

# The UK-Med response to Ebola in Sierra Leone



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## **Background**

Ebola virus disease was identified in 1976 in the Democratic Republic of the Congo and Sudan<sup>1</sup> as one of a number of potentially deadly viral haemorrhagic fevers. There have been more than 20 outbreaks, primarily in remote rural villages in Central Africa near tropical rainforests, with the largest historical outbreak occurring in Uganda in 2000<sup>2</sup>. The virus is transmitted to people from wild animals, and fruit bats of the Pteropodidae family are considered to be the natural host. It is thought to infect humans through the practice of eating bush meat and close contact with

infected animals. Once in the human population, spread is by contact with infected body fluids; including vomit, diarrhoea, sweat, saliva, tears, semen and vaginal fluids. Specific treatment is limited, though a vaccine is currently being evaluated<sup>3</sup>, but severely ill patients will require supportive intensive care. The recent West African outbreak belongs to the Zaire species and commenced in Guinea on the 26<sup>th</sup> December 2013 and spread to 6 countries in West Africa – Guinea, Liberia, Sierra Leone, Nigeria, Senegal and Mali. There have also been isolated cases in the USA, Italy, Spain and the UK,<sup>4</sup> including health care workers exposed to the virus while treating infected patients.

By August 2014 the World Health Organisation (WHO) declared the epidemic to be a “public health emergency of international concern.”<sup>5</sup> In response to the growing crisis, the UK Government committed its Armed Forces, NHS and public health workers, diplomatic and development staff, to a programme of support to Sierra Leone<sup>6</sup>. UK-Med, a medical NGO<sup>7</sup>, was asked by the UK Government to expand its existing recruitment and registration processes in use for primarily trauma

based humanitarian emergencies (predominantly earthquakes), and draw volunteers from across the NHS for deployment into UK Government funded Ebola Treatment Centres (ETC) in Sierra Leone.

### UK-Med

UK-Med (registered charity 1046202) was established in 1995 to facilitate the provision of trained healthcare workers from across the UK to support the hospitals in Sarajevo during the Balkans war and subsequently dispatched medical teams to a range of crises. UK-Med also runs education and training programmes and provides a Community of Practice from which its UK International Emergency Trauma Register (UKIETR) and UK International Emergency Medical Register (UKIEMR) can draw volunteers to deploy overseas into conflict and catastrophe. In collaboration with Public Health England it runs the UK International Emergency Public Health Register (UKIEPHR).

## **The UK Ebola Treatment Centre Programme**

The original request to UK-Med from the UK Government was to recruit and train 80 volunteers from the NHS to support Save the Children (STC) when, in February 2015, they were scheduled to take over from the UK Ministry of Defense (MoD) the running of a 20 bedded ETC established for infected health workers in Kerry Town. However, the plans were quickly modified as the numbers of infected patients in Sierra Leone increased. The MoD extended its mission in Kerry Town to continue running the health care worker ETC, and STC, along with other NGO partners, including International Medical Corps (IMC), GOAL, EMERGENCY, and Medicine du Monde (MDM), established and managed 80–100 bedded ETCs across 5 districts in Sierra Leone. In response to the increasing demand for healthcare workers in these ETCs, NHS recruitment and deployment were rapidly scaled up.

### Recruitment

An email enquiry sent to those on the UK-Med volunteer register in July 2014 had identified a significant willingness to respond to the crisis in Sierra

Leone. On September 19<sup>th</sup> 2014 a letter coauthored by the Chief Medical Officer for England, Medical Director of NHS England, Medical Director of Public Health England and the Chief Nursing Officer for England<sup>8</sup> was circulated to NHS Medical Directors and Directors of Nursing. The letter provided guidance to NHS clinicians wanting to volunteer in support of the crisis, and directed them to UK-Med. The Chief Medical Officers for Scotland, Wales and Northern Ireland expressed similar support.

The response from those in the NHS to these letters and the associated media coverage was immediate. UK-Med received 751 applications to its newly formed *UK International Emergency Medical Register for Ebola* in the three weeks following the Chief Medical Officers' letters, rising to 1978 by the time recruitment was closed.

### Selection

The treatment regime followed in the ETCs was guided by WHO and the Ministry of Health in Sierra Leone and was essentially pain relief, temperature control, fluid replacement (oral or I/V) and management of co-

morbidities. UK-Med was therefore looking to recruit healthcare workers who had current experience of managing or nursing very sick patients and who were highly competent in IV cannulation.

The UK-Med administration team excluded those applicants obviously not engaged in health care, and, where appropriate, forwarded relevant applications to Public Health England (PHE) (e.g. laboratory staff) and/or other agencies; leaving 1665 potential candidates for the UK-Med/NHS programme. 571 of these applications were from individuals who were not in the acute healthcare sector or did not complete the application form. A team of senior clinicians reviewed applicants' CV's and identified those without the relevant experience, and removed a further 324 from the list. Those remaining (770) were systematically invited to a standardised, structured telephone interview, where motivation was explored and the risks were clearly explained. Individuals were also asked to indicate their availability for a potential deployment. Following interview, candidates were asked to approach their NHS employer to seek their support for their release and engagement in the programme. One

hundred and sixteen applicants withdrew during or shortly after the interview.

Candidates who successfully completed the telephone interview were invited to an *Ebola information evening* where the UK-Med team could meet them face-to-face and address any further questions directly. These events were held weekly, alternating between Manchester and London. A thorough and transparent discussion of the programme, the disease and the risks was followed by an opportunity to try on the personal protective equipment (PPE).

It was made clear to volunteers during these events that they could withdraw at any time and without explanation. A further 168 withdrew at this last stage, including four who could not successfully complete the health screening (see below).

In summary, approximately 1 in 4 of applicants completed the selection process and provided the programme with over twice the number of volunteers that was ultimately requested. Medical practitioners and nurses formed the largest group, followed by paramedics and healthcare assistants.



### Pre-deployment Health Screening

To avoid any perceived or actual conflict of interest, the health screening process was independent from the UK-Med recruitment programme. Well Travelled Clinics (WTC) of the Liverpool School of Tropical Medicine was commissioned to carry out the mental and physical health screening of all the volunteers. In addition to any other health issues that were identified during screening they stipulated pregnancy, open skin lesions, refusal to take malaria prophylaxis and severe psychological vulnerability as absolute contraindications to inclusion in the programme. UK-Med was informed if the volunteers were medically fit to deploy.

### Training

A three stages approach to training was followed. Individuals were required to attend a UK based, operationally focused course, followed by training in-country delivered by the NGO in the ETC where they were to work. The final stage of training involved mentoring in the 'Red Zone' by an experienced Ebola worker.

The first UK based training programme was carried out by the British Army and then subsequently by RedR – an NGO specialising in training for humanitarian work. All training included immersive simulation exercises to optimise the preparation of teams ahead of deploying into an ETC.

During the UK based training courses, volunteers were informed about the background to the epidemic and brought up to date with the UK and international response. Volunteers were taught how to adopt safe working practices and behaviour in the Ebola Treatment Centres (ETC) and, most importantly, how to safely use the personal protective equipment (PPE). Individuals familiarised themselves with the treatment protocols they would apply and the overall management of the disease. The training also included discussion of the psychological impact of the disease on the patients, families and the communities, and of course themselves.

The residential course delivered blended learning, composed of lectures, simulation exercises and practical sessions in an interactive learning

environment. The majority of candidates went straight from the course venue to the airport and onwards to their allocated ETCs in Sierra Leone.

### Deployment

The agreed release period from the NHS was nine weeks in total (see fig 1). This was composed of: one week training in the UK; five weeks of clinical work in the ETCs; and on return, three weeks of restricted activity, as per Public Health England guidelines<sup>9</sup>. NHS volunteers were distributed across all the DFID funded ETCs, according to demand. They worked alongside Sierra Leonean healthcare workers, who continued to form the majority of the workforce, and others from the UK and elsewhere who volunteered outside of the NHS programme.



Fig 1: The NHS deployment cycle

The first cohort of NHS volunteers recruited through UK-Med deployed in November 2014 followed by 7 further teams until requests for further international support reduced in April 2015. A further two teams were trained and held on standby until the programme closed in November 2015.

In total, 153 NHS volunteers were required to deploy and a further 40 were trained and held on standby. The programme could have deployed more, but as more Sierra Leoneans were trained to work in the ETCs, and volunteers from other countries also came in support, the need for NHS support reduced.

To maintain their continuity of service, NHS volunteers remained employed by their Trusts/Health Boards, whose duty of care continued. Deployment within these caveats was facilitated by the establishment of a UK-Med Quality Monitoring' Unit (QMU). The QMU provided 24-hour welfare support to NHS volunteers in-country and the NGOs with whom they worked, and a focal liaison point between the teams in Sierra Leone

and the UK-Med HQ in the UK. The QMU also provided a centralised point to receive and act upon any concerns, whether clinical, logistical or related to infection control, raised by NHS and other UK government funded health care workers and NGO partners. Working in close collaboration with the Sierra Leone Ministry of Health and WHO, the QMU helped to promote operationally safe, well governed and clinically effective ETCs that worked to agreed standards, guidelines and protocols<sup>10</sup>. The team visited each UK Government supported ETC on a weekly basis to monitor directly staff welfare, ETC standards and clinical practice.

### Post deployment health screening

Deployment on a humanitarian mission can have a negative effect on health, with >35% in one study reporting that their health deteriorated during the mission<sup>11</sup>. The added threat to health care workers deploying into an Ebola epidemic increased these risks, including potential threats to mental health<sup>12</sup>. WTC were also commissioned to carry out post deployment health screening of the NHS volunteers.

Of the 153 who deployed, 148 agreed (96.7%) to complete a post deployment health screening questionnaire and 142 (92.8%) to a follow-up telephone consultation with a registered nurse. The commonest health complaint, reported by 37.2% (n=55), was travellers' diarrhoea (TD) and/or vomiting. This is consistent with previous studies of travellers to the tropics<sup>13</sup>; TD is the most common health problem in overseas travellers, affecting an estimated 20-60% of those who travel to high risk destinations<sup>14,15</sup>. (It is defined as three or more unformed stools in a 24-hour period, often accompanied by at least one of the following: fever, nausea, vomiting, cramps, or bloody stools). Respiratory infections occur in up to 20% of all travellers, the most common being viral upper respiratory tract infection (URTI)<sup>16</sup>. In this group the incidence was 6.8% (n=10) and did not require specific treatment or antibiotics.

The volunteers were under surveillance by Public Health England (PHE) for the 21 days of the incubation period of the Ebola virus, during which they took their temperature twice a day and reported any abnormalities to PHE. WTC also made contact with the

volunteers following their return. All volunteers were asked to complete a post deployment screening questionnaire and telephone interviews with WTC. Twenty-one volunteers (14.2%) developed a pyrexia of 37.5°C or above, either during their deployment, or during their 21-day period of restricted activity on return to the UK. All of those who developed fever on return to the UK were reported to PHE through the daily monitoring process. Thirteen of these twenty-one were isolated in a hospital and underwent screening for malaria, Ebola and other viral haemorrhagic fevers. Of those screened, one volunteer, working with STC, was identified as having Ebola. A panel convened by STC concluded that infection probably occurred within the ETC<sup>17</sup> and related to the use of PPE. UK-Med is also aware that one person developed a fever outside of the 21-day period and was subsequently diagnosed with Malaria (*P. malariae*), which is rare in Sierra Leone<sup>18</sup>. The remainder were identified as having a range of other, non-life-threatening infections, including respiratory tract infections, ear infections, TD and one who had infected mosquito bites.

When asked about broader health issues, many volunteers talked about the challenges of wearing PPE at midday in temperatures exceeding 40°C inside the red zone, and guidelines for volunteers were to limit themselves to 45 minutes in Personal Protective Equipment (PPE) in the red-zone at that time of day.

*“You can tell if you've not drunk enough water. You think I don't want to leave the patient but what if I'm about to faint? It's important to drink loads of water before you go in, I didn't realise you could sweat that much! Some days I had to come out after 30 minutes, one occasion I felt unwell, spoke to my buddy and we both left, we let the decontamination team know we were struggling, your head feels like it's going to explode”.*

They described water “pouring” from gloves and wellington boots during “doffing” of their PPE. Thirteen volunteers (8.8%) lost greater than 3 kilogrammes in weight during their 5 weeks in Sierra Leone, with one individual losing 12 kilogrammes.



*“You lose around 3 litres of sweat in an hour, your mask collapses and gets clogged up with sweat, you have to drink constantly to keep hydrated. I was drinking approximately 6-7 litres per day”*

### Reintegration

Fifty eight (40.1%) of the 142 volunteers who were interviewed on the telephone following their deployment described the social stigma they experienced on their return home. This subject was not raised in the questionnaire; only during the telephone consultation. The stigma was principally experienced during the 21-day period of restricted activity and ranged from social “wariness” from family and friends to more extreme displays of anxiety and prejudice. This was particularly prevalent amongst family and friends who had young children, and many volunteers reported that these friends did not want to see them during the 21-day period and that they in turn, were also reluctant at having contact with those families, “just-in-case”.

A number of volunteers were put under pressure by their employers to have no contact with their co-

workers during the incubation period and were asked not to return to their hospital accommodation during the 21 days. Two volunteers described reactions from their children's schools:

*"I'm chair of governors at child's school and have been asked not to go in. School wanted my daughter to stay off but I've stayed in different part of house to wife and daughter so that my daughter can continue to go to school"*

*"I stayed in London for first two weeks, my children's school had already sent emails out about people returning from Sierra Leone"*

A doctor described it as *'fighting the Hollywood idea of the disease'* and *'like sticking their head in the Lion's den'* as he was greeted with comments like *'see you in 21 days'* from colleagues and friends. Another doctor reported that he was *'treated like a leper by many people'* and was uninvited from a wedding because they had deployed as part of the Ebola response.

One volunteer described how following a visit to a bank to change back their currency, the teller had asked

where they had travelled from; when home the bank manager telephoned to say an ambulance had been called to the branch as some of the staff were experiencing “symptoms”. The police were also contacted and the volunteer had to speak to the ambulance service and the police over the phone to explain and reassure them and direct them to the PHE guidance.

During the 21-day incubation period a number of volunteers described having what they termed “*Ebola of the mind*”. This was particularly prevalent amongst those who returned during early 2015 when the press was full of stories of one returning NHS volunteer who had been diagnosed with Ebola.

*“When you're not with rest of group (when you're back home) your mind can play games with you a bit, you think you're ill”*

*“the 21-days incubation period was hard, I was paranoid the first week back, if you got a headache you were worried. I felt worried about people I live with catching it if I got sick”*

*"The 21-day incubation period was the worst part of the whole trip, coming back to all the phone calls and the press and everyone's reaction to the news" [re: the NHS volunteer with Ebola]. "I felt I couldn't do anything, I didn't want to go out and meet anyone and make them think they were at risk".*

18 returners (12.7%) described a culture shock on return to life and work in the UK. A number described the challenge of transferring from a resource-poor setting back into the resource-rich NHS environment, where multiple diagnostic tests were available.

*"You come back and you really start reflecting on things. NHS has so much, gives you a different perspective on your own job, it will make me grateful".*

*"First week back home was really difficult. I've got a two year old son and felt very sad when I saw him, just the discrepancy and the dichotomy in the world. Over a short period of time we saw a lot of people die. These thoughts have calmed down now, but I don't want to forget them. Talking with family has been hard, it's hard*

*to explain what it's like to be in red zone, it's so "other worldly"*

In addition to health screening, members of the UK-Med team had a telephone “factual debrief” with returning volunteers. No major operational issues were identified.

An independent review of the telephone debriefs reported that

*“there was an overriding sense that despite all obstacles, volunteers benefited hugely from the experience and felt they had achieved a great deal, which put many of the organisational challenges they met into perspective”. See Box 1.*

Volunteers were nevertheless deeply affected by the experience.

*‘It was the saddest and happiest experience of my life’.*

## Box 1

### **A Volunteer's experience in Sierra Leone**

I was in the first cohort to deploy from the NHS. On arrival in Sierra Leone we deployed straight to the allocated Ebola Treatment Centres (ETCs). Our 10 days of pre-deployment training was hosted and run by the British Army in York and entailed a comprehensive programme covering everything from PPE training to the cultural context of Sierra Leone and Ebola. The training gave the confidence and competence to function safely in the Red Zone (Ebola positive treatment area) of an ETC. 17 of us from the NHS deployed to Mathasker ETC, Port Loko which lies in the North of the country and was run by GOAL, an Irish NGO. The first weeks involved intense training and teaching to form a cohesive multinational team. Due to heavy rains the building and fitting out of the ETC was delayed. In this time, protocols were written, PPE donning and doffing rehearsed, and in situ simulation used to 'stress and assess' systems. The ETC had a phased opening in December commencing with the onsite Ebola testing lab run by Public Health England. Over the subsequent weeks initially Ebola positive then undifferentiated patients – both adults and children attended. Our care was based on quality ward care with a particular focus on analgesia and fluid management, and treatment of co-existent malarial and bacterial infections. When 50-60% of patients are dying, palliative care is a crucial component. In an ETC care has to be meticulously pre-planned and clinicians, be they doctors, nurses or paramedics, work with a buddy in the Red Zone. Red Zone working is hot and tiring and limited to a maximum of 2 hours, including donning and doffing. Simple tasks such as venepuncture, cannulation and communication were made very challenging by the wearing of the PPE. That said, survivors leaving the ETCs made it all worthwhile.

## Discussion

The deployment of NHS staff was a very public statement of commitment by the UK that spearheaded the opening of the DFID funded ETCs and may have been a catalyst for a wider international deployment of health care workers into Sierra Leone. Recruiting staff from the NHS was not without its critics, but we believe the strategy was justified. This was a global health emergency affecting a country with an already severely strained health service. Without outside support the epidemic would have continued for longer; the death toll risen even higher, and the long term effects on an already impoverished country's population, economy and health service would have been even greater. In any event, outside assistance was requested, both by the Government of Sierra Leone and by WHO. The past colonial links to West Africa were echoed in the USA agreeing to support Liberia, France supporting Guinea and the UK supporting Sierra Leone. It was perhaps not surprising that the UK government would look to its National Health Service to support its national response; a response, once activated, that needed to be as rapid, safe and skilled as possible. The only other

pool of health workers with this skill set that could be mobilised immediately and reliably was the armed forces, who had already been deployed into the response. The obvious potential drawback to using the NHS was the risk this might pose to an already stretched service, particularly over the winter period. This was mitigated by ensuring that volunteers were never drawn from any service known to be under particular pressure, that there was only one volunteer from any one department at any one time, and they were always recruited with the full consent of their employers. The overriding principles were that the UK NHS service provision and patient safety would never be compromised.

There was also an enlightened self-interest in terms of national security and keeping the infection at bay; which was challenged when an NHS volunteer contracted EVD and reentered the UK. In spite of this, there was no drop in recruitment from the NHS at any time, either from individuals or their employers, and as far as we are aware, no volunteer withdrew from the programme as a result.



The NHS volunteers were seconded from their NHS posts and continued to receive their usual salary and benefits. It was made clear from the outset that there was no offer of any extra payment for this work, and in fact we would not wish to have done so in order to avoid unduly influencing the decision to deploy into a high-risk area with any financial inducement. While we didn't want health workers to lose out financially and have to take a break in service and potentially lose employment benefits, we were looking for them to be volunteers and responding for purely altruistic reasons. We appreciate that not all agencies (can) share this approach, but it has been the principle of UK-Med's engagements with the NHS since its foundation. We encouraged colleagues to volunteer to cover their duties in the UK and for everyone to try and avoid expensive locum costs if at all possible. The final cost of "back-filling" posts in the NHS was circa £1.35m, a little less than the estimate of £1.4m for the numbers deployed, and within the budget allocated of £1.87m. With the additional cost of their training, health clearance and vaccinations, as well as the recruitment of extra staff to UK-Med to manage the programme and run the QMU in-country, the total UK-Med Ebola

budget was £2.3m. Once their training was complete, volunteers were allocated to other NGOs who managed their in-country deployment out of the wider ETC budget. The NHS deployment programme was therefore 0.55% of the overall £427m of DFID funding for the response to Ebola in Sierra Leone<sup>19</sup>.

The people of Sierra Leone have suffered terribly as a result of this epidemic, with deaths from the disease itself and as a consequence of the epidemic leading to the closure of other healthcare facilities<sup>20</sup>; yet in spite of this have been at the vanguard of the efforts to bring the disease under control. We acknowledge fully that it was Sierra Leonean healthcare workers who ultimately fought and won the battle; the NHS programme was but a part of the international support to their efforts.

We are proud of the NHS and its volunteers. It has been calculated that 56,600 Ebola cases (both reported and unreported) were averted in Sierra Leone up to February 2, 2015 as a direct result of additional treatment beds being introduced <sup>21</sup>. While the same researchers found that if beds had been introduced 1 month earlier, a further 12,500 cases could have been

averted, many beds would have opened even later (if at all) perhaps without the guarantee of these initial NHS staff.

Nevertheless, the deployment was not without personal cost, and for the one volunteer who contracted EVD, the cost has been immense. It was made known to all those who offered to volunteer that infection with the disease could not be absolutely prevented, and that NHS staff continued to volunteer despite witnessing the suffering of a colleague, is testament to the level of altruism there is within the NHS. Yet in spite of their personal altruism, almost half of the volunteers described the social stigma they experienced on their return home; principally during the 21-day period of restricted activity.

The legacy for the NHS is a cadre of healthcare workers highly experienced in managing high consequence infectious diseases, that is better prepared and can prepare others, to respond both nationally and internationally when, not if, the next outbreak of a dangerous pathogen occurs. This needs to be expanded and strengthened, with work already

underway to establish a common training pathway for overseas and national deployment to such events using the experience of overseas responses to reinforce our capacity here in the UK.

Following the Ebola crisis, WHO has put forward proposals for an expanded all-hazards Global Health Emergency Workforce (GHEWF) which will *create “a sustainable and coordinated source of emergency response partners from industrialised and developing countries including governments, civil society, the private sector and the military that responds to health consequences in protracted and acute emergencies resulting from any hazard”*.<sup>22</sup> In support of this a national UK Emergency Medical Team (UKEMT) has been established as a partnership between DFID, the national Fire and Rescue Service (who provide logistics, safety and security), Handicap International (an international NGO that provides rehabilitation and long-term follow up) and UK-Med who continue to recruit and train the healthcare members of the team. In December 2016, the UKEMT became the first European team to be verified by the WHO Global EMT initiative<sup>23</sup> as meeting its core classification and

standards and the first team in the world to be verified by WHO as meeting its standards for a specialist rehabilitation facility. The UKEMT also provides a national capability in the event of a major emergency at home.

The unprecedented response of NHS healthcare workers to the crisis in Sierra Leone confirms there is still a wealth of altruism within the NHS and a willingness to serve. Feedback from the Ebola response and earlier deployments, confirms that harnessing this for humanitarian work overseas is likely to maintain morale and enhance job satisfaction. The majority of those deployed to Ebola acknowledged that the experience had provided opportunities to experience working in resource limited environments, making decisions in difficult situations and being flexible. Incorporating overseas humanitarian work more formally into job plans may harness these benefits for the NHS and also aid both recruitment and retention, particularly in hard to fill posts and demanding specialties.

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