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Fighting Ebola in Sierra Leone: a view from the frontline

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ABSTRACT
The largest and most complex Ebola epidemic in history is believed to have started with the infection of a 2-year-old boy in South-eastern Guinea in late 2013. Within a year, thousands of children and their families had contracted the virus, many had died and many more were orphaned. We reflect on our experiences of volunteering at the Kerry Town Ebola Treatment Centre in Sierra Leone between January and February 2015, where we were deployed to care for just a few of these children as part of the Save The Children team.

In the summer of 2014, the largest and most complex Ebola epidemic in history spiralled out of control in West Africa. As a part of the belated international response to the crisis, the UK deployed first its military and then the National Health Service (NHS) to fight the virus in Sierra Leone, one of the worst affected countries. Between November 2014 and May 2015, teams of NHS volunteers were sent to support the efforts of non-governmental organisations already in the field, including 'Save the Children' (STC) which had been asked by the British Government to run its flagship Ebola aid project, the Kerry Town Ebola Treatment Centre (ETC), 40 km south of the capital Freetown (figure 1).

Built by the Royal Engineers in the shadow of the spectacular Western Peninsula Mountains, the 80-bedded facility was staffed by a cosmopolitan team of local health workers, STC volunteers and large contingents of NHS clinicians and the Cuban Medical Brigade. A separate 12-bedded unit was reserved for the treatment of Ebola-infected health workers under the care of military medics from the UK and Canada (figure 2). In January 2015, we began our own deployment at the ETC, and were quickly integrated into two of the six international teams working a 24 h rolling rota.

Each shift started at the nurses' station with a handover in English led by a Sierra Leonean community health officer, during which clinical tasks were allocated according to a tight ward schedule. In the absence of therapeutic drugs, the care we offered was basic, but essential. A veteran of a previous deployment had once explained how leaving the ETC each day after having given every patient in her care water, food, a wash and pain relief had felt like success, and this proved to be the case, though it was not easy to achieve.

We carefully collected all the kit that we would need out on the wards—the 'red zone'. Our first job was to put on personal protective equipment (PPE). With practice, the impermeable, all-in-one plastic suit, surgical mask, hood, apron, two pairs of long surgical gloves and goggles, could be donned in 15 min. Each step was carried out in tandem with a 'buddy', one checking the other for exposed skin or breaches in the equipment before both entered the red zone together. Once inside, we had to work quickly. Red-zone sessions were generally restricted to an hour during the middle of the day when temperatures exceeded 30°C, and the mounting effects of heat and dehydration made it difficult and dangerous to continue working enclosed in PPE. We tried to make every minute inside as productive as possible.

We moved through the wards reviewing the patients. By mid-January, the epidemic had already peaked (figure 3), and the ETC was starting to empty out, giving us more valuable time at each bedside. About a third of the patients were children, sometimes accompanied by an infected parent, more often alone. We monitored symptoms and checked vital signs. Clinical examination in PPE was necessarily brief and focused largely on assessing hydration, the basis of Ebola care. Few of us had ever managed patients with such severe diarrhoea and vomiting before, and hypovolaemia was a common problem. In contrast, the bleeding we had expected to see was uncommon, and when it did occur, it was subtle, with oozing from venepuncture sites or gums. However, the prognosis in such cases was poor despite treatment with vitamin K and even transfusions of fresh frozen plasma, a precious resource, which was not widely available elsewhere.

As each patient review was completed, clinical data were shouted over the red-zone fence or called in over the radio for transcription into case notes back at the nursing station. Drugs and fluids were prescribed on white boards according to unfamiliar WHO protocols. Cannula were sited and frequently resited with each shift, while unwell and sometimes unsupervised children were coaxed to drink large volumes of rehydration solution. Crude assessments of fluid balances were made based on counts of empty plastic bottles around each bed and the estimated volumes of the buckets of effluent positioned among them. Then all too quickly, it was time to leave the red zone and move to the decontamination bays.

Each component of PPE had to be removed in a strictly choreographed sequence, beginning with the most heavily contaminated elements (figure 4). Between each step, hands were ritually washed in 0.5% chlorine under the supervision of specially trained hygienists. Tired and drenched in sweat after a red-zone session, doffing PPE was our most dangerous task. The entire process took around 20 min to complete, and it was vital to maintain

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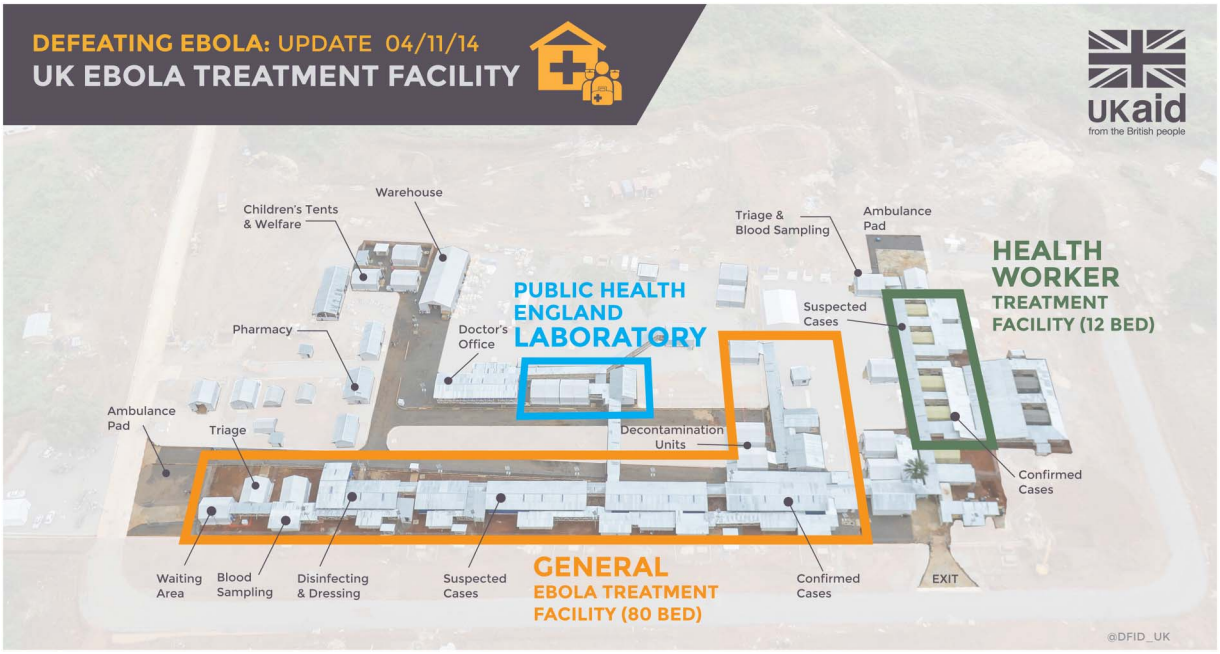

Figure 1 Schematic diagram of the Kerry Town Ebola Treatment Centre (Infographic: Ricci Coughlan/DFID).

Figure 2 Panoramic view of Kerry Town Ebola Treatment Centre at dawn.

concentration throughout. Eventually, we were permitted to step over the line of demarcation back into the green zone, for dry scrubs and some much-needed water. We would visit the red zone two or three times on each shift.

During our time at Kerry Town, the case fatality rate for children under 5 years old was 50%, and for those between 5 and 18 years old, 40% (K Wing, personal communication). Though the baseline serum concentrations of creatine kinase and liver

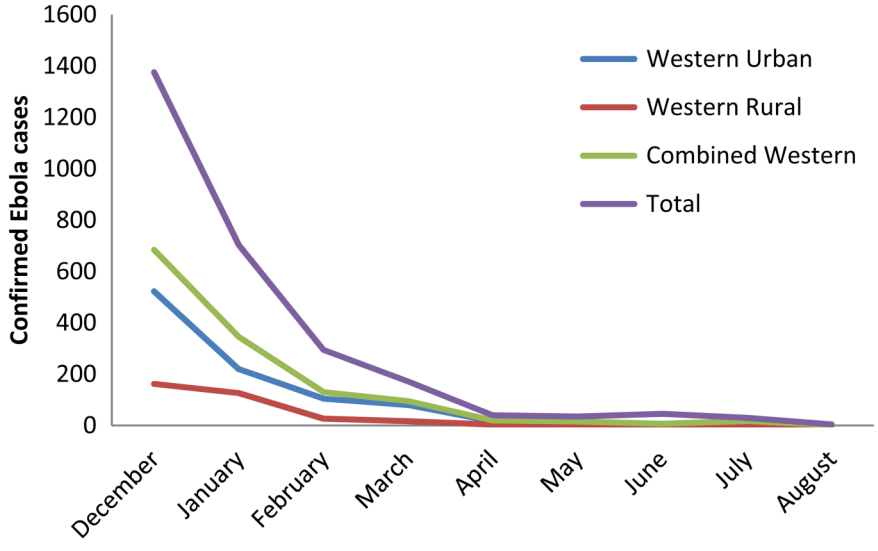

Figure 3 Graph showing totals of newly confirmed Ebola cases in Sierra Leone from December 2014 to August 2015.

Figure 4 Doffing personal protective equipment.

transaminases gave some indication of disease severity at admission, there seemed little to explain the spectrum of illness. Some patients appeared to be recovering, only to develop glassy-eyed encephalopathy or bleeding and to die soon afterwards. Others came in desperately unwell, but recovered slowly and steadily with our simple supportive care. Surprisingly, a significant minority of patients remained almost entirely asymptomatic. The youngest we saw was just 9 months old. She and her mother spent 3 weeks in the ETC with barely a temperature spike between them, just waiting for the obligatory double-negative blood PCR results, which would qualify them for the decontaminating 'happy shower' and discharge home.

The management of patients with Ebola in the ETC was in a sense, relatively straightforward. More challenging perhaps were those suspected patients who turned out to have a different diagnosis. Because the clinical case definition of suspected Ebola virus disease was so wide, we inadvertently admitted several children who actually had other infections, including cerebral malaria, hepatitis and pneumonia. The service we provided was not designed or mandated to treat such children and the longer they spent on our wards, the greater the chance that they or their carers would contract nosocomial Ebola infection. Yet, many were too ill to transfer out safely; the receiving hospitals too poorly resourced to provide a reasonable quality of care. These and other safeguarding concerns proved the most difficult dilemmas.

After 5 weeks, we left Kerry Town to return to the UK, and 21 days of voluntary isolation and monitoring at home. Meanwhile, the number of newly confirmed Ebola cases fell precipitously across Sierra Leone and the wider region, and by the end of March, the ETC was decommissioned. Ebola largely disappeared from the media agenda, the NHS deployment scheme was quietly wound down and most of us went back to our normal jobs. However, we left behind a decimated healthcare infrastructure in which the number of children dying from mundane and preventable diseases like malaria and measles was orders of magnitude greater than those killed by the Ebola virus. There is now a desperate need for a coordinated, international, post-Ebola response, which is as well resourced as that mobilised at the height of the epidemic. In its absence, as paediatricians, we must surely do what we can to help. One option is to become involved in the work our own college is doing in partnership with the Sierra Leone Government to develop its recovery strategy, in order that the country is better able to withstand future health crises (http://www.rcpch.ac.United Kingdom/member-services/get-involved/post-ebola-response-sierra-leone). This epidemic demonstrated that national health crises can quickly become international health crises and so need international solutions. After Ebola, the world seems a frighteningly smaller place.

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