

Response to Suspected Ebola Virus Disease Cases in New Zealand:

Key themes from sector and Ministry debriefs

July 2015

Background

In 2014 a significant outbreak of Ebola Virus Disease (EVD) in West Africa emerged. The scale and complexity of the outbreak resulted in the World Health Organization declaring it to be a Public Health Emergency of International Concern (PHEIC), under the International Health Regulations 2005.

While the risk of Ebola was very low, the New Zealand health sector and other government agencies enhanced their readiness for a potential Ebola case.

While some activity has been EVD-specific, such as the capacity and capability of the referral hospitals, much of the other activity has enhanced readiness for a wide range of events.

Activity over the last 12 months has included:

- establishment of an Ebola Technical Advisory Group (ETAG) to advise on sector capacity and capability, clinical management and public health issues for EVD in New Zealand
- implementation of border protocols for travellers from EVD-affected countries including pre-arrival and arrival screening¹
- development of a protocol for managing the return to New Zealand of humanitarian and health care workers assisting in the international Ebola response. This included a 21-day self-monitoring period starting from the date of departure from the Ebola-affected country, and daily contact from a public health unit
- training, exercising and enhancement, of four referral hospitals (Auckland, Middlemore, Wellington and Christchurch) which were preferred hospitals for definitive care of a confirmed EVD patient
- supporting the development of SOPs and training for clinical staff from receiving hospitals, St John and Wellington Free Ambulance staff on the correct use of personal protective equipment (PPE), medical waste disposal and specialised equipment
- purchase of specialised equipment; to transport suspect or confirmed EVD patients who may pose an infection risk (Isopods) and iStat point of care testing machines for each of the four referral hospitals

¹ From the introduction of additional screening on 10 August 2014 until 27 July 2015, 147 persons have been identified through enhanced New Zealand border screening as having travel history to Sierra Leone, Guinea or Liberia in the 30 days before arriving in New Zealand.

Of those, 48 have been returning humanitarian aid workers 42 of whom completed 21 days of self-monitoring in accordance with Ministry of Health protocols. The other six aid workers had no high risk contacts so were not required to undergo self-monitoring.

- development and maintenance of SOPs and clinical guidance for the sector including primary care
- provision of public information and information for health professionals through a variety of media
- managing elements of the deployment and return and self-monitoring for New Zealand resident health care workers and humanitarians working within the response.

The intent of this report is to highlight key thematic issues that have emerged from recent operational debriefs and planning activity and share these with the sector to inform current work. These issues will also be addressed within the current work to revise and update the 2004 *National Health Emergency Plan for Infectious Diseases (NHEP – Infectious Disease Plan)*.

Key themes

Coordination of readiness activity

The Ministry of Health and health sector responded effectively, off the back of 10 years of pandemic influenza readiness work which has embedded emergency management principles across the health sector. These principles have been well tested and refined over recent years with a range of national, regional and local responses including the 2009 H1N1 pandemic, 2009 and 2010 Canterbury earthquakes, RENA ship grounding in 2011, RWC 2011 and numerous local events. Key principles such as the Coordinated Incident Management System (CIMS) are well understood and in most areas there are effective local planning groups that bring together clinical and non-clinical areas to address emerging issues.

The Ministry of Health is currently reviewing the NHEP Infectious Disease Plan which will update these arrangements for an emerging infectious disease. It is recognised that the current NHEP Infectious Disease Plan was developed in 2004 post-SARS and was effectively superseded by the All Hazards National Health Emergency Plan and the New Zealand Influenza Pandemic Action Plan. The current plan is light on infectious disease management and focuses on overall coordination.

The revised NHEP Infectious Disease Plan needs to articulate elements of the technical response, within an overarching framework provided by the NHEP. Specific elements need to include:

- description of scalable infectious disease management capability in public health, primary care, ambulance, tertiary hospitals and the Ministry of Health
- establishment of an Infectious Disease Technical Advisory Group with core membership able to provide broad and specific advice on emerging disease threats in the same manner as the Ebola Technical Advisory Group. Membership may be altered to incorporate specific clinical expertise in a particular disease threat; however the core areas of IPC, intensive care, infectious disease, laboratory / clinical microbiology, and primary care served EVD readiness well. It may be necessary to consider some other areas such as Chief Operating Officers, public information management and ambulance sectors
- a framework that provides for infectious disease management across a range of disease types and transmission methods from a single imported case to respiratory disease with pandemic potential

- further development of intelligence, communication and decision support tools. Information dissemination worked effectively by email to single points of contact, health sector emergency managers, medical officers of health and public health unit managers. Strategic communication was undertaken with joint letters from the Chief Medical Officer and Chief Nurse to the sector. Most information was also posted to the Ministry of Health website, and the primary care sector also utilised information flow via the Royal New Zealand College of General Practitioners and their electronic newsletter (e-pulse). Health EMIS was also effective for sharing protected information within a secure cloud.

Infection prevention control

Appropriate infection prevention and control (IPC) is a critical aspect to management of a highly infectious patient. Good IPC protects staff and patients, and the revision of the NHEP Infectious Diseases will provide clear guidance on what capacity and capability should be maintained. There is a need to ensure a common understanding of baseline capacity in terms of PPE, equipment, training and business as usual across primary care, ambulance and hospitals as well as an escalation plan or trigger point for undertaking additional training or exercising in response to a specific disease threat.

Additional IPC issues emerged and were managed in areas as diverse as waste management, primary care, private homes where a patient may first become ill, aircraft disinfection and general communication with members of the public.

Key principles to be incorporated into response planning include:

- IPC needs to remain a sub-speciality on the proposed national Infectious Disease Technical Advisory Group
- IPC needs to be integrated into DHB response plans for emerging infectious diseases as well as being scalable for potential pandemic response
- national and local IPC leads need to have the capacity to engage and support readiness activity in other sectors or areas outside a traditional hospital setting
- IPC and associated PPE and training frameworks need to be considered in different settings such as primary care and tertiary.

People capability

- EVD required a subset of clinical staff in referral hospitals and ambulance to become competent in a much higher level of PPE than they would normally operate in. High nursing ratios, and heightened public awareness, especially following the Texas cases, exacerbated staffing issues.
- Practical staffing plans need to be developed by all tertiary and likely referral hospitals that provide for the maintenance of high level skills and knowledge in a small cohort of staff, with surge plans to deliver rapid training and exercising in the event of an emergent threat.
- Training and exercising needs to be graduated and comprehensive. Practical skills and procedures should be practised once training in donning and doffing is completed.
- Surge plans should also include refresher trainings and briefings for staff immediately before the arrival of a suspect patient. It is quite possible there may be a couple of hours' notice and this should be used for 'final rehearsals'. This must also be balanced with the need to safely manage a no notice presentation direct to a facility. It will be challenging to maintain competency and skills for high level PPE use with few, if any, actual presentations.

- Clinical staff with practical experience in the 2014/15 Ebola outbreak or other disease events should be identified locally and a plan developed to engage them for input or mentoring.
- Pandemic HR guidance should be updated to address emerging infectious diseases.
- Medical Council and NZNO Pandemic and Disaster Guidelines should be incorporated into the revised NHEP Infectious Disease Plan.
- DHBs need to plan for inter-DHB surge support, including scenarios where a patient cannot be moved to a preferred referral hospital. Impact of PPE and high care ratios may mean that even large hospitals may quickly exhaust their local resource. DHBs identified different approaches to managing and developing this resource.
- Standardisation of high level PPE and associated IPC practices would better enable inter-DHB support.
- National and local planning groups need to continue to work together to review good practice. PPE and IPC evolved globally throughout the 2014/15 EVD response.

Personal protective equipment (PPE)

- The receiving hospitals hold relatively low volumes of the higher level PPE stock; if they had to manage a confirmed EVD case much larger quantities would have been needed.
- At the height of EVD readiness, there were global shortages of some types of PPE, so much so that this impacted on the logistic supply chain for West Africa where it was actually required.
- A nationally coordinated high level PPE ensemble and stock holdings sufficient to treat a small number of imported and secondary cases should be developed.
- Staff at the receiving hospitals found some of the high level PPE difficult to use. Innovations in PPE should be periodically reviewed, noting that PPE ensemble and donning and doffing procedures evolved throughout the response in West Africa, but that not all may be transferrable to a high income tertiary setting.
- PPE and IPC provision and confidence in its use across primary care was highly variable. Revisions to the NHEP Infectious Disease Plan should clearly describe these requirements and link to the Royal New Zealand College of General Practitioners Cornerstone Accreditation and other standards.
- Referral hospitals developed their training scenarios from simple PPE donning and doffing to practising patient transfer, treatment, waste management and emergency procedures in PPE.

Waste management

- The events highlighted that existing waste storage and management protocols at the hospital may have struggled to cope with the volume of waste created by a confirmed EVD case.
- As the majority of hospital waste is category B² or less, hospital planning groups need to ensure they have contracts established with medical waste companies in order to provide and manage suitable category A waste containers in sufficient volume at the time of a suspect case or other event generating category A² waste.
- Primary sector should ensure that their IPC guidelines for medical waste management for routine presentations are known and understood and that these reflect the escalation via public health units in the event of assessing a confirmed EVD case.

² See UN 2814 Infectious substances

- Management of medical waste during patient transfer needs to be planned for.

Case management

Health agencies worked effectively with border management agencies at national and local level and Customs provided effective pre-screening and initial border screening for travels from the affected countries.

- Following the Gore and Nelson suspect EVD cases, the Border Risk Assessment and Guidelines for Health Care Professionals have been rewritten to strengthen the requirement for a suspect case to be assessed by an infectious disease specialist or clinical microbiologist.
- The infectious disease clinical network should ensure that they are confident that either a local infectious disease clinician or a clinical microbiologist is able to be deployed from a tertiary hospital to assess a suspect case in either a hospital without that speciality or in a private residence if a local infectious disease clinician is not available.
- Early clinical assessment will inform the most efficient and safest transfer option for the patient, clinical staff and the public, as well as the most appropriate health care facility.
- There was a high degree of self-monitoring compliance by returned health care workers, meaning that this assessment can be done at a very early stage of the disease progression.
- Early clinical assessment will also allow treatment – such as fluid management – to start early, optimising patient outcome.
- DHBs need to plan for effective incident management between their public health unit and clinicians managing a suspected case. This may include liaison across several PHU areas and a referral hospital outside the area the patient was identified in. The Ministry will continue to support this local coordination including identification or coordination of specialist resources where not available at the local level.
- The four referral hospitals undertook considerable work to enhance their capability to manage a suspect case, including modification and fit-out of ward areas. This work was commensurate with the risk and was timely and appropriate. The work and effort of staff involved was critical to domestic readiness.
- Given the low likelihood of highly pathogenic emerging infectious disease in New Zealand, it is not feasible for many facilities to provide totally separate isolation of these treatment areas. Planning for an EVD case in some areas therefore disproportionately impacted the operation of the hospital including closure of ward areas in order to ensure effective isolation. Middlemore Hospital was fortunate that they were able to dedicate and develop a wing as a dedicated ‘bio-containment’ unit.
- Conversely the geographic population distribution in New Zealand and patient transfer challenges necessitated multiple centres for EVD. Restrictions on self-monitoring location, i.e. a requirement to stay in Auckland, were not appropriate for a variety of reasons and New Zealand was recognised for its proportional and appropriate response under the International Health Regulations.
- The four referral centres should, in the short term, retain their planning and operating procedures to utilise their pre-identified EVD isolation areas in the event of an emerging infectious disease.
- The NHEP Infectious Disease Plan needs to articulate the expected level of capability for emerging infectious disease in primary care, ambulance, and receiving and referral hospitals, noting that referral hospital(s) for a specific emerging infectious disease may best be determined

by the proposed Infectious Disease Technical Advisory Group at the time. Planning needs to recognise that emerging infectious diseases will likely require a disease-specific response against a baseline capacity.

- Several other high income jurisdictions modified their triage and assessment process in the latter stages of domestic readiness so that suspect EVD patients presented at the nearest medical facility where their medical condition was then reviewed by a clinician and an Infectious Diseases Technical Advisory Group expert to determine transfer to a referral centre or not. This approach is essentially consistent with our existing plan, which includes the possibility that a patient may first present at primary or secondary care. The advantage of this approach is that the ‘at-risk’ patient has early access to medical care irrespective of where they are located in the country. The disadvantage is that delays in diagnosis may mean that the patient cannot be on-transferred to one of the four specified treatment centres. The main objective of triage via a health care system is that patients can be clinically assessed and transferred as early as possible with some treatment initiated. This is an important lesson from the Gore and Nelson cases. It is also a way of determining the clinical needs of the patient and what form of transport is the most appropriate for them.
- The alternative to this is to restrict the distance from a referral centre that a self-monitoring contact can reside at during the incubation period. This was not considered appropriate for EVD because of the gradual onset of symptoms, low initial infectivity and high level of awareness in returning health care workers. It may be appropriate for other diseases and should be an early recommendation from the Infectious Diseases Technical Advisory Group together with any specified referral hospitals.

Patient transfer

The Gore and Nelson cases were transferred to Christchurch and Wellington referral hospitals respectively. A number of debriefs have examined arrangements for both ambulance and helicopter transportation and work is under way to enhance this capability:

- Finite planning resources had meant that effort had been focused on ensuring arrangements to transport by air of a suspected case within an Isopod. St John had identified and engaged directly with Northern Emergency Services Trust (NEST) (rotary) and Lifeflight Auckland (fixed wing).
- Further training and exercising is needed with ambulance and the aeromedical providers to enhance this process and increase the level of clinical care provided to a suspect case before being placed in an Isopod and during the flight.
- Lifeflight Auckland is no longer the fixed wing aeromedical provider for Auckland DHB and readiness work is now under way with the new provider, New Zealand Air Ambulance Service (NZAAS).
- Simulation training for ambulance staff, with input from a clinician with experience in an Ebola treatment centre would be beneficial to improve clinical care and support during the transfer.
- The size of the Isopod means it is impractical to deploy it within a BK117 or Squirrel helicopter (used by the majority of aeromedical providers) and effort was concentrated on arrangements with the S-76 helicopter utilised by NEST. The S-76 has numerous advantages over these smaller helicopters including large cabin, high speed, high levels of crew comfort and extended range. However NEST is based in Auckland and Whangarei and the S-76 is likely to be replaced in the next few years.

- Until then the S-76 should remain the preferred civilian helicopter platform due to its internal size, speed and operating range, however planning needs to be enhanced to better define triggers and timeframes to ensure as effective a response as possible to a long distance mission.
- The AME capability, across civilian and military, rotary and fixed wing, needs to be documented and endorsed by stakeholders, including any service restrictions or limitations.
- During the response to the Nelson case, it was assessed that the patient was asymptomatic and that transfer by Isopod was not clinically required. However no aeromedical provider had been engaged on the possibility of transfer without an Isopod, and the default planning assumption had always been that transfer by air would be in an Isopod for an asymptomatic to moderately unwell patient.
- AME providers, other than those engaged in the readiness planning, had little previous engagement and were unwilling, in spite of extensive clinical and managerial engagement, to transport a suspect EVD case without an Isopod. Significant delays and effort were experienced in making transport arrangements that deviated from the agreed SOPs.
- New Zealand Defence Force (NZDF) provided an NH-90 helicopter and crew that were tasked to transport a patient in PPE only from Nelson to Wellington Hospital. NZDF are reviewing their capability in this area to support future missions if required; however they should be engaged as a provider of last resort.
- Transport costs for aeromedical transfers are centrally funded by the National Ambulance Sector Office (NASO) as an exceptional cost, and these arrangements were suitable and should continue. There should be no actual or perceived cost barrier where a transfer is clinically required.
- A planning meeting was held in Auckland on 16 July 2015 with New Zealand Air Ambulance Service (NZAAS), NEST, St John Ambulance, the Ministry of Health, NASO and NZDF to confirm current capability and gaps. This meeting further explored the work required to ensure AME providers are willing and able to undertake the transfer of a patient when isolation in an Isopod is not required.
- St John have been asked to continue to lead the work on this, and to also explore training and capability required to enable the transfer of patients not in an Isopod with varying levels of crew and patient PPE.

Equipment

The Ministry purchased modified Isopod and iStat point of care testing machines to use in the transportation and testing of suspected EVD cases. DHBs led the procurement of a wide range of consumables, especially higher level PPE ensembles that were not previously used in the sector, as well as fit out and modification of identified ward areas. The Ministry and referral hospitals worked together to ensure that contracts for areas such as clinical waste management were met.

Globally there was a shortage of many items of higher level PPE during the initial stages of the response.

There are very limited isolation transport options and New Zealand lacks commercial or military aircraft equivalent to the small number of aircraft in the US or Europe that are large enough to use other isolation systems. Isopods have been modified and used for air transport by Western Australia flying doctors since SARS in 2003 and no viable alternative seems to have been developed in the interim.

Suspect EVD case management

Pre-hospital

The Gore and Nelson suspect EVD cases were identified by their public health unit in response to self-monitoring by the returned health care worker. Both patients were located in smaller DHBs and a transfer to a referral hospital was initiated.

- The transfer of suspected EVD patients from Gore and Nelson generated significant media interest.
- The Ministry followed normal procedure around maintaining patient privacy; however the very high level of media interest, information available on social media, and a family member choosing to speak to media, meant maintaining anonymity was difficult.
- The media obtained personal information on the patients, including photos, from social networking sites. In the second case, early advice was provided to the patient around taking steps to protect their privacy on their social media accounts.
- Calls from media to the patients' phones made it difficult for family and responders to make contact – communication was improved when a separate phone was provided to the patient.
- During the first case, ambulance staff reportedly did not brief the patient prior to and during the transport from home to the receiving hospital and the patient felt that they received little effective emotional support or contact from crews. Practical scenario training for ambulance staff involved in the transfer may address this.
- Dedicated contact needs to be established and maintained between the receiving hospital, the PHU and the patient.
- Earlier clinical assessment, pre-hospital treatment, clinical care, psychosocial support and communication/media handling advice should be planned for. Depending on the disease type and advice from the Infectious Technical Advisory Group, alternative patient pathways may be used including admittance to a non-referral hospital for initial assessment, this approach has been successfully used in the UK.
- Clinical assessment, by an infectious disease specialist, should occur at an early stage and this should inform transfer type and destination as well as the public health response.
- Psychological and clinical support should also be arranged for the patient while transport options are being arranged.

In hospital

The Gore and Nelson suspect cases were accommodated in isolation rooms at the receiving hospitals.

- Patients found the isolation environment very challenging due to long periods with no contact and the inability to take any personal items into the room.
- Referral hospitals should plan for patient support and welfare within isolation, including communication with their families.
- An information-sharing protocol, recognising the high degree of likely media and stakeholder interest, should be developed and shared with agencies at an early stage of the response.
- With the exception of Middlemore, which has established a dedicated bio-containment unit wing, there will be significant disruption caused by an isolated patient with EVD or a similar disease. A key decision for the Infectious Disease Technical Advisory Group will be to advise on the optimum location and number of referral centres specific to the disease.

Diagnostic testing

- The commercial arrangement with a specialist medical logistics company and Air New Zealand to provide sample shipping to the VIDRL reference laboratory in Melbourne worked effectively when it was used in the second case. Use of an NZDF flight in the first case, to achieve an earlier arrival time to Melbourne, resulted in a very modest time saving and required additional operational coordination at national and local levels.
- Clear criteria for requesting support from NZDF over the commercial solution need to be agreed but should be an exceptional option.

Returning humanitarian and health care workers

Border

- The health assessments at the border went well; public health staff were waiting to meet returning health care workers and the risk assessment was efficient. Public health units with international airports in their coverage area need to continue to plan to meet this IHR function.
- The support of New Zealand Customs Service, border agencies and airport staff ensured that border operations were effective and unobtrusive. New Zealand was acknowledged by the World Health Organization as meeting the recommendations within the Public Health Emergency of International Concern in implementing proportional and appropriate controls on international travellers. Engagement included a series of face to face briefings at airports, as well as regular updates by email. Pre-arrival electronic screening, as well as engagement from international NGOs and organisations working in countries with high rates of Ebola transmission, provided high confidence in detecting travellers returning from the affected region.
- Self-monitoring of returned personnel went well, with high compliance and engagement from returned staff, most of whom had experience in treating EVD patients themselves. There are assumptions about the effectiveness of the self-monitoring, including the quality of the thermometer being used, and the reliability and accuracy of self-reporting. Standardised thermometer and recording sheets would enhance this process and these were developed and used by some public health units.
- The Infectious Disease Technical Advisory Group should consider any restriction on maximum travel distance to a referral hospital, dependent on the characteristics of the emerging infectious disease.



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