



# TECHNICAL DOCUMENT

## CORE COMPETENCIES

for public health epidemiologists working in the area of communicable disease surveillance and response, in the European Union

Stockholm, January 2008



**TABLE OF CONTENTS**

Background ..... 2

    What are the core competencies? ..... 2

        Definition of competency ..... 2

        Definition of core competency ..... 2

    What this list 'is not' ..... 3

    Use and users ..... 3

    Development process ..... 3

        Literature review and first draft ..... 3

        Expert meeting and review ..... 4

        Review by the Advisory Forum working group of the preparedness and response unit ..... 4

        Web-based review ..... 4

    List of core competencies ..... 6

    Acknowledgements ..... 6

    References ..... 6

Appendix A: List of Core Competencies for field epidemiologists in the PH administrations of the European Union, grouped by categories and domains ..... 7

    1. Areas specific for the profession ..... 8

        1.1. Public Health ..... 8

        1.2. Applied Epidemiology ..... 8

    2. General areas, common to other professions ..... 10

        2.1. Biostatistics ..... 10

        2.2. Informatics ..... 10

        2.3. Communication ..... 10

        2.4. Management ..... 11

        2.5. Capacity development ..... 12

        2.6. Ethics ..... 12



Core competencies for public health epidemiologists working in the area of communicable disease surveillance and response, in the European Union

## BACKGROUND

The European Centre for Disease Control (ECDC) founding regulation, in article 9, details the Centre's role in providing training: 'The Centre shall, as appropriate, support and coordinate training programmes in order to assist Member States (MS) and the Commission to have sufficient numbers of trained specialists, in particular in epidemiological surveillance and field investigations, and to have a capability to define health measures to control disease outbreaks'.

One priority identified during the first consultation with the MS for a training strategy for intervention epidemiology in Europe, held in 2005 in Stockholm, was the development of core competencies for field epidemiologists in the European Union (EU).

ECDC, along with a group of experts (core competencies group) has developed a list of suggested core competencies for field epidemiologists working at all the levels from sub-national (provinces, districts, regions) to national and supra-national (European and international) in the public health administrations of the EU.

There are other areas where ECDC does 'capacity building through training': Assessment of epidemiological capacity and training resources and needs in the MS of the EU; Organisation of short training modules for EU/European Economic Area (EEA) MS; Integration of the European Programme for Intervention Epidemiology Training (EPIET) into the Centre.

## What are the core competencies?

### Definition of competency

A competency is a combination of knowledge, skills and abilities that a professional must demonstrate and that are critical to perform work effectively.

### Definition of core competency

Core competencies listed in this document are defined for mid career professionals, as opposed to junior or senior epidemiologists.

Mid career was defined as related to three years of experience in the area or after one two-year training programme of field epidemiology. The professional profile would be that of a unit supervisor for surveillance or preparedness and response activities. Despite the risk of creating artificial categories, this approach is taken to facilitate the process.

The term 'core' indicates that the competencies should be a minimum pre-requisite for all field epidemiologists, regardless of the administrative level (international, national, sub-national, local, etc) he/she occupies in the public health system. They should be common to all professionals in this field.

This list is of 'workforce' versus 'instructional' competencies.

Sub-competencies may be developed in the future, to facilitate curriculum development.

## What this list 'is not'

This list is not a regulatory document, or a definite text, or a curriculum ready to be used.

## Use and users

The list of core competencies is intended to be used as a reference document for different institutions and individuals related to public health in the countries of the EU.

It will be updated periodically and in collaboration with the potential users (Public Health Institutes in the EU, training programmes, etc).

They should also be an important tool during the assessments done in the country visits, to identify areas of work or expertise that should be strengthened.

Important uses include:

- Evaluation of trainees: for recruitment and later, to assess their status in the learning process as achievements against competencies. Sub-competencies, considered as the ability to perform specific tasks, may be more suitable for this purpose.
- Curriculum development and instructional design.
- Accreditation of training programmes: competencies and curricula of training programmes should be assessed as part of any accreditation process.

Potential users are not only public health institutes and training programmes, but also professionals and trainees, individually. They are needed for the recognition of the profession, increasing the comparability of job descriptions.

## Development process

### Literature review and first draft

In 2006, ECDC reviewed several lists of competencies of field epidemiologists, as well as those of Field Epidemiology Training Programmes (FETP). Special attention was given to the list of the Indian FETP, which was developed as a means of producing an assessment tool for the trainees. The Training Programmes in Epidemiology and Public Health Interventions Network (TEPHINET) list and the list of competencies in applied epidemiology, for different tiers, of the United States Centers for Disease Control and Prevention (US CDC) in collaboration with the Council of State and Territorial Epidemiologists (CSTE) were studied in depth.

The Vademecum of the European Master of Public Health of the Association of Schools of Public Health in the European Region (ASPHER) in its Part 5: Catalogue of Potential Competencies was reviewed as a necessary reference for the domains of public health science and policy.

Regarding methodology, special attention was paid to the US CDC/CSTE process of developing core competencies in applied epidemiology and to the experience of the Jagiellonian University in Poland, as part of a Leonardo da Vinci Project. Also, the phases in the Master's Degree in Public Health Core Competency Development Project were studied.



A working paper and a first ECDC draft list was written and reviewed internally and by the EPIET coordinators and EPIET Alumnae Association (EAN) during November 2006.

### **Expert meeting and review**

The first draft list of core competencies was discussed in January 2007 by 18 experts from 15 different institutions, including Institutes of Public Health surveillance in the EU, the European Public Health Association (EUPHA), several FETP from EU countries and abroad, the EPIET, the EAN, the US CDC, TEPHINET, ASPHER and the World Health Organization (WHO). The complete report of this meeting can be found at <http://ecdc.europa.eu/Activities/Training.html>.

Differences by administrative levels (national, sub-national, local, etc) were only considered when exploring the tasks to be performed and to identify the intersection among them, because the core competencies are those needed to perform the job on any of the levels. In working groups, the experts conducted a critical review of each of the core competencies, using also list of 'Applied epidemiology competencies for governmental public health agencies', of the US CDC/CSTE, and particularly those for the 'tier 2: Mid-level epidemiologist'.

After the meeting and taking into consideration the discussion conducted in working groups, it was decided that the first draft list should be updated. A structured questionnaire was sent out to all the experts by e-mail. All the categories, areas and domains, as well as the list of competencies were presented. All the experts were invited to give general comments on the structure. For each of the competencies they would choose to: (1) accept it without changes; (2) accept it with changes or edits that should be specified or (3) delete it. For each domain it was also possible to propose additional competencies.

### **Review by the Advisory Forum working group of the preparedness and response unit**

After collecting all the conclusions in the Expert Meeting of January, the activity was presented briefly to the AF working group of PRU in May 2007, who was invited to review the list, using the same questionnaire.

### **Web-based review**

In July and August 2007, a survey was posted on the ECDC website and was open to all the professionals in the area of epidemiology in communicable diseases surveillance and response of the EU wishing to participate. Employers, for example the Public Health Institutes, professional associations, trainers and coordinators of epidemiology training programmes were encouraged to participate.

To increase the level of participation, a short article was published in the *Eurosurveillance* on Thursday, 2 August 2007.

The participants were characterised according to current position, sector (public administration/private company), level (region-province/national/international), number of years of experience in the current job, profession, postgraduate title, age and country of residence.



General comments were collected. Eighty five competencies were scored in this survey using a Likert scale (1 for strong disagreement, 2 for disagreement, 3 for not sure, 4 for agreement and 5 for strong agreement).

A total of 38 questionnaires were analyzed, received from public health professionals from different countries in Europe: Belgium (1), Czech Republic (1), Denmark (1), Finland (1), France (7), Germany (2), Greece (1), Hungary (1), Ireland (2), Italy (1), Norway (1), Portugal (1), Romania (2), Spain (9), Sweden (2), The Netherlands (3), United Kingdom (1) plus Croatia (1).

Twenty were graduates of an FETP, therefore can be considered specialists in applied epidemiology. Twenty eight were medical doctors and three, veterinarians. Eleven had a PhD and at least 13 have a Master's degree in public health, epidemiology or other health sciences.

Thirty four (90%) work in the administration at different levels in the EU. The median age of the respondents is 40, with a range of 27–63.

No respondent expressed disagreement with any of the 85 competencies. Strong agreement (over 4) was expressed for 67 of the proposed competencies. Considered agreement if scored over 3.5, a total of 81 could be kept in the list.

Those that scored between 3.2 and 3.4 (uncertain importance) were the following four competencies, and for the same reason, they were deleted from the list:

- Number 10 (*Apply economic methods and tools to support and evaluate decision making in health*) in the domain of 'public health policy', under the area of public health. Score= 3.2
- Number 36 (*Create a protocol for specimen collection*) in the domain of 'laboratory issues', under applied epidemiology. Score 3.2
- Number 37 (*Identify the appropriate tests needed for the diagnosis of a disease*) in the domain 'mathematical modelling', under biostatistics. Score 3.3
- Number 55 (*Use software packages for other types of data analysis (modelling, etc)*) in the domain 'statistical and other data analysis', under the area of applied informatics. Score 3.4

The final number of competencies was 80, after deleting the four for which there was a neutral position, and one that was considered redundant: Number 83 in the original list: 'Promote ethical conduct amongst colleagues', as this could probably be implicit in the rest of competencies under the area of Ethics and in Capacity Development.

Also, the consideration made by AF members about the need of including an area on infectious diseases was solved, by adding it and putting under this area the new competency, number 35: '*Be familiar with transmission dynamics of infectious diseases*'.

The results of this survey were presented and discussed in the Second ECDC Consultation with the MS of the EU on the ECDC Training Strategy on 11 and 12 September 2007, in Stockholm, and to the ECDC AF of 13 and 14 September 2007.



## List of core competencies

After all the development process, the table of categories, areas and domains and the list of proposed competencies, is included in Appendix A. ECDC wishes to use this list as an assessment tool for specific training needs in the countries of the EU that can be applied in country visits, surveys, etc.

General competencies that belong to other disciplines outside public health or applied epidemiology but are essential to do the job are part of the list.

## Acknowledgements

A long list of individuals and institutions has contributed to the project of development of core competencies:

- The participants in the Expert Meeting of 31 January in Stockholm (CC-group) were: Preben Aavitsland, Katharina Alpers, Nancy Binkin, Jeanette de Boer, Arnold Bosman, Luca Busani, Katarzyna Czabanowska, Denis Coulombier, Ruth Gelletlie, Brigitte Helynck, Yvan Hutin, Denise Koo, James Stuart, Alena Petrakova, Lara Payne, Zoltan Voko, Marta Valenciano and Carmen Varela.
- Special thanks to the working group of Preparedness and Response in the AF that has contributed to the review.
- Also, thanks to all those that distributed the survey to different professional associations and networks in the EU and to all those that have contributed anonymously.
- And to other professionals of public health institutions that have helped or provided ideas and concepts during this exercise, through direct contact with ECDC or by discussions with the experts.

## References

- Regulation (EC) No 851/2004 of the Parliament and of the Council, establishing a European Centre for Disease Prevention and Control  
[http://ecdc.europa.eu/About\\_us/Key\\_Documents/ecdc\\_regulations.pdf](http://ecdc.europa.eu/About_us/Key_Documents/ecdc_regulations.pdf)
- Meeting Report: Consultation with the MS about an ECDC Training Strategy, Dec 2005, Available from <http://ecdc.europa.eu/Activities/Training.html>
- Meeting Report: Core competencies of epidemiology in the area of communicable disease surveillance and response in the EU, 1st ECDC expert meeting, Stockholm, 31 January 2007. Available from <http://ecdc.europa.eu/Activities/Training.html>
- Miner K, Childers W, Alperin M, Hunt N; The MACH Model: From Competencies to Instruction and Performance of the Public Health Workforce, Public Health Reports 2005 SUPPLEMENT 1 / Volume 120. [http://www.publichealthreports.org/userfiles/120\\_SUP1/120009sup.pdf](http://www.publichealthreports.org/userfiles/120_SUP1/120009sup.pdf)
- Varela C, Coulombier D. Defining core competencies for epidemiologists working in communicable disease surveillance and response in the public health administrations of the European Union. *Eurosurveillance* 2007;12(8):E070802.2. Available from: <http://www.eurosurveillance.org/ew/2007/070802.asp#2>

## APPENDIX A: LIST OF CORE COMPETENCIES FOR FIELD EPIDEMIOLOGISTS IN THE PH ADMINISTRATIONS OF THE EUROPEAN UNION, GROUPED BY CATEGORIES AND DOMAINS

**Table 1: Areas and domains in public health epidemiology**

Category	Area	Domain
Specific for the profession	Public health	1. Public health science
		2. Public health policy
	Applied Epidemiology	3. Risk assessment
		4. Public health surveillance
		5. Outbreak investigation
		6. Epidemiological studies
		7. Infectious diseases
		8. Laboratory issues
		9. Public health guidance
Common to other professions	Biostatistics	10. Probability
		11. Inferential statistics
		12. Sampling
	Applied Informatics	13. Internet
		14. Statistical and other data analysis
		15. Editing and presentations
	Communication	16. Risk communication
		17. Written communication
		18. Oral communication
		19. Use of new technologies
	Management	20. Planning and use of resources
		21. Team building and negotiation
	Capacity development	22. Mentorship
		23. Training
	Ethics	24. Protection of individuals
25. Confidentiality		
26. Conflicts of interests		



## **1. Areas specific for the profession**

### **1.1. Public Health**

#### ***Domain 1.1.1.: Public health science***

1. Use current knowledge of epidemiology of diseases to guide public health or epidemiological practice
2. Provide epidemiological input to develop measurable relevant objectives of public health programmes
3. Use knowledge of specific sociological and cultural factors in the population to conduct studies and recommend public health actions relevant for the affected community

#### ***Domain 1.1.2.: Public health policy***

4. Understand and analyse legal public health policy documents at local, national and European level
5. Use epidemiological findings to plan public health programmes
6. Implement public health programmes: translate policy into public health practice
7. Identify effective health promotion measures for specific problems
8. Identify appropriate health prevention measures for specific problems
9. Evaluate the impact of an intervention on population health
10. Measure health outcomes to guide decision making in prevention strategy
11. Use evaluation results of programme progress towards objectives and outcomes in further programme planning and modification
12. Identify an appropriate public health intervention based on surveillance data

### **1.2. Applied Epidemiology**

#### ***Domain 1.2.1.: Risk Assessment***

13. Identify sources of information about potential public health threats
14. Conduct risk assessments: verify, using critical thinking, if a public health problem exists and describe its magnitude
15. Identify surveillance data needs for risk assessments of public health threats

#### ***Domain 1.2.2.: Public health surveillance***

16. Run a surveillance system
17. Conduct surveillance data management
18. Perform descriptive analysis of surveillance data
19. Interpret disease and public health events trends from time series analysis

20. Identify key findings from surveillance data analysis and draw conclusions
21. Evaluate surveillance systems
22. Recognise the need for and set up a new surveillance system
23. Use event-based surveillance, also called epidemic intelligence, to detect health threats
24. Be familiar with laws on surveillance and reporting of communicable diseases at national, EU level and globally (International Health Regulations)

***Domain 1.2.3.: Outbreak investigation***

25. Create a case definition and adjust it as necessary during the investigation
26. Describe the outbreak in terms of person, place and time
27. Generate hypothesis about the cause and/or risk factors of the outbreak
28. Conduct analytical epidemiological investigation to identify the source
29. Recommend appropriate evidence based measures to control the outbreak
30. Report and present results of an investigation

***Domain 1.2.4.: Epidemiological studies***

31. Write a study protocol using investigation techniques consistent with the public health problem
32. Conduct epidemiological studies
33. Report and present results of a study
34. Recommend evidence-based interventions in response to epidemiological findings

***Domain 1.2.5.: Infectious diseases***

35. Be familiar with transmission dynamics of infectious diseases

***Domain 1.2.6.: Laboratory issues***

36. Interpret the diagnostic and epidemiological significance of reports from laboratory tests
37. Be familiar with different methods for diagnosis and typing, including molecular tests
38. Communicate effectively with the laboratory team

***Domain 1.2.7.: Public health guidance***

39. Identify, review and assess relevant literature and other evidence
40. Develop evidence based guidelines for surveillance, prevention and control of communicable diseases and other acute public health events
41. Identify appropriate target groups for guidelines



## **2. General areas, common to other professions**

### **2.1. Biostatistics**

#### ***Domain 2.1.1.: Probability***

- 42. Apply basic concepts of probability

#### ***Domain 2.1.2.: Inferential statistics***

- 43. Calculate and interpret point estimates and confidence intervals of measures of central tendency and dispersion
- 44. Calculate and interpret point estimates and confidence intervals of measures of disease frequency
- 45. Calculate and interpret point estimates and confidence intervals of measures of association and impact
- 46. Calculate and interpret significance tests

#### ***Domain 2.1.3.: Sampling***

- 47. Select an appropriate sampling strategy

### **2.2. Informatics**

#### ***Domain 2.2.1.: Internet***

- 48. Use internet sources to conduct literature search
- 49. Use web-enabled databases

#### ***Domain 2.2.2.: Statistical and other data analysis***

- 50. Use database software packages for entering and managing data
- 51. Use software packages for statistical analysis (measures of association, testing, and logistic regression)
- 52. Draw conclusions from the results of analysis

#### ***Domain 2.2.3.: Editing and presentations***

- 53. Use software for writing, editing and creating presentations

### **2.3. Communication**

#### ***Domain 2.3.1.: Risk communication***

- 54. Apply the basic principles of risk communication, adjusting the message when presenting results of an investigation to different audiences: media, general public, professionals and policy makers

***Domain 2.3.2.: Written communication***

55. Write a report of an epidemiological investigation for decision makers
56. Write an article for a scientific journal
57. Write an abstract
58. Write a press release
59. Produce documents, reports, letters, meeting minutes, etc

***Domain 2.3.3.: Oral communication***

60. Incorporate interpersonal skills in communication with colleagues and with the other audiences
61. Analyse and synthesise main points in a speech
62. Provide objective feedback (descriptive, rather than judgemental)

***Domain 2.3.4.: Use of new communication technologies***

63. Use communication technologies (videoconference, teleconference, e-mail, etc.) effectively

**2.4. Management**

***Domain 2.4.1.: Planning and use of resources***

64. Plan, prioritise and schedule tasks in a project
65. Monitor progress and quality against specific targets, adjust schedules and make changes if necessary
66. Manage available resources (staff, time, budget, etc) effectively
67. Conduct epidemiological activities within the financial and operational planning context
68. Prepare an activity report

***Domain 2.4.2.: Team building and negotiation***

69. Be an effective team member, adopting the role needed to contribute constructively to the accomplishment of tasks by the group (including leadership)
70. Promote collaborations, partnerships and team building to accomplish epidemiology programme objectives
71. Develop community partnerships to support epidemiological investigations
72. Mutually identify those interests that are shared, opposed or different with the other party to achieve good collaborations and conflict management



## **2.5. Capacity development**

### ***Domain 2.5.1.: Mentorship***

- 73. Mentor peers or junior epidemiologists
- 74. Assist others to clarify thinking, create consensus, and develop ideas into actionable plans

### ***Domain 2.5.2.: Training***

- 75. Train junior epidemiologists

## **2.6. Ethics**

### ***Domain 2.6.1.: Protection of individuals***

- 76. Respect and adhere to ethical principles regarding human welfare
- 77. Follow ethics principles and guidelines for planning studies, conducting research, and collecting disseminating and using data
- 78. Apply relevant laws to data collection, management, dissemination and use of information

### ***Domain 2.6.2.: Confidentiality***

- 79. Respect and adhere to ethical principles regarding data protection and confidentiality regarding any information obtained as part of the professional activity

### ***Domain 2.6.3.: Conflicts of interests***

- 80. Handle conflicts of interests