

Preparedness and Response to Emerging and Highly Infectious Diseases

European Projects coordinated by
National Institute for Infectious
Diseases “L. Spallanzani”

Francesco M. Fusco, MD
EuroNHID project Coordinator

Global Re-Emergence of Infectious Diseases

Main key-actions

- **PROTECT**

- Early Detection
- Rapid Response

- **PREVENT**

- Research -Vaccines, Drugs, Diagnostics

- **PREPARE**

- Readiness

Priority areas for research in EIDs

- **clinical epidemiology** (human and animal) and surveillance including disease burden estimation,
- identification of reservoirs and vectors,
- **laboratory diagnosis**,
- molecular studies,
- **case management**,
- modelling and mathematical modelling,
- methods for risk analysis, decision analysis, support to the diagnosis,
- **infrastructure preparedness**,
- animal research,
- socio-anthropological.

Based on the model developed in the WHO SEARO
Brainstorming Meeting- , New Delhi, 20-21 July 2007

Priority areas for research in EIDs

Preparedness

- research infrastructure
- high containment lab
- communication
- multidisciplinary integration
- international cooperation
- capacity building

Based on the model developed in the WHO SEARO
Brainstorming Meeting- , New Delhi, 20-21 July 2007

HIDs: a definition

A HID:

- **is transmissible from person-to-person,**
- **causes life-threatening illness,**
- **presents a serious hazard in health care settings and in the community,**
- **requires specific control measures**

WATCH OUT!!



PANIC IN THE STREETS



RICHARD
WIDMARK

PAUL
DOUGLAS

BARBARA
BEL GEDDES

with ELIA
KAZAN

with JACK PARRON - BOB
WELLS - CAROL HAYES - BOB
LOP - FRANKLYN - TERRY COOK

20th
CENTURY-FOX
with SOL C.
SIEGEL

Produced by EDWARD BREMER - Story & Screenplay by EDNA and EDUARDO ANGLAT

Agents/Diseases fulfilling the definition

- **Viral haemorrhagic fevers:** marburgvirus, ebolavirus, Crimean Congo haemorrhagic fever virus, Lassa virus, and South American haemorrhagic fever (Junin, Machupo, Sabia, and Guanarito) viruses;
- **Multi drug- or Extensively drug- resistant M tuberculosis (MDR and XDR-TB)** (known or suspected infection)
- **SARS Co-V**
- Emerging highly pathogenic strains of **influenza virus**
- **Smallpox** and other orthopox infections (eg monkeypox)
- Other emerging highly pathogenic, human-to-human transmitted agents, including agents of deliberate release (**pneumonic plague**)

European Network: why?

The response to newly emerging global concerns must be:

- Coordinated
- Effective
- Rapid

A trans-national response to trans-national threats

Needs

- Ensure a **rapid and effective response** to health threats deriving from natural infection by highly infectious agents or their deliberate release
- Stimulate **complementarity** and prevent **duplication**
- Promote **exchange of information and international cooperation**
- Share **good practice and protocols**
- Cooperation agreement for **training, communication, and service availability** to other Countries



Areas of interest and projects coordinated by INMI

- **Laboratory diagnosis and research**

- The European Network of P4 Laboratories ([Euronet-P4](#) and [ENP4-Lab](#), 2005-2010)

- **Training**

- European Training in Infectious Disease Emergencies ([ETIDE](#), 2006-2009)

- **Clinical management**

- The European Network for Infectious Diseases ([EUNID](#), 2004-2007)
- European Network for highly infectious diseases ([EURONHID](#), 2007-2010)

Laboratory diagnosis and research

The European Network of P4
laboratories

Euronet-P4 and ENP4-Lab: Partners

- INMI L. Spallanzani, [Italy](#)
- Health Protection Agency, London and Porton Down, [UK](#)
- Philipps Universitat Marburg, [Germany](#)
- Bernhardt Nocht Institute of Tropical Medicine, Hamburg, [Germany](#)
- Swedish Institute for Infectious Disease Control, Solna, [Sweden](#)
- Inserm, Lab. P3/P4 Jean Mérieux, Lyon, [France](#) (as of 2007)

Euronet-P4 and ENP4-Lab: Observers

- Institut Pasteur, Lyon, [France](#)
- Robert Koch Institute, Berlin, [Germany](#)
- Bundeswehr Institute of Microbiology, Munich, [Germany](#)
- University of Marseille, [France](#)
- Austrian Agency for Health and Food Safety, Vienna, [Austria](#)

Euronet-P4 and ENP4-Lab: main problems to face in dealing with P4 agents

- The need to manipulate such agents in high containment laboratories:
 - not present in all European countries,
 - the maintenance of which is very expensive;
- The absence of reference samples for the diagnosis of group 4 agents;
- The absence of commercially available diagnostic tests;
- The need to use in-house tests and reagents that need to be constantly verified and validated;
- The need to provide assistance to the new European laboratories that are being built;
- The need to establish a common strategy to provide diagnostic assistance to European countries that do not have such costly facilities.

EuroNet-P4 and ENP4-Lab: Aims

Aims 2005-2007

- Development of a network of the existing P4 laboratories in Europe;
- Improvement of diagnostic capabilities;
- Training, communication, service availability;
- Cooperation with other EC-funded networks and international activities.

Aims 2007-2010

- Harmonisation of biosafety procedures;
- Harmonisation of diagnostic procedures through External Quality Assurance exercises;
- Feasibility study on the implementation of a mobile laboratory for outbreak investigations in or outside Europe.

Euronet-P4: Results

Euronet-P4

- Web Site with public and restricted access areas (www.euronetp4.com)
- Cooperation Agreement for sharing information, procedures, diagnostic samples and personnel for training
- Collection and evaluation of protocols for diagnostic procedures for risk group-4 agents
- Review of biosafety procedures in P4 labs
- Definition of minimum training requirements for staff

EUP4-Lab

- Lists of existing European P4 laboratories and experts associated with each laboratory and diagnostic capabilities, constantly updated and available on the project's web site.
- Developing of a biosafety and biosecurity checklist, to be used to perform internal and external biosafety audits.
- External Quality Assurance exercises for the diagnosis of Arenaviruses, Orthopoxviruses, Filoviruses, and Nipah, Hendra, and CCHF viruses.
- Feasibility study for establishing a European mobile laboratory, including cost estimates and definition of a road map.

European Training in Infectious Diseases Emergencies

3 year project: 1/10/2006 to 30/09/2009

Involving 8 institutions

1. INMI “L. Spallanzani”
2. Azienda Ospedaliera e Azienda ULSS di Padova, [Italy](#)
3. Royal Free Hospital, [UK](#)
4. Health Protection Agency, [UK](#)
5. Hellenic Centre for Infectious Disease Control, [Greece](#)
6. Johann Wolfgang Goethe – Universitaet, Stadt Frankfurt am Main, [Germany](#)
7. National Board of Health & Welfare, [Sweden](#)
8. INSERM, [France](#)

ETIDE: Objectives

- To: produce and deliver a train-the-trainers programme
- Target: front-line health professionals (clinicians, nurses and other HCW, laboratorians)
- For: recognition and management of infectious disease emergencies
- To: enhance European capacity to recognise and respond effectively and in a coordinated fashion to any infectious disease emergency

- The full course lasts for 5 days
 - 1 day for the interdisciplinary foundation module,
 - 3 days each for the specialist modules,
 - 1 day for interdisciplinary scenario simulation module;
- Delivered at the National Institute for Infectious Diseases, L. Spallanzani, Rome;
- 5 courses delivered:
 - January 2008 (pilot course)
 - May 2008
 - November 2008
 - February 2009
 - September 2009 (initially planned in June 2009, postponed because of pandemic (H1N1))

ETIDE: interdisciplinary module (WP4),

- Major Incident Management
- Risk Communication
- Syndromic Presentation
- Principle of infection control and transmission;
- Sample collection, handling and transport;
- Diagnostic procedures;

ETIDE: specialist training module for emergency care clinicians (WP5) and specialist training module for nurses and other HCW (WP6)

- Advanced incident management
- Syndromic presentation and basic clinical management
- Principles of infection control and transmission prevention
- Psychological effects
- Communication skills

ETIDE: specialist training module for laboratorians (WP7)

- Hazard identification, characterisation and working practices
- Biosafety containment response strategies
- Make safe
- European legal framework
- Laboratory detection strategies
- Practical sessions
- Preparation of training programme by candidates
- BW detection strategies

ETIDE: interdisciplinary scenario training module (WP8)

- Simulation exercise (which tests the knowledge learned in previous modules)
- Plan, implement, evaluate exercises.

- The course was open to EU/EFTA/EEA and candidate countries
- 3 candidates were invited per country, comprising of each specialism i.e. clinician; laboratorian; nurse or other health care worker
- Not more than 21 candidates per course
- Each candidate become part of ETIDE alumni, communicating through the forum on ETIDE website (www.etide.eu)
- Each candidate was expected to return to own country to deliver all/or aspects of the course to achieve overall aim

Invitations were issued to all 32 EU/EFTA/EEA and candidate countries. By the end of the project 101 people from 25 different countries have been trained.

ATTENDEES PER EU/EEA/EFTA & CANDIDATE COUNTRIES

Austria	2	Poland	2
Czech Republic	2	Romania	2
Estonia	3	Slovak Republic	2
France	6	Slovenia	2
Germany	17	Spain	1
Greece	3	Sweden	4
Hungary	4	United Kingdom	6
Irish Republic	1		
Italy	8	Turkey	1
Lithuania	5	Norway	3
Malta	6	Switzerland	1
The Netherlands	1		

ATTENDEES FROM COUNTRIES OUTSIDE EU/EEA/EFTA

Moldovo	4
Kosovo	4
New Zealand	1

WHO attendees 7

EU/EEA/EFTA & Candidate Countries not attended

<i>EU Countries</i>	Latvia
Belgium	Luxembourg & Portugal
Bulgaria	<i>EEA/EFTA/Candidate Countries</i>
Cyprus	Croatia
Denmark	The Former Yugoslavian Republic of Macedonia
Finland	Iceland

Reasons for countries not attending

Country	Reason
Belgium	Invitation sent to Belgium through HSC & National Bulletin Advertising; no reply
Bulgaria	As above; no reply
Cyprus	As above; no reply
Denmark	As above – reply rec'd...felt no suitable candidates
Finland	As above – no reply
Latvia	As above. Invitations sent to 2 institutions – no reply
Luxembourg	Invitation sent to Health Security Committee – no reply
Portugal	2 candidates (nurses) nominated for last course- withdrew
Croatia	No communication
Macedonia	No communication
Iceland	Interest expressed but difficulties finding suitable candidates

Breakdown of Specialities by Country

<i>Country</i>	<i>Emergency Care Clinician</i>	<i>Laboratorian</i>	<i>Nurse/other HCW</i>	<i>Total</i>
Austria	2	0	0	2
Czech Republic	1	1	0	2
Estonia	1	1	1	3
France	2	3	1	6
Germany	5	5	7	17
Greece	0	1	2	3
Hungary	1	2	1	4
The Irish Republic	0	1	0	1
Italy	3	2	3	8
Lithuania	3	1	1	5
Malta	2	1	3	6
The Netherlands	0	1	0	1
Poland	1	1	0	2

Continued.....

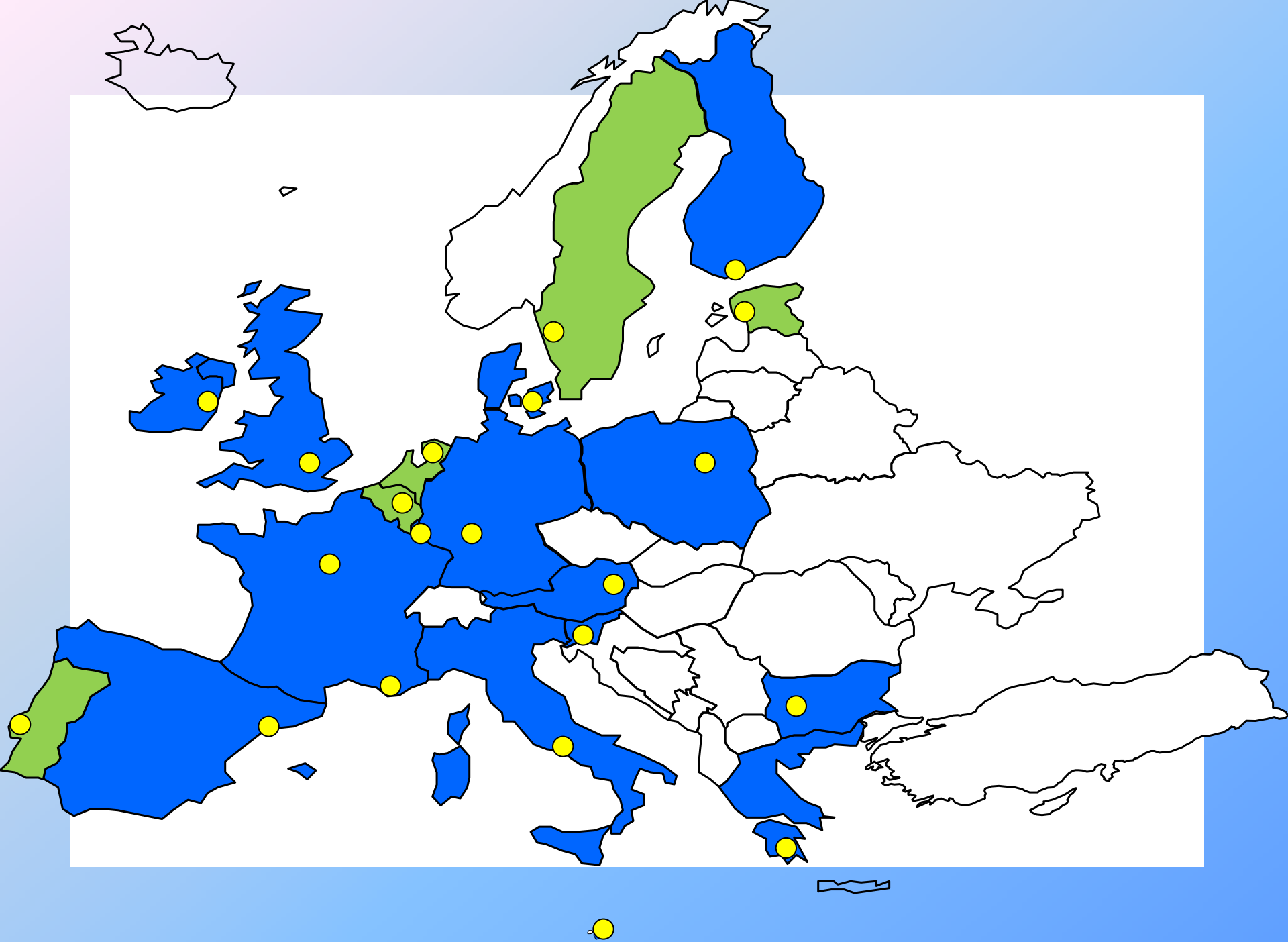
Country	Emergency Care Clinician	Laboratorian	Nurses/other HCW	Total
Romania	1	0	1	2
Slovak Republic	0	1	1	2
Slovenia	1	1	0	2
Spain	0	1	0	1
Sweden	1	1	2	4
United Kingdom	3	3	3	6
Turkey	1	0	0	1
Norway	1	1	1	3
Switzerland	0	1	0	1
Moldova	3	1	0	4
Kosovo	1	1	2	4
New Zealand	1	0	0	1

ALL DELIVERABLES COMPLETED

Deliverable	
1	Common European Curriculum on infectious disease emergency management (IDEM)
2	Interdisciplinary foundation IDEM training module
3	Specialist IDEM training module for emergency care clinicians
4	Specialist IDEM training module for emergency care nurses & other HCW
5	Specialist IDEM training module for laboratorians
6	Interdisciplinary IDEM training on simulation planning and evaluation
7	Criteria for selection of 'trainee' trainers for ETIDE onsite train-the-trainers course
8	Train-the-trainers course in IDEM on-site at INMI, Rome
9	Evaluation report of on-site IDEM train-the-trainers course
10	Certification of first tranche of European trainers in IDEM
11	Creation and maintenance of ETIDE website
12	Progress reports from ETIDE trainees
13	Reports of ETIDE partners and speciality board meetings
14	2 annual technical & financial progress reports & 1 financial progress report to the Commission.

The European Networks for Infectious Diseases Clinicians

- **EUNID** (European Network of Infectious Diseases, Jun 2004 – Jun 2007)
- **EURONHID** (European Network of Highly Infectious Diseases, Jul 2007 – Jun 2010)
- 20 Countries: Austria, **Belgium**, **Bulgaria**, Denmark, **Estonia**, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, **the Netherlands**, **Malta**, **Portugal**, **Poland**, **Slovenia**, Spain, **Sweden**, and the UK.



Main aims:

- To co-operation and exchange of information on highly infectious diseases (HIDs) among ID clinicians, epidemiologists and public health experts;
- Create a functioning network of High Level Isolation Units / Referral Centres for the management of HIDs in Europa;
- To enhance preparedness and response within Europe to health threats from HIDs.

Exchange of data, personnell and experiences



- Agreement on definition of Highly Infectious Diseases (available on web-site)
- Archive of national guidelines on isolation and management of patients with Highly Infectious Diseases from all the participating countries (available on web-site)
- Inventory of availability and features of High Isolation Units in participating countries, including Intensive Care capabilities (published on Journal of Hospital Infections)

- Definition of requirements for operation and management for High Level Isolation Units (published on Lancet ID)
- Definition of correct procedures for the donning and removal of PPE in HIUs (available on web-site)
- Definition of a core-curriculum for the infectious disease clinicians involved in the management of patients with HIDs, and development of training modules (published on EuroSurveillance)
- Definition of criteria for patients admission in HIUs and development of consensus agreement on the management of some medical procedures in patients with HIDs (published on Lancet ID)

Main limits of EUNID project

- Lack of collaboration by National Authorities;
- Difficult to overcome National Authorities indications/guidelines;
- Lack of external validation (self-reference results);
- Use of personal, not-official, contacts;
- Difficulties in applicability.

From Eunid to EuroNHID

- From consensus (theoretical) to applicability (practical);
- On-the-field survey of hospital capabilities;
- Real-life assessment

European Network for Highly Infectious Diseases

- 3-year-long project;
- From July 2007 to July 2010
- Re-enforcing and continuing EUNID work

EuroNHID Coordination Team

- Dr. Giuseppe Ippolito (Project leader, Italy)
- Dr. Vincenzo Puro (Scientific Coordinator, Italy)
- Dr. Francesco Maria Fusco (Project Coordinator, Italy)
- Ms. Ramona Iacovino (Project Secretary, Italy)

EuroNHID Steering Committee

- Barbara Bannister (UK, Collaborator: Gail Thomson)
- Hans-Reinhard Brodt / Renè Gottschalk (Germany, Collaborator: Stefan Schilling)
- Philippe Brouqui (France, Collaborator: ?)
- Olga Adrami (Greece, Collaborator: Helena Maltezou)

General Structure of the Project

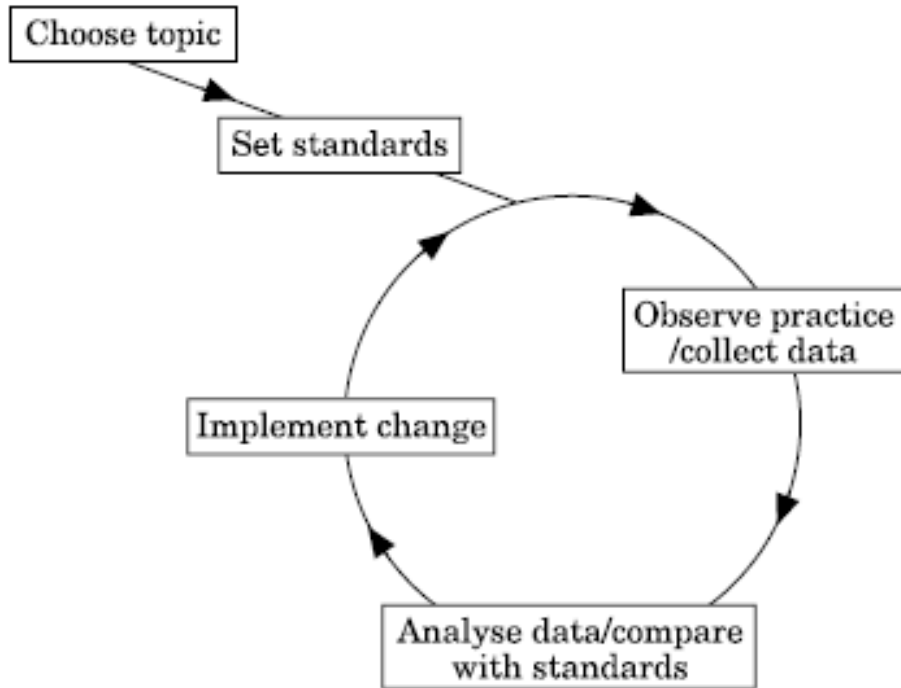


Figure 1 The audit cycle.

Standard: a required level of performance
Criteria: a systematically developed statement that can be used to assess the appropriateness of specific healthcare decisions, services and outcomes.

EuroNHID main aims

The mission of EuroNHID is to prepare and support target hospitals in participating countries:

- to provide appropriate infection control measures;
- to implement strategies for HCWs safety;

in the case of Infectious Diseases Emergencies (caused by naturally emerging or deliberately released agents of HIDs, or in the care of sporadic imported cases).

Which are the target hospitals?

- HLIUs/HIUs (BSL 3-4 Units), if any;
- In general: Referral Units for HIDs.

It means: the hospitals identified/authorized by National Authorities to provide care to patients with HIDs

According to data collected, 46 surveys in 15 countries are planned.

EuroNHID specific objectives 1

Development of checklists - 1

The first objective of the project is the development of specifically designed, evidence-based (if possible) checklists to assess current hospital capabilities on resources, infection control policies and HCW safety in the management of patients with HIDs.

EuroNHID specific objectives 1

Development of checklists - 2

A “networking strategy” has been adopted in order to develop the checklists:

- topics and items to be explored were selected during a Steering Committee meeting;
- the list of selected topics and items was approved from all national representatives;
- Each main topic had been attributed to a Steering Committee member with specific expertise, who drafted a preliminary checklist and sent it to all participants;
- Advanced checklists versions were developed in order to incorporate comments, suggestions and additional evidence;
- A final agreement had been reached during a general meeting.

EuroNHID specific objectives 1

Development of checklists - 3

Checklist 1 (hospital resources) explores:

- infrastructure issues (including location, capacity and specific infrastructures),
- technical issues (including technical infrastructures, control and maintenance issues, availability of medical equipments, diagnostic capability),
- personnel availability (including composition of staff and timeframe),
- an optional section on the infection control in Emergency Department / Medical Admission Department.

EuroNHID specific objectives 1

Development of checklists - 4

Checklist 2 (hospital procedures) explores:

- administrative aspects,
- management of PPE (including selection, donning and removal procedures, and supplying),
- hand hygiene (including specific procedures and existence of adequate technical features),
- prevention of needle-stick injuries (including existence of adequate devices),
- transportation of patients (including logistic and technical issues),
- routine hygiene and disinfection,
- waste management (including logistic and technical features),
- post-mortem procedures,
- surge capacity procedures.

EuroNHID specific objectives 1

Development of checklists - 2

Checklist 3 (HCWs safety) explores:

- organizational and administrative aspects of HCWs safety (including services available, procedures of assessment of safety culture and climate),
- medical aspects of HCWs safety (including prevention issues and post-exposure management),
- education and training of HCWs.

EuroNHID specific objectives 2

Survey in selected centres

- The survey is conducted by each partner (or their collaborators) in their own centre and by Project Coordinator in the other selected centres in the country;
- Until now 41 survey (on 46 planned) have been performed (tomorrow 42).

EuroNHID specific objectives 3

Data analysis and proposal for the improving - 1

- Private feedback will be provided to each surveyed centre , in order to
 - identify lessons that might be learned,
 - perform a spotting of critical points emerged;
- Finally, a Final Report will be developed, as a practical guide to handle different aspects in the management of highly infectious diseases in the hospital settings. The final report will not include data on specific centres.

EuroNHID specific objectives 3

Data analysis and proposal for the improving - 2

Final aims:

- To provide to EU Commission a comparative review of national capabilities and policies in the hospital management of HIDs;
- The Report could be used by Health Authorities and Hospital Administrators for the implementation and update of Country hospital capability.

Dissemination of results

- Articles on peer-reviewed journals and epidemiological bulletins
- Posters and communications at international meetings
- Web site (www.eunid.eu)

A CORE CURRICULUM FOR HEALTH CARE WORKERS ON TRAINING IN MANAGEMENT OF HIGHLY INFECTIOUS DISEASES

A. Baka¹, F.M. Fusco², V. Puro², N. Vetter³, P. Skinhoj⁴, K. Ott⁵, H. Siikamakii⁶, H.R. Brodt⁷, P. Follin⁸, B. Bannister⁹, G. De Carlis⁹, C. Nisii⁹, J. Heptonstall¹⁰, G. Ippolito²

¹Hellenic Center for Infectious Disease Control, Athens, Greece, ²National Institute for Infectious Diseases L. Spallanzani, Rome, Italy, ³Otto-Wagner-Spital, Wien, Austria, ⁴Rigshospitalet, Copenhagen, Denmark, ⁵West Tallinn Central Hospital, Tallinn, Estonia, ⁶Helsinki University Central Hospital, Helsinki, Finland, ⁷Klinikum der Johann Wolfgang Goethe Universitaet, Frankfurt, Germany, ⁸Swedish Institute for Infectious Disease Control, Stockholm, Sweden, ⁹Royal Free Hospital, London, United Kingdom, ¹⁰Scarborough and North East Yorkshire NHS Trust, Scarborough, United Kingdom

Review

Framework for the design and operation of high-level isolation units: consensus of the European Network of Infectious Diseases

Barbara Bannister, Vincenzo Puro, Francesco Maria Fusco, Julia Heptonstall, Giuseppe Ippolito, for the EUNID Working Group*

Review

D-08-00386R1
51473-3099(09)70070-2

Infection control in the management of highly pathogenic infectious diseases: consensus of the European Network of Infectious Disease

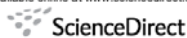
Philippe Brouqui, Vincenzo Puro, Francesco M Fusco, Barbara Bannister, Stephan Schilling, Per Follin, René Gottschalk, Robert Hemmer, Helena C Maltezou, Kristi Ott, Renaat Peleman, Christian Perronne, Gerard Sheehan, Heli Siikamakii, Peter Skinhoj, Giuseppe Ippolito, for the EUNID Working Group*

Emerg Infect Dis 2009

Journal of Hospital Infection (2009) 73, 15–23



Available online at www.sciencedirect.com



www.elsevierhealth.com/journals/jhin

Isolation rooms for highly infectious diseases: an inventory of capabilities in European countries

F.M. Fusco^{a,*}, V. Puro^a, A. Baka^b, B. Bannister^c, H.-R. Brodt^d, P. Brouqui^e, P. Follin^f, I.E. Gjørup^g, R. Gottschalk^h, R. Hemmerⁱ, I.M. Hoepelman^j, B. Jarhall^k, K. Kutsar^k, S. Lanini^a, O. Lyytikäinen^l, H.C. Maltezou^m, K. Mansinhoⁿ, M.C. Marti^o, K. Ott^p, R. Peleman^q, C. Perronne^r, G. Sheehan^s, H. Siikamakii^t, P. Skinhoj^u, A. Trilla^v, N. Vetter^w, G. Ippolito^a

Dissemination of results

- A special issue of Clinical Microbiology and Infections has been completely dedicated to HIDs, with several articles dedicated to our projects



EDITORIAL

10.1111/j.1469-0691.2009.02942.x

What will 21st-century hospitals for the care of patients with highly infectious diseases look like?

REVIEW

10.1111/j.1469-0691.2009.02873.x

Facing highly infectious diseases: new trends and current concepts

REVIEW

10.1111/j.1469-0691.2009.02876.x

Facing the threat of highly infectious diseases in Europe: the need for a networking approach

REVIEW

10.1111/j.1469-0691.2009.02874.x

EuroNHID checklists for the assessment of high-level isolation units and referral centres for highly infectious diseases: results from the pilot phase of a European survey

OVERVIEW

10.1111/j.1469-0691.2009.02871.x

REVIEW

10.1111/j.1469-0691.2009.02946.x

The European network of Biosafety-Level-4 laboratories: enhancing European preparedness for new health threats

European concepts for the domestic transport of highly infectious patients

OVERVIEW

10.1111/j.1469-0691.2009.02872.x

Training health care workers to face highly infectious diseases

Added value for the Community - 1

- To enhance European capacity to recognize and respond effectively and in a coordinated fashion to infectious disease emergencies;
- To use experts in infectious diseases, infection control, microbiology, risk communication, psychology, and education and training to develop a common European framework for the first-line management of infectious disease emergencies;
- To disseminate the knowledge and the “know how” in the management of HIDs;
- To improve communication, understanding each other’s needs or problems.

Added value for the Community - 2

In conclusion, we established networks of people who have discussed and put together common ways of dealing with highly infectious diseases, we create a group of professionals who know each other personally, know how to communicate with one another, and will interact more efficiently in case of a future emergency.

By speeding up our response, we protect the population within the EC.



www.etide.eu

www.eunid.eu

www.euronetp4.eu

Thank you!