

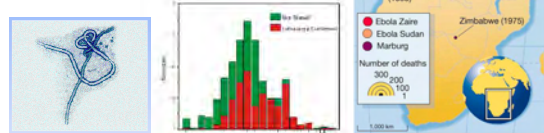
*The European Centre for Training and Research on Imported and Highly Contagious Diseases*

- Status quo, gaps, and tasks for the future in the field of emerging/highly pathogenic viruses
- Role of infrastructures
- User needs

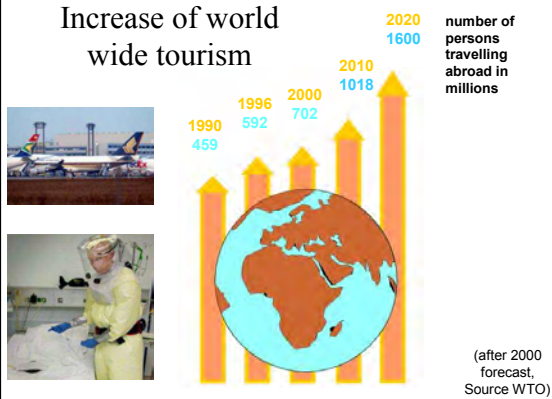
Emerging/highly pathogenic viruses

- limited treatment options, no vaccines
- high mortality,
- often viral hemorrhagic fevers (VHF)
- human-to-human transmission possible
- may cause epidemics (Biosafety level 4)

Examples: Ebola/Marburg virus, Lassa virus, Crimean-Congo hemorrhagic fever virus, SARS virus, (new pandemic influenza)



Increase of world wide tourism



VHF/emerging viruses recently imported to Europe

BSL-4 agent

Pathogen	Imported from	Imported to	when
suspected VHF <sup>1</sup>	Gambia	Belgium	11/1998
Yellow Fever	Ivory Coast	Germany	08/1999
Lassa	Ivory Coast	Germany	01/2000
Lassa	Sierra Leone	U.K.	03/2000
Lassa	Nigeria	Germany	03/2000
Lassa	Sierra Leone	Netherlands	07/2000
suspected VHF <sup>2</sup>	Kenya	Germany	12/2000
suspected VHF <sup>1</sup>	Sierra Leone	Germany	03/2001
Hanta (Andes)	Chile/Argentina	France	03/2001
Rift Valley	Chad	France	09/2001
CCoP <sup>3</sup>	Bulgaria	Germany	10/2001
Yellow Fever	Gambia	Belgium	11/2001
West Nile	USA	France	08/2002
suspected VHF <sup>4</sup>	Nepal	Spain	09/2002
suspected VHF <sup>1</sup>	Cameroon	Ireland	10/2002
Lassa	Sierra Leone	UK	02/2003
SARS	Asia	Europe	Spring 2003
West Nile	USA	Germany	08/2003
West Nile	Portugal	Ireland	07/2004
West Nile	USA	Germany	09/2004

Source: European Network for Diagnostics of "Imported" Viral Diseases (ENVD)  
<sup>1</sup> final diagnosis: Malaria, <sup>2</sup> final diagnosis: generalised Herpes (HSV 1) <sup>3</sup> Crimean-Congo H.F.

**Eurosurveillance**

**BICHAT GUIDELINES\* FOR THE CLINICAL MANAGEMENT OF HAEMORRHAGIC FEVER VIRUSES AND BIOTERRORISM-RELATED HAEMORRHAGIC FEVER VIRUSES**

\* Bossi, A Tegnelli, A Baka, F Van Loock, J Hendriks, A Werner, H Moidhof, G Gouvras  
 Task Force on Biological and Chemical Agent Threats, Public Health Directorate, European Commission, Luxembourg

**Conclusions**  
 Even if data are lacking, most of the HFVs must be considered as a serious potential biological weapon (Ebola, Marburg, Lassa fever, New World arenaviruses, Rift Valley fever, yellow fever, Omsk haemorrhagic fever, and Kyasanur Forest disease). Most of these viruses have been studied and developed as biological weapons in many countries. Aerosolisation of these viruses can be associated with significant morbidity and mortality in the exposed population: transmission from person-to-person can amplify disease outbreaks. Moreover, specific treatment and vaccines are lacking for most of them.

**Laboratory criteria for diagnosis**

- Positive virus isolation
- Positive skin biopsy (immunohistochemistry for Ebola/Marburg viruses, Lassa fever virus)
- Detection of specific viral nucleic acid sequences
- Positive serology, which may appear late in the course of the disease

**World Health Organization**

**Epidemic and Pandemic Alert and Response (EPR)**

Country activities | Outbreak news | Resources | Media centre

Images from the outbreak of Marburg haemorrhagic fever in Uige Province, Angola 2005

Active Surveillance and detection of suspect cases in Uige by Mobile teams.

Is there a mobile EU BSL4 laboratory?


PROTECTING HEALTH THROUGH GLOBAL EPIDEMIC CONTROL

**Developing laboratory partnerships to detect infections and prevent epidemics**

**The challenge**

**The growing threat of epidemics**

Epidemics and newly-emerging infections are threatening the health of people globally and impacting on travel and trade in our increasingly interconnected world. Many epidemic threats, such as cholera, meningitis, yellow fever and dengue, recurrently challenge health systems in countries with very limited resources. Others, such as influenza and severe acute respiratory syndrome (SARS), have demonstrated their potential to create new pandemics.



## The essential role of laboratories

**Vision** The earliest possible detection of epidemic threats through a network of effective diagnostic laboratories

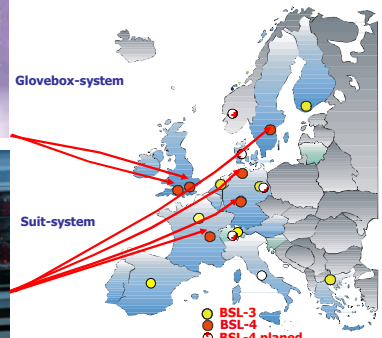
Expanding capacity by partnership

Will EU BSL4 laboratories be involved?

NIH grants database Ebola/Marburg 2005  
 →60 hits  
 →Basic science  
 →antivirals  
 →vaccines  
 →diagnostics

Rank Number	Grant Number	PI Name	Project Title
1	5U11A00090-01	CRABY, SHARON	Initiation of Cerebral Lymphitis in Ebola Virus
2	5U11A00277-02	HARTY, RONALD	Ebola Virus VP40 Host Interactions in Virus Entry
3	5U11A001366-02	HU, JIN	Ebola VP24 mediated viral gene expression
4	5U11A001919-01	KAWAOKA, YOSHIOHRO	Molecular Basis for Ebola Virus Pathogenicity
5	5U11A001979-02	ALEXANDER	Development of Kinase Inhibitors for Ebola Virus
6	5U11A001979-01A2	BONG, LINDA	Characterization of Ebola Virus
7	5U11A001979-04	SMITH, RONALD	Characterization of Ebola Virus
8	5U11A001979-02	SMITH, RICHARD	Characterization of Ebola Virus
9	5U11A001979-01A2	CHESLTON	Characterization of Ebola Virus
10	5U11A001979-01	SALZMAN, ANDREW	Characterization of Ebola Virus
11	5U11A001979-01	PATRICK, ANDREW	Characterization of Ebola Virus
12	5U11A001979-01	PATRICK, ANDREW	Characterization of Ebola Virus
13	5U11A001979-01	PATRICK, ANDREW	Characterization of Ebola Virus
14	5U11A001979-01	PATRICK, ANDREW	Characterization of Ebola Virus
15	5U11A001979-01	PATRICK, ANDREW	Characterization of Ebola Virus
16	5U11A001979-01	PATRICK, ANDREW	Characterization of Ebola Virus
17	5U11A001979-01	PATRICK, ANDREW	Characterization of Ebola Virus
18	5U11A001979-01	PATRICK, ANDREW	Characterization of Ebola Virus
19	5U11A001979-01	PATRICK, ANDREW	Characterization of Ebola Virus
20	5U11A001979-01	PATRICK, ANDREW	Characterization of Ebola Virus
21	5U11A001979-01	PATRICK, ANDREW	Characterization of Ebola Virus
22	5U11A001979-01	PATRICK, ANDREW	Characterization of Ebola Virus
23	5U11A001979-01	PATRICK, ANDREW	Characterization of Ebola Virus
24	5U11A001979-01	PATRICK, ANDREW	Characterization of Ebola Virus
25	5U11A001979-01	PATRICK, ANDREW	Characterization of Ebola Virus
26	5U11A001979-01	PATRICK, ANDREW	Characterization of Ebola Virus
27	5U11A001979-01	PATRICK, ANDREW	Characterization of Ebola Virus
28	5U11A001979-01	PATRICK, ANDREW	Characterization of Ebola Virus

### BSL-4 facilities in Europe



**Glovebox-system**

**Suit-system**

● BSL-3  
 ● BSL-4  
 ● BSL-4 planned

Current EU support in the area: Networking of EU BSL4 facilities

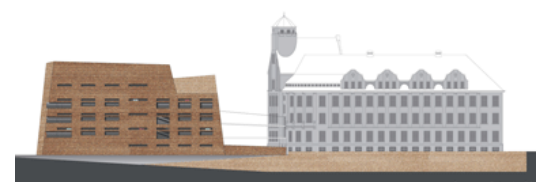
**1. FP6 COORDINATION ACTION (no funding of research)**

Development and commercial production of standardized PCR-assays for detection of viral hemorrhagic fever viruses and variola virus and their implementation in the diagnostic service of EU P4 laboratories

**2. SANCO EURONET P4 (no funding of research)**

Sharing protocols and materials, and providing diagnostic service to all Member States

### New BSL-4 infrastructure in Hamburg (EU co-funded)



European Training and Research Centre for Imported and Highly Contagious Diseases (EUTRICOD, FP6 infrastructure project)

The project will contribute to the development of the European research area:

- attractive for researchers seeking to conduct a project involving BSL 3 and BSL 4 pathogens
- enhanced accessibility and improved training conditions
- possibilities for studies in endemic areas of West Africa
- enhanced European preparedness for outbreaks of new and highly infectious diseases

**Expensive infrastructure**  
(running and maintenance costs  $\geq 300.000$  €/year)



Future tasks of EU BSL-4 facilities - areas for EU support in FP7

