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SHARP
Strengthened International HeAlth Regulations & Preparedness in the EU

Application of a "syndrome based" approach for prompt and early clinical management of High Consequence Infectious Disease

Work Package 10 – Deliverable 10.3

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Summary

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ABBREVIATIONS

AMR antimicrobial resistance
AIRR airborne infection isolation room
BSL Biosafety level
CCHFV Crimean-Congo haemorrhagic fever virus
CDC Centres for Disease Control and Prevention
DRC Democratic Republic of the Congo
EC European Commission
ERCC Emergency Response Coordination Centre
EVD Ebola virus disease
EWRS Early Warning and Response System
HCID High Consequence Infectious Disease
HCW Healthcare worker
HCP Health care providers
HEPA High-efficiency particulate air filter
HFRS Haemorrhagic fever with renal syndrome
HLID High level Infectious Disease
HLIU High Level Isolation Unit
HSC Health Security Committee
ID Infectious Disease
IHR International Health Regulations (2005)
LHF Lassa haemorrhagic fever
MARV Marburg virus
Medevac Medical evacuation
MERS Middle East respiratory syndrome
MS member states
MVD Marburg virus disease
NHS National Health Service (UK)
PHE Public Health England
PHEIC Public Health Emergency of International Concern
PoE Points of Entry
PPE Personal protective equipment
PUI Persons under investigation
RVF Rift Valley fever
RRA Rapid Risk Assessment
SARS Severe acute respiratory syndrome
SFTS Severe fever with thrombocytopaenia syndrome
SOP Standard operating procedure
VHF Viral haemorrhagic fever
WHO World Health Organization

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INTRODUCTION

The SHARP Joint Action aims to strengthen the implementation of Decision 1082/2013/EU and Regulation (EU) 2022/2371, supporting the EU level preparedness and responses to health threats and the implementation of the International Health Regulations (2005). The Joint Action implements actions mentioned in Annex 1 of the Annual Work plan 2018 of the EU Health Programme 2014–2020. Through the Joint Action, the member and partner states and the Union's common ability to prevent, detect and respond to biological outbreaks, chemical contamination, and environmental and unknown threats to human health will be strengthened. Special efforts will be employed to fill gaps that have been or will be identified in priority countries (countries that have not yet reached the capacity required for full IHR capability). The Joint Action consists of 10 Work Packages (WP), covering core public health capacities according to the IHR (2005). In addition to a coordination function, these will cover areas such as communication, evaluation, sustainability, IHR core capacity, preparedness, laboratories, training and exercises, chemical threats and clinical management. WP10 activities will strengthen IHR, through the enhancement of preparedness and response among European countries to the importation or autochthonous transmission of high consequence infectious diseases (HCIDs). The goal of the WP 10 is the achievement of the best management and infection prevention and control (IPC) of HCIDs through cooperation, communication and exchange of information among clinicians and public health officers in participating countries, by different tasks:

- Task 10.1 Mapping of existing facilities (Lead: SERVAS; Co-Lead: RFL)

- Task 10.2 Assessment of country hospital preparedness and capacity for HCID, including high level isolation unit (HLIU) (Lead: UKF; Co-Lead: INMI; participants: IHUMI)

- Task 10.3 Feasibility study for an expert clinical support service for HCIDs (Lead: HD; Co-Lead: FoHM)

- Task 10.4 Application of a "syndrome based" approach for prompt and early clinical management of HCIDs (Lead: INMI; Co-Lead: SSI; Participants: VHA, IHUMI, THL).

In task 10.4, application of a "syndrome based" approach for management of HCIDs, we describe a practical screening guidance algorithm and a syndromic protocol as an aid for health workers. This syndromic approach can be used in a situation of a terrorist attack with a biological agent, but also in the case of a natural event with a HCID.

Changes in population behaviour and the environment, and increased global travel make Europe more likely to face patients with HCIDs Experience from the COVID-19 pandemic has shown how case management and preparedness for infection prevention and control is crucial in order to respond quickly and effectively to outbreaks, including a single case of a

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HCID or infection by an unknown agent. A written and handy protocol might improve clinical and biorisk management, hospital preparedness and response to HCIDs.

This paper is based on the international epidemiological situation as of September 2023. This epidemiological situation may rapidly change. Updates to this document will take into consideration any changes in the international scenario.

The protocol includes planning, identification of priority risks, definitions of different responsibilities and duties, description of subsequent activities and a flowchart and a check-list for procurement of the necessary supplies for HCID patient management.

The checklist has been developed for public health planners as an operational tool to review the system of preparedness for responding to potential autochthonous or imported HCIDs in the European Union/European Economic Area (EU/EEA).

The content is based on current literature/resource references, such as those available on websites, and it takes into account the guidance issued by different international bodies (especially ECDC, CDC and WHO) and ministries of health across Europe (see references below).

OBJECTIVES

The specific objective of WP10 is to improve the capacity building and preparedness of hospital facilities regarding clinical and biorisk management to possible trans-border health threats.

The aim of the work package is to improve clinical and associated biorisk management of infectious diseases, so called high-consequence infectious diseases (HCID), which could have high clinical and public health impact in the EU. Within WP10, task 10.4 is designed to reinforce any healthcare structures using a standardized clinical approach for HCIDs and to adopt new tools for early detection and timely clinical management (page 48; 848096_Annex 1 - Description of the action (part A) 24.4.2019.)

The application of a syndromic approach to management of HCIDs is practical and easy when a patient returns from travel and comes to the emergency room (ER) or any front-line health service.

Expected outcomes of the task 10.4: increased knowledge on the existing hospital preparedness for HCIDs, including that of HLIUs; increased knowledge on biorisk management and capabilities at the assessed hospitals in SHARP JA partner countries.

The use of a standardized clinical approach for the early detection of HCIDs might improve the level of hospital preparedness and response to these cross-border health threats.

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HIGH CONSEQUENCE INFECTIOUS DISEASES

High consequence infectious diseases: definition and characteristics

According to the current definition (1-7), a high consequence infectious disease (HCID) is defined according to the following criteria:

- are all acute infectious diseases;
- typically have a high Case Fatality Ratio;
- may not have effective vaccine, prophylaxis or treatment;
- are often difficult to recognize and to detect promptly;
- have the ability to spread in the community and within healthcare settings;
- require an enhanced individual, population and system response to ensure effective and safe management including a biocontainment clinical unit and a biosafety level 4 laboratory.

The outbreak of measles and the autochthonous cases of chikungunya in some of EU countries are clear example of cross-border risk related to HCID. Defining the detailed list of HCID is one of the tasks in this WP. Here the definition of HCID includes diseases with potential high public health impact such as measles; new introductions with epidemic potential such as dengue, chikungunya, MERS, EVD; emerging diseases as consequence of AMR. There are substantial differences in clinical expertise and experience in managing cases of HCID, as well as many tropical severe infections that are rare in the EU region. Preparedness and response in terms of hospital facilities varies greatly between the countries. At the same time, the connectivity of the modern world ensures that a person with a HCID can appear in any of the cities of the EU or neighbouring countries, even before actual symptoms start. Thus, preparedness and response capacities for such events have to be in place in all member states.

Patients with a suspected or confirmed HCID at first contact with a health care facility pose a significant risk to healthcare workers. It requires health facility specific processes to ensure early identification and isolation of infected patients and the use of effective infection control practices to prevent transmission of the disease to other patients, visitors or professionals while the patient is being evaluated.

HCIDs, including viral haemorrhagic fevers (VHFs), are rare in Europe. When they do occur, cases tend to be sporadic and are typically associated with recent travel to an area where the infection is known to be endemic or where an outbreak is ongoing.

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Classification of HCIDs according to the current international definition

In the protocol developed below, we adopt the list of HCIDs agreed by a joint Public Health England (PHE) and NHS England HCID Programme and the ECDC (4).

HCIDs are further divided into contact and airborne groups:

- contact-HCIDs are usually spread by direct contact with an infected patient or infected fluids, tissues and other materials, or by indirect contact with contaminated materials and fomites.
- Airborne HCIDs are spread by respiratory droplets or aerosol transmission, in addition to contact routes of transmission.

Contact HCIDs	**Airborne HCIDs**
Argentine haemorrhagic fever (Junin virus)	Andes virus infection (hantavirus)
Bolivian haemorrhagic fever (Machupo virus)	Avian influenza, highly pathogenic A (H7N9) and A (H5N1)
Crimean Congo haemorrhagic fever (CCHF)	Avian influenza, highly pathogenic A(H5N6) and A(H7N7)*
Ebola virus disease (EVD)	Middle East respiratory syndrome (MERS)
Lassa fever	Mpox (monkeypox) (Clade I only)**
Lujo virus disease	Nipah virus infection
Marburg virus disease (MVD)	Pneumonic plague (*Yersinia pestis*)
Severe fever with thrombocytopaenia syndrome (SFTS)	Severe acute respiratory syndrome (SARS)***

Adapted from https://www.gov.uk/guidance/high-consequence-infectious-diseases-hcid

*Human-to-human transmission has not been described to date for avian influenza A(H5N6). Human to human transmission has been described for avian influenza A(H5N1), although this was not apparent until more than 30 human cases had been reported. Patients diagnosed with A(H5N6) and A(H5N1) often have severe illness and case fatality rate is high. Therefore a(H5N6) has been included in the airborne HCID list despite not meeting all of the HCID criteria.

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**Based on the new WHO nomenclature, the mpox virus is comprised of 2 clades: Clade I (formerly Congo Basin (Central African) Clade) and Clade II (formerly West African Clade). Clade II consists of the subclades Clade IIa and Clade IIb, with the latter subclade referring mainly to the group of variants circulating in the 2022 global outbreak. See HCID status of mpox for further details on status classification.

***No cases reported since 2004, but SARS remains a notifiable disease under the International Health Regulations (2005), hence its inclusion here.

Classification of HCIDs according to different consortiums and networks

In recent years, developing strategies have been the focus of a large body of research, to identify priorities for a rational allocation of resources for research and surveillance. Several coalitions/partnerships are working on the recognition of the specific and optimal definitions to prioritize the efforts and resources for the identification and management of HCIDs. The document tries to firstly describe the different definitions of HCIDs and then to analyses which could be the most practical and tailored definition, that is also flexible enough to be adapted to different scenarios. We identified a list (table 2) of HCIDs after literature research concerning established data of HCIDs and emerging infectious threats, and we elaborated a matrix to identify single common items to define an HCID according to the different consortiums and network. The list of HCIDs has been discussed and modified by the partners of WP10. The categorization of infectious diseases into 'high consequence' or 'non high consequence' is influenced by:

- The perspective of the health care providers. Current infectious diseases can have a high consequence clinical impact in terms of morbidity, mortality, infection control admission, isolation, and adverse events due to treatment, but this is not what 'high consequence' means when it is used in this context.
- The awareness of health care providers. Patients with HCID acquired in other regions or countries could be admitted or evacuated to hospitals in high-income countries. The EVD secondary transmissions in Dallas in September 2014 (8) is paradigmatic of no definitive identification of unprotected exposure. Low approximating zero risk policy for HCID transmission should be actively pursued in case of clinical management of patients with unknown pathogen at any health facilities.

We used list of HCIDs from different networks dealing with highly infectious diseases over the years.

Among different scenarios, we have to consider a potential HCID by a pathogen with an unknown route of transmission, which could cause an outbreak outside Europe, such as viral haemorrhagic fever, and subsequently could occur for the first time in the EU. Another circumstance could be that a laboratory worker falling ill due to exposure to a known agent

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in BSL 3-4 laboratory while doing his or her work. The final, less likely circumstance is a deliberate release of a biological agent (bioterrorism, bio-crime, biological warfare). It is likely that the first cases in an outbreak may be undiagnosed in all these situations.

For the list of HCIDs according to different consortiums and networks, see Table 1. For the list of HCID according with the single pathogen, see Table 2.

Analysing the various definitions and classifications of HCID, we concluded that the most complete and comprehensive classification is the one adopted by PHE.

HCIDs – lessons from the COVID-19 pandemic experience

Recent outbreaks (EVD, COVID19) have shown many common features:

- It takes time to recognize an outbreak, and meanwhile the disease spreads.
- Populations are highly susceptible to emerging pathogens.
- Urbanized areas are most vulnerable to rapid spread of viral diseases.
- Misinformation and stigma might have a negative impact on outbreak containment.
- Weak health systems will struggle to control epidemics, and the risk of transmission in health facilities is high.
- A more rapid and efficient international community response is needed.
- Investigation and monitoring of outbreaks must be ensured at all times in every country, but especially in low-income countries.
- There is a need for on-site training of personnel to identify, prepare and respond to HCIDs.
- Intersectional cooperation and international community communication must be ensured for efficient building of partnership.
- Laboratory capacity is often inadequate.
- Regional or local production of vaccines may be delayed for logistic, political, or economic reasons.
- There is an urgent need for rapid reorganization of emergency medical facilities during large outbreaks.

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Based on experiences from COVID-19, WP10 task 10.4 will primarily addresses first-line hospitals by the development of a useful and practical diagnostic and therapeutic algorithm for use in the triage of patients arriving at the health facility.

Practical application of a syndrome-based approach

We suggest that priority should be given to early detection and isolation". Patients with travel-associated emerging/re-emerging diseases (e.g., EVD, Lassa fever, and MERS) can seek care at any health facility at any stage of illness. Some facilities are more at heightened risk than others due to population demographics and proximity to airports and other entry points. Delayed and sub-optimal management of a HCID could cause transmission both in healthcare facilities and the community, with major consequences. Unfortunately, is likely that triage personnel would initially fail to recognize a sporadic case of a HCID, as symptoms are generally nonspecific. Therefore healthcare facilities must have standardized protocols to ensure timely identification and isolation of infected patients and the use of effective infection control practices to prevent the spread of the disease. In addition, frontline health staff needs must be adequately formed to better manage any case of cross-border health threats.

APPLICATION OF SYNDROME-BASED APPROACH

A syndrome-based approach may enable early recognition and identification of biological threats, including both naturally occurring HCIDs and deliberate biological events. The syndromic approach for HICD patients allows frontline professionals to implement a strategy including timely triage, initial evaluation, and initial clinical management.

All health care facilities must have the ability to identify and manage a HCID case and have plans in place to provide appropriate care while awaiting transfer to referral centres. For this reason, frontline professionals need a clearly written procedure for how to contact consultation resources and referral facilities and how to collect, process, and transport possible special pathogen specimens (specific activities of WP10 Task 1, task 2 and task 3).

The syndromic approach protocol provides a planning guide for health facilities that are not equipped as a referral centre for HCIDs. This guide uses a multidisciplinary approach in order to optimally manage a HCID patient until transferral to the closest referral centre (preferably within 24 hours), for further assessment and treatment. After immediate detection of signs and symptoms, personal protective equipment and infection control practices must be adopted, and internal and external stakeholders must be informed. The guide will be developed to be as flexible as possible to different scenarios and to support and train healthcare professionals in the initial management of patients with HCID.

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Both early identification and prompt diagnostic and clinical management of suspected HCID using already available simple algorithms and boards/charts, is a crucial at front line hospital level.

Algorithms to guide HCWs should include:

- A case definition
- hyperlinks to resources
- PPE (personal protective equipment) instructions and availability
- Pre-identified pathways and rooms for transfer and placement of patients
- Laboratory protocols
- Notification protocol
- Clinical management guidance, including critically ill patients
- Safe transfer protocol
- Staff availability
- Waste disposal, cleaning and disinfection protocol

Case definition

Case definitions may vary depending on the pathogen and the epidemiological situation (i.e ongoing outbreaks, etc) at the time of occurrence. Case definitions for each infectious disease covered by EU surveillance are published in the Official Journal of the European Union (Commission Implementing Decision (EU) 2018/945) and are available at: https://www.ecdc.europa.eu/en/all-topics/eu-case-definitions. Additional sources of information can be found in Table 3.

Hyperlinks or internet sources

Hyperlinking could be a feasible and practical tool to enable any healthcare professional to consult the information needed to better define clinical pictures at any time. It could help with case definition criteria, the geographical location of the current outbreak, and the notification form to be filled in to report any suspected HCID case.
Consultation of user-friendly digital platforms (available on the web) updated in real time on any outbreaks or clusters around the world, allows for quick knowledge and preparation on HCID management for any health worker.

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A weekly summary of all information is gathered through ECDC's epidemic intelligence activities on communicable diseases of concern in the EU. It also provides updates on the global situation and changes in the epidemiology of communicable diseases that may affect Europe. (https://www.ecdc.europa.eu/en/publications-and-data/monitoring/weekly-threats-reports). Table 4 shows an additional list of websites updated in real time on the ongoing epidemic around the world.

PPE instructions

Transmission-based precautions reinforce standard precautions for patients with suspected or confirmed infection or colonization of specific infectious agent. PPE is selected according to the required transmission-based precaution for a specific pathogen. Table 5 shows types of precautions and corresponding PPE. Standard PPE is adapted for screening and initial management of patients in any health facility in the absence of suspected communicable disease. Some pathogens require a combination of precautions and the type of PPE might be modified or upgraded if there is suspicion of a HCID, if the patient is not stable, or in case of body fluid exposure. The training plan for all front-line staff should include safe PPE practices. It is also desirable that ICU staff receive training in the use of PPE required in the management of critically ill patients with a suspected HCID. In addition, the procurement of sufficient PPE for healthcare workers (HCWs) already available on-site for at least the first 24 hours of care is critical in the management of suspected case.

Most HCIDs require a complete combination of airborne and contact precautions, in addition to eye protection; on the other hand, only a few confirmed HCIDs (VHF, EVD etc) require complete combined precautions and trained health workers to work in HLIUs. The multilevel recommendations for PPE for each HCID for each clinical stage (persons under investigation, clinically stable, and unstable patients, patients dry or wet exhibiting vomiting, diarrhoea, or bleeding, and so on) are not simple to adopt in the rapid/initial assessment of HCID patient. For this reason, according to the policy already adopted in several hospitals (9) it might be useful to recommend standard PPE strategy for initial assessment and evaluation of all suspected pathogen that required combined isolation precautions patients.

Until the diagnosis of a suspected HCID is definitively excluded, it is likely that the risk of acquiring HCID and the consumption of PPE is highly overestimated, but at this level, precautionary approach must guide initial strategies for handling suspected cases. The adoption of this first-line policy includes a standardized initial set of PPE and infection control measures available in every European Health care facilities, that resembles COVID19 equipment used in the first phase of epidemic period (Table 6 and Fig 1 SPECIAL PATHOGEN PPE BASIC).

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A health systems may reasonably decide to adopt more specific or flexible screening-based PPE ensembles than the ones presented here. Only in the case of suspected VHF or EVD we recommend raising the level of protection with VHF PPE (Table 6, Fig 2).

These materials should be immediately available at triage and staff should be able to don them rapidly. The storage of each health facility has to provide sufficient PPE at least 12-24 hours of care. The inventory should be monitored constantly to ensure availability. In the absence of a known outbreak, consider keeping stockpile accessible but locked to avoid alternative use and depletion of the stock. Frontline facilities should ensure that adequate space is available for donning and doffing and that checklists and trained observers are used when donning and doffing higher than usual levels of PPE, for example in case of suspected VHF.

Pre-identified pathway and room to transfer and place patient

Every hospital should have in place pre-identified pathways, dedicated isolation rooms and available protocols for safe transfer of the suspected case to a designated evaluation hospital or a state or regional HLIU. Each health facility should be equipped with a designated isolation for suspected HCID patients, preferably with negative pressure isolation room including private bathroom, adjacent or bedside commode with clear procedure on how to dispose the waste. There should be designed donning/doffing areas optimally in an adjacent room/anteroom with sufficient protected space.

This protocol based on the clinical presentation of patient and the travel history. In order to simplify the best path to follow, we developed the Fever Pathway (Figure 3) and three different screening protocol (Figure 4).

Laboratory protocol

The protocol should include laboratory diagnostic tools to be used on the ER for early detection (Figure 5) and procedures for safe disposal of waste and cleaning and disinfection of fomites. Here we only describe the correct use of rapid diagnostic kits to obtain an early diagnosis that may allow for timely isolation or decrease the level of isolation measures if the test come back negative.

Notification protocol

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Notification protocols can help HCWs to timely notify the suspected case to internal (e.g., infection prevention staff) and external (e.g., state or local health officials) stakeholders at the national or international levels. Each country has a specific form to be completed according to national regulations. The notification form should be available in every health facility to expedite the notification of suspected HCID cases. A contact list with specific email addresses or telephone numbers should be available in case of a suspected HCIDs.

Clinical management of HCID: Identify, Isolate and Inform

From a specific clinical perspective, the syndromic approach protocol includes four different clinical pictures, which will be described in detail in the following paragraphs, in association with the epidemiological link of travel exposure (see hyperlink to countries with ongoing HCID transmission) or suspected outbreaks.

According with ECDC guidance regarding "Health emergency preparedness for imported cases of high consequence infectious diseases", the clinical approach should focus on triple I (identify, isolate, inform):

• identifying the HCID case promptly ('**identify'**). Signs and symptoms vary by disease and may be nonspecific, check for both epidemiological links and travel destinations, and regarding VHF abrupt onset of fever, myalgias and prostration;

• isolating the person (isolation room) and providing initial supportive care, while ensuring the safety of staff and others in contact with the case ('**isolate'**). Isolation should occur in a designated private room (with private bathroom or covered bedside commode) separated from other patient care areas, using if possible airborne infection isolation room (AIRR). Provide access to interpreter via phone as required by the patient, to address family and visitor issues. Place appropriate infection control/infection prevention door and other relevant signages. In case of VHF, it could be helpful to provide the patient with a means of communications (e.g., phone, tablet/slate computer, white board/dry erase markers).

• informing the public health authorities and coordinating the safe in-country transport of the suspected case to a designated treatment facility ('**inform'**).

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Every hospital is obliged to have an infection prevention control program and available PPE for the safe management of common infectious disease such as flu, chickenpox, measles, COVID-19, and pulmonary TB. Once a special pathogen case is suspected, HCWs should apply and follow specific guidance. The standard PPE is described in Table 5 and it is adapted for screening and initial management of patient in any health facility WITHOUT the need to touch the patient. This type of PPE might be modified or upgraded if there is a suspect HCID case, if the patient is not stable or with risk of exposure to bodily fluids. Most likely, a case of HCID in Europe will be travel-associated, less often could be an emerging/re-emerging disease. The least likely scenario is a deliberate biological attack. However, the aforementioned approach "identify, isolate and inform" can be adopted in all settings and it is characterized by timely triage, initial evaluation of risk of communicable disease and subsequent management and final transmission of information to official authorities.

Every single frontline hospital should have a plan for managing a potential HCID patient, who could potentially arrive at any time to the triage area of the ER.

HAND HYGIENE (with both alcohol-based gel or non-antimicrobial soap and water) and standard infection control precautions must be adopted. The patient is asked to wear a surgical MASK and perform hand hygiene (Fig 6).

HCWs must wear FFP2 face mask and gloves before touching patient if needed, if contact is required wear SPECIAL PATHOGEN PPE BASIC (Fig 1.)

Clinical management: four HCID clinical syndromes

HCWs assess the patient in the triage area considering the following items:

- Travel history (when and where) and any contact with sick people or previous access to health care facilities.
- The patient's medical history and comorbidities (frail patient, pregnancy patient, paediatric patient).
- General conditions (vital parameters, MEWS or other early scores), main signs and symptoms.

Triage for travel history has to include all activities conducted in the previous 21 days: different areas of visited countries, transports, mass meeting (festivals, public celebrations, camps etc.) any contacts with pet/wild animals/health facilities, recreational activities (swimming in fresh waters, sexual intercourse etc.). Self-completed screening questions on

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travel and contacts could be added to the triage documents (Table 7). In case the patient is unable to provide an exposure history due to the clinical condition or other communication barrier, obtain a history from the most reliable source (family, friends, digital translator).

Then, five easy-to-provide questions (5Qs) are needed at the triage level for all patients, 4 questions on sign & symptoms, 1 on travel destinations (Fig. 7):

1. Have you fever or have history of feverishness in the previous 24 hrs?
2. Have you cough or other respiratory symptoms?
3. Have you a rash?
4. Have you neurologic symptoms?
   &
5. Have you travelled abroad in the previous 21 days? If affirmative, detail country destination, travel itinerary, date of departure and return, contact with sick persons, hospitalization, reason to travel, mass events.

Assess potential contacts with sick people from abroad or from previous hospitalization.
Check vital signs by quickly assessing the patient's severity, taking care not to coming to contact with the patient's visible biological fluids.
After the patient has been placed in an isolation room ensure to put isolation signage at the door.
Evaluate persons accompanying the patient for illness and/or exposure to a HCID.
Track all the HCP who have had contact with the suspected HCID patient for potential exposure.

Contact the laboratory leadership before sending specimens to the facility's clinical laboratory

According to the clinical pictures, we can define four different syndromes:

1. Febrile Syndrome: fever as the main symptom (Fig 8).
2. Cutaneous syndrome: fever with rash (Fig. 9).
3. Respiratory Syndrome: Fever with respiratory signs and symptoms (Fig. 10).
4. Neurologic Syndrome: Fever with neurologic signs and symptoms (Fig. 11).

Each syndrome is summarized in Figures 8-11 respectively.

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If there is a positive history of recent travel and the presence of a clinical syndrome, the healthcare provider should suspect the presence of a HCID and take isolation measures to control the contagious disease (Table 5):

1) Special Pathogen Basic Precautions: combined contact, droplet and airbone isolation precautions (Fig 1)
2) VHF PPE Precautions: precautions used during clinical activities for patients affected by a viral haemorrhagic fever such as Ebola Virus Disease (Fig 2).

Three main different scenarios could be observed from the response to the 5Qs:

1. In case of a patient **with fever only, and travel exposure**, s/he needs to be further assessed regarding:

a. epidemiological link with areas with HCID outbreak;

b. clinical characteristics related to the suspect of a HCID;

- If there is no epidemiological link to HCID, the patient, can be managed with combined airborne and contact isolation precaution. Reassess the patient to be sure that other clinical symptoms are not present at the clinical examination. Afterruling out SARS-CoV-2 infection, the patient can be managed with standard PPE.
- If epidemiological link is present, adopt protocol screening (Fig 4.). In this case HCID precaution measures are indicated. The patient is placed in a single room (negative pressure system if possible) with written indication of the type of isolation on the door. For the HCWs the HCID precaution measures are intended as the combined use of contact, droplet and airborne isolation precautions (**Special Pathogen basic precaution**) eventually supervised during the PPE donning and doffing procedure. Notify the suspected case according to the definition criteria, alert the trained HCWs dedicated to HCIDs management, ensure the availability of PPE storage.

- 2. In case of patient (**irrespective of fever**) with rash, or cough, or neurological symptoms contact plus airborne isolation measures are indicated. The patient is placed in a single room (negative pressure system if possible) with written indication of the type of isolation on the door. In case of lack of epidemiological or clinical HCID link, we can decrease the level of isolation precaution measures in contact and airborne isolation precaution.The patientcan be managed, and investigated according to local health regulation and to the clinical needs. Once

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the etiologic diagnosis is reached, appropriate isolation precaution measures will be adopted.

- In case of presence of travel link for HCID, precaution measures are indicated.. For the HCWs the HCID precaution measures are intended as the combined use of contact, droplet and airborne isolation precautions (**Special Pathogen basic precaution**) eventually supervised during the PPE donning and doffing procedure.. Notify the suspected case according to the definition criteria, alert the formed HCWs dedicated to HCIDs management, ensure the availability of PPE storage.

- 3. In case of epidemiological link for areas with VHF/EVD or clinical features related to the suspect of an VHF or unstable conditions of patient use HCID measure as VHF (VHF PPE). If after an adequate medical history the unstable patient has no epidemiological links for area with VHF/EVD, isolation precaution measures can be reduced to those used for special pathogen basic precautions. Otherwise in case of suspected VHF/EVD notify the suspected case according to the definition criteria, alert the formed HCWs dedicated to HCIDs management, ensure the availability of PPE storage. See algorithm for clinical management for VHF on website: https://www.gov.uk/government/publications/viral-haemorrhagic-fever-algorithm-and-guidance-on-management-of-patients.

According to the clinical evaluation and perspective, special pathogens like HCIDs may still be considered in the absence of specific travel alerts. Indeed, algorithms are useful, but they do not replace good clinical judgment. Screening criteria and isolation level may change as more information becomes available or clinical pictures change.

In all cases of implementing HCID measures, direct contact with the HLIU referral at regional and/or national level according to each member state is required. In case of lack of epidemiological or clinical HCID links, the patient, under the above-mentioned isolation precaution, can be managed, investigated and, eventually, notified to local health regulation, according to the local clinical indications.

Safe transfer protocol

A plan for safe transport of a HCID patient from a front line health centre to hospital, or from hospital ta a dedicated HLIU is required. Transport can be performed on the ground or in the air, but requires specially trained personnel to avoid compromising safety for the patient and the accompanying personnel. If available, the patient can be placed in a personal isolation

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unit with negative pressure and filtered air. Unnecessary contact with non-essential healthcare workers or the public should be developed.

Staff Availability

In order to ensure sustainable staffing and resources, a roster for trained personnel should be set up. Turn-over staff concerning hours, rotation, process must be able to ensure the first hours of care (at least 24 hrs). In the case of VHF, limit the number of patient care providers and keep a log of those entering the room. Only trained HCWs should enter the room, institutional policy should specify the level of training for providers including staff requirements (e.g., only those trainees essential to accomplish critical procedures, no students) while balancing available staffing with potential increased risks in involving less experienced HCWs.

At the same time, periodical training courses (drills, exercises), physical and mental health monitoring of HCWs should be in place.

Critically ill patient management

The protocol should include all high-risk procedures (e.g. central line placement and intubation for VHF patient).

Waste disposal, cleaning and disinfection protocol

A protocol for waste disposal and disposal plan must be available according to the local procedures and guidelines of health facility.

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REFERENCES

1. England PH. https://www.gov.uk/guidance/high-consequence-infectious-diseases- hcid#definition-of-hcid 2021 [Google Scholar].

2. Brouqui P. Facing highly infectious diseases: new trends and current concepts. Clin Microbiol Infect. (2009) 15:700–5. doi: 10.1111/j.1469-0691.2009.02873.x

3. Public Health England (PHE). High consequence infectious diseases (HCID) [updated 13 May 2019] [cited 15 August 2019]. Available from: https://www.gov.uk/guidance/high-consequence-infectious-diseases-hcid.

4. Health emergency preparedness for imported cases of high-consequence infectious diseases. Operational checklist for country preparedness planning in the EU/EEA countries www.ecdc.europa.eu

Bannister B, Puro V, Fusco FM, Heptonstall J, Ippolito G; EUNID Working Group. Framework for the design and operation of high-level isolation units: consensus of the European Network of Infectious Diseases. Lancet Infect Dis. 2009 Jan;9(1):45-56. Available on https://www.sciencedirect.com/science/article/pii/S1473309908703049?via%3Dihub

WHO Research and Development Blueprint. 2018 Annual review of diseases prioritized under the Research and Development Blueprint Informal consultation 6-7 February 2018 Geneva, Switzerland. http://www.who.int/csr/research-and-development/en/)

7. Health emergency preparedness for imported cases of high-consequence infectious diseases Operational checklist for country preparedness planning in the EU/EEA countries www.ecdc.europa.eu7.

8. Wendy M Chung, Jessica C Smith et al. Active Tracing and Monitoring of Contacts Associated With the First Cluster of Ebola in the United States. Ann Intern Med. 2015 Aug 4;163(3):164-73. doi: 10.7326/M15-0968. PMID: 26005809. DOI: 10.7326/M15-0968.

9. High Consequence Infectious Disease Surge Overview. https://www.health.state.mn.us/communities/ep/surge/infectious/index.html

NYCHH-Frontline-Hospital-Planning-Guide.pdf. https://hhinternet.blob.core.windows.net/uploads/2019/07/

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TABLES AND FIGURES

Table 1. Definition of HCID according to the different Consortiums and networks

	EUNID[1]	WHO[2]	ECDC[3]	UK PHE[4]	Minnesota HCID collaborative[5]	NYC general hospital[6]	CDC – DHCPP[7]	NIAID[7]	EMERGE[8]
Acute ID	X	X	X	X	X	X	X		x
High CFR	X	X	X	X	X	X	X	X	x
No Vaccine	-	X	-	-	X	X	X		x
No Prophylaxis	-	X	X	X	-	X	X		x
No Treatment	-	X	X	X	-	X	X		x
Difficult early Dx	-	X	X	X	-	-	X		
Community spread	X	X	X	X	X	X	X	X	x
Health care transmission	X	X	X	X	-	X	X		
HLIUs	X	X		-	-	X	X		
BSL-4 Laboratory	-	-		-	X		-		
Public health response: impact	-	X	X	X	-	X	X	X	
Public health response: risk assessment	-	X	X	X	-	X	X	X	

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Existence of diagnostic gaps									x
Presence of reservoir or vector									x
Other - detail	-	X - societal impact, evolution potential, animal interface etc-	-	-	X - Cat A medical waste (UN2814)	X – in patients under evaluation	X - societal impact, evolution potential, animal interface etc-	X - Might cause public panic and social disruption	X - Size of susceptible population, Use of ProMed (indicator of threat)

1 Highly ID definition is available on Bannister B, Puro V, Fusco FM, Heptonstall J, Ippolito G; EUNID Working Group. Framework for the design and operation of high-level isolation units: consensus of the European Network of Infectious Diseases. Lancet Infect Dis. 2009 Jan;9(1):45-56. Available on https://www.sciencedirect.com/science/article/pii/S1473309908703049?via%3Dihub

2. Blueprint methodology for priority list by WHO is available on https://www.who.int/blueprint/priority-diseases/RDBlueprint-PrioritizationTool.pdf?ua=1

3 HCID definition is based on UK PHE definition and available on https://www.ecdc.europa.eu/sites/default/files/documents/Health-emergency-preparedness-imported-cases-of-high-consequence-infectious-diseases.pdf

4 HCID definition is available on https://www.gov.uk/guidance/high-consequence-infectious-diseases-hcid

5 HCID definition is available on https://www.health.state.mn.us/communities/ep/surge/infectious/index.html

6 Special pathogen definition is available on https://hhinternet.blob.core.windows.net/uploads/2019/07/NYCHH-Frontline-Hospital-Planning-Guide.pdf

7. DHCCP (Division of High Consequence Pathogens and Pathology) https://www.cdc.gov/ncezid/dhcpp/pdfs/DHCPP-diseases-508.pdf

8 NIAID Emerging Infectious Diseases/Pathogens. Category A: pathogens are those organisms/biological agents that pose the highest risk to national security and public health. https://www.niaid.nih.gov/research/emerging-infectious-diseases-pathogens

9 EMERGE Viral Pathogens Working Group.
Prioritization of High Consequence Viruses to Improve European Laboratory Preparedness for Cross-Border Health Threats. PMID: 28032326 DOI: 10.1007/5584_2016_152

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Table 2. List of HCID with single pathogen

After analysed each definition of different networks we proposed a whole list of every single pathogen according to the family or classification in order to evaluate if there are any priority between the same families of single pathogen or between viral and bacterial pathogens. We do not more consider SARS-CoV-2 as the declaration of 19 March 2020 .

	EUNID[1]	WHO[2] R&D Blueprint, WHO 2018	ECDC [3] (disease examples)	UK PHE [4]	Minnesota HCID collaborative[5] (disease examples)	NYC general hospital[6] (disease examples)	CDC – DHCP[7]	NIAID[8]	EMERGE[9]
Family Filoviridae	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	
Ebola and Marburg VD	X	X	X	X	X	X	X	X	X*
Family Bunyaviridae	**X**	**X**	**X**	**X**	**X**		**X**	**X**	**X**
CCHF	X	X	X	X	X		X	X	X
Rift Valley virus		X					X	X	
Hantavirus Pulmonary Syndrome (HPS) associated viruses			X (Andes)	X (Andes)			X	X	
HemorrhagicFever with Renal Syndrome (HFRS) associated viruses					X		X		

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Family Arenaviridae	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
Lassa	X	X	X	X	X	X	X	X	X
Lujo virus		x			X	X	X	X	
Lymphocytic Choriomeningitis Virus		x					X		
Machupo Virus (Bolivian Hemorrhagic Fever)	X	x			X	X	X	X	
Junin Virus (Argentinian Hemorrhagic Fever)	X	x			X	X	X	X	
Sabia Virus (Brazilian Hemorrhagic Fever)	X	x			X	X	X		
Guanarito Venezuela HF	X	x			X	X	X	X	
Chapare Virus		x			X	X	X	X	
Family Poxviridae	**X**		**X**	**X**	**X**	**X**	**X**	**X**	**X**
Smallpox	X				X	X	X	X	X
Monkey Pox	X		X	X	X	X	X	X	X
Other poxviruses							X	X	X
Family Rhabdoviridae (Rabies and non-Rabies)	X						X		

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Family Coronaviridae	**X**	**X**	**X**	**X**	**X**	**X**			
SARS	X	X	X	X	X	X			
Mers-CoV	X	X	X	X	X	X			
Other Coronaviruses		x							
Family Paramixoviridae		**X**					X		
Nipah	X	X	X	X	X		X		
Hendra	X	X			X		X		
Family Flaviviridae					**X**		**X**	**X**	
Tick-borne encephalitis (TBE) complex viruses							X		
Far-eastern TBE virus							X		
Omsk Hemorrhagic Virus	X				X		X		
Kyasanur Forest Disease virus	X				X		X		
Family Picornaviridae		**x**							
emergent non-polio enteroviruses (including EV71, D68		x							
Arbovirosis		**X**						**X**	
Zika		X							

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Dengue								X	
Chikungunya		x							
Family Phenuiviridae		**x**	**X**	**X**					
SFTS		x	X	X					
Pandemic Flu	**X**		**X**	**X**	X	X			X*
A (H7N9)			X	X		X			
A (H5N1)			X	X		X			
A (H5N6)			X	X					
A (H7N7)			X	X					
A (H3N1)						X			
MDR TB	**X**								
Bacterial special pathogen							**X**		**X****
C. botulinum toxin (botulism)								X	
Pneumonic Plague			X	X				X	
Actinomycoses and Nocardiosis							X		
Anthrax							X	X	
Brucellosis							X		
Buruli ulcer							X		
Capnocytophaga							X		
Glanders (Burkholderia mallei)							X		

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Hansen's Disease (Leprosy)							X		
Leptospirosis							X		
Melioidosis (Burkholderia pseudomallei							X		
Pasteurella sp. Infections							X		
Francisella tularensis								X	
Rat-Bite Fever							X		
Unknown emerging pathogen	**X**	**X (Disease X)**			**X**				
Engineered pathogen or suspected bioterrorist pathogen	**X**								
Prion							**X**		
Chronic viral diseases							**X**		

1. https://www.sciencedirect.com/science/article/pii/S1473309908703049?via%3Dihub
2. https://www.who.int/blueprint/priority-diseases/RDBlueprint-PrioritizationTool.pdf?ua=1; https://extranet.who.int/goarn/content/2018-annual-review-blueprint-list-priority-diseases
3. https://www.ecdc.europa.eu/sites/default/files/documents/Health-emergency-preparedness-imported-cases-of-high-consequence-infectious-diseases.pdf
4. https://www.gov.uk/guidance/high-consequence-infectious-diseases-hcid
5. https://www.health.state.mn.us/diseases/hcid/ High Consequence Infectious Diseases
6. https://hhinternet.blob.core.windows.net/uploads/2019/07/NYCHH-Frontline-Hospital-Planning-Guide.pdf
7. DHCCP (Division of High Consequence Pathogens and Pathology) https://www.cdc.gov/ncezid/dhcpp/pdfs/DHCPP-diseases-508.pdf

This document is part of the Joint Action 848096 / SHARP JA which has received funding from the European Union's Health Programme (2014-2020).

8. NIAID Emerging Infectious Diseases/Pathogens. Category A: pathogens are those organisms/biological agents that pose the highest risk to national security and public health. https://www.niaid.nih.gov/research/emerging-infectious-diseases-pathogens
9. EMERGE Viral Pathogens Working Group. Prioritization of High Consequence Viruses to Improve European Laboratory Preparedness for Cross-Border Health Threats. PMID: 28032326 DOI: 10.1007/5584_2016_152

*Ebola & Highly Pathogenic Influenza (HPI) were not considered an immediate urgency since large networks and commercial diagnostic tests are already available

** The same approach was used to produce the annual work plan also for highly pathogenic bacteria.

Table 3. Examples of Hyperlink to resource to different HCID case definition criteria

Avian Influenza	https://www.cdc.gov/flu/avianflu/case-efinitions.html#:~:text=Persons%20with%20recent%20exposure%20(within,or%20A(H9)%20viruses.
EVD	https://www.hss.gov.nt.ca/professionals/sites/professionals/files/resources/ebola-virus-disease-case-definitions.pdf
Lassa fever	https://cdn.who.int/media/docs/default-source/outbreak-toolkit/final_lassa-fever-outbreak-toolbox_20221011.pdf?sfvrsn=d3852354_1
High consequence infectious disease: country specific risk	https://www.gov.uk/guidance/high-consequence-infectious-disease-country-specific-risk
MERS-CoV	https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1062335/MERS-CoV-algorithm.pdf
Mpox	https://www.gov.uk/guidance/monkeypox-case-definitions
Nipha virus	https://cghealth.nic.in/cghealth17/Information/content/NipahVirus/Case_definition.pdf
Plague	https://ndc.services.cdc.gov/case-definitions/plague-2020/
VHF	https://ndc.services.cdc.gov/case-definitions/viral-hemorrhagic-fever-2022/
SFTS	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8310018/
Argentine haemorrhagic fever (Junin virus)	https://ndc.services.cdc.gov/case-definitions/new-world-arenavirus-junin-virus-2022/

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Table 4. Examples of Web site Digital platform

1. http://www.cidrap.umn.edu/Emerging and Reemerging infectious diseases
2. https://wwwnc.cdc.gov/travel/destinations/list
3. https://www.who.int/emergencies/disease-outbreak-news
4. https://outbreaks.globalincidentmap.com/ automatic update regarding worldwideoutbreak
5. https://dph.georgia.gov/TravelClinicalAssistant
6. https://who.maps.arcgis.com/apps/opsdashboard/index.html#/f9003796864241b99d21474025f3667e In time update concerning outbreak EVD in RDC
7. https://www.promedmail.org/
8. http://newsletters.afro.who.int/outbreaks-weekly-bulletin/
9. https://www.who.int/csr/don/archive/year/2019/en/
10. https://travelhealthpro.org.uk/
11. https://www.woah.org/en/home/ World Organization for Animal Health
12. www.cdc.gov/travel/notices
13. Yellow book cdc
14. https://www.gpmb.org/news
15. WHO yellow book

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16. https://www.gov.uk/guidance/high-consequence-infectious disease-country-specific-risk

Table 5. PPE by type of Precautions.

Type of Precautions	PPE
Standard	gloves, gown, surgical mask1, goggles or face shield1 (exact ensemble determined by the type of clinical interaction with the patient and patient signs and symptoms)[2,3]
Contact	FFP2, fluid-resistant gown, gloves[2]
Droplet	FFP2, eye protection (eye protection not required but recommended by most sources)[2]
Airborne	FFP2/3 or equivalent/higher respirator or powered air-purifying respirator (PAPR)[2,4] if available

1 Use PPE to protect the mucous membranes of the eyes, nose and mouth during procedures and patient-care activities that are likely to generate splashes or sprays of blood, body fluids, secretions and excretions. Select masks, goggles, face shields, and combinations of each according to the need anticipated by the task performed

2 Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings (2007)

3 Standard Precautions in Health Care

4 PAPR might be reserved if available in critical care setting, otherwise appropriate N95 or higher filters is recommended.

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Table 6. PPE by type of Precautions: Special Pathogen basic and VHF PPE Precautions

Special Pathogen Basic Precuation	VHF PPE Precaution
MERS, SARS, Avian Influenza, Novel acute respiratory infections with potential for a high public health impact	EVD or another VHF with vomiting, diarrhoea, bleeding, instable conditions. Stable VHF
FFP2/3 Fluid-resistant gown that extends to at least mid-calf Nitrile gloves with extended cuff Face shield Consider booties and head cover The first four items should be available at triage and routinely applied for any suspected special pathogen patient requiring physical contact and during initial assessment.	FFP2/3 or equivalent/higher respirator fluid resistant (EN14683:2005 TypeIIR) Nitrile gloves with extended cuff - 2 pairs Coveralls with overboots/shoes Impermeable gown that extends to at least mid-calf Knee high pull-on impermeable booties Surgical hood (full head coverage draping onto shoulders),Face shield Impermeable apron should be added for patients with significant body fluid losses/exposure risk ALL SKIN SHOULD BE COVERED

These materials should be immediately available at triage and staff should be able to don them rapidly. Inventory should be monitored to ensure individual items are not removed from the ensemble for alternate uses. In the absence of a known outbreak, consider keeping materials accessible but locked to prevent alternate use. 2 PAPR with proper filtration may be advisable if available for patients with respiratory symptoms or requiring airway intervention.

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Table 7. Triage Patient Questionnaire

Patient Name	Country of residence	
Visited countries	from …… to	from …… to
Visited countries	from …… to	from …… to
Date of arrival	Placed visited after arrival and address	Placed visited after arrival and address
Reasons for travel ○ Vacation ○ Work ○ Humanitarian mission ○ Residence in the country visited ○ Other……	Do you have ○ Fever date…… ○ Diarrhoea date…… ○ Headache date…… ○ Muscle/Joint pain date…….. ○ Weakness date…… ○ Vomiting date……	Do you have ○ Cough date…… ○ Rash date…… ○ Dyspnea date…… ○ Confusion date…….. ○ Visible bleeding date…… ○ Dark/bloody urine date…
Contact with sick people with vomiting, diarrhoea or bleeding in the previous 3 weeks ○ Yes ○ No	Contact with animal in the previous 3 weeks ○ Yes ○ No	Contact with sick people with someone who died in the previous 3 weeks ○ Yes ○ No
Have you been hospitalized in the previous 3 weeks ○ Yes ○ No	Have you attended funerals or burials in the previous 3 weeks ○ Yes ○ No	Do you work in laboratory or hospital? ○ Yes ○ No
Contact in the previous 3 weeks with/for ○ Blood ○ Bodily fluids ○ Personal care	Contact in the previous 3 weeks with/for ○ Primates ○ Rodents ○ Bats	Visit in the previous 3 weeks: ○ Caves ○ Mines ○ Health facilities

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○ Sexual intercourse	○ Others	○ Mass event
Contact with person diagnosed with hemorrhagic fever or with suspicious symptoms		
Contact name:		Return date
Type of contact ○ Blood ○ Bodily fluids ○ Personal care ○ Sexual intercourse ○ Other	Complete the story of Contact's journey in these sections	

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Fig 1. Special Pathogen Basic PPE

Fit-tested FFP2/3 /Fluid-resistant gown that extends to at least mid-calf/Nitrile gloves if possible with extended cuff - 2 pairs/Face shield/Consider booties and head cover.

Fig 2. VHF PPE

Fit-tested FFP3 or equivalent/higher respirator/Nitrile gloves with extended cuff –2 pairs/Impermeable gown that extends to at least mid-calf/Knee high pull-on impermeable booties/Surgical hood/Face shield/Impermeable apron should be added for patients with significant body fluid losses/exposure risk

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Fig 3. Fever Pathway

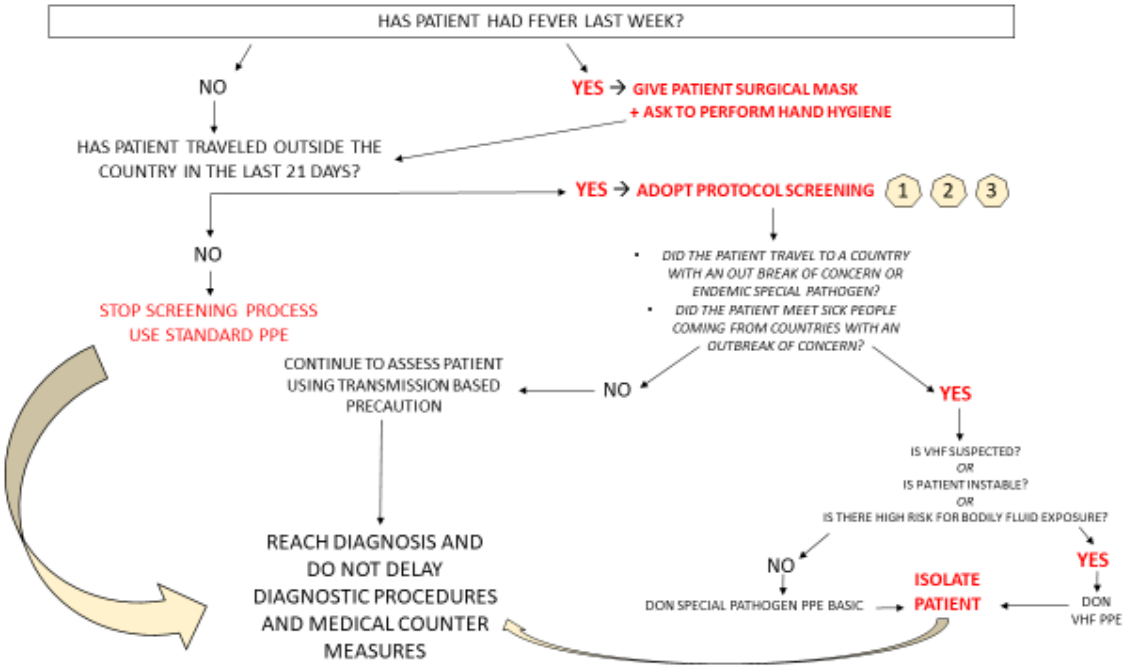

Fig 4. Screening Protocol 1,2,3.

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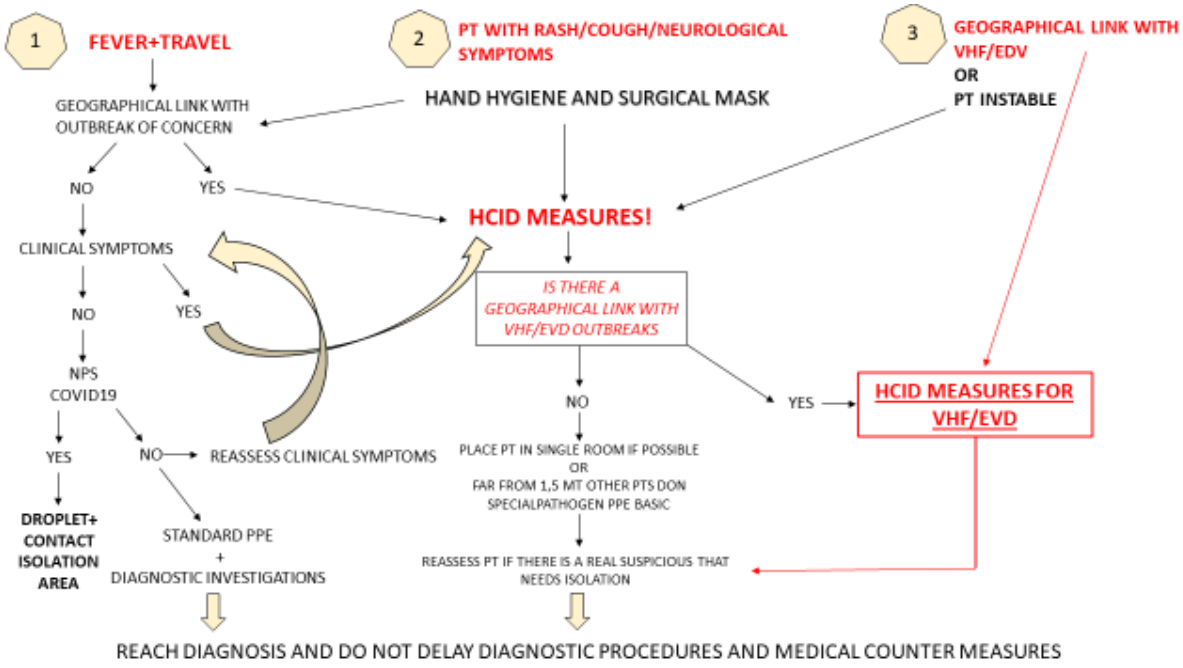
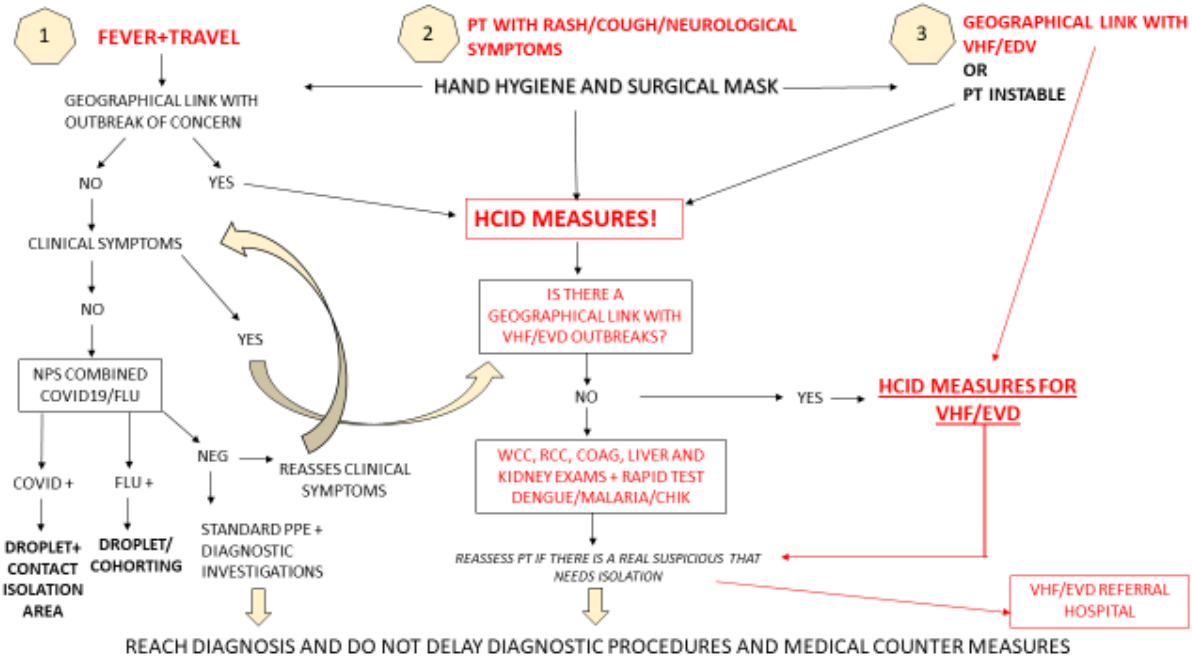


NPS: NASOPHARYNGEAL SWAB, SPECIAL PATHOGEN BASIC PPE SEE FIG 1.

Fig 5. Laboratory protocol



NPS: NASOPHARYNGEAL SWAB, SPECIAL PATHOGEN BASIC PPE SEE FIG 1.

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Fig 6. Universal Screening Sign Example

Credits: https://hhinternet.blob.core.windows.net/uploads/2019/07/NYCHH-Frontline-Hospital-Planning-Guide.pdf

Fig 7. Different clinical pictures + travel history

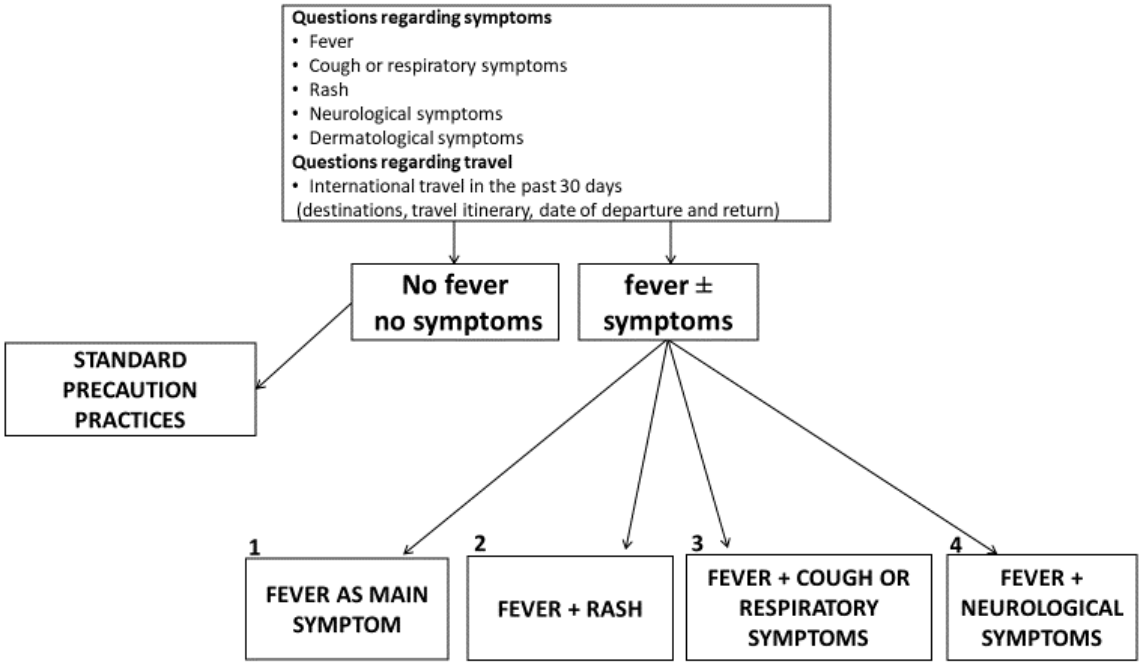

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Fig 8. Fever as main symptom

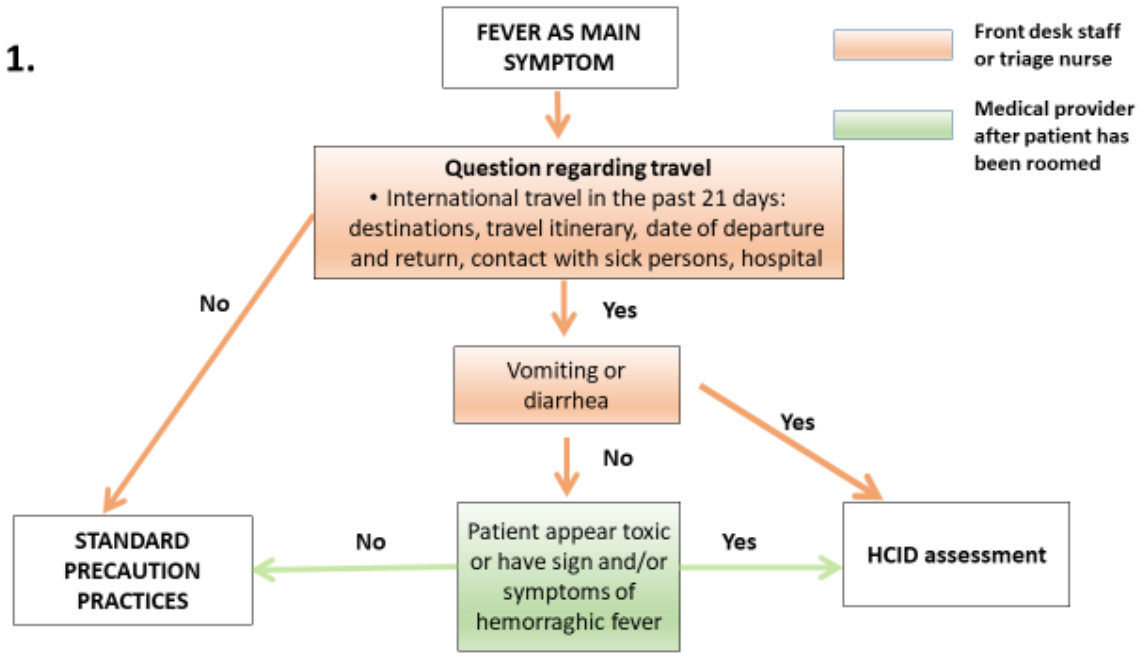

Fig 9. Fever + rash

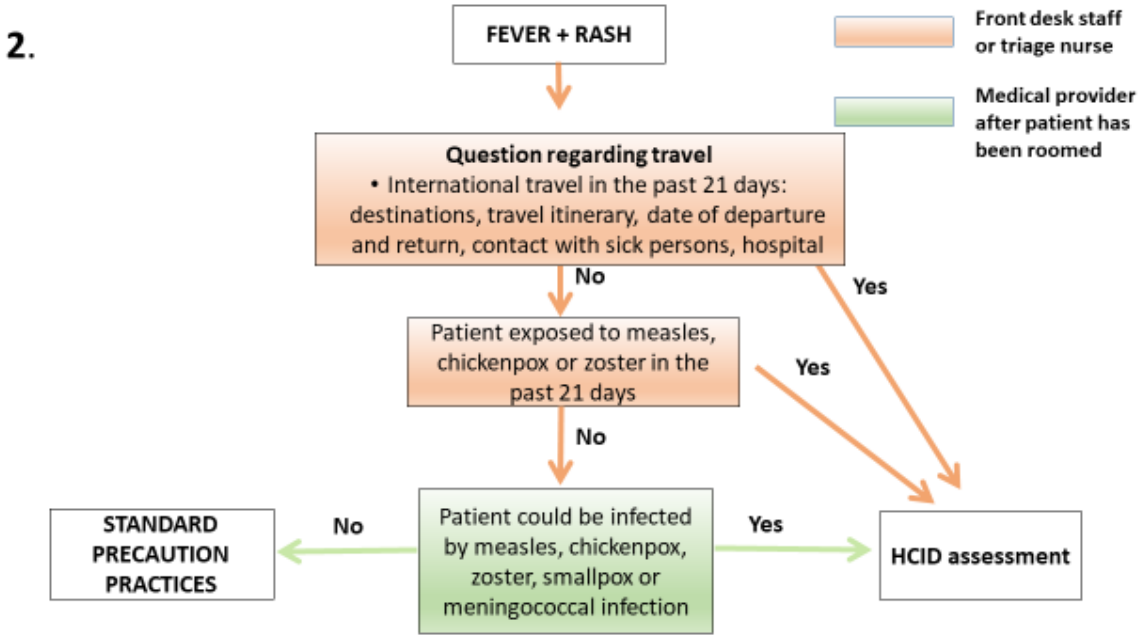

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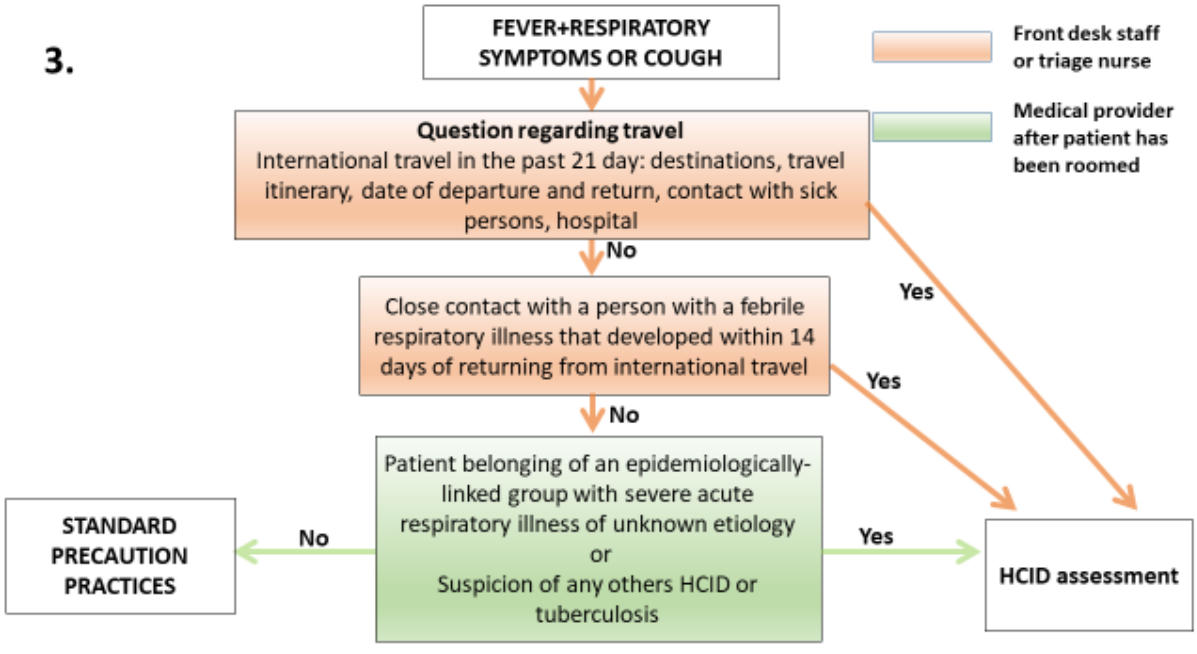
Fig 10. Fever + cough or respiratory symptoms



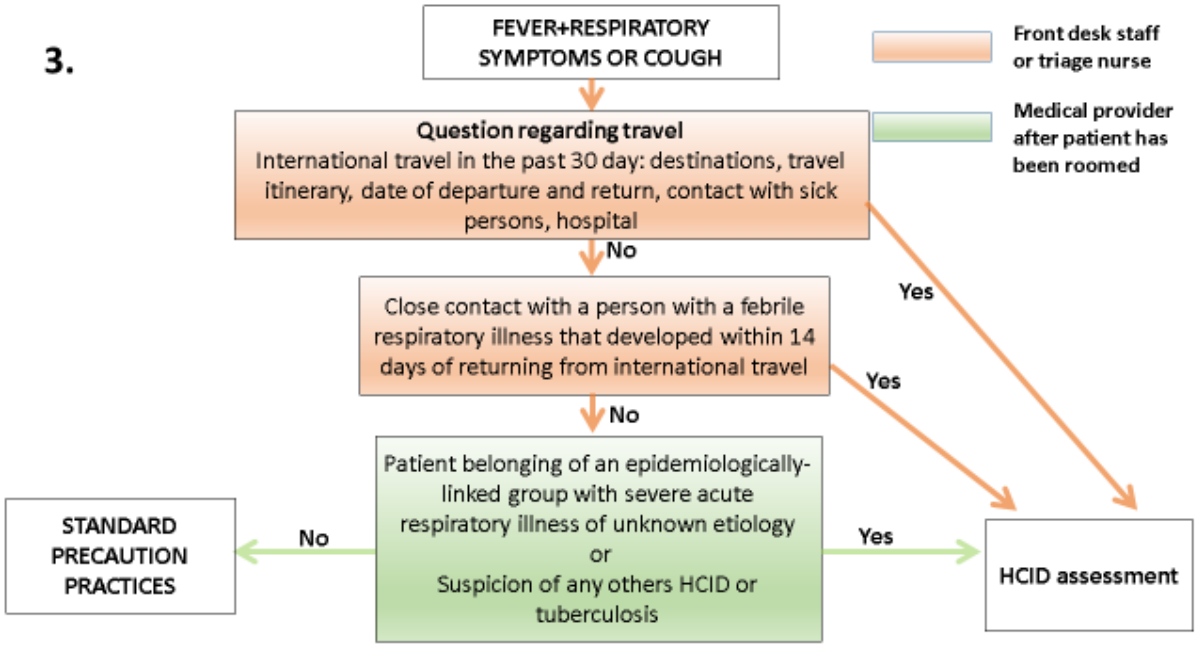
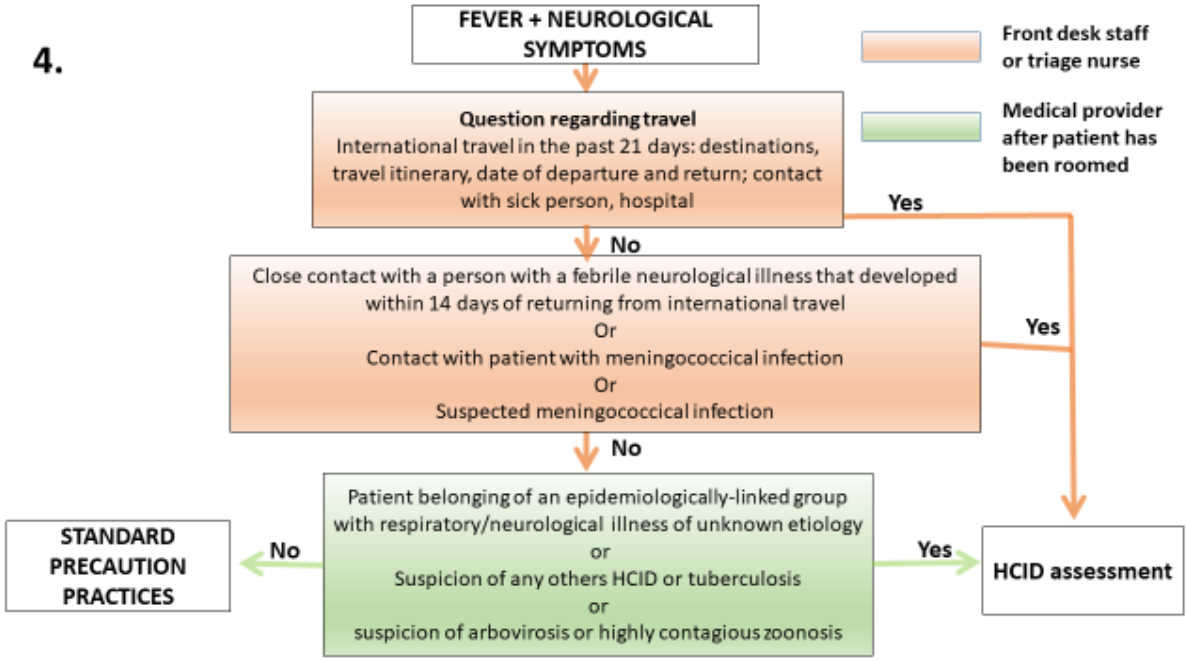


Fig 11. Fever + neurological symptoms

This document is part of the Joint Action 848096 / SHARP JA which has received funding from the European Union's Health Programme (2014-2020).

4.



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