MISSION REPORT

Public health emergency preparedness for cases of viral haemorrhagic fever (Ebola) in Belgium: a peer review

16 – 19 March 2015

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This report of the European Centre for Disease Prevention and Control (ECDC) was coordinated by Svetla Tsolova and Graham Fraser.

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Abbreviations

CBRN	Chemical, biological, radiological and nuclear defence
EC	European Commission
ECDC	European Centre for Disease Prevention and Control
ED	Emergency department
EU	European Union
EVD	Ebola virus disease
FAQ	Frequently asked questions
FPS	Federal public service
GDP	Gross domestic product
GP	General practitioner
HIT	Health in transition
IATA	International Air Transport Association
ICU	Intensive care unit
ITM	Institute of Tropical Medicine
Medevac	Medical evacuation
MERS CoV	Middle East respiratory syndrome coronavirus
MoD	Ministry of defence
MoH	Belgian Ministry of Health
MSF	Médecins Sans Frontières
NCHS	National Council for Hospital Supplies
NCN	National Council of Nurses
NFP	National focal point
NGOs	Nongovernmental organisations
PCR	Polymerase chain reaction
PH	Public health
PHE	Public health emergency
PPE	Personal protective equipment
RAG	Risk Assessment Group
RMG	Risk Management Group
SARS	Severe acute respiratory syndrome
SIAMU	Service d'Incendie et d'Aide Médicale Urgente (fire and emergency medical care service, Brussels Capital Region)
SHC	Superior Health Council
SIPH	Scientific Institute of Public Health
SOP	Standard operating procedure
VHF	Viral haemorrhagic fever
WG	Working group
WHO	World Health Organization

Executive summary

In the context of preparedness for, and management of, cases of Ebola infection imported into the EU, ECDC – in collaboration with Belgium public health authorities – conducted a 3.5-day peer-review country visit in March 2015. Five experts (three from ECDC and two from other EU Member States[1]) supported the national public health leaders to review and identify strengths and areas for possible improvements of the country's health emergency system.

The review focussed on four critical pathways for viral haemorrhagic fever: point of entry, community, inland transportation, and treatment in designated hospitals. In addition, the support infrastructure around these pathways and the key responders were considered, e.g. system governance, system organisation, surveillance systems, and laboratory services.

Main findings

Organisational structure and collaboration: strong and dedicated arrangements for Ebola response governance and organisation, with clearly defined leadership. Intensive and effective collaboration between key stakeholders; clearly defined coordination and collaboration with key organisations outside the health sector.

Guidelines and procedures: guidelines and standard operational procedures (SOPs) adapted or developed after extensive collaborative efforts, areas covered include participation of professional experts and participation of scientific and non-governmental organisations.

Communication and capacity building: transparent communication with professionals and the public on the Ebola health threat (e.g. through a multilingual website). Simulation exercises and numerous training courses for staff were organised, both for stakeholders in health and non-health sectors.

Points of entry: entry checks for all passengers arriving on flights from affected countries. Passenger flow at the international airport is well organised. Intensive collaboration exists between airport, airlines and federal health authorities. This allowed authorities to build confidence among the public about implementation of safety measures and to keep direct flights operational. The country contributed to efforts of the international community to control and maintain the outbreak, by ensuring continuation of direct flights to affected African countries for the deployment of health professionals.

Community/primary respondents: general practitioners were consulted in the process of developing guidelines and standard operating procedure (SOPs). Health inspectors held an important role as intermediate level liaisons between primary care and hospital care in the decision-making process on case definitions and referrals.

Inland transport: criteria for distinguishing cases ('dry' or 'wet') were applied to differentiate the mode of transportation. Protocols were developed for both types of transportation and for the use of different types of personal protective equipment (PPE).

Designated hospitals for Ebola treatment: three hospitals were designated, which offer a total of six beds dedicated to viral haemorrhagic fever (VHF) care, located in different places in the country. Structures were modified to meet requirements for isolation and protection of staff when receiving and treating highly infectious patients.

Strengths in preparedness planning, organisation and functions

Belgium uses concise criteria for deciding on a case (symptoms compatible with diseases, e.g. fever, evidence of exposure, and assessment of risk behaviours). Guidelines and flow charts with algorithms were developed, regularly updated, and disseminated to different levels of the healthcare system. Medical staff was informed, trained and provided with advice on how to detect, protect and control the spread of the highly contagious Ebola fever. Public and professional communication measures were extensive, with a clear commitment to establish a multilingual 'one-stop shop' website for reference.

Organisational structures were enforced and additional ones were established to improve coordination among counterparts. Appointing an Ebola coordinator and deputy coordinator was a great step forward and improved coordination at the clinical and political levels. Collaboration between authorities was enhanced in the context of Ebola. Regular reports produced by the Ebola coordinator were discussed and disseminated to all relevant stakeholders.

[1] ECDC national focal points for preparedness and response from the United Kingdom and the Netherlands

Direct flights to affected countries were not interrupted, which allowed the international community of health professionals to continue their efforts to contain the outbreak in West Africa.

Designated healthcare facilities were in frequent contact with public health authorities in order to strengthen organisational aspects and capacities. Health facilities communicated about adopted practices.

Laboratory capacity was sufficient, and laboratories could provide timely diagnoses.

Preparedness system vulnerabilities

Availability of staff was discussed with regard to the public health area and primary, secondary and tertiary care. Cuts in budget and staff in the public healthcare system were noticeable in all public health activities during the crisis.

One debated issue was the sustainability of functions at different levels of the healthcare system if more than one individual case of Ebola occurred. Shortage of staff and work overload can cause significant pressure to sustain other (routine) activities. Having more than one individual case may turn out to be extremely stressful for hospitals.

Lack of resources could be seen as a reason for not organising more simulation exercises.

There is no standardisation of PPE as hospitals initiated procurement of PPE at different times. This may be an issue if the country wants to build a common stockpile.

Lessons learned and potential areas for actions

Taking care of Ebola patients requires sufficient resources (both technical and human) and may turn out to be very expensive for hospitals. Therefore, a broader legal framework to support and back up hospitals might be needed. Such a framework would ensure the continued support of hospitals once they have committed to become a 'designated hospital' for the treatment of resource-intensive cases.

Some guidelines/protocols were still in development or about to be finalised. Professionals dealing with risk groups need to be more involved in discussing and testing guidelines (e.g. carers of asylum seekers). More analysis based on available detailed data and specific attention to targeted populations could support risk assessments.

A detailed analysis of the 11 suspected cases could be helpful in order to improve system performance. It is particularly important to assess the level of burden imposed on the system and how capacity problems were addressed.

GPs preparedness and their involvement in simulation exercises may need to be further discussed and assessed.

Emergency departments have an important role to play (and this includes emergency departments in non-designated hospitals), and improved collaboration with regard to epidemiological situation and preparedness would be helpful. Hospital networks may be used for information exchange about good practises. There might be a need for preparedness and training for all hospital staff (and not only for designated health facilities).

Review and evaluation of entry screening: Reviews could be performed in collaboration with countries that carried out entry screening. Sharing best practices between airport, airline, marine and railway authorities may support the learning process.

Evaluation results need to be incorporated in future generic preparedness planning. Preparedness planning needs to reflect on legacy issues of capacities which were developed in the processes of managing health threats. Lessons learned by using good practices need to be applied to future events and should be incorporated in training plans and capacity building measures.

Main steps forward

- Preparation of concise plans for system sustainability and resource supply.
- Comprehensive analysis of case management algorithms, based on experience with suspected cases.
- Initiatives for more simulation exercises with counterparts at all levels of the healthcare system (including GPs) and non-health sector stakeholders.
- Evaluation of system performance and incorporation of legacy issues and lessons learned into generic preparedness planning.

Introduction

European Union Member States faced major challenges when, in 2014, they prepared for, and responded to, a serious cross-border health threat caused by an outbreak of Ebola in West Africa. Over a period of several months, Member States revised preparedness plans and responded to suspected or confirmed cases.

Key stakeholders from non-health sectors (e.g. transport, international affairs, Civil Protection, military, etc.) were also engaged in the discussions and intersectoral collaboration. Moreover, a number of Member States participated extensively in the international efforts to contain the epidemic in Africa by providing expertise, logistical and financial support. Public health preparedness systems were optimised at all levels during 2014, both nationally and internationally, in order to respond to this emerging cross-border heath threat.

Nature and evolution of the communicable disease threat and assessment of risks

The 2013/2014 epidemic of Ebola virus disease in Guinea, Liberia and Sierra Leone was the largest ever documented epidemic of Ebola, both in terms of numbers and geographical spread. The first cases were internationally notified in December 2013, and on 8 August 2014, the WHO declared the Ebola epidemic in West Africa to be a Public Health Emergency of International Concern.

Healthcare workers (HCWs) are vulnerable due to direct exposure to the virus. In the EU, three HCWs were infected – one in Spain (infected while caring for an evacuated Ebola patient), and two in the UK (both infected in Sierra Leone). In the USA, six HCWs were infected: two in Sierra Leone, two in Liberia and two while caring for a confirmed case in Texas (as of April 2015).

The risk of importing Ebola into the EU, and in particular to Belgium, as well as the risk of transmission within the country following an importation, remains low or very low. This is a result of the range of risk reduction measures that were put in place by Belgium and other Member States, as well as by the affected countries in West Africa. However, continued vigilance is essential. If a symptomatic case of Ebola presents in an EU Member State, secondary transmission to caregivers in the family and in healthcare facilities cannot be excluded.

Country visit – background

In collaboration with Belgian public health authorities and upon invitation from the country, a team of five experts (three from ECDC and two from other EU Member States) conducted a peer-review visit to Belgium from 16–19 March 2015.

The objective of the visit was to support national public health leaders to review and identify strengths and areas for improvement of the country's health emergency preparedness system. The visit was initiated in the context of a cross-border health threat caused by Ebola infection and a need for preparedness actions.

The following outcomes have been envisaged:

- Identification of practices and lessons learned, based on activities to strengthen preparedness for health threat of imported infections of highly contagious infectious diseases, such as viral haemorrhagic fevers.
- Identification of system strengths, vulnerabilities and risks.
- Sharing of experiences between EU Member States.
- Identification of areas for potential further support from ECDC.
- Input to EU debate on lessons learned from Ebola outbreak in West Africa and actions to strengthen preparedness.

The methodology of the peer-review visit has been based on a protocol developed by ECDC's Country Preparedness Support section. Critical areas of potential pathways for a case of viral haemorrhagic fever (VHF) were the primary focus of the methodology and the system review: points of entry, first responders and public health, emergency transportation, treatment in designated hospital, medical evacuation. In addition, the support infrastructure around the pathway and the key responders were considered: system governance and organisation, surveillance system, laboratory services, and risk communication. (Annex 4, Figure 1)

Terms of reference for the peer-review visit have been developed together with the Belgian health authorities prior to the visit. Before visiting Belgium, the peer-review team conducted a quick review of documentation on Ebola preparedness documents published by the Belgian authorities (Annex 3).

In Belgium, four critical areas were in the focus of the review: point of entry, community, inland transportation, and designated hospital treatment. Medical evacuation has not been reviewed as the country decided to join the EU shared mechanism for medical evacuation. This decision was considered as an act of solidarity and collaboration. Joint EU mechanisms are seen as a way to encourage cooperation between EU Member States and to emphasise EU added value. The idea of shared resources in the area of medical evacuation by supporting a concerted action is seen by the Belgian authorities as more efficient than developing and maintaining their own structures.

'Primary responders' were defined as organisations which may have first exposure to an unrecognised case of VHF. Critical capabilities for these organisations include the ability to recognise a person as possibly suffering from VHF, to safely isolate and manage the patient, and to immediately report a (suspected) case to public health authorities. 'Secondary responders' are organisations responsible for the management of a person who has been identified as possibly infected with a VHF virus. Key organisational capabilities for these organisations include effective clinical care for the patient while ensuring safety of staff and environment.

The peer-review visit mainly explored the national level. Site visits to health facilities or points of entry (airport) were also conducted. The ECDC and Member States teams met with a number of authorities from the health and non-health sectors that cooperated to strengthen preparedness and response to the Ebola health threat.

Findings, reporting and limitations

Provisional findings were discussed with main stakeholders in Belgium during a debriefing session at the end of the visit. The draft report was reviewed by country contact points in order to make factual corrections. Clarifications aimed at a better understanding of some aspects of system effectiveness. This collaborative approach is important as the report outlines matters for possible future actions. Issues discussed in the report can be further expanded at the EU level in order to improve collaboration and share experience and knowledge.

The peer review was limited by the short duration of the country visit (3.5 days). Moreover, the time for preparation was very short, which made it difficult to collect comprehensive information on system capacities and capabilities prior to the visit.

ECDC did not include a specific evaluation of the epidemiological work. A deeper exploration of epidemiological data gathered by the Scientific Institute of Public Health (SIPH) could have contributed to a better understanding of the epidemiological situation and provided additional information and evidence for risk assessments.

1 Background and specific Ebola response organisational issues

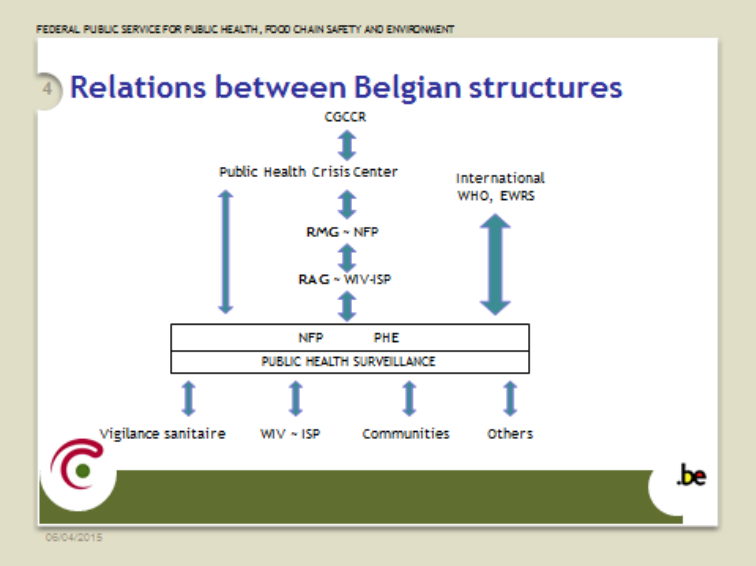
The chapter provides very short information about the country, describes public health preparedness structures, adopted plans, procedures and targeted audiences in the context of the Ebola health threat. Main key stakeholders in the area of public health preparedness are also listed. Preparedness, response and crisis management structures and processes are discussed briefly. System strengths and vulnerabilities are outlined at the end of the section, as are suggestions for further actions.

The Belgian population reached 11.2 million in 2013[2]. Belgium has one of the highest population densities in Europe. There are three official languages: Dutch, French and German[3]. Information about the organisation of Belgium's public healthcare system is provided in Annex 5.

1.1 Principal stakeholders and their interrelations

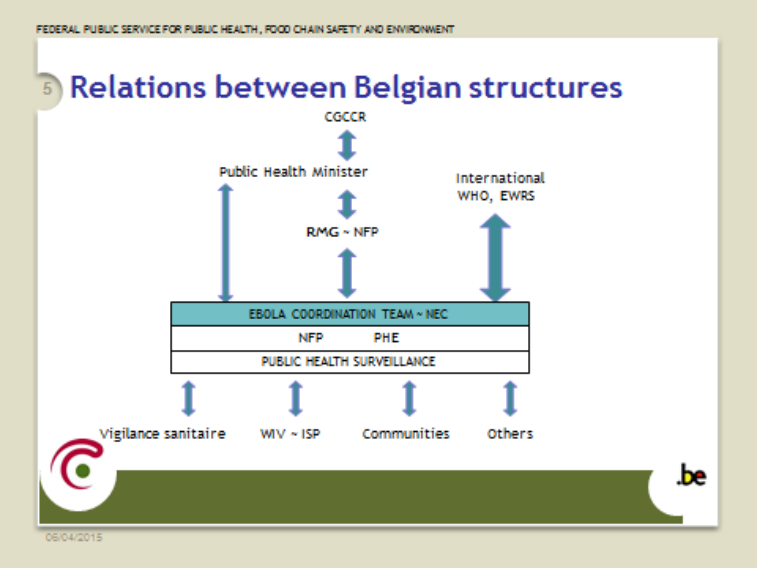
In the context of Ebola preparedness, the following main stakeholders have been involved: national focal point (NFP), risk assessment group (RAG), Risk Management Group (RMG), Scientific Institute of Public Health (WIV-ISP), Superior Health Council (SHC), public health emergency (PHE), Public Health Disaster Management Service, SANIPORT, communities/regions, Departmental Public Health Crisis Centre, Minister of Public Health, Governmental Coordination and Crisis Centre (CGCCR). The links between these actors are presented in Figure 1.

Figure 1: Structure and relationships between stakeholders



[2] World Bank, http://data.worldbank.org/country/belgium

[3] Dutch is spoken by around 59% of the population, French by around 40% and German by less than 1% (Belgium Federal Portal 2005). The distribution of Belgium's residents by region is as follows: 6.3 million live in the Flemish Region, 3.5 million live in the Walloon Region (including 75 000 from the German-speaking community) and 1.1 million reside in the Brussels-Capital Region. Approximately one million inhabitants are of a different nationality (i.e. not Belgian). In 2010, Italians were the largest group of non-Belgian nationality, followed by French and Dutch nationals. Moroccans were in fourth position, followed by Poles. Source: http://www.belgium.be/en/about_belgium/country/Population/



Source: presentation by Belgian Ebola coordinator (16 March 2015)

1.2 Designated coordination entity

A Belgian Ebola coordination team was set up in October 2014, with an Ebola coordinator (a clinician) and a deputy coordinator (a representative of the federal public health bureau). The deputy Ebola coordinator is also the chair of the Risk Management Group and a representative on the EU Health Security Committee, which ensures the information flow with regard to domestic and international priorities. The link between clinical and policy expertise has been seen as positive and important for a good understanding of medical and policy issues and for supporting a smoother decision-making process. Federal level authorities plan to assess whether the Ebola coordinator's function needs to be continued. The assessment is to be based on a risk assessment, a report on activities, and an analysis of further needs.

Five main working groups were established in order to have a common forum and include all relevant stakeholders. Several subgroups were created to support the working groups and the Ebola coordination team:

- Logistics: national stockpile (PPE), dead body management, waste management, cleaning and disinfection
- Communication: FAQs and website
- Experts: scientific support, cooperation with Superior Health Council (SHC), legal aspects
- Prevention and control: screening sea and airports, police policy, general practitioners, follow up of staff, contact tracing, emergency interventions (112 and emergency services), courses and training
- Hospitals: procedures, hospital/emergency departments/university hospitals, reference hospitals, medicines.

The communication is centralised and information is directed to the Ebola coordinator and the federal public health service, as well as to public health inspectors and designated hospitals. Communication has also been streamlined. Initially, there were several websites, which at some point were incorporated in one designated multilingual website with all relevant materials: www.info-ebola.be.

1.3 Timeline and milestones

Over the course of one year, a number of actions and decisions were taken in Belgium. The list below provides an overview of key dates.

- 23 March 2014: first WHO warning on Ebola in Guinea
- 24 March 2014: first meeting of the Risk Assessment Group (RAG)
- 8 April 2014: first meeting of the Superior Health Council (SHC)
- 8 July 2014: first meeting of the Risk Management Group (RMG) on Ebola preparedness
- 4 August 2014: publication of SHC recommendations (doc 9188)
- 21 August 2014: meeting with university hospitals
- 26 August 2014: publication of a national procedure on Ebola containment (RMG)
- 30 September 2014: implementation of a high-level transport procedure (Defence)
- 9 October 2014: 'Ebola crisis team' within MoH established, working groups

- 17 October 2014: Dr Vlieghe (ITG) appointed as National Ebola Coordinator, deputy: Dr Reynders (MoH)
- 20 October 2014: entry temperature checks at Brussels airport initiated
- 14 November 2014: administrative decision on use of experimental drugs
- 18 December 2014: three reference hospitals signed an agreement on Ebola treatment
- 27 December 2014: finalisation of most procedures
- 14 January 2015: official launch of website www.info-ebola.be
- 15 and 22 January 2015: simulation exercises at Brussels airport

Planned additional meetings: inter-ministerial conference on health (with presentation on Ebola), report from National Ebola Coordinator on activities plus an assessment of the need to maintain the Ebola coordination function.

1.4 Contribution of main consultative bodies

Many key stakeholders have collaborated to strengthen preparedness and enhance the system for control and prevention of Ebola. The following consultative bodies have played a major role: the Scientific Institute of Public Health (SIPH) (with risk assessment group), the Superior Health Council (SHC) and the Risk Management Group (RMG).

a) Scientific Institute of Public Health

The Scientific Institute of Public Health is a research institute in public health which is active in the area of health promotion and disease prevention. It provides knowledge-based advice and scientific evidence to public health authorities.

The Institute's main activities in the area of communicable disease are in surveillance, epidemiological support and risk assessment. The Institute also provides expertise in biosafety and laboratory support. The SIPH gathers all epidemiological data for Belgium. The Institute produced several risk assessments for Ebola and held a number of meetings of the Risk Management Group. The Risk Assessment Group is led by the SIPH and comprises experts from relevant fields; it provides information to the national focal point and public health emergency authorities.

The collaboration between risk assessment and Risk Management Groups is seen as good.

b) Risk Management Group

The competencies of the Risk Management Group (RMG) were strengthened. Initially, the RMG was in charge of external notifications (WHO, European Commission, ECDC). Since 2014, its competencies have been extended through a decision of the health ministerial conference which extended the RMG's mandate to manage public health crises in Belgium. The chair of the RMG is also the deputy Ebola coordinator and representative of the Belgian federal health authority in the Health Security Committee. Should the crisis become acute, the MoH will also be represented in the Risk Management Group.

During a meeting of the RMG on 17 March 2015 – the ECDC peer-review team participated as guests – several Ebola-related issues were discussed: harmonisation of key messages for hospitals, disinfection procedures for households, a template for a letter to a person identified as contact of a case, a sample letter aimed at people in transit zones at Brussels airport, procedures on cremation and burial, decontamination of dedicated ambulances, and a procedure for screening harbours (a particularly complex issue because of the high number of involved parties).

The RMG receives regular input from the Risk Assessment Group. It also receives input on different types of activities from key stakeholders. For example, feedback was received on a table-top exercise performed at Brussels airport in January 2015, complete with a list of lessons learned and identified needs for good internal communication, good cascading of information, PPE usage by cabin crews, and more training possibilities.

The RMG was expecting a final report on hospital capacities which was drafted after several informational visits to healthcare facilities. Another pending issue is a procedure on regional and charter flights related to humanitarian aid.

c) Superior Health Council

The Superior Health Council (SHC) is the link between government and the scientific community in the field of public health. The Council provides independent advice and recommendations to the Minister of Social Affairs and Public Health (based either on specific requests from the Minister or on its own initiative). The SHC is competent in all matters related to public health[4].

[4] Source: http://www.health.belgium.be/eportal/Aboutus/relatedinstitutions/SuperiorHealthCouncil/index.htm?fodnlang=en

In July 2014, the SHC published practical recommendations for healthcare professionals and authorities regarding the identification and care of suspected or confirmed carriers of highly contagious viruses (Ebola or Marburg type) in the context of the epidemic outbreak in West Africa. The document provided practical recommendations for medical professionals for actions to be taken when dealing with suspected and confirmed cases (so that cases can be managed and specialised care is provided). A patient assessment algorithm was presented to evaluate the probability of having Ebola disease and as a means to control the infection risk and prevent the spread of the infection. A viral haemorrhagic fever risk assessment outline was presented to be used by emergency departments and admitting physicians. Management of cases was split into three categories (possible, probable, and confirmed). The document also provided information on other hazard group 4 haemorrhagic fever viruses.

The document also listed a number of university hospitals which were supposed to manage a possible/suspected or a confirmed case. After the establishment of an Ebola coordination function and as a result of intensive discussions between health authorities, three hospitals were designated for Ebola treatment: Antwerp University Hospital, Saint Pierre Hospital in Brussels, and University Hospital in Leuven.

Further topics included: general principles for the isolation and transfer of patients, guidelines on specimen collection and laboratory procedures, personal protective equipment (e.g. training and summary of good practices), management of staff accidentally exposed to potential infectious material, decontamination, waste treatment and disposal, and care-after-death guidance[5]. The SHC is currently in the process of revising the guidelines.

The final recommendations were issued by the health authorities.

d) Other actors

The National Council for Hospital Supplies (NCHS) and National Council of Nurses (NCN) were also involved in the preparedness planning process. On 30 October 2014, a first meeting with the NCHS and NCN was organised. Participants were informed about the various working groups, the selection process for reference hospitals and all related procedures. On 10 October 2014, representatives of non-reference hospitals (chief medical officers, hygienists, and heads of emergency departments) were updated on procedures and asked for their input. Several gaps and needs were detected.

Each province has a health officer who represents the federal Minister of Public Health in the field of public hygiene. Provincial health officers are in charge of the administration of provincial medical commissions and take necessary actions if acute cases of communicable diseases are detected. Normally, provincial medical commissions have a general advisory function but during the Ebola preparedness and response phase, the provincial medical commissions, together with federal health officers, were only involved in transportation issues (ambulance service centre, 112) because the responsibility for the detection and notification of contagious diseases lies with the communities. Risk estimates assumed that only individual cases would occur, not major outbreaks, which would then be dealt with by provincial crisis centres.

1.5 Key priority areas and related activities

The public health authorities defined several priority areas: points of entry (entry screening at maritime ports and airports), community (local authorities, GPs, ambulances), and regional and tertiary hospitals (including laboratories).

Clear criteria for a probable case were defined:

- Stayed in epidemic area in the 21 days before onset of illness
- Fever (vomiting, diarrhoea)
- Local exposure to sick people/body fluids.

Detailed guidelines, procedures, flow charts, information leaflets and a website were designed to explain the process of risk evaluation and decision-making to general practitioners, carers of targeted groups (e.g. asylum seekers), and hospitals. There were seven rules of thumb for health professionals if they suspected a case: 1) be aware of risk groups: 'the three questions', 2) discuss situation with provincial health inspector, 3) keep > 1 m distance and use standard hygienic precautions, 4) separate patient until safe transport to hospital is ensured, 5) ensure dedicated cleaning of rooms, 6) perform inventory of contacts, and 7) inform and reassure relatives.

Possible revisions of protocols on case definitions may want to include disease manifestations without fever so cases do not go undetected. The working group already discussed a fever threshold, but kept the criterion 'fever of at least 38 °C in the past 24h and/or vomiting, diarrhoea, unexplained bleedings or signs of organ failure'. Nevertheless, some discarded cases had clear risk exposure and a vague malaise, but showed not fever.

[5] Source: http://www.health.belgium.be/internet2Prd/groups/public/@public/@shc/documents/ie2divers/19097511_en.pdf

The authorities encouraged medical professionals to carefully conduct a detailed anamnesis. An important element of this process in Belgium is the discussion with the community health inspector to ensure appropriate care (referral to hospital). This level has been significantly strengthened during the Ebola preparedness. It has served as a link between public health and primary care (GPs) and secondary and tertiary care (hospitals designated to treat Ebola cases). The health inspectors (physicians) have a prominent role in the decision-making process because they determine whether a case will be sent to a hospital, and to which one.

There are eight university hospitals with infectious disease specialists who support health inspectors in defining the level of risk. The health inspectors are responsible for the coordination and organisation of the process, which includes contact tracing. Federal inspectors in each province are in charge of establishing provincial contingency plans.

1.6 Intersectoral collaboration

a) Federal Crisis Centre

The government crisis coordination is handled by a Crisis Centre[6], which is an operational structure under the Federal Public Services of the Interior. The Centre has been activated in the past for events linked to terrorist attacks, anthrax, etc. It operates around the clock and collects and analyses information for political and executive authorities.

In the case of a national crisis, the Centre provides infrastructure, interdepartmental management, expertise and coordination. It serves as a focal point for national and international alerts, i.e. authorities get prompt information about all relevant national and international events.

The Centre organises and coordinates emergency planning. Contingency planning at the federal level is designed in consultation with various partners and performed at different levels: municipal, provincial and federal[7]. For four years, the centre has also been mapping public health risks. A number of groups support the work of the Centre. Regular exercises are performed with key stakeholders.

The first national meeting on the Ebola health threat was held in October 2014 in the Crisis Centre. It was attended by representatives of home office, public health, transport and mobility, defence, police and foreign affairs. The different levels: federal and regional were present. Discussion was focused on situation reports, risks for Belgium, activities and actions of Brussels airport and Brussels Airlines, medical evacuation, European aspects of preparedness, preventive and control measures, and communication. Ebola task force has been established. Second national meeting was organised at the beginning of March 2015. Scenarios have been discussed for isolated cases (standard medical response) and for situations with more cases (response to elevate to federal level).

b) Public Health Crisis Centre in the Federal Ministry of Health

Departmental Public Health Crisis Centre has been set up in the Federal Ministry of Health to deal with public health emergencies, staffed with three physicians on 24/7 duty. Depending on the nature of an event, more resources can be mobilised (if needed) by involvement of different departments of the ministry[8]. The crisis management system was adjusted to address the Ebola threat. The emergency preparedness level was raised, which resulted in increased resources, e.g. a crisis team from the Ministry of Health was mobilised.

So far, public health authorities have been relying on the existing structures as much as possible, by tweaking the existing system to meet the new needs they avoided the establishment of new specific systems for the prevention and control of Ebola disease. There is no specific Ebola preparedness plan because previous experiences with SARS, MERS, and H1N1 could be used to adapt and modify procedures to cover Ebola. The procedures established by the Ebola coordination team are based on previous experiences, existing protocols on haemorrhagic fever, and additional input from the different working groups.

The public health authorities consider a generic approach as more appropriate than an individual preparedness plan for every pathogen. A new generic preparedness plan is under development.

c) Other stakeholders

Intersectoral coordination has been quite intensive, involving both health and non-health entities: communities and regions, the Institute of Tropical Medicine in Antwerp (ITM), reference hospitals, non-designated hospitals, general

[6] www.crisiscentrum.be

[7] Services include: rescue, medical transportation, police coordination, logistical support/transportation as well as information to the population.

[8] If an event goes beyond health domain, the governmental crisis centre takes over the leadership role.

practitioners, paramedics, Médecins Sans Frontières (MSF), defence authorities (transportation of confirmed wet cases), Brussels Airlines, Brussels airport, Fedasil (federal agency for the reception of asylum seekers), trade unions, customs, and police authorities.

Collaboration between sectors is well-established in Belgium. There are regular training courses on crisis management available at the university level. The Ebola health threat is seen as an opportunity for staff members at emergency services to be more aware of emerging risks and to sign up for more training courses and exercises on public health risks.

The trade unions are regularly informed about staff protection measures[9].

The non-government sector, in particular MSF, also had a significant role due to the fact that the MSF Brussels office coordinated the deployment of healthcare workers and logistics staff to affected African countries. All medical professionals passed through Brussels twice, upon deployment and upon return from deployment. MSF also produced a wide variety of briefing materials for medical staff deployed to Africa[10].

MSF shared the experience accumulated during the Ebola outbreak in Africa with health professionals in Belgium by briefing Ministry of Health experts and by training staff in designated hospitals on PPE use. MSF was also asked for input when Belgian authorities developed procedures for the Belgian setting. For example, Civil Protection developed a procedure on disinfection in collaboration with MSF[11].

1.7 System organisation: strengths, vulnerabilities and suggestions for further actions

a) Strengths

- System structure: Efforts at all levels of the public healthcare system (policy making and operational) were made to prepare and respond to the serious cross-border health threat posed by Ebola. The number of involved staff members was increased (e.g. by training or reallocation of staff), authorities invested to strengthen the healthcare system, and collaboration within the health sector (and with other key sectors) was improved. Coordination and communication was challenging at times, but key stakeholders felt that the preparedness planning process kept all involved parties engaged.
- Organisational functions: The establishment of a new function – an Ebola coordination team (combining clinical and policy expertise) was seen as positive and important. The function of health inspectors is also considered important in the process as they liaise between primary and secondary care.
- Development of guidelines: Guidelines were developed by using legacy issues and lessons learned from past events. Existing guidelines were modified to cover the Ebola risk, all in accordance with an Ebola risk assessment. Existing processes and functions were used as much as possible. Nevertheless, many ad hoc arrangements had to be made.
- Communication: Concise and transparent public and professional communication strategies were implemented, a multilingual website ensured the availability of up-to-date information.

b) Vulnerabilities

- Staff availability and capabilities: One vulnerability of the system is the lack of a sufficient number of health inspectors. As their role is important, this function should be strengthened. Moreover, health inspectors have no training in addressing the Ebola health threat. This is likely to cause delays because they would have to consult infectious disease specialists first in order to assess a potential case.
- Large number of sources for advice: Expert advice on the public health emergency situation is provided by multitude of advisory bodies. The resulting diversity of opinions could make consensus elusive.
- Effectiveness of measures: Operational information and indicators were insufficient to measure the effectiveness of adopted measures and overall system performance.
- Case definition: The criteria for a probable case should include illness without fever.

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[9] Some trade unions – for example those whose members work at the airport – were more actively involved in discussions than others.

[10] Strict rules on self-monitoring and reporting when back from Africa; stress management briefings, etc. People deployed in affected areas were required to have previous experience in Africa and had to pass a two-day practical training in Brussels. If needed, MSF returning staff stayed in Belgium for 21 days. Returning staff members were discouraged from returning to work during the 21-day period (policy in some countries and hospitals), while MSF continued to pay salaries.

[11] Civil Protection currently collaborates on additional procedures, for example a procedure for the decontamination of public spaces.

c) Suggested further actions

- The tasks and responsibilities of advisory bodies should be clearly defined, for example, scientific advisory bodies and operational entities that develop and apply more practical recommendations should be clearly distinguishable.
- Before undertaking a system evaluation, a set of performance indicators should be established; indicators can help to determine a risk and are helpful when evaluating response mechanisms and taken actions. The evaluation process should be planned well ahead of time and be part of generic preparedness planning.
- Protocols and guidance should be continuously reviewed to reflect changes in recommendations from international and leading national authorities.
- The revision of the case definition should be further discussed.
- An analysis of achievements and vulnerabilities should be conducted in order to strengthening capacities and capabilities. Authorities should draw on lessons learned and established capacities in order to better respond to future emergencies.

2 VHF/Ebola pathway and potential responders

For this review, ECDC prepared a conceptual scheme on the Ebola pathway: point of entry for travellers, designated hospitals for treatment of confirmed cases, community (including public health measures, primary care – GPs, emergency departments in hospitals, transportation/ambulance service) and medical evacuation. Cross-cutting themes such as surveillance, laboratory diagnostics, communication and capacity building (training) were also discussed (Annex 4, Figure 8).

The Belgian government decided to not develop and maintain its own medical evacuation capacity. Instead, health authorities will collaborate with Member States under the coordination mechanisms for medevac.

This section presents findings on four critical areas of the VHF pathway: points of entry, community, inland transportation, and treatment in designated hospitals. At the end of each subsection, strengths and vulnerabilities are listed and suggestions for further actions are outlined.

2.1 Epidemiological information

There are several ways for a case to get detected and to enter the medical system: visit to a GP, emergency call (112) to request an ambulance, or self-referral (of, for example, a returning healthcare worker) to a hospital emergency room.

In the period 2/2014–2/2015, 11 'probable cases' tested negative for Ebola. Initially, they met three criteria, a fact which was discussed with the health inspectors in charge at the time. The cases were then admitted to isolation units and laboratory tests were made (PCR). Other possible cases did not meet all three criteria and could not be confirmed.

- Country of possible infection: Guinea (n=8); Sierra Leone (n=2); Liberia (n=1)
- Type of exposure: humanitarian aid workers: n=5 (2 high-risk exposure), recent contact with local hospital: n=1, recent contact with known or possible Ebola patient/funeral: n=3, unable to assess: n=2
- Admitted to reference hospitals: Saint-Pierre University Hospital, Brussels (n=5); Antwerp University Hospital (n=4); Leuven University Hospital (n=2)
- Tested in Hamburg (BNI): n=5, Antwerp (ITM): n=6

All detected cases initially triggered an alert but could not be confirmed. Detecting these 11 probable cases (Figures 2a–c) helped to fine-tune the procedures and processes. An analysis of the taken response measures led to an adjustment of procedures and guidelines. The first case (5 August) was characterised by a number of ad hoc arrangements which showed that both guidelines and hospital preparedness were inadequate. The cases detected at the airport in October and November were leaked to the press, which showed the need for a coordinated, centralised communication system. Other steps taken in this context included the introduction of dedicated ambulances, improved post-exposure prophylaxis, and a renewed focus on ethical and deontological aspects for humanitarian aid workers. Overall, it was noted that the response was timely.

Figure 2: Suspected cases

Case at the train station

Male from Guinean descent with chronic undefined intracranial pathology and chronic headache, had come to Belgium to seek expert medical advice. He spent the night on a bench at the Brussels North train station and was found by a fellow Guinean who found him ill with fever and diarrhoea and therefore called the ambulance services.

The ambulance team made a first assessment and contacted the health inspector of the Brussels region (in accordance with procedures), who then opened a formal procedure for a 'probable case' (based on symptoms, country of origin and confused behaviour/impossibility to clarify exposure). The man was taken to Antwerp University Hospital by a dedicated ambulance operated by the Brussels SIAMU fire brigade (belongs to the network of dedicated ambulances). He tested negative for Ebola and became afebrile within 24 hours. Patient was discharged on day 3.

Source: Presentation on highly secure infectious disease transport capacity, Crisis Centre, Brussels, Belgium (18 March 2015)

2.2 Points of entry

a) Entry screening for arrivals with direct flights

Belgian authorities discussed the possible discontinuation of direct flights to affected African countries. It was decided to maintain direct flights, operated by Brussels Airlines. This was a particularly important decision because this route was the crucial access route for healthcare workers to the affected African countries. Maintaining direct flights to West Africa was also seen as an act of solidarity, helping the international medical community to control and contain the outbreak.

Entry screening for air passengers arriving on direct flights from affected countries was introduced. This was not motivated by improved case finding (which is the prerogative of the healthcare system); instead, entry screening was seen predominantly as a trust-building measure.

A dedicated gate for all incoming direct flights from West Africa was assigned at Brussels airport. Two checks were performed: a passenger locator card was collected and the passenger's body temperature was taken. Taking the temperature was continuously improved and only took 12 seconds per passenger. At the time of the peer-review visit (Mach 2014), Brussels airport handled incoming direct flights on four days a week. For the period 20 October 2014–17 March 2015, the authorities screened 13 356 passengers who had disembarked from a total of 78 planes.

Entry screening was quite manageable, but required additional resources. Concerns were raised about the summer schedule, which has more flights scheduled and may require additional resources.

Experiences from entry screening in the United Kingdom are presented in Box 1.

b) Procedures and guidance

After intensive discussions with key stakeholders, several procedures were updated. Brussels Airlines updated their on-board procedures (currently version 7 of the frequently asked questions for cabin crew)[12]. For the most part, existing procedures were kept and adapted only when needed.

Coordination of activities with the affected countries was good. Brussels Airlines executives went on an evaluation mission to the affected countries and, upon their return, changed the procedures on hand hygiene and overnight stays of cabin and cockpit crews[13].

Airport and airline administrators held daily staff meetings to address current problems. A procedure for unloading baggage from affected countries was implemented for luggage handlers at Brussels airport. Guidelines for cabin crews were produced, addressing the use of personal protective kits, and providing detailed information on how to deal with a suspected Ebola case on board a flight. On the ground, protective hygiene measures were stepped up at Brussels airport.

A private-sector company was hired to provide around-the-clock medical services: ambulance technicians measured the body temperature of incoming passengers and were prepared to call a doctor. Provisions were made to transfer suspected Ebola cases (dry[14] or wet[15]) to a designated hospital, either by fire brigade (SIAMU)/ambulance or military medical service. The ambulance run by the military medical service was designated to transport 'wet' cases to the hospital, whereas the airport FES (private-sector) ambulance would take care of 'dry' cases.

The health authorities discussed procedures of for all points of entry: airports, maritime ports and train stations. A meeting of all involved sectors did not take place until mid-March 2015.

c) Capacities and evaluation

Existing structures were adapted to meet the new demands. For example, the position of airport medic was extended to cover Ebola preparedness and response.

Authorities communicated extensively with trade unions and staff on the risks of Ebola infection. Risk assessments were regularly updated and validated. In addition, 1 800 staff members participated in training activities on new procedures and checklists.

Authorities made sure that informational material was distributed widely among ground staff and flight crews. A video about Ebola detection and protection was produced and made available. All documents and materials (e.g. procedures) were published online and regularly updated. A biohazard platform on the airline/airport intranet was established and promoted.

Several table-top simulation exercises were held at the airport, followed by debriefings. A simulation exercise on 'wet' Ebola cases was held at the airport. Two suspected cases were transported to hospital, which strengthened employee knowledge and competence.

Evaluations were performed on a regular basis. A general evaluation of the entire Ebola preparedness effort will be conducted at a later stage.

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[12] For example, paracetamol will no longer be dispensed on board aircraft; change in the number of PPE kits on board; modified communication procedure between pilots and control tower.

[13] Changes were also made for psychological reasons. There were genuine concerns that the healthcare systems in the affected countries would be overburdened with Ebola cases, and that crew would experience problems in obtaining medical help in the case of a medical emergency different from Ebola.

[14] Dry case: with symptoms such as fever (no vomiting or bleeding)

[15] Wet case: severe symptoms (vomiting and bleeding)

d) Stakeholders

The relationship between Brussels airport and Brussels Airlines has always been excellent, but the Ebola preparedness effort strengthened this collaboration even further. The Ebola emergency required the involvement of a large number of organisations: Brussels international airport, Brussels Airlines, public health inspectors, airport ambulance services, regional authorities and communities, fire brigade (SIAMU), and federal public health services.

Over the course of one year, collaboration was very intensive. There were a number of meetings between different stakeholders as well as negotiations with social partners. Although there was no formal meeting, Brussels Airlines shared their experiences with sea port administrators. The collaboration between Brussels Airlines and MSF was intensive and productive for both sides. Brussels Airlines also exchanged information with Air France and British Airways.

The collaboration between Brussels Airlines, airport authorities, public health inspectors, the Flemish community and federal public health authorities was perceived as good.

e) Strengths, vulnerabilities and suggested further actions (points of entry)

Strengths

- Collaboration: intensive cooperation between Brussels Airlines, airport authorities, health authorities and other key stakeholders (fire brigade/SIAMU, regional/community authorities), ensuring coordinated actions. The crisis was used as an opportunity to improve relationships between key stakeholders.
- Organisation: use of existing structures, enforcement of specific functions (entry screening), regular updates of procedures, procedural improvements (time for entry screening was shortened to 12 seconds per passenger)
- Risk analysis: work was done simultaneously on Ebola and biohazards to make procedures more generic
- Exercises: a number of table-top exercises and trainings were held; airport and airline authorities drew on experiences to improve short- and mid-term planning
- Legacy: general hygiene measures at the airport improved; additional long-term benefits are expected
- Good information policies: concise and timely information provided to ground staff and airline staff/crews; involvement of unions in discussions.

Vulnerabilities

- Decontamination of aircraft: a non-resolved issue with aircraft decontamination. To resolve this issue, IATA, WHO and EU had to cooperate.

Suggested further actions

- Develop criteria to determine when entry screening can be discontinued
- Review and evaluate entry screening, possibly in collaboration with countries that applied similar policies
- Collaborate/liaise with EU countries that applied entry screening measures and European projects such as AIRSAN and SHIPSAN to share experiences
- Closer collaboration between airlines and cruise lines should be considered (sharing best practices and experiences).
- Issues regarding the decontamination of aircraft need to be resolved; this includes the approval of a number of decontamination products by airplane manufacturers and in accordance with EU regulations.
- This issue has to be discussed at the international level, involving IATA, airlines and aircraft manufacturers.

Experiences in the United Kingdom: screening at points of entry

- All direct flights to the United Kingdom from the three countries of interest in West Africa were suspended in August 2014. In October 2014, active entry screening, where screening teams were physically present at the ports, was established to cover the airports receiving the majority of through-ticketed passengers as well as at the UK's only international rail terminal. These four airports (Heathrow, Gatwick, Birmingham and Manchester) and the Eurostar terminal at London St Pancras combined gave a 97% coverage of through-ticketed passengers returning from the three affected countries. All other ports were covered by an offsite arrangement where the border force informed Public Health England (PHE) when arrivals from the three countries of interest came through their port and PHE conducted a telephone screen.
- Screening at key entry points was essential for the risk management of Ebola in the UK through identification of those with Ebola symptoms, risk categorisation of incoming passengers, and the provision of appropriate information to ensure early and appropriate access to health services if needed.

Border force was able to identify the majority of through-ticketed passengers and guide them to the screening process, a requirement under public health interventions as part of the national Ebola response.

- Posters and information leaflets were provided to guide people into the screening process. PHE staff, comprised of medical and administration staff, helped passengers complete a health risk assessment form and took their temperature. This enabled the categorisation of passengers into risk groups dependent on their potential exposure.
- Three categories of risk were used (no known exposure, low risk exposure – no direct patient contact, and higher risk exposure). Those in the low and higher risk exposure categories were monitored for 21 days after leaving the country of interest by PHE, either by reporting if they had a raised temperature/symptoms (passive monitoring – low risk category) or being asked on a daily basis if they had a raised temperature/symptoms (active monitoring – higher risk category). If passengers had any signs or symptoms consistent with Ebola or a temperature ≥ 37.5°C, then, in consultation with an infectious disease physician at the local hospital, they were transferred to the local acute hospital for further observation and if necessary, onwards to a designated specialist hospital.
- Over the six-month period to the end of March 2015, approximately 5 000 people were screened and nine were referred to an acute hospital for further monitoring but later discharged. Only one person has developed Ebola while in the UK, a returning healthcare worker living in Scotland who later made a full recovery.
- Overall, the screening process in the UK was more complex than in Belgium where direct flights between Brussels and the three countries of interest continued. In addition, the UK deployed thousands of personnel from the military and more than 50 different NGOs. Many of these were healthcare workers who had close contact with Ebola patients and were therefore considered as having a higher exposure to risk and required active follow-up.

Source: Presentation from UK team member

2.3 Inland transport: ambulance

a) Transport 'triage' system

Cases were categorised as 'dry' or 'wet' cases for transport purposes.

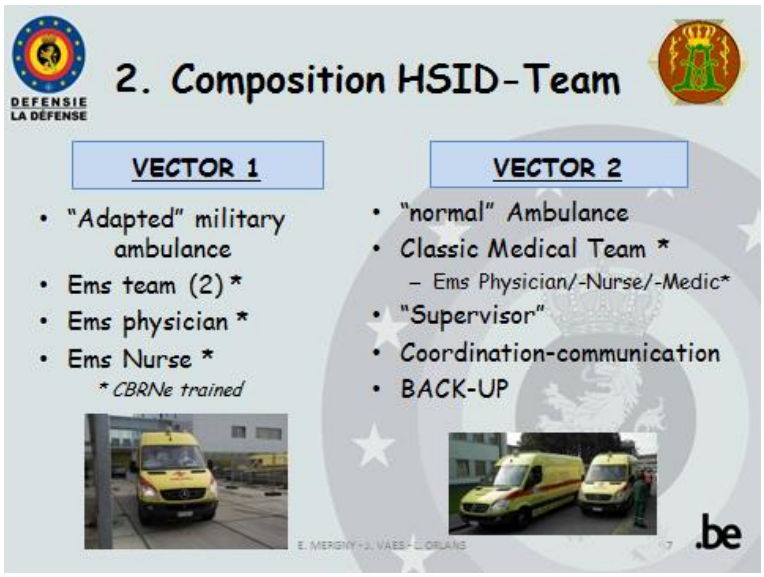
'Dry' cases (no vomiting or diarrhoea or other signs of fluid disruption) are usually able to drive themselves in their own car to a medical facility. For 'wet' cases (vomiting or excretion of bodily fluids), a specialised military ambulance is available.

Calls to the 112 emergency number are assessed (triage) over the phone. The call centre then decides which type of ambulance is dispatched. The composition of teams is presented below in Figure 3. Six ambulances (four operated by the fire brigade (SIAMU) and two by Civil Protection) were made available for 'dry' Ebola cases.

If military ambulances are used ('wet' cases and inter-hospital transportation of cases), two vehicles are assigned to the mission (both ambulances are stationed at Queen Astrid military hospital). During the Ebola health threat, this option was used three times. A formal agreement between MoH and Ministry of Defence (MoD) was made in September: MoD agreed to provide an IsoArk N 36-6 isolation chamber, which provides good protection for the staff but deployment requires between two and three hours.

Because there is always a team on duty, sending out an ambulance could be almost instantaneous, but Ebola procedures require the deployment of two ambulances, one for transporting the patient, and one as a back-up and to transport back the first ambulance team in a non-infected environment. To overcome this issue, dedicated 'single' ambulances were made available, which can reach any location in Belgium within one hour of a request. These ambulances are deployed in urgent cases (i.e. after a 112 call).

Figure 3: Composition of teams



Source: Presentation on highly secure infectious disease (HSID) transport capacity, Crisis Centre, Brussels, Belgium (18 March 2015)

b) PPE training and use

Training on PPE was conducted for the teams using designated ambulances for urgent and 'dry' cases. All other cases are handled by the Belgian defence forces, who provide transportation for 'wet' and inter-hospital cases (IsoArk isolation chamber).

Two teams were appointed to take care of cases that require the use of PPE; PPE is issued and used in accordance with general CBRN requirements (see Figure 4). One case was transported in a military ambulance, with the team using CBRN PPE equipment, which both Army and Civil Protection considered overdone; it was, however, agreed internally that the entire CBRN capacity should be tested to be prepared for other scenarios. The type of CBRN equipment used for Ebola is routinely used in other areas, and staff are trained in CBRN medical preparedness.

The Ebola emergency helped to gain more experience and practice response measures for future biohazard threats.

Figure 4: PPE equipment

Source: Presentation on highly secure infectious disease transport capacity, Crisis Centre, Brussels, Belgium (18 March 2015)

Decontamination of ambulances is carried out by the Army and coordinated by the crisis centre.

Experiences from the United Kingdom and the Netherlands are presented in Box 2 at the end of this subsection.

c) Strengths, vulnerabilities and suggested further actions (ambulance)

Strengths

- Collaboration: traditionally good collaboration between Civil Protection, military and health authorities in crisis situations. In the context of the Ebola health threat, several meetings were held and relationships have improved even further. Multisectoral cooperation in crisis situations was assessed and reinforced.
- Guidelines and protocols: clear transportation protocols; clear criteria for distinguishing dry/wet cases. Different modes of transportation specified, e.g. private transport for 'dry' cases ('drive your own car') or military ambulance for 'wet' cases.
- Vehicles and PPE: six designated, specially equipped ambulances for nationwide use; ambulances available for 112 emergency calls; military ambulances for complex cases; pragmatic approach towards using CBRN.
- Capacity building: exercises on hospital transfer of cases by military transport, including detailed procedures (e.g. designated spaces at the hospital for unloading).

Vulnerabilities

- Providers: high level of complexity due to several transport providers
- Timeliness of operations: deployment of Army ambulances takes time – 2 to 4 hours before ambulance reaches a patient
- PPE: Use of PPE/gas mask may alarm the public/media; doffing procedures vary between hospitals because facilities are different.

Suggested further actions

- Discuss a common approach, i.e. same minimal procedural requirements on doffing at all designated hospitals.
- Health providers should be kept informed about the time needed to prepare specialised (military) vehicles so that the arrival time of an ambulance can be realistically planned.
- Review specifications for the use of PPE to avoid excessive use. Discuss with the media on how to present the use of full sets of PPE and avoid alarmist sentiment in the general public.

Lessons from the United Kingdom and the Netherlands

The UK accessed normal ambulance services across the country to transfer potential Ebola cases to an acute hospital, and all ambulance services were trained in handling suspected Ebola patients. Confirmed cases could be transferred using specialist ambulance resources if required. The ambulance service, as often with responses to incidents, used an algorithm to determine the urgency of the case which would then impact on the response time.

In the Netherlands, the ambulance sector has been privatised and is organised under a national umbrella organisation. Representatives of the ambulance sector participated in two national meetings on Ebola preparedness with the Dutch Institute for Public Health and the Environment (RIVM) and the academic hospitals where triage guidelines, PPE and other measures were discussed. RIVM supported the ambulance sector with expertise on hygiene, an area which still needs further improvements. It was recognised that training was essential and that ambulance staff need to practice the doffing of PPE after patient delivery at the designated academic hospital. Hospital facilities vary greatly, which calls for either simplified or modified procedures on doffing.

Source: Presentation from team members from the UK and the Netherlands

2.4 Community: public health, primary care (GPs)

a) Guidelines and protocols

Guidelines for practitioners were revised by drawing on international guidelines. Although general practitioners were not actively involved in this process, they were consulted and felt positive about the process. Several seminars for Dutch- and French-speaking GPs were held. Information evenings for GPs were part of the information campaign.

Starting December 2014, all materials were made available on a website. Moreover, leaflets with an algorithm on how to identify cases (including checklists on detection and isolation) and what actions to take were printed in different languages and distributed to GP practices.

b) Case detection

Instructions on triage assessment and suspected patients (whom to call, how to isolate a patient) were considered clear and concise by GPs. Nevertheless, doubts remained whether all primary care physicians would follow guidelines and ask patients if they had a travel history to the affected African countries.

At the time of the peer-review visit, no case had been detected in the primary care system. Although entry screening was considered to be helpful to identify cases, an effective triage system in primary care settings was seen as vital for the identification of cases. A representative of Domus Medica, a GP association, stated that the strength of a chain depended on its weakest link, and if GPs were not well prepared, they could become a weak link. Overall, primary care physicians considered themselves well informed.

At the GP level, heightened Ebola awareness was seen as essential. As the Ebola outbreak coincided with the influenza season, health professionals needed to know how to distinguish initial symptoms. GPs pointed out the need to receive more comprehensive epidemiological information from competent bodies.

c) Organisational structures

The president of the Belgian GP organisation is also the contact person for Ebola preparedness for the federal public health authorities. This focus on only one person – the president – makes it difficult to maintain a continuous flow of information. Already in 2013, suggestions were made to introduce a 24/7 'secretary' function. Another suggestion, the introduction of a designated infection alert system for each GP subgroup (GP 'circle') is still under consideration but has not yet been endorsed by the health authorities.

An important element of the Belgian system is the function of health inspector: all suspected cases during the Ebola health threat were discussed with the primary care sector (i.e. GPs) and the health inspectors. Surveillance and contact tracing fall under the responsibility of health inspectors, in collaboration with the Scientific Institute of Public Health and the GPs. Preparedness plans for primary care are usually produced by the regions, with the collaboration of all stakeholders at that level.

Experiences from the United Kingdom and the Netherlands are presented in Box 3 at the end of this subsection.

d) Strengths, vulnerabilities and suggested further actions (GPs)

Strengths

- Collaboration: exchange of information between GPs traditionally organised in 'circles'; discussions and enhanced collaboration between GPs, health inspectors and federal health authorities
- Information: information on Ebola disseminated to primary-care level, including algorithms and guidelines
- User-friendly web site and additional leaflets
- Guidelines: clear and accessible guidelines for GPs; GPs were consulted on the guidelines.

Vulnerabilities

- Capacity building:
  - GPs did not participate in any of the training activities organised by the public health authorities; GPs did not consider this relevant because they thought that GP practices were not at high risk. However, involving the primary-care level as first responders could strengthen the system.
  - Health inspectors have not received Ebola-specific training, which could lead to non-referrals and delays because they would have to consult with infectious disease experts first.

Suggested further actions

- Encourage a more active information exchange between primary care and public health, i.e. between GPs and epidemiologists.
- GPs working with migrants and asylum seekers need to be better informed about Ebola epidemiology and disease manifestation.
- Strengthen the system for active notification by introducing an infection alert function as proposed by GPs.
- Try to use the experiences from the Ebola information website and apply them to other diseases; add additional information/advice from travel clinics.

Experiences from the United Kingdom and the Netherlands

United Kingdom: PHE, in close collaboration with NHS England, provided support and literature to all GPs practices and pharmacists and offered advice on what to do should a patient recently returned from the three countries of interests, present with symptoms of Ebola. No cases have been reported through GP practices or pharmacies.

In the Netherlands, the existing communications structure was used to inform GPs about Ebola through their national organisation's website (Nationaal Huisartsen Genootschap, NHG). Also, Municipal Health Services (MHS) informed the GPs in their region. MHS contact GPs individually (direct mail, fax) if they need to disseminate information. GP representation was ensured at the Outbreak Management Team. The guidelines for an unexpected possible Ebola case in a GP practice focus on simple but adequate measures, e.g. isolating the patient in a side room upon arrival, keeping physical distance. Supplying all GP practices with FFP2 masks and full sets of PPE would seem out of proportion to the actual public health needs.

Source: Presentation from team members from the UK and Netherlands

2.5 Designated hospitals to provide care for Ebola patients

a) Designation process

Hospitals were asked to evaluate their capacity and determine if they could be a designated hospital for the treatment of Ebola. It was initially discussed to send patients abroad for treatment, but in the end it was decided that treatment should take place in Belgium. Three hospitals were designated to treat Ebola cases: Antwerp University Hospital (in collaboration with the Institute for Tropical Medicine), Saint Pierre Hospital in Brussels, and Leuven University Hospital. All three hospitals have departments for infectious diseases with staff experienced in the treatment of haemorrhagic fevers. `

Designated hospitals were given additional government funding. Various seminars and training courses were organised in all three hospitals. Arrangements for the deployment of staff and support for other hospitals were discussed but no actual steps were taken.

b) Organisational issues

Emergency departments serve as referral centres for patients sent by GPs or other hospitals, as well as for self-referring patients. The reception performs triage. Altogether, Belgium reserved six hospital beds for confirmed cases (including one bed for a child). Hospitals share the burden through a rotation principle.

Designated hospitals shared protocols but there were no site visits to exchange practices. Designated areas for Ebola cases were established in the emergency departments, taking into account the different hospital settings and practices. Therefore, arrangements in the three designated hospitals differed in terms of staff allocation and space. The three hospitals also used different types of PPE.

Task forces were set up in hospitals and doctors shared experiences on a regional platform forum. The expert teams in three designated hospitals held weekly teleconferences and discussed various types of care and supportive measures. Reference hospitals were permitted to use experimental drugs.

c) Guidelines, protocols, training

Hospitals were actively involved in the development of procedures and guidelines. Three staff training courses on PPE use in healthcare settings were conducted: in Antwerp, 150 staff were trained, 175 in Brussels (147 nurses, 25 medical doctors, 3 other) and 119 in Leuven (85 nurses, 10 medical doctors, 24 other). MSF collaborated with hospitals on staff training. Designated hospitals specified and procured their PPE requirements independently; the PPE is reportedly similar but not identical. Hospitals also conducted information sessions, exercises and reviews on how to apply procedures. Comprehensive debriefings on cases were conducted along with the assessment of actions and measures taken. Lessons learned were shared and adjustments were made based on these analyses.

Designated hospitals discussed how to ensure the sustainability of functions without having to resort to external resources. Sharing resources between hospitals was not feasible due to differences in procedures and routines. Transferred staff, for example, would be prone to making mistakes because different hospitals use different procedures.

Every hospital has a disaster plan which addresses the specific procedures for preparedness, planning and response to cover emergencies. Hospital officials agreed that it would be difficult to ensure business continuity if a

hospital had to take care of more than one Ebola patient because of insufficient staff numbers. Also, a prolonged stay of an Ebola patient would be very resource-intensive.

There were extensive discussions on the implementation of a 24h-duty shift, mainly for nurses. All relevant unit staff was expected to participate in the care for Ebola patients, with the exception of pregnant staff members. Anxiety among some staff members was alleviated by adequate training.

Plans called for the isolation and assessment of probable cases in a designated hospital; treatment would be accompanied by full infection control precautions while waiting for laboratory results, which could take up to three days.

Military authorities developed procedures for unloading patients from an ambulance at the hospital and taking off and discarding PPE after the delivery of a 'wet' case. Different procedures were adopted for each hospital.

Communication between the federal ministry of health and the reference hospitals was intense: topics included planning arrangements, case management, business continuity and resources.

d) Observations during site visits

The ECDC team visited two of the three designated hospitals: Antwerp University Hospital and Saint Pierre Hospital in Brussels, where the team met with heads of emergency departments, microbiologists in charge of infectious disease control, and head nurses of intensive care who led the EVD task force. The medical professionals met during these visits were satisfied with the preparations and guidelines provided by the public health authorities and, in particular, the Risk Management Group.

Lessons learned from the United Kingdom and the Netherlands are presented in Box 4 at the end of this subsection. Photographs from the visit are shown in Figures 5, 6 and 7.

During the visits to two designated hospitals and their emergency departments (ED) the following observations were made:

Suspected case recognition:

- There is no (longer) signage in the waiting areas of either ED; Antwerp University Hospital displays a bespoke black-and-white sign next to the receptionist enquiring about recent travel to and from Africa. 'Fever' would not necessarily prompt enquiry with regard to overseas travel, and detection at reception is only possible if patients volunteer to share their travel history.
- Both departments use triage nurses, and there are designated facilities for isolation of suspected infectious patients. If Ebola infection is suspected by triage nurse or emergency doctor, the patient remains isolated pending review by the on-duty infectious disease physician; if necessary, patients are transferred to either ICU (Saint Pierre) or a dedicated suite of rooms (temporarily decommissioned from urgent chest assessment) on the same floor (Antwerp University Hospital). The transfer will be carried out by PPE-protected personnel. Antwerp University Hospital has a facility for patients to be interviewed by telephone by the infectious disease physician on call.
- In Antwerp, the reception area is separated by a glass partition from the waiting room, which provides a certain degree of protection for staff working at the reception; additionally, receptionists and secretaries have been trained on how to interact with infectious disease patients. If a patient in the waiting room indicates having a travel history to the affected countries, a nurse can isolate the patient in a room for further anamnesis and consultation with a microbiologist and/or an internal specialist on call. If a patient meets the case definition, s/he is transferred to a dedicated isolation area for suspected Ebola cases. If the patient has to be transferred to an emergency unit, preparations are made in a separate room, with communication by phone, while staff puts on PPE.

Reception of a known case:

- In both EDs, a dedicated pathway has been mapped out, leading from the ambulance bay to the ICU/isolation room; throughout the transfer, staff members wear PPE. When moving Ebola cases, Saint Pierre hospital blocks elevator access for all other floors so the Ebola team can reach the ICU/isolation room directly.

Case reporting:

- Both EDs have 24/7 access to infectious disease physicians and the public health officer in charge.
- In Antwerp, there was a total of four suspected cases, three arrived in an ambulance, one came with own transport. Suspected cases were either self-referred, via calling the emergency line 112 (ill patient was picked up at the railway station), or were transferred to the hospital from the airport. There were no suspected cases referred from GPs.

High-intensity care unit (HICU):

- Both hospitals feature HICUs. Saint Pierre has a suite of four rooms dedicated to Ebola care, at one end of the ICU on the 9th floor; at Antwerp University Hospital, the HICU is in a dedicated – presently decommissioned – suite of rooms near the ED. Both facilities can be activated in two to four hours. At Saint Pierre Hospital, the HICU may be occupied by other patients, which requires a patient transfer before VHF mode can be activated.
- In Antwerp University Hospital, the dedicated isolation unit area was previously part of a cardiac care unit, which was converted to accommodate Ebola patients by adding a wall. The unit consists of three rooms. The isolation unit has a spacious anteroom for doffing PPE; it is supplied with disinfection materials and provides ample space for observers. Basic PPE instructions are posted on the walls. Incoming ambulances have their own arrival area outside; a separated corridor leads directly to the isolation room. Several exercises on how to handle a wet case delivered by Army ambulance were conducted.

Protocols, staffing, training, and PPE procurement:

- Both hospitals have protocols describing the operation of the VHF HICU; protocols are available to all staff on the intranet. HICU are staffed by ICU staff who receive additional training on PPE and on safe care of highly infectious patients; staff members then take care of only one Ebola patient. Both hospitals discussed the role of supportive care and the ethical implications of experimental drugs.
- Hospitals have PPE stock for five days (Saint Pierre) or several weeks (Antwerp University Hospital). Saint Pierre Hospital is confident that additional supplies can be procured if needed.

HICU equipment and laboratory tests:

- Both HICUs add necessary diagnostic and therapeutic equipment as needed. Samples are sent to the BSL3 microbiology laboratory. Samples for venous blood gas and arterial blood gas analysis are packaged and sent to the hospital laboratory – both clinical and laboratory staff received additional training on this.

Waste management, post mortem, decontamination:

- Both facilities have protocols for the management of solid and liquid wastes. Staff members received training in all relevant subjects. Biological waste matter is stored and eventually properly disposed of. There are post mortem protocols, and no autopsies are carried out. Daily disinfection of clinical areas is carried out by the HICU nurses. Upon discharge, the suite is disinfected and cleaned by a team of hospital cleaners who have received special training pertinent to hygiene and safety.

e) Strengths, vulnerabilities and suggested further actions (designated hospitals)

Strengths

Collaboration:

- Good communication and collaboration between staff within and between designated hospitals.
- Collaboration between emergency departments and MSF on training and exercises for PPE use.
- Procedures shared among hospitals (but no direct meetings).

Resources:

- Flexible and responsive staff to meet requirements for the treatment of Ebola patients.
- PPE stock.

Guidelines and procedures:

- Clear patient flow, based on well-designed procedures. Several adjustments were made when simulation exercises revealed shortcomings.
- VHF policy in the tertiary hospitals was adapted to also cover Ebola.
- Well-developed guidelines for patient care and donning/doffing PPE.
- Clear national guidelines for emergency departments. Emergency departments were well prepared, with clear patient flow and staff allocation; flexible provisions for isolation rooms.
- Designation of areas for PPE donning and doffing (disinfection buckets, large room for doffing);

Information:

- Informative posters displayed in all relevant areas.

Vulnerabilities

Capacities:

- Having an additional ICU isolation area for Ebola reduces overall ICU capacity.
- Long-term care for an Ebola patient could affect care continuity for other ICU/infectious disease ward patients. No arrangement exists between the three hospitals to support each other's staff in the event of a confirmed Ebola patient.
- As care for Ebola patients is very labour-intensive, additional resources might be needed, particularly if there is more than one case. This could become a sustainability issues with regard to other hospital functions.
- Different types of PPE in use, which makes it difficult to build one common stockpile.
- Some communities inquired about arrangements for the burial or cremation of deceased Ebola patients.

Suggested further actions

- Perform a review of emergency departments in non-designated hospitals to assess how peripheral emergency departments would handle Ebola cases.
- Stimulate more active information sharing between health facilities, e.g. by means of a platform for the exchange of best practices in the management of (suspected) cases.
- More interaction between the three designated hospitals may improve planning and quality-of-care issues.

Lessons from the United Kingdom and the Netherlands

The United Kingdom has one designated hospital for the treatment of VHF, the Royal Free Hospital in London, which has a standing capability to accept VHF patients into a high-containment infectious disease unit. In addition, three other hospitals in the UK were designated as able to receive confirmed Ebola patients when it was decided that additional capacities were needed. Hospitals were raised to the necessary standard through staff training and refurbishment. The Royal Free is the default VHF hospital, given its previous experience, but consideration has also been given as to how the other hospitals will be used if the Royal Free's capacity was exceeded. This worked well when several potential cases were medically evacuated from Sierra Leone as a precaution and isolated in one of the other Ebola-receiving hospitals until Ebola testing was concluded; all potential cases were found to be negative.

In the Netherlands, all eight academic hospitals are able to triage possible Ebola cases. Three academic hospitals and the Major Incident Hospital at University Medical Centre Utrecht are designated for the treatment of confirmed Ebola cases. Two meetings for Ebola preparedness with infectious disease specialists, hygiene experts and microbiologists from the academic hospitals were organised by RIVM in August and October 2014. Guidelines for professionals covering triage, diagnostic procedures and PPE are available on the RIVM website (www.rivm.nl). The results of a stock inventory of PPE were made available online by RIVM and can be accessed by all academic centres. Municipal Health Services strengthened the ties between regions, academic hospitals, peripheral referral hospitals and ambulance services. Organising a preparatory information event for these sectors by the MHS turned out to be very effective.

Source: Presentation from team members from the UK and Netherlands

Figure 5: Entrance to Saint Pierre Hospital, Brussels

Figure 6: Antwerp University Hospital – isolation rooms

Figure 7: Antwerp University Hospital – posters

2.6 Laboratory review

a) Observations during site visits

The very first samples from suspected Ebola cases were sent to Hamburg, Germany, but testing is now done by a laboratory in Antwerp. ECDC Member States team visited two laboratories: the Belgian reference laboratory for EVD at the Antwerp Institute for Infectious Diseases[16] and the microbiology laboratory at Saint Pierre Hospital in Brussels.[17]

The following observations were made:

Reference laboratory for EVD in Antwerp, Belgium[18]

- ISO 15189 certified laboratory for certain diagnostic procedures (not for Ebola)
- L3 facility (built in 2006), well organised (dedicated to virology, mainly HIV) with a separate room used for EVD diagnostic in a BSL cabinet (inactivation, RNA extraction and sample storage); the room is also used to store additional PPE. Waste treatment uses the L3 process.
  - Two-person teams, with one person assuming the role as supervisor.
  - Transportation is by a commercial specialty logistics company. Good tractability of the shipment from hospitals or any other place to Institute of Tropical Medicine. Transport can be arranged within two hours. Reasonable domestic shipping rates.
  - RNA extracts processed in L3 follow the usual channels for PCR assays; separate rooms for mix preparation, RNA amplification, etc. Process: two different Ebola targets are tested (in-house RT-PCR targets the GP gene; the large polymerase gene is targeted with an Altona commercial kit by Diagnostics GmbH, Hamburg, Germany). Malaria PCR is run in parallel. Results are available in four hours.
  - Laboratory of the Institute of Tropical Medicine offers new type of diagnosis; enhanced diagnostic panel foreseen: other VHF viruses (presently only covered by the Altona kit), e.g. Lassa, require further adjustments.
  - Major support from networks (ENIVD, Madrid laboratory, etc.) to set up and validate the assays (positive controls, EQA, etc.). Belgian biologists participated in the recent EVD training organised by ENIVD on 25–27 February 2015 at RKI, Berlin.

[16] Persons met: Marjan Van Esbroeck, Kevin Arien (in charge of HIV laboratory), Lieselotte Cnops

[17] Persons met: Anne Dediste (chief bacteriologist), Oliver Vandenberg (assistant)

[18] Reference: Cnops L, Gerard M, Vandenberg O, Van den Wijngaert S, Heyndrickx L, Willems E, et al. Risk of misinterpretation of Ebola virus PCR results after rVSV ZEBOV-GP vaccination. Clin Infect Dis. 2015 Jun 1;60(11):1725-6. doi: 10.1093/cid/civ131. Epub 2015 Feb 18

Microbiology laboratory, Saint Pierre Hospital, Brussels

- Laboratory is ISO 15189 certified, with a BSL3 used for MDTR TB. Experiences from MERS CoV and A(H1N1) are used to further build capacity.
- Standard operating procedures for sending blood specimens to the laboratory: specific packaging and labelling. Shipping contract with a logistics company; all shipments can be tracked online.
- All specimens processed in L3 by senior staff members (two people: on-call duty lab technician and supervisor). Other staff members cannot enter the laboratory when EVD specimens are processed.
- Shipping arrangements for sending specimens to ITM or Bernhard Nocht Institute via courier.
- Additional laboratory diagnostics thanks to new devices: malaria rapid test, haematology (blood count numeration of three cell populations, coagulation parameters), and biochemistry (eight parameters including haemoglobin, creatinine, urea, and glucose). Processing is done by senior experts supervised by another person.

b) Strengths, vulnerabilities and suggested further actions (laboratories)

Strengths

- Well-organised laboratory services; first-rate national reference laboratory service
  - Institute of Tropical Medicine has a wealth of experience in testing highly contagious pathogens. The Institute is currently updating its diagnostic equipment.
- Excellent support from networks and good exchange of information.
- Well-designed SOPs (protocols) and guidelines.

Vulnerabilities

System sustainability: availability of staff able to work longer hours not guaranteed – there is a need to build resilience in the system.

Suggested further actions

- Discuss work rotation schedule for on-call experts to ensure adequate service (two in ITM, two in the laboratory at Saint Pierre's). Service continuity may require training of more staff.
- Discuss experiences and overall ability to respond to further communicable disease threats.

Conclusions

During the peer-review visit, the ECDC-led team reviewed – together with the Belgian health authorities – the organisational arrangements and processes of emergency preparedness planning. In the preceding sections we outlined our observations on the various organisations that constitute the VHF ('Ebola') emergency system in Belgium.

Health authorities and key stakeholders used the Ebola crisis as an opportunity to improve Ebola preparedness. Progress on preparedness was reviewed in mid-term assessments; further in-country assessments will follow.

Experiences with SARS, MERS CoV, A(H1N1) and the influenza pandemic plan were used and put in the context of the Ebola health threat. This lead to the implementation of a coordination function which relied on a dedicated Ebola coordinator, a deputy coordinator, and an Ebola crisis team in the federal Ministry of Health with up to ten staff members who worked on procedures and with stakeholders.

Belgium implemented comprehensive emergency preparedness measures to respond effectively to the risk of imported cases of Ebola. Public health authorities and health professionals felt confident that Ebola cases would be detected soon after importation and that optimum treatment would be delivered in the most efficient way, while at the same time ensuring the safety of healthcare workers and other professionals involved in the care and transport of Ebola patients.

Overall, preparedness measures were initiated faster than during previous public health crises. Additionally, collaboration with key stakeholders was excellent and resulted in a complete set of guidance documents, protocols and procedures for the Ebola public health threat.

Legacy: conserving gains in preparedness for highly infectious communicable diseases

Key responder organisations in and outside the health services benefitted from the implementation of Ebola preparedness programmes, mainly through advances in staff skills and knowledge, the revision of organisational policies and protocols, and upgrades and adjustments of facilities and infrastructure for the management of highly infectious diseases. The current strategic challenge is how – and to what extent – those skills and organisational adjustments can and should be maintained to ensure preparedness for the next communicable disease threat.

Evaluation: drawing lessons for future preparedness

Evaluation: The Belgian public health authorities have already resolved to take further effective measures and actions, for example to maintain procedures and engage more directly with key stakeholders (fire and emergency services). In fact, the final evaluation of all Ebola preparedness activities may include a focus on preparedness of the system as a whole, in addition to the reviews of individual responders. While some pertinent information on the system is not available, a comprehensive review could still be achieved with a mix of proxy information, subjective feedback, and critical reviews of probable cases. In addition, data for an evaluation of lessons and shortcomings could be gleaned from simulation exercises.

Strengthening preparedness: A generic preparedness plan, which will incorporate best practices and lessons learned, is under development. Established networks are seen as an important element of collaboration between institutions and peer organisations when preparing and responding to a crisis. A strengthened healthcare system would have a number of beneficial effects, one of which being an increased capacity for identifying, isolating and treating cases of highly infectious diseases. A national conference with presentations from key partners and stakeholders on the transition from preparedness for Ebola and other contagious diseases to a generic epidemic preparedness plan is scheduled for the end of September 2015.

Looking forward: areas which should be prioritised

Staff skills: It is essential to maintain the skills, competencies and capacities developed by all responding organisations for the management of highly infectious diseases.

Designated hospitals: Sustainability plans (staffing) and business continuity contingency plans should be in place. It is important to have scenarios and staffing plans in place which cover both single and multiple VHF patients; this should include an analysis of how the management of VHF cases would affect the overall capacity of the hospital.

Analysis of all 'probable cases': This should be subject to an incident review involving all parties dealing with the identification and management of patients.

Sub-national levels: The ECDC team was not able to make a site visit to community first responders, e.g. GP offices and emergency departments in non-designated hospitals. We therefore advise authorities to review these structures in a more comprehensive way. The aim of such a review would be to analyse if community first responders could respond as well designated hospitals. Another objective would be to see if peripheral hospitals are satisfied with the national guidelines for Ebola preparedness, whether they are sufficient to provide medical care in a probable or suspected case and how they implemented the national guidelines. Finally, the review would also assess the level of preparedness in GP practices.

At the EU level, Belgian authorities and ECDC should involve other EU and no-EU countries in the preparedness process. Possible areas of activity could include: an analysis of entry screening procedures in Belgium, the United Kingdom, France and possibly Morocco; discussions in (clinical) networks on patient management and lessons learned; involvement of AIRSAN and SHIPSAN to advice on best practices; and the evaluation and review of the added value of entry screening.

Annex 1. Agenda

16 March 2015

Time	Topics	Systems aspects to be observed	Team
11.00 arrival of ECDC team at Federal PHS			ECDC/Member States Svetla Tsolova, Graham Fraser, Hervé Zeller, Paul Riley
11:15 – 12:00 Meeting with Federal public health service	Presentation of team members, objectives of the visit, final adjustments on the agenda (45 min)		Belgium Daniel Reynders – Head of Service General Services International Relations and Public Health Emergencies and Deputy Ebola coordinator
12:00 – 13:00 meeting with Federal public health service and main counter parts	Discussion on the preparedness structure in Belgium, planning process, governance, changes caused by Ebola outbreak in the plans, key stakeholders Public health service (national and provincial) Ambulance service (national and provincial) Inter-national collaboration	Policies, protocols, capacities: infrastructure, staff organisational aspects	Erika Vlieghe – National Ebola coordinator Koenraad Stevens – Member of the crisis team Ebola Dirk De Groof – PH Emergencies Paul Pardon – PH Emergencies Jan Eyckmans – Head of Communication Service Marcel Van der Auwera – Chief Emergency Medical Service Sophie Quoilin – Head of Service, Epidemiology of Infectious Diseases, Scientific Institute of Public Health ECDC/Member States team Svetla Tsolova, Graham Fraser, Hervé Zeller, Paul Riley
13:00 – 13:45 Working lunch	Critical incident review		Experienced from Belgium, the Netherlands and the United Kingdom
14:00 – 17:30 – Saint Pierre hospital	Discussion on hospital preparedness (designated hospitals) - Visit patient pathway - Discuss with senior hospital staff - Explanation of organisational training/how to manage a case Case reception and management Staff safety Environmental protection Lab issues/ Emergency dept.	Policies and protocols Exercise and training	Team 1 – ECDC/Member States Graham Fraser, Hervé Zeller, Paul Riley Belgium: Erika Vlieghe Daniel Reynders Koenraad Stevens
14:00 – 16:00 – meeting with MSF	Health workers returning from affected countries	Staff safety, Input of MSF experience in preparedness and response planning	Team 2 – ECDC/Member States Svetla Tsolova Belgium: Paul Pardon Representatives of MSF
18:30 – 19:30	Debrief with team members (hotel)		ECDC/Member States only

17 March 2015

Time	Topics	Systems aspects to be observed	Team
9:00 – 11:30 – Brussels airport	Entry point preparedness – airport services, Brussels Airlines; medical, fire and emergency services at the airport. Case detection Response and case management communications, staff safety Airport screening (costs, benefits, effectiveness)	Procedures Policies, protocols, exercises, training	ECDC/Member States Svetla Tsolova, Graham Fraser, Hervé Zeller, Paul Riley 10–15 min presentation by Paul on UK airports and Ebola measures Belgium: Daniel Reynders Erika Vlieghe Marcel Van der Auwera Koenraad Stevens – member of the Ebola crisis team Michel Van Geert – member of the Ebola crisis team
12:00 – 13:45 Lunch break			
14:00 – 16:30 Belgium Risk Management Group meeting	Agenda to be provided by Belgian colleagues before the meeting		ECDC/Member States invited
17:00 – 18:00 Meeting with Flemish region and Scientific Institute of Public Health	Regional aspect of preparedness; links with key stakeholders at regional level,		Members of the Flemish region Members of the Scientific Institute of Public Health
19:30 (19:45) – 20:30	Debrief with team members (hotel)		ECDC/Member States only

18 March 2015

Time	Topics	Systems aspects to be observed	Team
9:00 – 11:00 Institute of Tropical Medicine 11:00 – 11:30 Transfer to Antwerp University Hospital 11:30 – 13:00: meeting and working lunch with Antwerp University Hospital staff and representatives of GP association *Domus Medica*	Community preparedness, primary healthcare, emergency departments in local hospital, ambulances meeting with some key stakeholder: Flemish GP association Institute of Tropical Medicine University of Antwerp Contact tracing, case detection, local (provincial/regional) public health services, ambulance service at provincial level	System strengths and vulnerabilities Links between elements in the community (primary healthcare, ambulances, hospitals)	ECDC/Member States Svetla Tsolova, Graham Fraser, Hervé Zeller, Paul Riley, Corien Swaan Belgium: Erika Vlieghe Dirk De Groof Koenraad Stevens
14:30 – 17:00 Coordination Crisis Centre	Meeting with defence, Civil Protection; discussion on intersectoral collaboration, links, lessons learned, people taking care of asylum seekers, aid departments	Policies, procedures	Member States to present in 15–20 min each their intersectoral collaboration activities and how the planning was organised; critical incident review (plans or actual procedures in dealing with confirmed/suspected case) Belgium: Erika Vlieghe, Daniel Reynders, Sophie Quoilin
18:00 – 19:30	Debrief with team members (hotel), preparation of presentation for authorities		ECDC/Member States only

19 March 2015

Time	Topics	Systems aspects to be observed	Team
09:00 – 9:45 Federal Public Health Service	Discussion on lessons learned from Ebola – priorities and future action in preparedness planning	Preparedness planning Changes in policies and practices	ECDC/Member States Belgium Daniel Reynders – Head of Service General Services International Relations and Public Health Emergencies Erika Vlieghe – National Ebola Coordinator Dirk De Groof – Public Health Emergencies Paul Pardon – Public Health Emergencies
10:00 – 11:00 – public health authorities	Debriefing, missions finding and further steps for collaboration		ECDC/Member States Svetla Tsolova, Graham Fraser, Hervé Zeller, Paul Riley Belgium: Dirk Cuypers – President of the board of Directors Gert-Jan Sterckx – Adviser of the Minister of Health, Mrs De Block Johan Peeters – General Manager (Scientific Institute of Public Health) Representative of Crisis centrum
11:30 – 12:30 Federal Public Health Service	Final discussion on mission report and executive summary – deadlines, table of content		ECDC/Member States Svetla Tsolova, Graham Fraser, Hervé Zeller, Paul Riley Daniel Reynders – Head of Service General Services International Relations and Public Health Emergencies

Annex 2. List of participants

Belgian experts who participated in meetings with ECDC/EU Member State team:

Brussels airport company
Wim Fabeck (Health and Safety Manager)
Eric Claeys (Service Development Manager)
Jeroen Geeraerts (Fire and emergency services)

Brussels Airlines
Sophie Van Zaelen (Safety, Health and Environment Manager)
Andrea D'haeselere (President Cabin Services)

Saniport
Jean-Marie Risselin, Roger Crispeyn

Ministry of Health
Marcel Van der Auwera
Michel Van Geert
Koen Stevens
Geert Gijs (Disaster management)
Dirk De Groof (PHE)
Paul Pardon (PHE)
Daniel Reynders
Erika Vlieghe
Jan Eyckmans – Head of communication service
Dirk Cuypers – President of the board of Directors
Gert-Jan Sterckx – Adviser of the Minister of Health Mrs De Block

Institute of Tropical Medicine
Marjan Van Esbroeck, Kevin Arien, Lot Cnops (lab)
Fons Van Gompel, Brecht Ingelbeen, Alex Van den Daele (policlinic)

Antwerp University Hospital
Hilde Jansens (head of infection control dpt)
Koen Monsieurs (head of emergency dpt)
Michael Verbist (head nurse ICU)
Gunther Thys (adjunct head nurse emergency dpt)
Yvan Somers (head nurse ICU)
Paul Van Aken (nursing director)
Wim Flipse (infection control MD of the community)
Yves Rosiers (GP, representative of Domus Medica)
Fons Van Gompel (medical director of ITM and head of travel clinic ITM)

Crisis Centre
Cedric Erken (Civil Protection)
Jerome Massart (Crisis Centre)
Frederic De Fays (Crisis Centre)
Sophie Quoillin (IPH)
Jan Vaes (Defence)
Koen Stevens
Gino Claes (Disaster Management)
Geert Gijs
Daniel Reynders
Erika Vlieghe

MSF
Stephan Goetghebuer (deputy general director), Francoise Saive

Scientific Institute of Public Health

Herman van Oyen (director), Sophie Quoillin

Participants of the risk management meeting (17 March 2015)

Daniel Reynders, Erika Vlieghe, health inspectors for the French, Flemish and Brussels regions, Sophie Quoillin (SIPH)

ECDC/EU team: short biography

Name	Short bio
Team leader: Svetla Tsolova Senior expert, Country Preparedness Support Section	Svetla Tsolova holds a master's degree in health policy, planning and financing from LSE and LSHTM, UK. She has experience in working with government and non-government organisations in the area of health policy since 1993. She worked for the Bulgarian Ministry of Health and National Health Insurance Fund in the 1990s. She was a research fellow in the Centre for European Policy Studies in Brussels, where she worked on topics related to aging and healthcare costs. In 2007, Svetla joined ECDC where she is a senior expert in monitoring and evaluation in the section of Country Preparedness Support and contributes to core activities in the area of preparedness and supports the activities of several disease-specific programmes.
Graham Fraser Senior expert, Country Preparedness Support Section	Graham Fraser is a medical epidemiologist in the ECDC Country Preparedness Support Section (CPS), with a particular interest in the review and development of communicable disease surveillance and response systems. Since 2010 he has worked in surveillance quality system improvements at ECDC, and in development of methods for review of communicable disease surveillance and response systems of EU enlargement countries. Since 2013, in the CPS section, he has also worked on development of self-assessment methods for country review of health emergency response systems. He completed specialty training in public health medicine in New Zealand, where he worked as a health programme manager, clinical university lecturer, and regional medical officer of health. From 2001 to 2010 was a Regional Epidemiologist for London, with the Health Protection Agency. His research interests include evaluation of surveillance programmes and measles public health interventions, and the development of valid methodologies for review of communicable disease surveillance and response systems.
Hervé Zeller Head of Disease Programme Emerging and Vector-borne Diseases, Office of the Chief Scientist	Senior expert in the European Centre for disease prevention and control, Office of the Chief scientist since 2008. Coordinator of the Emerging and Vector-borne Disease Programme which contributes to the European Union-wide preparedness and response capabilities and provides Member States with access to expertise, topical assessments of disease risks and decision- support tools with the latest scientific knowledge. Former director of the national reference laboratory and WHO collaborative centre on airborne viruses and viral haemorrhagic fevers at the Pasteur Institute in Paris/Lyon, France. Previously coordinated virology laboratories within the international Pasteur Institute network in several countries in Africa and the Americas (Tunisia, Madagascar, Senegal, French Guiana, and the USA). Field work on epidemiology and ecology on dengue, chikungunya, yellow fever, Rift valley fever, Crimean Congo haemorrhagic fever, West Nile fever, hantaviruses, Lassa fever. Involved in several outbreak responses through the WHO Global Outbreak Response Network on Yellow fever, Ebola, Marburg, Crimean Congo haemorrhagic fever in Guinea, RDC, Gabon, and Turkey.
Paul Riley Emergency Response Department, Public Health England, United Kingdom	Current role: Deputy Director of Operations for Port Screening Control, PHE Ebola Response since October 2014. The Port Screening Control Cell is responsible for the strategic and operational delivery of all screening activities at all ports across England. In my previous role, as acting head of the corporate resilience team, I was responsible for supporting the design and implementation of the current Ebola response architecture, so have effectively been working on Ebola since July 2014. The above is a secondment to my usual role which is as the senior scientific advisor to the Emergency Response Department. ERD has two principal functions preparing our organisations to respond to public health emergencies and preparing the health community more widely to respond to unusual emergencies (CBRN, infectious diseases and environmental hazards). I provide scientific support into all the activities across emergency preparedness and response. I also coordinate European programmes of work and have several research projects in the area of response to emergencies. *Previous history* PhD in molecular microbiology. 20 year experience in developing molecular techniques for detecting bacteria in the environment and last 12 years working in emergency preparedness and response. In between I worked briefly for the UN in Iraq. I was for six years the head of the exercises team in ERD, leading over 100 health-focussed exercises in the UK and Europe on CBRN incidents, infectious diseases and more recently environmental impacts.

Name	Short bio
Corien Swaan Head of Department for Prevention and Response (LCI), Centre for Infectious Disease Control (CIb), National Institute for Public Health and the Environment (RIVM), Bilthoven the Netherlands	Profession: Medical Doctor (1994). Specialisation in Public Health, Communicable Disease Control (2003). DTM&H (1997). The RIVM Department for Prevention and Response provides 24/7 advice on infectious disease control, coordinates outbreak response within the CIb and organises outbreak management teams and expert meetings. This includes EVD preparedness and response activities related to the EVD outbreak in West Africa. The department doubles as an IHR National Focal Point of the WHO in the Netherlands and provides advice to the municipal health services and the ministry of VWS about infectious disease preparedness. Responsible for the medical quality of implementation of the EPI programme, including indications and assessments of side effects of EPI vaccines. Includes risk assessment and advice on occupational risk of infectious diseases. Professional history: Senior Consultant Communicable Disease Control, at central level (RIVM, 2006-2011, including influenza pandemic response) and regional level (MHS Hollands Midden, Leiden 2000–2006). MD and project coordinator with Médecins sans Frontières (MSF) in Afghanistan (1997), DPRK/North Korea (1998), Bangladesh/India (1999). Projects included midwifetraining, PHC, malnutrition project, infectious disease outbreak and natural disaster preparedness & response programmes. Locums in hospital The Gelderse Valle (Ede, the Netherlands) 1994-1996.

Annex 3. List of documents retrieved to review the Belgium system

Relevant documents below are available at www.info-ebola.be

- Publication of the Superior Health Council No. 9188 Practical recommendations to the attention of healthcare professionals and health authorities regarding the identification of and care delivered to suspected or confirmed carriers of highly contagious viruses (of the Ebola or Marburg type) in the context of an epidemic outbreak in West Africa (52 pages) (in English)
- Procedures for managing the risk of Ebola for public health professionals (38 pages) approved on 18/12/2014 (in French)
- Procedures for managing the risk of Ebola for public health professionals (38 pages) updated in October 2014
- Questionnaire à compléter par le médecin MEDA (2 pages) (in French)
- Procedure for transport from airport to hospital (1 page) (in French)
- Élimination des déchets d'un patient avec (ou suspect d') une fièvre hémorragique virale en milieu hospitalier (4 pages) (in French)
- Multilateral agreement for the transport of contaminated medical waste from haemorrhagic fever viruses (3 pages) (in French)
- Recommandation de traitement de depouille d'un patient avec fievre virale hemorragique (9 pages) (in French)
- Procedure for contact tracing (7 pages) (in French)
- Questionnaire dépistage ebola par le médecin (1 page) (in French)
- Organigramme intervention (1 page) (in French)
- Procédure pour l'approche d'un patiént soupçonné d'une fiévre virale hémorragique au sein de l'Aide Médicale Urgente (14 pages) (in French)
- Directives for general practitioners regarding Ebola (8 pages) (in French)
- Overview of the Ebola response system in Belgium (in French)
- Crisis emergency procedures as well the 'Standard operating procedures' (in French)
- Procedures and/or guidelines on E.R. environment
- Procedures and/or guidelines on laboratories
- Procedures and/or guidelines on ambulance transport (there is only a one page document on 'Procedure for transport from airport to hospital'

Annex 4. Methodological tools

Health emergency preparedness for imported cases of viral haemorrhagic fever

Review instrument – overview for country respondents

Introduction

This document provides an overview of the system elements and organisational capabilities subject to inclusion in the peer reviews of country systems for health emergency preparedness for the safe management of persons suffering from viral haemorrhagic fevers (VHF).

The primary approach of the review is to examine country preparedness as an interconnected system that aims to ensure that imported cases of VHF are managed effectively without the occurrence of secondary cases among healthcare workers or in the community.

A simplified conceptual outline of a country system is in Figure 1. The system is subdivided into five subsystems, connected with different aspects of case recognition and the safety of persons in contact with the infected person. These subsystems must both operate effectively and in coordination if public health is to be protected.

For convenience these subsystems are here referred to as 'Modules A to E' (see system figure):

Module A	Primary responders (primary medical care, hospital emergency departments, ambulance emergency call outs)
Module B	Point of entry (identification of suspected cases on arrival at ports of entry)
Module C	Medevac (planned evacuation of known cases)
	[Note: this assessment module has yet to be developed]
Module D	In-country transport (planned transport of known cases)
Module E	Designated hospitals

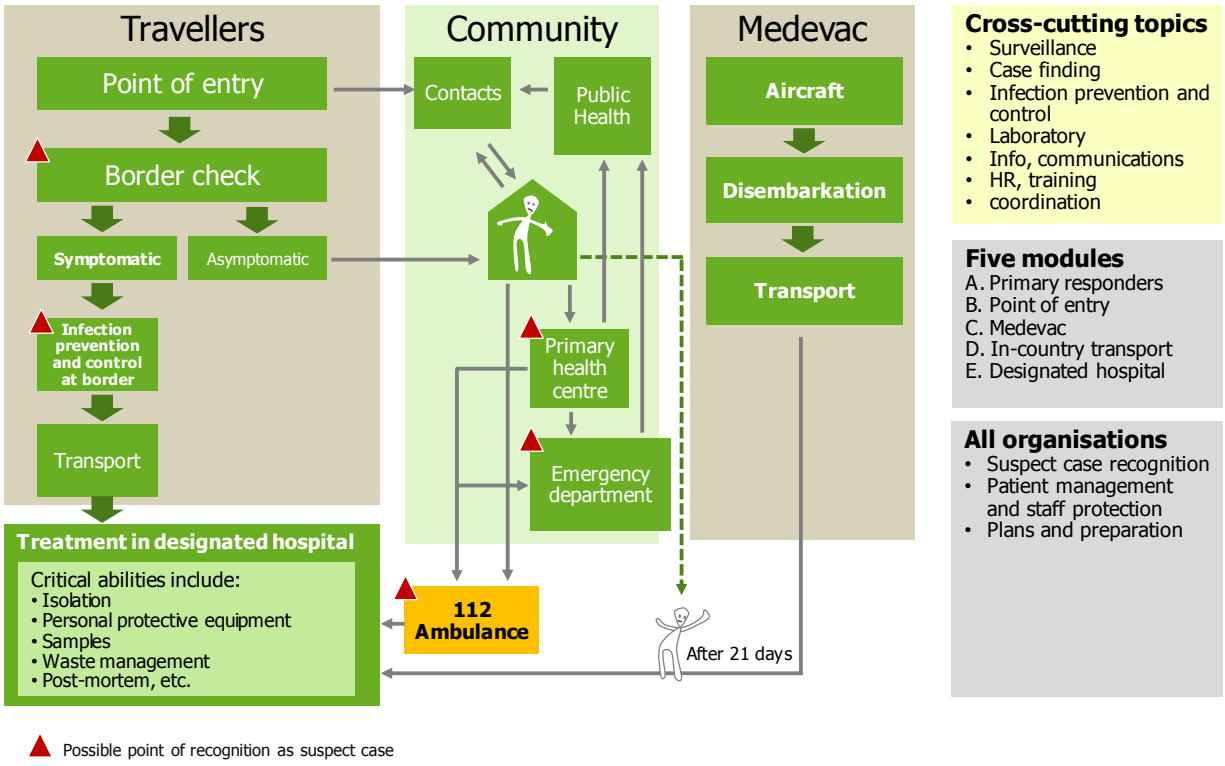
The approach to each subsystem (module) relates broadly to the ability of the involved organisations to fulfil their required 'organisational capabilities' so that the infected person may be effectively cared for while at the same time protecting public health. Accordingly, each module is subdivided conceptually into the organisational capabilities required to:

- recognise individuals who may be infected with VHF agents;
- effectively manage the care of these individuals while ensuring the safety of staff in contact with them;
- plan and prepare to ensure the ability to achieve the above in the event of a VHF case.

Within each module, the system elements are grouped according to the following rubric for purposes of use by the peer reviewers, e.g.:

- suspected case recognition
- patient management and staff protection
- plans and preparation.

Figure 8: VHF pathways and potential responders: conceptual scheme



Module A

First responders: First responders are institutions and their staff who first receive the patient before the diagnosis of 'suspected VHF' is known.

The greatest likelihood is that these will be a) primary medical centres b) hospital emergency departments or c) ambulances (responding to a call regarding an acutely unwell patient).

Critical abilities of first responders are:

- recognition of the person as possibly a VHF case ('identify')
- prompt isolation of the person to prevent transmission of infection ('isolate')
- prompt reporting of the case to public health authorities and others who need to know ('inform')[19]

First responders referred to include:

- primary healthcare centres (A-PHC)
- hospital emergency departments (A-ED)
- ambulance services[20]

A-PC Primary medical care centres

APC 1 Suspected case recognition

APC 2 Patient management and staff protection

APC 3 Plans and preparation

No	System element	Organisational capabilities
APC 1	**Suspect case recognition**	
APC 1.1	Identification of suspected VHF case (1)	VHF cases may be suspected and flagged up by reception staff: • On arrival at the clinic • By telephone call from the ill person
APC 1.2	Identification of suspected VHF case (2)	VHF cases are identified during clinical consultation
APC 2	**Patient management and staff protection**	
APC2.1	Temporary isolation and care of the patient	The patient can be promptly and effectively isolated from other patients and staff
APC2.2	Protection of primary care staff	Clinical staff are aware of safe practice, and able to safely use and remove PPE
APC 2.3	Protection of other primary healthcare patients and visitors	There is prompt and effective isolation or at least separation of suspected case from other patients There is effective identification and follow-up if necessary of contacts with the case in the practice
APC 2.4	Reporting of suspected case to public health authorities	The suspected case is promptly reported and discussed with the Public Health authorities
APC 2.5	Reporting of suspected case to designated hospital	The suspected case is promptly reported and discussed with the designated tertiary hospital
APC 2.6	Initiation of designated transport arrangements	There is access to appropriately equipped and trained service for transport of the patient
APC 2.7	Contact identification and tracing	The practice is able to support the public health authorities in identifying case contacts within the practice
APC 2.8	Environmental protection	The practice is able to arrange for suitable disinfection of contaminated areas and equipment
APC 3	**Plans and preparation**	
APC3.1	VHF policy and procedure	Policy and procedures are in place and functional
APC 3.2	Organisational infection control	Protocols and procedures are in place and functional
A(PC 3.3	Staff Training (I): risk and procedural awareness	Reception and clinical staff are aware of EVD risk, suspected case recognition and procedures for case management and occupational safety
APC 3.4	Staff training (II): personal protective practices and equipment	Clinical staff are aware of safe practice, and able to safely use and remove and dispose PPE

[19] These three requirements are equivalent to the current CDC classification for first-responder organisations

[20] This analysis is under development: see module for the role of ambulance services in a 'known/suspected VHF call out' situation

A-ED: Hospital emergency departments

A ED 1 Suspect case recognition

A ED 2 Patient management and staff protection

A ED 3 Plans and preparation

No	System element	Organisational competency
A ED 1	**Suspect case recognition**	
AED 1.1	Identification of suspected VHF case (1)	VHF cases may be suspected and flagged up by reception staff: • on arrival at the clinic • on telephone call from the ill person
AED 1.2	Identification of suspected VHF case (2)	VHF cases are identified during the triage
AED 1.3	Identification of suspected VHF case (3)	VHF cases are identified during the clinical consultation
A ED 2	**Patient management and staff protection**	
AED 2.1	Temporary isolation and care of the patient	The patient can be promptly and effectively isolated from other patients and staff
AED 2.2	Protection of clinical staff	Clinical staff are aware of safe practice, and able to safely use and remove PPE
A(ED2.3	Protection of other primary healthcare patients and visitors	Prompt and effective isolation or at least separation of suspected case from other patients; identification of potentially exposed patients or visitors
AED 2.4	Reporting of suspected case to public health authorities	The suspected case is promptly reported and discussed with the public health authorities
AED 2.5	Reporting of suspected case to designated hospital	The suspected case is promptly reported and discussed with the designated tertiary hospital
AED 2.6	Initiation of designated transport arrangements	There is access to appropriately equipped and trained service for transport of the patient
AED 2.7	Support to contact identification and tracing	The department is able to support the public health authorities in identifying case contacts within the department
AED 2.8	Environmental protection	The hospital is able to undertake, or arrange for, suitable disinfection of contaminated areas and equipment
A ED 3	**Plans and preparation**	
AED 3.1	VHF policy and procedure	Policy and procedures are in place and functional
AED 3.2	Organisational infection control	Protocols and procedures are in place and functional
A ED 3.3	Staff training (I): risk and procedural awareness	Reception and clinical staff are aware of EVD risk, suspected case recognition and procedures for case management and occupational safety
AED 3.4	Staff training (II): personal protective practices and equipment	Clinical staff are aware of safe practice, and able to safely use and remove and dispose PPE
AED 3.5	PPE and infection control procurement	Sufficient PPE are procured on an ongoing basis

Module B

Point of entry: (a) airports

This module covers the arrival at points of entry of suspected VHF infected passengers that are unwell at the time of arrival.

The planned medical evacuation of patients diagnosed in the affected countries is covered in Module C.

B1 Suspected case recognition

B2 Patient management and staff protection

B3 Plans and preparations

No	System element	Key organisational competency
B1	**Suspect case recognition**	
B1.1	Awareness of incoming passengers from Ebola/VHF epidemic affected countries	Airport authorities are aware of incoming passengers from Ebola-affected countries and have a framework for, and capacity to, risk-classify such passengers
B1.2	Measures to enhance the likelihood of identification of unwell passengers	Unwell arriving passengers from Ebola affected areas are detected by: • Report of captain in transit • Observation of airside staff • Self-report to airside staff • Self-report to land-side staff • Systematic screening (if used) – see next question
B1.2a		Unwell arriving passengers may be detected by systematic screening (if implemented)
B1.3	Management of unwell passengers during flight	A passenger exhibiting symptoms of a highly infectious disease (such as EBV) is managed during the flight for their care and to limit exposure to passengers and crew
B1.4	Risk assessment for passengers returning from Ebola affected countries	Unwell passengers are assessed by staff competent in taking travel and symptom histories sufficient to identify a person requiring investigation for VHF
B2	**Case management and staff safety**	
B2.1	Management and isolation of	Suspected VHF cases are promptly and effectively isolated, and provided necessary primary care

No	System element	Key organisational competency
B1	**Suspect case recognition**	
	suspected VHF case at airport	
B2.2	Protection of staff dealing with suspected cases of VHF	
B2.3	Transport of suspected VHF case	
B2.4	Environmental protection	
B2.5	Protection of contacts	
B2.6	Communication with key stakeholders	A suspected VHF case is handled in accordance with a national preparedness plan; key stakeholders and other airports are notified
B3	**Plans and preparation**	
B3.1	Risk identification of possible ports of entry	
B3.2	Emergency plan for VHF cases	
B3.3	Staff training	All staff potentially exposed to a highly infectious disease case (e.g. VHF) have been trained in their role and know how to ensure their safety

Module C

[Not yet available]

Module D

In-country transport to designated receiving hospital.

In-country transport to the receiving hospital should be by ambulance (or equivalent) services designed for the safe care and transport of patients known (or suspected) to be suffering from VHF.

The 'designated receiving hospital' is a tertiary hospital designated as capable of providing appropriate continuing care to suspected and confirmed VHF patients while at the same time ensuring the safety of staff and environment (see Module E).

This module assumes that the status of the patient (i.e. suspected or confirmed VHF infection) is known and that the transport is planned. Transport of patients not known to be VHF patients at the time should be considered in Module A ('first responders') *(Note: this subsection is still under development).*

Designated ambulance service

D1 Suspected case recognition

D2 Patient management and staff protection

D3 Plans and preparation

No	System element	Key organisational capabilities
D1	**Case recognition**	
D1.1	Receipt of call	There is 24/7 adequate availability of lines and qualified call staff to receive calls
D1.1	Activation of VHF protocol	Secure definitive rapid initiation of protocol for transport of VHF patient
D1.2	Activation of designated ambulance and team	Rapid mobilisation of designated ambulance and crew
D2	**Patient management and staff protection**	
D2.1	Dedicated vehicles	Dedicated vehicles are used capable of providing for clinical care and patient transfer, safety for crew caring for the patient, effective disinfection after delivery.
D2.2	Personal protective equipment (PPE)	PPE of adequate specifications are used.
D2.3	Patient isolation during transport	There is a defined method of isolation and care during transport, able to be effectively deployed by trained staff.
D2.4	Environ-mental protection	Ambulances are effectively disinfected after transport; waste water is safely disposed of.
D3	**Plans and preparation**	

Module E

Designated receiving hospital(s)

The 'designated receiving hospital' is the tertiary hospital(s) designated as capable of providing appropriate care to suspected and confirmed VHF patients while ensuring safety of staff and environment.

This designated hospital receives known suspected or confirmed VHF patients. Presentation of undiagnosed patients at hospital emergency departments is covered in Module A.

E1 Organisation and infrastructure

E2 Patient management and staff safety

E3 Environmental protection

	System element	Organisational capability
	Organisation and infrastructure	
	Organisational and administrative aspects	National legislative framework and regulatory monitoring
		Epidemiological intelligence
		Emergency organisation and chain of command
		Plans for surge capacity
	Infrastructure issues	ICU Facility characteristics
		ICU Facility capacity
		Isolation rooms
		Other infrastructure issues
		Laboratory facilities and access
	Isolation facility technical issues	Anteroom
		Air filtration
		Maintenance and control
		Medical equipment
	Personnel management	Start-up time for VHF care
		Staffing
		Shifts
		Call availability
		Public health
	Staff safety	
	Staff safety: administrative	Services
		Accidents
		Worker participation
		Operational risk protocols
	Staff safety: medical aspects	Safety protocols
		Psychological support
		Dedicated staffing
		Vaccination and chemoprophylaxis
	Healthcare workers: education and training	Training requirements
		Continuous education
		SimExes
	PPE	Selection
		Procedures donning and doffing
		Fit testing
		Procurement
		Accidents
	Needle stick injuries	Protocols for prevention
		Protocols for management
		Technical prevention measured
	Environmental protection	
	Waste management	Solid waste
		Liquid waste
		Waste management
	Post mortem care	Protocols

Annex 5. Public healthcare system in Belgium[21]

Belgium is a federal state with a parliamentary democracy. There are three Communities (Flemish, French and German speaking) and three regions (Brussels-Capital, Flemish and Walloon Regions). The main federal institutions are federal government and parliament. Communities and Regions also have their own legislative and executive bodies[22]. Health policy is both a responsibility of the federal authorities and federated entities (regions and communities). Decision-making in the Belgian healthcare system is based on negotiations between several stakeholders.

The budget for public health expenditure is fixed by a legal real growth norm (4.5% since 2004). In 2007, Belgian total health expenditure was 10.2% of gross domestic product (GDP). There are two categories of hospitals: general and psychiatric. In 2008, there were 207 hospitals, of which 139 were general and 68 psychiatric. The general hospital sector consists of acute (112), specialised (19) and geriatric hospitals (8).

Since the devolution of public health policy to the communities in 1980, so-called inter-ministerial conferences (composed of the ministers responsible for health policy from the federal and federated governments) have been regularly organised to facilitate cooperation between the federal government, the communities and the regions. These conferences have no binding decision-making power, but they are the ideal forum for smooth and efficient consultation between the governments, with respect for the autonomy of each of them. Within the framework of the inter-ministerial conferences for health policy, protocol agreements have been made concerning the most divergent problems in the field of public health.

At the federal level, the parliament is the legislative body. The federal government and the Minister of Social Affairs and Public Health are the executive bodies. Main federal departments, agencies and advisory bodies include: a) in the field of organisation and financing: FPS Health, Food Chain Safety and Environment, FPS Social Security, National Institute for Health and Disability Insurance, National Social Security Office, Federal Agency for Medicines and Health Products, Supervising authority for sickness funds and national associations of sickness funds, The Federal Agency for Nuclear Control; and b) as consultative bodies: Scientific Institute of Public Health, National Council for Hospital Facilities, multipartite consultation structure for hospital policy, Belgian Healthcare Knowledge Centre, Superior Health Council, National Council of Nursing.

In the field of healthcare, the federal authorities determine the general legislative framework for the healthcare system by issuing laws and by drawing up the annual budget. They are responsible for the regulation of the compulsory health insurance, the determination of the overall budget for healthcare, the determination of norms and standards for granting accreditation to hospitals, nursing homes and heavy medical equipment units, the financing regulations concerning operating costs of hospitals and nursing homes, the planning and financing regulation of the healthcare infrastructure and of heavy medical equipment units, the granting of university hospital status, the legislation covering professional qualifications and remuneration, the control of healthcare technology, the regulation of pharmaceuticals and their price control, and the management of urgent medical assistance. In the field of preventive healthcare, the federal state also remains responsible for compulsory polio vaccinations and the protection of the population against ionising radiation.

The most specific health competencies of the communities lie in the domains of health promotion, health education and preventive healthcare. This includes mandatory notification of infectious diseases, outbreak investigation and control of infectious and non-infectious diseases, management of the free (childhood) vaccination programme, complaints and incident management in environmental public health, environmental licence procedures, different kinds of information and awareness campaigns, data collection, such as on mortality and natality, the organisation of medical screening, and control activities, such as medical school surveillance, medical sports inspections and occupational health control.

At the level of provinces and municipalities, each province has a provincial health officer, who represents the federal Minister of Public Health in the field of public hygiene and whose responsibilities include taking necessary actions in cases of acute communicable diseases and the administration of the provincial medical commissions. These commissions have a general advisory function and they may take any measure necessary to deal with contagious diseases.

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[21] Gerkens S, Merkur S. Belgium: Health system review. Health systems in transition, 2010, 12(5):1–266. Available from: http://www.euro.who.int/__data/assets/pdf_file/0014/120425/E94245.PDF

[22] Available from: http://www.belgium.be/en/binaries/Belgium_At_A_Glance_EN_LowRes_tcm115-250305.pdf

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