPHEC?

Initially there were a couple of possible (although low risk) cases of Ebola in our area – all were subsequently negative on testing. Other calls have been asking for general advice or clarification of guidance, such as identifying the local infectious disease lead. There have been a number of calls from schools with concerns around students or family members travelling to Africa over holiday periods and what measures they should take.

Has TVPHEC been involved in any other wider Ebola response activities in addition to managing potential cases and contact tracing?

TVPHEC has played an active role in emergency planning through the LRF exercise but also dissemination of information to local stakeholders. This has included liaising with the private airport within Thames Valley, giving advice but also directly screening returning travellers arriving through this airport. In addition, TVPHEC provided staff for the initial stages of the main Port Screening at Heathrow Airport. Currently, we are actively involved in the monitoring of humanitarian workers following their return from Ebola affected areas.

What have been the most challenging parts of your experience?

It has been challenging to keep on top of all the guidance that is published and updated on a regular basis. Especially being fairly new to health protection and so having other training commitments. From a centre wide perspective, staff have had to reprioritise their time and Ebola has brought new commitments to everyone’s workload. The influx of enquiries at times has been high which has been challenging, especially when the number of other cases and situations is high.

What was most rewarding?

I really enjoyed the LRF exercise. It was a great opportunity to get more involved with the emergency planning side to health protection.

Is there any advice you’d give to other public health specialty registrars at health protection units when taking an Ebola enquiry?

Be aware of what guidance is out there as many scenarios have already been thought through, from “Environmental cleaning guidance” to the “Management of pets of individuals with Ebola”. Given the increasing numbers of returning humanitarian workers, having a sound knowledge of the protocols for monitoring these individuals is also key.

Is there anything else you wish to add?

If anyone has the opportunity to take up a placement within their local PHEC during this Ebola outbreak, I would highly
recommend it. It has been absolutely fascinating to work within the heart of the local PHE response to such an extraordinary outbreak, a one off learning opportunity.

Ebola – Field Epidemiology Training Programme (FETP)

An Interview with Dr Sam Bracebridge, FETP Director, Public Health England

By Behrooz Behbod, MB ChB MSc ScD DFPH
Specialty Registrar in Public Health, ST3, Oxford Deanery

What is the Field Epidemiology Training Programme (FETP), and how has it been involved in the response to the Ebola outbreak in West Africa?

The FETP is a two-year fulltime workplace-based training programme open to those with a keen interest and future career in field epidemiology. The programme provides training and experience to develop the core competencies in infectious disease control and prevention agreed for field epidemiologists in the European Union; the focus being on outbreak investigation, surveillance, applied research, teaching and training others, and scientific communication. Training is provided on the job, but at least ten percent of time is dedicated to formal training courses run in the UK and Europe in collaboration with the European Programme for Intervention Epidemiology (EPIET; http://ecdc.europa.eu/en/epiet/about/Pages/About.aspx). Fellows are based in one of the PHE training sites within England and Northern Ireland for the two year Fellowship.

Since 2011 we annually recruit up to 5 fellows, including StRs who have completed Part A and B exams. More information about the programme, recruitment and selection criteria can be requested from fetp@phe.gov.uk

The FETP has been involved in the Ebola effort, both in Sierra Leone and in the UK.

What has been your personal role?

I was deployed to Sierra Leone in late July. I travelled as part of a PHE team alongside an FETP fellow, a consultant epidemiologist and virologist. My role was to help develop the national surveillance system for cases and contacts.

Other than that, I have coordinated and overseen the deployment of FETP fellows.

What have been the most challenging part(s) of your experience?

Arriving in Sierra Leone at the end of July and finding that no Emergency Operations Centre (EOC) had been set up to coordinate efforts, and that there was no Wifi so it was impossible to gather electronic data efficiently from around the country.

What was most rewarding?

Working with wonderful colleagues in WHO, DFID, MSF, CDC and the Sierra Leone Ministry of Health and Sanitation.

Have any FETP fellows from the UK been involved in preparedness or response efforts?

All fellows have been involved in the PHE Ebola response to some extent. We have seconded four fellows to date, and a fifth fellow will be deployed in the New Year. Two fellows deployed to Sierra Leone to work as field epidemiologists. Their roles included the development of surveillance systems, data collection, analysis and reporting. Two further fellows were seconded to DFID to assist with a literature review and data modelling.

FETP in the UK is similar to the European Programme for Intervention Epidemiology Training (EPIET) and the Epidemic Intelligence Service (EIS) in the USA. Has there been any collaboration between training programmes in the Ebola response?

Yes, we are an EPIET- associated programme. Our fellows become part of the EPIET cohort, and train alongside them for the majority of the modules.

We worked alongside EIS Officers in Sierra Leone setting up surveillance systems.

Can public health specialty registrars collaborate with the UK’s FETP to help with the Ebola response? Where can they learn more about how to get involved?

Most requests for assistance with the Ebola response come from WHO colleagues directly, or through the WHO Global Outbreak Alert and Response Network (GOARN) and are quite specific. They are coordinated centrally within PHE.

I understand some specialty training programmes have specific guidance around Ebola, so would advise registrars to discuss this with their Educational Supervisor and Training Programme Director.

Do you feel that the FETP would be useful addition-
al training for public health specialty registrars?

About 50% of the FETP fellows are StRs, and I am sure they wouldn’t continue to apply if they didn’t think it was useful training! Personally I feel that it is an exceptional opportunity for those who want to go on to have a career in health protection epidemiology, and I would have chosen to apply to the programme if it were available at the time I was a public health registrar. As stated earlier, StRs must have passed Part A and B before applying.

How have you been involved in the public health response to the Ebola outbreak in West Africa?

1. Kailahun Sierra Leone, Aug 2014, 3 weeks, assistance with setting up database systems, training contact tracers.
2. Monrovia, Liberia, attending physician, Monrovia Medical Unit, ~60 days, treating ill healthcare workers.

How did you prepare for your deployment(s)? Did you need any special training or equipment?

We undertook 1 week of specialized training at the United States Federal Emergency Management Agency (FEMA) training center in Anniston, Alabama. This was a course designed specifically for us by the Centers for Disease Control and Prevention (CDC) with significant input from Médecins Sans Frontières / Doctors without Borders (MSF) and the World Health Organization (WHO). We use approved personal protective equipment (PPE) that provides protection against blood borne pathogens and are impermeable to fluids.

What skills or knowledge do you feel are required for successful deployments?

I am pulling for the Military Tropical Medicine courses I took while I was a Naval Medical Officer – it certainly helps when I am making a differential on fever here in Liberia.

Who else was in your team?

Physicians, nurses, laboratorians, logisticians, administrative staff.

What does your typical workday look like/consist of?

When I was out in Sierra Leone, we would meet with team every morning and decide which villages to go to and see cases, collect and gather data, coordinate transportation to treatment facilities, get reports from the contact tracers, decide which villages need to be visited the following day and report our findings to the emergency operations center in the capital.

Here in Liberia – we have been spending day and night getting the Medical Unit up and running – we have been accepting our first patients and had our first two discharged patients walk from the unit this morning (24th November 2014).

What kind of work are you doing with infected patients? Do you feel your work poses a risk to your health or safety?

I am assessing them for their symptoms, just like a regular doctor’s office visit, ordering laboratory evaluations to see how best to modify my recommendations for treatment/medications. In terms of safety, we are very cautious and deliberate in all that we do. Everything is planned and we are using the best practices for protective equipment to ensure that contaminated body fluids do not come into contact with us – especially our eyes and mouth. I feel completely safe when I am working in this protective gear and always have a safety team that watches me very closely while I am working to make sure that there is no accidental contamination.

What has been the most difficult part about your work so far?

Knowing that I am here for a limited time but I am reassured that my fellow US Public Health Service officers will take up the struggle when I depart.

How challenging has the process of contact-tracing the Ebola virus been?

It is complicated to organize the large number of contacts, each seen by a tracer, and getting that information up to the national level. We want tracers to gather information from 5-10 contacts per day, which is relayed to supervisors and then collated to us for re-
view. This work tracers are doing is in addition to their daily activities of life like farming. However, without them it would be impossible – they live and are neighbors within the communities so we rely on their ability to have social networking and local knowledge of culture and practices.

What have been some of the challenges you’ve had to face culturally, mentally, physically, and emotionally?

I have been on two very different missions so far this year to West Africa. The first mission, I was dedicating my time to work and interact with colleagues at the ministry of health in Sierra Leone to help their efforts to track cases and contacts of those cases with database systems. In addition, we wanted to help train the contact tracers to be able to follow case-contacts to see if they start developing symptoms. If they do, we wanted to make sure that they families and communities practiced good infection control and get those individuals to treatment facilities as soon as possible for confirmatory testing. The second mission is to treat Liberian and International health care workers that become infected with Ebola. As part of my training, I was working at the MSF Ebola Treatment Unit (ETU) to gain practical experience in how best to care for individuals ill with this disease.

What has been the most rewarding part about your work so far?

I was profoundly humbled when the MSF doctor introduced me to the team there as “the doc who is going to take care of us if we get sick.” To know that these dedicated international health workers are relying on me for them to do their work is something I will cherish. While I was working at the MSF facility, being one of the doctors that helps feed oral rehydration solution to a very sick patient knowing that it is helping them – it is a deep feeling of fulfillment that you have when performing selfless service for others.

What makes the recent Ebola outbreak so newswor-

thy, in comparison to other viruses/public health issues, in light of the fact that the virus has been around for nearly 40 years?

This epidemic is noteworthy for its sheer magnitude. It has profound impact to all sectors of life here and really highlights the need to have better health systems in this part of the world.

Why is the Centers for Disease Control in Africa? Specifically, why did America get involved?

There are many organizations here from all over the world – including but not limited to the CDC, WHO, MSF, International Medical Corps (IMC) and US Public Health Service (http://www.usphs.gov/). We are all working together to combat this epidemic – each group is playing a part in the overall framework to help West Africa. The two specific groups I have been working with are the CDC and US Public Health Service. The CDC does significant work in epidemiology to include contact tracing, helping emergency operations centers, community mobilization, messaging, implementation and other programs; the US Public Health Service is staffing the Monrovia Medical Unit and the only organization from our government dedicated to treating Ebola patients who are international and Liberian healthcare workers.

What would you advise to a public health professional contemplating travel to West Africa to respond to the Ebola outbreak?

Please come and bring invigorating energy and hope. The influx of new people sustains the needed vigilance to prevent new infections and treat those that are ill.

Monrovia Medical Unit
Credit: LT Michelle Holshue
Soon after joining the Epidemic Intelligence Service (2-year fellowship in field epidemiology; [www.cdc.gov/eis](http://www.cdc.gov/eis)), you were deployed to Dallas as part of the Centers for Disease Control and Prevention’s (CDC) public health response to the first case of Ebola in the USA. What was your role?

The month before being deployed to Dallas I participated in the CDC’s Ebola Response by working in the agency’s Emergency Operations Center (EOC) on the Epidemiology Team. On the very last day of my assignment, four EIS colleagues and I were asked to deploy to Dallas after the Texas Department of State Health Services asked us to assist with the Dallas response. After picking up supplies and debriefing, we all raced home to pack and say farewell to our families. Within a few hours of receiving the call to deploy, we were on a flight to Dallas. But the field team isn’t the only group called to action. A response of this nature requires an extensive network back at CDC headquarters and all those folks work really hard to support us.

My role in Dallas centered around helping the excellent team from Dallas County Health and Human Services to perform contact investigation and tracing. But since the response was fast-paced and very fluid, we all tackled a variety of tasks – managing data, generating reports, developing guidance, and general troubleshooting.

Though contact tracing itself isn’t a novel public health activity, contact tracing for Ebola in the U.S. proved to be a unique challenge that required a great deal of creativity, flexibility, and teamwork. There wasn’t much precedent to fall back on, so we worked hard to adjust to the ever-shifting landscape and anticipate problems before they arose.

**What was a typical day like in your investigation?**

We didn’t have an opportunity to establish much of a rhythm in the first few days simply because the initial contact investigation is heavily focused on identifying and interviewing contacts, assessing their risk, and applying state-specific guidelines for the assignment of monitoring and movement restrictions.

These activities sound so straightforward when written on paper but prove to be far more complicated and nuanced in the field. How do you track down a contact whose phone number and address are inaccurate or missing, without leaking their identity? If you’re not entirely sure of their culture, heritage, or preferred language, how do you prepare to deliver the delicate news to someone that they may have been exposed to a person with Ebola? With all the media coverage, how do you contact trace out in the community while maintaining a person’s right to privacy and confidentiality? And knowing that their cooperation is vital to stopping disease transmission, how do you best support contacts who were already facing a number of day-to-day struggles?

Once we had interviewed all the contacts and knew what type of monitoring they needed, we were able to schedule our in-person visits and phone calls to some extent. But honestly there wasn’t a single day that resembled the others, and just when we thought things were settling down we would face a new challenge. Though the first several days were especially long and grueling, we all felt a great sense of responsibility that greatly overpowered any feelings of fatigue.

**What skills or knowledge do you feel were most
What has been the role of the Emergency Operations Center (EOC) in the current Ebola response efforts at the US Centers for Disease Control and Prevention (CDC)?

The EOC has been and is a critical component of the response effort. It is where efforts of the people working on the response come together. Because there are so many people working on the response (500+) it is impossible for them to all be together in the exact same location, but allowing people who occupy key roles to be in the same area helps to insure that the work can be done in the most efficient manner possible.

Can you describe a typical day you spent at the EOC?

I characterized the first few days as receiving information through a fire hose. It was very intense and there was a lot to learn and come up to speed on so that I could be effective in my role. It was a position where each day you hit the floor running upon arrival. I was responsible for tracking “tasks” which were numbered and for which a deadline was set to insure we were responding in a timely fashion, when possible. We received queries from a range of people, including elected officials, Health and Human Services officials, to a nurse located in a small clinic asking about what sort of personal protective equipment should be worn when dealing with patients who might present to their practice with symptoms consistent with Ebola disease. The sheer number of these queries was somewhat overwhelming! Also, because this work is done on a rotational basis by the staff at CDC who have “regular jobs” somewhere else, we were cycling people through for 30 day rotations, thus staffing is always at issue. Another activity was entering staff requests into the staffing system, entering requests for meeting space, workspace, conference lines, and other largely administrative tasks. I generally worked between 9-11 hours a day and it felt like it was at a sprint or dead run all day, every day. Also I was issued a work blackberry that I needed to monitor for urgent messages – I would check this at night just before going to bed, and first thing in the morning before heading in to work, as well as regularly on the weekends.

What do you feel was most rewarding parts of your experience?

It’s hard for me to identify just one because there are so many. Though we were deeply saddened by the index case-patient’s passing, I am incredibly grateful for the recovery of others who fell ill with Ebola. And though I know the Dallas and Ohio contacts will struggle to regain some sense of normalcy after this ordeal, it’s very rewarding to know that many have completed their monitoring periods and remain healthy.
What are the key skills and knowledge you feel are required to work effectively in the EOC?

The ability to work under pressure and to work cooperatively with other people. Also, not being afraid to ask questions and to be as organized as possible.

What were the most challenging aspects of your time in the EOC?

The first day when I attended our team leads meeting the gravity of the situation and the importance of getting this "right" really hit me emotionally! It was overwhelming for me. I felt so insignificant and afraid about what would happen if we did not get this right. I also felt tremendous empathy for the situation in the effected countries in Africa. For the first week, when I tried to talk to people about what I and, more importantly others at CDC and in-country were doing to try and contain the disease, I had to fight tears. It was kind of interesting, because it was completely unexpected for me.

The longer hours and the pace were a challenge. I jokingly referred to time in the EOC as like "dog years" where for each year a human ages, a dog ages by a factor of 7. The system itself has flaws – the staffing system does not work efficiently at all. Our task force was large (100+ people working) and therefore we had constant staff needs. We found that referring other people we knew would work well was more efficient than putting in a request for a type of position or role and waiting for the folks in staffing to locate individuals who might be appropriate to fill the role. But both methods were very arduous and time consuming. I was referred to the "resume vault" which I assumed would be a series of electronic files that were arranged by type of job skills. What I found instead was I was granted access to an e-mail box where employees had uploaded their resumes or CVs and there was no order at all!

What were the most rewarding aspects of your time in the EOC?

Working with people who were absolutely committed and dedicated to helping get the outbreak under control and being able to contribute in some small way to helping that happen.
Ebola - Maintaining Public Health Resilience in Post-Earthquake Haiti

An Interview with Alyson Rose-Wood, MSc, Lieutenant at the United States Public Health Service & Senior International Health Analyst covering the Western Hemisphere in the Office of Global Affairs in the Office of the Secretary of the United States Department of Health and Human Services

By Behrooz Behbod, MB ChB MSc ScD DFPH
Specialty Registrar in Public Health, ST3, Oxford Deanery

Washington, D.C.

In October 2014, the Office of the Americas within the Office of Global Affairs (OGA) in the Office of the Secretary of the U.S. Department of Health and Human Services (HHS) worked with representatives of the Office of the Assistant Secretary for Preparedness and Response (ASPR) within HHS to convene the first of what has turned into weekly meetings of representatives from U.S. Government agencies who cover the Americas’ Region who have equities in Ebola preparedness planning and response. The purpose of these meetings is to ensure harmonized messaging and support to counterpart governments and U.S. missions in the region.

In addition to the weekly internal U.S. Government-Western Hemisphere coordination meetings, representatives from the Office of the Americas in OGA and ASPR have been coordinating twice monthly meetings with senior representatives of the Pan American Health Organization (PAHO), the regional body for the Western Hemisphere of the World Health Organization (WHO). The purpose of these meetings are to ensure that the U.S. Government is aware of the work that PAHO is doing in the Americas to help countries prepare for Ebola Virus Disease (EVD) and to coordinate efforts.

Haiti

As of November 2014, Haiti has no confirmed cases of Ebola Virus Disease (EVD) but is engaged in intensive preparedness efforts. Over the last two months, the Government of Haiti has developed a National Ebola Preparedness Strategy, under the leadership of the Ministry of Public Health and Population (MSPP) and with technical support of from the U.S. Government and other partners. Since August 2014, the Haitian Minister of Health, Dr. Florence Guillaume, has convened several high level meetings of Government of Haiti institutions, U.S. Government agencies, representatives of PAHO in Haiti, Médecins Sans Frontières, and additional NGOs to review progress on the implementation of the National Ebola Preparedness Plan.

Under the leadership of the U.S. Ambassador to Haiti, Pamela White, the U.S. Embassy (through the Centers for Disease Control and Prevention (CDC) of the Department of Health and Human Services (HHS), the U.S. Agency for International Development, the Department of State, and the Department of Defense) is actively engaged with the Government of Haiti in the development of the national Ebola preparedness plan and disease surveillance activities. CDC manages the U.S. Interagency Ebola Preparedness Committee within the U.S. Embassy, charged with reviewing technical assistance needs and opportunities, and ensuring harmonized messaging and support to the Government of Haiti.

The U.S. Government is supporting the MSPP to utilize existing surveillance and laboratory capacity for Ebola preparedness. This includes leveraging the existing national cholera surveillance sites and reportable disease surveillance systems for EVD detection. Once all preparatory and training activities are completed, if a suspected case of EVD does arrive in Haiti, the U.S. Mission expects the Government of Haiti to have basic procedures in place to appropriately identify and manage the individual(s). This includes proper airport screening, transport, isolation, clinical care, contact tracing, monitoring, reporting, and communication.

How have you been involved in the public health response to the Ebola outbreak in West Africa?

Washington, D.C.

Before I deployed to Haiti in November 2014, as a senior staff member of the Office of the Americas in OGA (a policy position), I was heavily involved in the creation of the weekly internal coordination meetings of representatives of the U.S. Government and the biweekly coordination meetings with PAHO (described above in Context). This included determining who to invite and
contributing to the draft meeting agendas and minutes. In October, I led the effort to map out key U.S. Government stakeholders and get their endorsement/support to have the Office of the Americas in OGA take a leadership role in coordinating internal government communications on Ebola Virus Disease (EVD) preparedness and response efforts in the region.

Haiti

I have been working in the Haiti office of the Centers for Disease Control and Prevention (CDC) since early November 2014. I have a policy and communications function in the office. The CDC office currently has staffing gaps due to the deployment of some staffers to West Africa to support the EVD response there. I am helping to fill those staffing needs while at the same time supporting the CDC Haiti Country Director and team in their efforts to support the Government of Haiti as it implements its National Ebola Preparedness Strategy.

How did you prepare for your deployment to CDC Haiti? Did you need any special training or equipment?

I didn’t need any special training or equipment before arriving at the CDC office in Haiti. This is because, up to now, there are no confirmed cases of EVD in Haiti. The work I had been doing in Washington, D.C.—to coordinate efforts in the region on EVD preparedness—helped prepare me to understand the context for Haiti’s preparedness efforts as well as the roles that PAHO and U.S. Government agencies have in these efforts.

What skills or knowledge do you feel are required for being competent and successful in both your roles?

For policy/communication/coordination work, excellent interpersonal, communication (both spoken and written), and cross-cultural skills are central to gaining the trust and respect of your key partners and stakeholders. You need the trust in order to work together to address difficulties that exist or arise—and together come up with creative and appropriate solutions.

What has been a typical day like?

A typical day is long (in an office, not out in the field) coordinating with stakeholders through drafting of meeting minutes, writing reports, briefing senior officials, moderating and facilitating meetings (both in-person and on the phone). The amount of concentration needed to keep all the balls in the air and moving is mentally and physically very draining.

What do you do after returning home from Haiti?

I will need to write a trip report and then will continue on with the work I was doing in Washington, D.C. before I left for Haiti which includes the support to the regular EVD preparedness meetings and coordination efforts within the U.S. Government and with PAHO.

What was the most challenging part(s) of your experience and the most rewarding?

The most challenging part for me was in October 2014 when I was still in Washington, D.C. and leading the effort to communicate with-and map out-all the key U.S. Government stakeholders involved in EVD preparedness and response in the region. Information was moving quickly and there was so much potential for miscommunication and misinformation. The work I was doing to synthesize what we knew as a U.S. Government, what we didn’t know, and who was doing what took a lot of effort but ultimately resulted in the coordinated efforts that currently exist. For me the regular meetings and sharing of information (especially as it supports our U.S. missions in the field) has been the most rewarding.

Ebola – The Journalist’s Perspective

An Interview with Dr. Seema Yasmin, MD, Medical Analyst at Cable News Network (CNN), Staff Writer at The Dallas Morning News, and Professor of Public Health at the University of Texas at Dallas

By Behrooz Behbod, MB ChB MSc ScD DFPH
Specialty Registrar in Public Health, ST3, Oxford Deanery

I understand you studied medicine at Cambridge University and served as an Epidemic Intelligence Service Officer at the US Centers for Disease Control and Prevention (CDC). What led you to train to become a journalist?

Top of the list was finding a vocation that was as exciting, unpredictable and mentally challenging as being an Epidemic Intelligence Service Officer! I ran through a list of options and then heard about a journalism fellowship for subject-matter experts and thought that was the right fit for me. Journalists are curious and unrelenting in their quest to find the truth and that brought together the things I liked about being a doctor and a disease detective.
You’ve had tremendous success within the first year of your career as a journalist, both at Dallas Morning News and CNN in the US. Can you please tell us what this experience has been like?

The Global Fellowships in Journalism at the University of Toronto really jump-started my career. I started the program shortly after finishing up at the CDC and as soon as I graduated, I was hired for a joint appointment by the Dallas Morning News and the University of Texas at Dallas. The workload is intense and I’ve learned that whenever someone offers you two part-time jobs, it really means two full-time jobs. But I love it and have now added a third job as a CNN medical analyst.

In your coverage of the Ebola outbreak, what has your work entailed?

As a doctor, you serve as an advocate for your patient: answering questions about their health, their management plan, making sure they have access to the best services and specialists, helping them to open up and share information with you. As a journalist, you’re an advocate for the public. I try to dig deep and ask the questions that our readers and viewers have. And those same bedside skills come into play especially gaining trust and getting people to open up to you.

When Ebola came to Dallas, the entire newsroom stepped up to cover every angle of the story. It was great to see the camaraderie and the immense attention to accuracy and detail. We covered both the breaking news and provided in-depth analysis about Ebola. We did live Twitter chats to answer the public’s questions and make sure that people had the information that they needed.

What tips do you have for public health professionals in the UK who are considering a career in journalism?

I draw so many parallels between medicine and journalism, especially eating “lunch” at 7 pm and not having time for bathroom breaks when there’s breaking news and multiple deadlines to be met! Fine-tuning communication skills, finding the right people to talk to, asking good questions and really listening to the answers - those are the things that make both for good journalism and good medical care.

How would you compare working at a newspaper like Dallas Morning News with a television news network like CNN?

I enjoy both print and broadcast journalism. There are more similarities than there are differences, especially when it comes to delivering accurate information and analysis in a timely manner.
Can you please describe the clinical trials of Ebola treatments in West Africa?

It is likely that the standard of supportive clinical care that is given to people with Ebola Virus Disease (EVD) can make a big difference in their chances of survival. Although data are currently rather limited, there appears to be an important proportion of moderately sick patients who will recover if fluid and electrolytes are adequately replaced. There are however substantial challenges to monitoring fluid and electrolyte balance in Ebola treatment centres in West Africa. We have seen from the medically repatriated patients that survival rates can be good in a modern intensive care setting, but this standard of care is not an option for the vast majority of Ebola patients.

Specific treatments for Ebola virus disease, either antiviral agents or agents directed at the pathological process, have been developed but were not taken through to a stage where they are ready to evaluate in real patients. The Ebola epidemic has shown the importance of completing sufficient efficacy and safety testing of experimental products so that they are ready to evaluate in the event of an epidemic. We have wasted a lot of time completing these final steps.

The clinical trials have been triggered by the clinical need and the statement by WHO in August 2014 that it was ethical to fast-track evaluation of the experimental therapeutic products for Ebola.

What has been your personal role?

I am the Principal Investigator of a Wellcome Trust funded project to establish clinical trial sites in West Africa where we can undertake rapid evaluation of the experimental treatments for Ebola. We have launched one clinical trial in an Ebola treatment centre in Liberia and at the time of writing we are working on establishing other sites in Sierra Leone.
What have been the most challenging part(s) of your experience?

It is important to recognise that the treatment and prevention of epidemic diseases such as Ebola can only be properly evaluated during an epidemic. It is very challenging, but is the only the choice we have. The challenges are too numerous to mention them all. A key one has been controversy over the clinical trial design. A randomised controlled design is the gold-standard but there are significant ethical concerns about randomising to standard of care when the baseline mortality is so high and when patients medically repatriated to Europe and the US have not been asked to accept randomisation, instead receiving fast-track access to one or more experimental therapies. Alternative, innovative designs are available and we have been working hard on developing these. Another major challenge has been the issue of post-trial access and pricing of anti-Ebola drugs. The most promising agents are novel and expensive, and previous experience with HIV and drugs for neglected tropical diseases shows that there is a real danger that the drugs are not made available to the populations that need them most.

What was most rewarding?

Conducting research on epidemic infectious diseases is exciting. There is always the need to innovate, be flexible, and to be decisive. The most rewarding aspect is witnessing the energy and dedication of colleagues who are ready to work all hours, take risks, and push boundaries in order to make a real difference.

How can public health specialty registrars in the UK take part in your work?

Health protection is global - there is no better example than Ebola - and there is a dynamic and innovative community of public health and clinical specialists waiting to welcome you if you are willing to take chances.

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A Public Health Haiku
By: Aparnareddy Mummadi, MB ChB MSc
Specialty Registrar in Public Health, ST3, Oxford Deanery

1: One saved more await
Life let me do more see more
Public health it is

2: There once was a man
Who had a plan who did try
But unjust is life

3: Quick hurry make haste
Poseidon claims 'kiri-bas',
Time for man to change

4: Bless you bless you too
Hope you got the flu jab too
Protect those you heal

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Public Health Haiku: Aparnareddy Mummadi, MB ChB MSc
Specialty Registrar in Public Health, ST3, Oxford Deanery

1. Why I joined public health
2. Social inequalities
3. Climate change and Kiribati
4. Flu jabs for health workers
A public health presence in NHS provider trusts is becoming increasingly common, driven by factors as wide ranging as the Francis Report, Making Every Contact Count, and the Boorman Review, and more recently strongly supported by NHS England’s Five Year Forward View.

Since April 2013, public health registrars from the Oxford Deanery have been developing a public health resource for patients, staff and visitors at Oxford University Hospitals NHS Trust, including the establishment of a trust-wide public health strategy.

Initial work focussed on engagement with senior management and clinical staff, the local authority, and public involvement representatives, as well as coordinating with existing work to develop staff wellbeing. Following a wide consultation process, a combination of strategy development and change management techniques were used to develop and gain board support for a strategy, and secure funding for initiatives.

A public health strategy was put in place for April 2014, approved by the board and jointly owned with public health in the local authority. The strategy focusses on expanding behaviour change initiatives, improving the hospital environment, and embedding public health approaches within the organisation, including the establishment of a sustainable internal resource. Consultation on priorities for 2015-16 is currently underway.

One particularly exciting initiative has been the launch of an innovative drop-in health improvement advice centre for patients, staff and visitors at one of the hospital sites. In the four months following its opening in August 2014, the centre has seen more than 600 individuals, has become an integral part of several clinical pathways, and has received extremely positive feedback both from service users and referring clinicians.

This work by registrars has established a novel public health resource within an acute trust, on a very limited budget with limited resources. The focus is now on ensuring sustainability within the organisation, and building on the exciting developments to date. The positive response received from patients, staff and partner organisations, together with the direction signalled in the NHS England Five Year Forward View, provide strong reinforcement for the importance of a public health approach within an acute hospital, and the opportunities that this setting presents for taking a proactive approach to preventive care.

For more information, visit: www.ouh.nhs.uk/HereforHealth
I have been working with people living with HIV and colleagues in FPA the UK’s leading sexual health charity and in Public Health England to develop and implement a national survey, the People Living with HIV UK Stigma Index 2015, which aims to assess and describe the lived experience of HIV-related stigma experienced by adults living with HIV in the UK. This work is part of an international project called the People Living with HIV Stigma Index and aims to understand HIV-related stigma and inform effective interventions to reduce stigma for people living with HIV.

The project is community driven and has input from a group of people living with HIV at all stages, from conception of the idea, through development of the survey instrument and piloting of the online survey. People living with HIV will also be involved in administering the survey through local and national HIV support organisations.

Previous work in the UK in 2009\(^1\) suggested that people living with HIV experienced stigma and discrimination within settings such as education, housing, workplace and healthcare. Nearly half of participants reported feeling of shame or guilt, and almost two thirds reported having low self-esteem in the last 12 months. Participants reported experiencing discrimination in the form of gossip, verbal insults and exclusion. Six percent of respondents in the 2009 survey had experienced a physical attack due to their HIV status and twenty two percent had experienced physical harassment and just over half of these said that this at least partly related to their HIV status. In addition, forty percent of participants in this survey reported isolating themselves from family and friends. Fifteen percent had avoided attending clinic and twelve percent avoided going to hospital when they felt they needed to.

HIV-related stigma was also reported within personal relationships, with sexual rejection being the most common form of stigma experienced within a relationship. Discrimination and stigma in healthcare settings was also commonly reported. There is good evidence that HIV-related stigma is associated with refusal of HIV testing, non-disclosure to partners, and lack of or reduced engagement with healthcare services and so understanding this stigma is key to enabling more people with HIV to get the care and treatment they need as well as increasing the numbers of people who test for HIV.

In developing the updated survey we have aimed to capture more detail to help understand the ways in which stigma is experienced in these different settings, particularly within healthcare settings such as GP and dentistry. In addition to experiencing stigma by virtue of their HIV status people living with HIV may also be stigmatised by virtue of other factors, including risk factors associated with the routes of transmission (e.g., injecting drug use and sex work) and other personal characteristics such as ethnicity, religion, sexuality, gender or disability. This new online survey asks participants about the extent to which they feel stigmatised or discriminated against by such issues and should provide novel data on which to base further qualitative work.

This work has been a fantastic learning experience and a rare chance in health protection to really engage and collaborate with key population groups at risk of HIV to develop a tool which is fit for purpose.

If you are working with people living with HIV in NHS or community settings and would like to get involved by becoming a local study site or would just like more information about the UK Stigma Index 2015 please get in touch with me (jo.jefferies@phe.gov.uk)

Sustainable Healthcare

An Interview with Rebecca Gibbs, Sustainable Specialties Programme Manager at the Centre for Sustainable Healthcare (www.sustainablehealthcare.org.uk)

By Behrooz Behbod, MB ChB MSc ScD DFPH
Specialty Registrar in Public Health, ST3, Oxford Deanery

In a nutshell, what is the concept of ‘sustainable healthcare’ and why is it important?

Sustainable healthcare seeks to ensure that we can protect population health, prevent disease and deliver care today without undermining the ability of future generations to do the same. Two concrete tasks bring this into focus. The first is to reduce the impact that healthcare and public health has on the environment, an area where public health has the potential to make a huge contribution. The second is to ensure that we understand the health effects of climate change, take action to protect health and ensure services are able to continue to run, even when the weather changes. This all sounds pretty straightforward when set out in a couple of sentences but, of course, each involves detailed work in a range of areas.

What are the top issues or priorities facing the UK in the field of sustainable healthcare?

We know from the NHS Sustainable Development Unit’s analysis (please see slide below) that the NHS emits approximately 25 million tonnes of carbon (MtC02e) each year. Parliament’s Climate Change Act requires an 80% reduction by 2050. While good work has been done to reduce the intensity of the health sector’s activities (i.e. less carbon emitted per pound spent) we are already behind where we need to be to meet even the 2020 interim target.

One of the greenest things we can do is to stop people falling ill and for this reason action on public health is the first task of sustainable healthcare. Excellent things are underway to reduce energy use and refurbish buildings in the NHS but we know that this will only deliver about a quarter of the savings we need. Urgent action is needed to change what happens to those using health care services and this starts with the funding and development of public health which matches the both the urgency of the climate risks we face and the need to reduce the social costs of preventable chronic illness. Simon Steven’s NHS Five Year Forward View with its focus on prevention is a good start but making progress involves more ambitious policy and action that reaches beyond NHS England into neighbourhood design, community connectedness and the drivers for good employment.

Funding is also a key issue. The Centre for Sustainable Healthcare is a charity and so need to fundraise for our activities. While our research shows that large savings are possible from a sustainable approach – our kidney care work points to possible savings of £1bn from adopting green strategies – but is currently very difficult to secure the initial investment to make those savings possible.

Can you please describe the history and mission of the Centre for Sustainable Healthcare?

CSH started life as the Campaign for Greener Healthcare in 2008 with the goal of helping the NHS fulfil its legal requirement to reduce its carbon footprint by 80% by 2050. We do this by

- Exploring methodologies and metrics that can help to transform models of care;
- Developing programmes that will inspire, empower and support people to change;
- Working with key partners to engage healthcare professionals, patients and the wider community in understanding the connections between health and environment; and
- Researching and highlighting best practice that reduces healthcare’s resource footprint while also improving health outcomes.

Our main focus is on finding ways to mainstream sustainability so that it is a key part of the planning of health systems and the practice of healthcare professionals. To help us design the health systems of the future our medical director, Frances Mortimer, has identified four key pillars to sustainable healthcare: prevention, patient focus, lean pathways and low carbon.

What are the key successful projects that the Centre for Sustainable Healthcare has worked on?

Our two main areas of work are clinical transformation and the NHS Forest. Healthcare workers are best placed to redesign healthcare for the benefit of patients and the environment and we recognise that that the natural communities of practice in healthcare are not institutions like hospitals and health centres but specialties. We have developed our clinical specialties transformation programme which combines research with support for local change, underpinned by wider engagement with patients, and relevant industry and clinical bodies. (http://sustainablehealthcare.org.uk/clinical-transformation)
The NHS Forest (http://nhsforest.org), is a practical, national initiative that builds on the evidence of the benefits of the natural environment to patients, visitors and staff. Its aims are to:

- improve health and wellbeing by increasing access to green space on or near to NHS land;
- encourage greater social cohesion between NHS sites and local communities;
- spark projects that bring together professionals and volunteers to use new and existing woodland for art, food crops, reflective or exercise spaces and to encourage biodiversity; and
- highlight innovative ideas to encourage the use of green space for therapeutic purposes.

**What skills and knowledge do public health professionals need to learn or develop in order to fully engage in sustainable healthcare projects?**

Sustainable public health spans three areas:

1. Public health measures have the potential to reduce the social burden of disease (with particular benefit to those from low socio-economic groups) and the carbon load of the NHS. The development of ambitious initiatives that seek to bring about radical changes in areas such as active travel, sustainable food production and consumption and health inequalities will enable public health to be a force for change in creating a more sustainable society. In addition, **public health registrars with the carbon measurement skills who are able to demonstrate the carbon savings from reduced NHS activity will inform decisions and help to ensure the added environmental value of public health is part of the evidence supporting investment in public health.**

2. The health of the general population depends on urgent, well-directed climate change mitigation and adaptation measures. Also, integrated national action on climate change has an enormous potential to improve health through the intelligent harnessing of health and environment co-benefits. **Public health professionals need good knowledge of the health effects of climate change and systems thinking approaches to ensure that health protection fully caters for this important threat.**

3. UK public health interventions should be delivered using low carbon methods where this can be shown to be equally effective in improving population health. **Including sustainability thinking and metrics in the development of every public health initiative and sharing this learning will give everyone in public health a tremendous bank of evidence to draw from.**

Those interested in this area may also be interested to read Environmental sustainability & public health training in the UK (http://www.fph.org.uk/uploads/Environmental Sustainability and Public Health Training in the UK FINAL.pdf) produced by the Faculty of Public Health's Sustainable Development Network for registrars.

**Can public health specialty registrars spend any placements at the Centre for Sustainable Healthcare?**

We are currently exploring the possibility of a range of ways of working with and supporting public health trainees including hosting placements, developing teaching modules and supervising projects. It's always valuable to hear from those training about what they would like included in their training and what they would like to be involved in. email: rebecca.gibbs@sustainablehealthcare.org.uk}
Getting Started with Spatial Analysis

By Simon Hailstone, BSc(Hons) MPH
Specialty Registrar in Public Health, ST2, Oxford Deanery

Prior to entering the specialty training programme, I was employed as a jobbing information analyst in the NHS. I have had a side interest in Geographic Information Systems (GIS) for around 4 years.

Public health is a discipline which frequently requires a level of geospatial awareness. Whether it’s deprivation indices, proximity to health risk factors or modelling the spread of disease, geography plays an important role in targeting the efforts of healthcare professionals. It is easy to get bogged down in the detail of this field but it is important to communicate that acquiring skills in the basics is perfectly easy for anyone with the desire to do so, even on the tightest of budgets. All you need is a computer and an internet connection to get started.

Many readers may be unfamiliar with the term ‘Open Source’. It is a software related term usually used in the context of applications developed by a community of contributors and released freely. Note that here the word ‘free’ is often used in the context of ‘free speech’ (libre) rather than ‘free beer’ (gratis), however both uses of the word apply. One major benefit of open source software is being able to go to any computer in the world and download and install the software that you need to get on with your work. A desirable trait, especially in the itinerate life of a registrar.

QGIS is a fully-featured, free & open source package for geospatial analysis.1 It can perform practically any form of spatial task that you throw at it. It’s easy to use and there is a supportive community of users on hand should you hit a problem. It is able to handle many different formats of geospatial data and has a user friendly interface to boot. The community behind it have also released a fantastic ‘Gentle Introduction to GIS’ guide which is worth reading.2

R is another free and open source package.3 You may have heard its name screamed in the dead of night as students wrestle with its arcane syntax and obtuse reference material. I have heard it whispered that the lighting of candles and muttering of dark incantations is essential to progress with this tool. That aside, R is great for geo-statistical analysis. Actually R is great for all analysis, it is fast becoming the lingua-franca for data analysis and statistics.4 Many spatial packages are available to expand R’s core functionality and they can be used in conjunction with R’s huge number of specialist statistical libraries.5

Databases are an important tool to mention. PostgreSQL combined with the PostGIS extension provide a database architecture which can handle spatial data.6 It’s free and plays well with QGIS. If you find yourself in a position where you have to handle a lot of spatial data then you should consider utilising these tools for efficient working.

All the GIS software in the world is useless if you have no spatial data. This is supplied in many different formats but the most common is the eponymous ESRI shapefile. They call it a file but each ‘file’ actually consists of at least 3 (often more) sub-files.7

The UK has access to two fantastic spatial data resources. These are the Ordnance Survey (OS) and the Office for National Statistics (ONS). The OS releases data under two schemes, OS OpenData, for the general public, and the Public Sector Mapping Agreement (PSMA) for public sector organisations.8,9 Both of these resources allow a wealth of geographic information to be downloaded, from postcode reference files through to digital map tiles. The ONS provides data relating to administrative boundaries through its geoportal website, from super output areas through to local authority boundaries, there is a huge volume of useful data and guidance here.10

The sites above are obviously focused on the UK. For the rest of the world it is best to pursue solutions specific to the countries of interest, however there are global solutions out there. One of these is the website Natural Earth, a public domain website which provides data at varying levels of detail.11

If you need more detail, try Open StreetMap, an online community-mapping project. Simply navigate to the area of interest and you are able to export the backing data.12 Of particular public health interest, Open Streetmap and its community of volunteer mappers played an important role in the Haiti earthquake crisis in 2010 by providing improved, up-to-date maps to rescue workers.13 Currently the Humanitarian Open StreetMap Team (HOT) are working with the Red Cross to deliver detailed maps to fieldworkers involved in the West African Ebola epidemic.14,15

The tools and techniques for using geographical data are out there, waiting to be used. There are no budgetary constraints preventing the adoption of these tools, all that limits their use is the necessary knowledge and
experience in their application.

Fallacies, Fallacies Everywhere!

There are many pitfalls in spatial analysis and a special measure of pain is reserved for those who have endured this far and choose to delve deeper. This supplementary section provides a brief outline of some notable issues.

The Fractal Coastline

First observed by Lewis Fry Richardson and further discussed by Benoit Mandelbrot, the problem of measuring the length of the British coastline is one of the more intuitive geographical problems to consider. If you took your measurements using a ruler a kilometre long then you would arrive at a very different value than if you were to use a standard 30cm ruler. Your measurement would change yet again if you used one that was just a centimetre long. In practical usage this has an effect on measuring distances between features when following roads or water courses. It also raises the importance of how something is measured. How precise are those co-ordinates? Does everyone live at ground level? Does your commute to work in the morning bear any relationship to the Euclidean 'as-the-crow-flies' distance?

The Ecological Fallacy

Also known as the Fallacy of Division, this can be surmised as follows: The average English male aged 25-34 stands 5ft 10in, ergo the author must be 5ft 10in tall (I am not). As is common with these things, it gets a little more complicated...

The example above illustrated the difference between the overall average and the individual (or sub-group) average. What of the difference between the average and likelihood? If an area has a higher average deprivation score, does that mean that the likelihood of any one individual being more deprived is also higher? The table below describes the heights of the occupants of two rooms each with four occupants. One of the occupants is the world’s tallest man. Both rooms have a mean height of 6ft but in which room are you more likely to be tall?

Simpson’s Paradox

Continuing to erode our perceptions of reality, we may now look at Simpson’s Paradox (confusingly a bias, not a paradox). Let us consider a fictional example consisting of three neighbouring towns. Data have been gathered on the percentage of people enrolled in smoking cessation programmes who have managed to quit for 12 weeks. If we look at the combined results it appears that males are more likely to manage this. But if we look at the three constituent towns separately, the opposite appears to be true. There is a lesson here around lies, damned lies and statistics. Do not be tricked into believing this is merely a classroom oddity, it is encountered out in the wild in various guises.

The Boundary Problem

You live in West Berkshire, close to the border with Reading. There has been a fire in a Reading chemical plant, just down the road from where you live. Don’t worry, the toxic smoke will sense the change in administrative authority as it approaches the boundary line and turn back. How do you know what happens outside the borders of the area of interest? How do you evaluate the impact of factors which fall outside of your area? Do the residents of a local authority live, work, eat and breathe entirely within its borders?

<table>
<thead>
<tr>
<th>Person</th>
<th>Room A</th>
<th>Room B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Person 1</td>
<td>8ft 2in</td>
<td>6ft</td>
</tr>
<tr>
<td>Person 2</td>
<td>5ft 2in</td>
<td>6ft</td>
</tr>
<tr>
<td>Person 3</td>
<td>5ft 2in</td>
<td>6ft</td>
</tr>
<tr>
<td>Person 4</td>
<td>5ft 2in</td>
<td>6ft</td>
</tr>
<tr>
<td>Mean Height</td>
<td>6ft</td>
<td>6ft</td>
</tr>
<tr>
<td>Likelihood of Being Above Average Height (5ft 10in)</td>
<td>25%</td>
<td>100%</td>
</tr>
</tbody>
</table>
Spatial Autocorrelation

Tobler’s first law of geography states that “Everything is related to everything else, but near things are more related than distant things”.22

One of the assumptions of many statistical models is the independence of observations. This assumption conflicts with spatial analysis where relationships based on proximity are key. This is similar in basis to time-series models where temporal autocorrelation is also considered.

The Modifiable Areal Unit Problem

Boundaries change, not always for clear reasons. Indeed their original location may have been decided on a whim or through some unrecorded quirk of planning (see Sykes-Picot for a topical example). The reader may be familiar with the term ‘gerrymandering’; in reality redistricting is often done for more mundane purposes but it does occur. This is one of the reasons why output areas were introduced in the UK, to offset the issues around changes in ward boundaries. In reality, a border has to be drawn somewhere and ultimately the precise location will always be arbitrary to some extent.

References
A lot has been talked about the popularity of initiatives involving public health and film lately (1-3). So we wanted to give public health trainees and students a quick guide to why you should care about public health films now and what you can do to find out more.

**Why it matters now?**

Public health has been defined as “the art and science of preventing disease, prolonging life and promoting health through the organized efforts of society” (4). Some of our most helpful artistic tools have been the moving image and sound. Tim Boon, chief curator at the Science Museum has written eloquently about the fine tradition of scientific and medical documentary film making in Britain. Over the past decade there have been substantial changes in camera technology and unprecedented access to simple tools that allow the making and sharing of films. More films than ever are being made about health and posted to media sharing sites. As we currently embark on this brave new era for film, the public health community including students and trainees have rightly become interested in how this artistic tool can be harnessed to effect positive changes in health.

For example the Public Health Film Society a group launched by public health trainees and students in Oxford are organising in collaboration with the Film Studies Department at Oxford Brookes University an international film competition later this year that offers a platform for film-makers to show their films and the chance for audiences to develop an understanding of how film can be best used to address public health issues. We are also working together to develop a contemporary public health film archive to allow the films from the competition to be enjoyed after the event. It will also be a focus for people working within public health and film to develop a shared understanding and terminology for public health films to aid discussions and facilitate assessments of the impacts of these films.

**How can I find out more?**

As a student of public health, now is a great time to involved in public health films, and help shape this evolving field. We welcome anyone with an interest in public health films. Our events are advertised on our website www.publichealthfilms.org or twitter site @PHfilmsociety, or email us at publichealthfilmsociety@gmail.com.

We will also be arranging screenings at the UK Faculty of Public Health annual conference this year so why not catch up with us there.

**References**

2. Limb M. Internet pornography is an urgent public health issue, conference hears. BMJ. 2014;349.