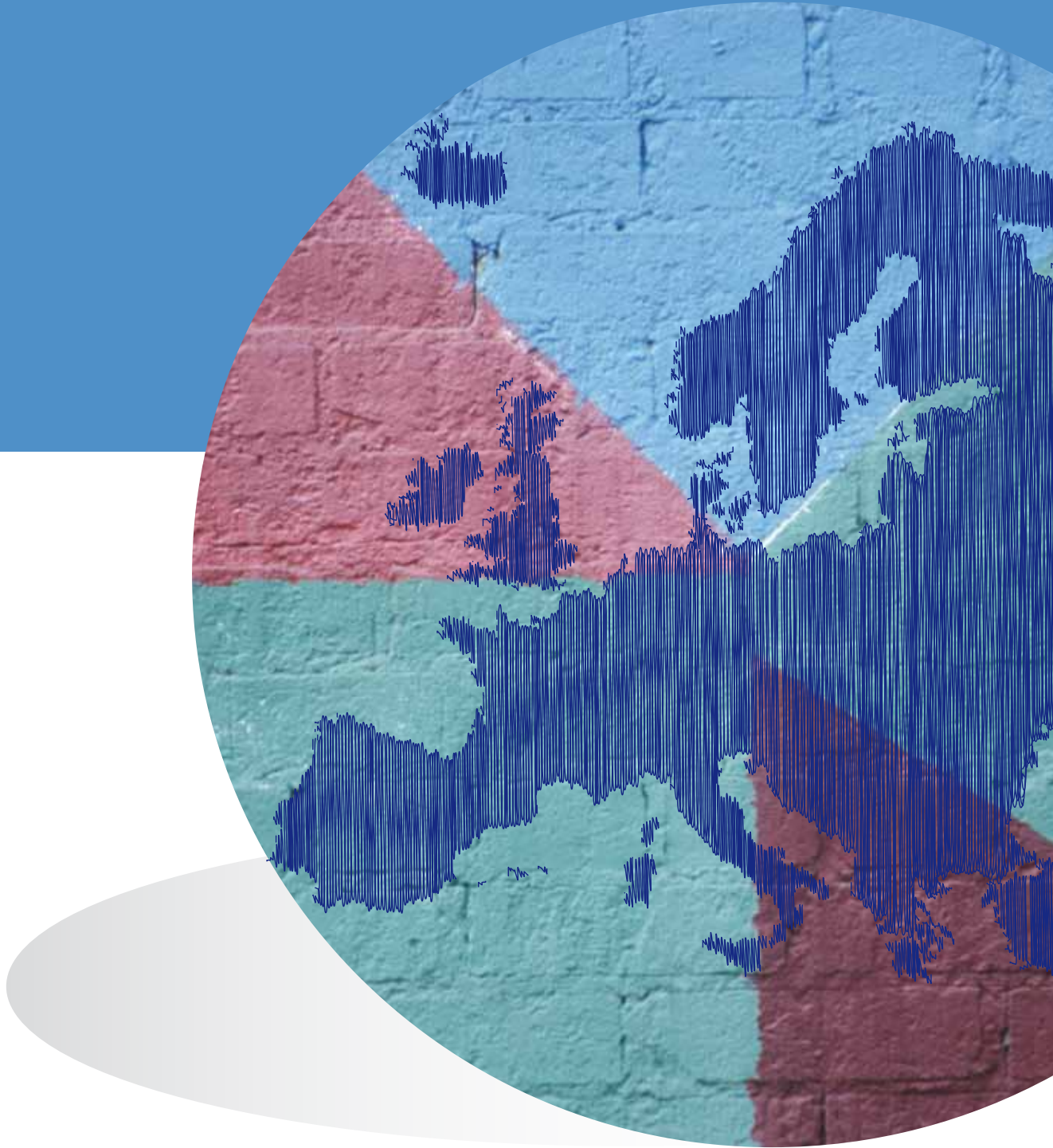


National Public Health Institutes

European perspective

REPORT



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NATIONAL PUBLIC HEALTH INSTITUTES

EUROPEAN PERSPECTIVE



NATIONAL INSTITUTE
FOR HEALTH AND WELFARE

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IANPHI Office:
National Public Health Institute
P.O. Box 30, FI00271 Helsinki
FINLAND

layout: Seija Puro

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FOREWORD

This document has been written as a practical tool in the work to strengthen European National Public Health Institutes (NPHIs), their network and collaboration with EU/SANCO. The background text was prepared by Jussi Huttunen and Pekka Puska, with the aid of some IANPHI documents. The text was modified and endorsed by an editorial group of directors of European NPHIs: Reinhard Burger (Germany), Justin McCracken (UK), Jose Pereira Miguel (Portugal), Pekka Puska (Finland), Marija Seljak (Slovenia), Geir Stene-Larsen (Norway), Sarah Wamala (Sweden) and Jane Wilde (Ireland). The editorial group is grateful to the National Institute for Health and Welfare (THL) in Finland for printing the document.

INTRODUCTION

Public health policies aim to maintain and improve the health of citizens, and reduce health inequalities. It is essential that these policies are based on scientific information about health and disease and evidence of effectiveness. Many countries have established scientific organizations to serve as a national resource to prevent and control health problems through research, monitoring, interventions, or development of programmes, strategies and policies. Increasingly countries, especially in Europe, have a national public health institute (NPHI) as the main agency to serve this purpose. This paper describes the nature and status of such national public health institutes and describes their components. It identifies actions that would increase their effectiveness in preventing disease and promoting health and wellbeing in response to new challenges in Europe and worldwide.

NPHIs are science-based organizations that serve the whole country as a source of public health expertise. In most cases they are a part of the government (usually under the Ministry of Health) or closely attached to it, but as an expert agency, with varying degrees of self direction and continuity in spite of political changes. Often the Ministry is responsible for policy, legislation, and budgets and the NPHI carries out relevant research, provides expert advice, implements public health programmes, participates in disease and risk factor monitoring and supports national health promotion and education activities.

Because they are science-based, NPHIs are a trusted source of counsel for policy and decision-makers. They are always multi-disciplinary organizations with a wide range of skill and experience which allows them to perform critical public health functions. NPHIs have the important advantage of a stable and critical mass of expertise, continuity of experience, scientific knowledge and appropriate human, technical and financial resources to tackle public health challenges. They are well placed to form the national and international partnerships that are crucial in responding to threats to public health.

HISTORICAL CONTEXT

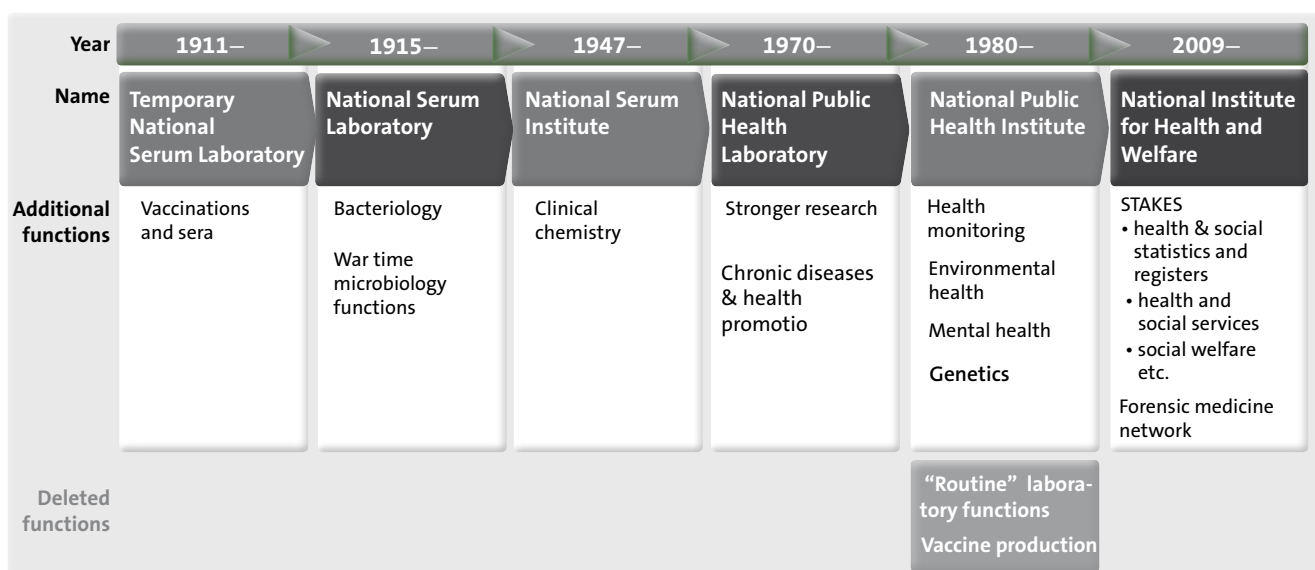
Most of the modern NPHIs have their roots in prevention and control of infectious diseases. The oldest of the institutes participating in the collaboration of NPHIs today is Brazil's Fiocruz. It was created in 1900 as the Federal Seropathy Institute to produce serums and vaccines against plague. Finland's National Institute for Health and Welfare (THL) started 11 years later as the Temporary Serum Laboratory with similar activities and responsibilities. The U.S Centers for Disease (CDC) was created from an organization called Malaria Control in War Areas; in 1946, the institute was renamed the Communicable Disease Center with expansion of its activities to include other infectious diseases.

These and other NPHIs subsequently grew to meet new public health challenges through a variety of processes, including mergers with existing institutions and programmes, extension of existing programmes into new scientific and programmatic areas and creation of new programmes through legislative and administrative decisions. The development of the Finnish National Institute of Health and Welfare from a Temporary Serum Laboratory into a comprehensive NPHI in 100 years is illustrated in Fig. 1.

Because of the historical background and the differences in administrative cultures in different countries, NPHIs vary in scope, size and nature. However, there is now convergence in development and an expanding remit from narrow infectious disease laboratory services or several smaller organizations to more comprehensive institutes. NPHIs have increasingly developed similar features, and breadth of work, as discussed in this document.

The current list (as per August 22, 2011) of the institutes participating in the collaboration of the world's NPHIs (the International Association of National Public Health Institutes; IANPHI) includes over 70 members worldwide, including 26 members in Europe. The size of the institutes ranges from a few hundred workers in the smallest ones to several thousands in the institutes in Brazil, China and the United States. The scope of the activities varies but most of the NPHIs work on infectious disease control, vital statistics, chronic disease risk factors and prevention, health promotion, environmental health and safety, and health services research. The list of European NPHIs is in Annex 1.

FIGURE 1. Evolving development over 100 year to the current National Institute for Health and Welfare (THL) in Finland



NPHI – WHY AND HOW

IANPHI has defined an NPHI as a science-based organization or network of organizations that provides national leadership and expertise to efforts to achieve substantive, long-term improvements in the public's health. The main attributes of an NPHI include: (i) national scope of influence; (ii) national recognition; (iii) limitations on political influence (linked to government but without undue political influence); (iv) scientific basis for programmes and policies; (v) focus on the major public health problems affecting the country; (vi) adequate human and financial resources; (vii) adequate infrastructure support; (viii) strong linkages and networks; and (ix) clear accountability and good governance.

The NPHI should be a key source of technical and scientific information for the Ministry of Health, legislators, and other parts of government. The Ministry of Health and other government officials and policymakers should view the NPHI as a critical resource for policy-making and establishing public health priorities and programmes. In turn, the NPHIs should advocate for scientific and other evidence to influence decision-making at all levels of government and contribute to public health leadership and related capacity building.

An NPHI should have a national scope, i.e. developing policies and interventions that affect the country widely and address the health problems of importance to the country. Although some activities might focus on one part of the population or a local issue, an NPHI must have significant impact on the health of the country as a whole. Having a national scope means being able to deliver programmes throughout the country, either through direct intervention or in collaboration with sub-national levels of the public health infrastructure. Relationships with sub-national levels are critical to monitor the health of the population, respond to health threats, support the use of best practice in developing, implementing, and evaluating programmes, and involve local decision-makers and communities.

NPHIs are not isolated from political influence. Nevertheless, the priorities of the NPHIs should be driven largely by science and data, including information about the public health needs of the country. Scientific work, data collection, analysis, and reporting should be conducted free from political influence. When political concerns significantly influence the formulation of policies and programmes, this influence should be explicit. An NPHI should have a dedicated and separate budget which is largely predictable from year to year and includes adequate funding to carry out the core NPHI functions.

The workforce of an NPHI should include individuals with a variety of expertise and skills—managerial as well as technical and scientific. An NPHI needs access to laboratories capable of using good laboratory practices and doing high-quality work, whether as part of the NPHI or in closely collaborating organizations. All laboratories should use appropriate quality assurance procedures and should include security safeguards.

An NPHI must coordinate its activities with other national organizations, including other government organizations and some that are not governmental. The NPHI of any country is part of a larger infrastructure that includes other national and sub-national organizations. At national level, other government agencies may have responsibility for aspects of the country's health. Functions such as occupational health, radiation safety, some specific laboratory tasks, food safety, medicine control, health service control or medico-legal issues may be conducted by separate agencies. Dispersion of public health functions among agencies requires extra efforts to ensure that these agencies work together. Formal and informal mechanisms are needed to create a national network of agencies with public health responsibilities.

Relationships with universities and other academic institutions are of critical importance as they provide opportunities for building the public health workforce and conducting research.

Many countries have found it useful to consult outside experts for advice about policy issues. One approach is to convene formal advisory bodies, which synthesize the scientific literature about an issue and make recommendations based on a mixture of scientific and non-scientific issues. A key task of the NPHI is knowledge translation, i.e. putting research into practice and action.

An NPHI should have clear and transparent governance arrangements and hold itself accountable to the public and should try to help the public understand the basis for its principles, policies and actions. The NPHI should be known by the population and valued for its contributions to their health and well-being. The public should have access to the NPHI's strategic plan and information about the expenditure of funds and the impact of the NPHI's work. The NPHI should make special efforts to educate and communicate with professionals working in health and health-related disciplines, as their efforts can markedly expand the NPHI's reach.

NPHIs should participate in networks with countries struggling with similar technical issues, or developing research or programmes to address specific problems. Multi-national collaborations (such as the European Centre for Disease Prevention and Control) are important in increasing the efficiency and effectiveness of NPHIs as they develop and disseminate programmes, protocols, and tools that can be used by many countries; provide opportunities for joint research; and enhance the ability to identify and respond to threats that cross national borders. NPHIs should also collaborate with the World Health Organization and its Regional Offices (e.g. WHO Regional Office for Europe in Copenhagen) in its technical programmes and support WHO's leadership in setting norms and standards; producing guidelines; developing initiatives; disseminating information; and providing forums for discussion, collaboration, and joint learning. NPHIs should support their governments and especially their Ministries of Health in preparing national positions and contributions for the European Union and WHO.

CORE FUNCTIONS OF THE NPHIs

NPHIs have varying emphasis on research, service and regulation. Some are more research oriented, while some have a predominant focus on public health functions. If service or public health functions are the primary activities, research is usually carried out to improve and support the primary functions. Combining research functions and service provision ensures a strong response capacity to any type of emergency or delivery of public health programme. A few NPHIs have academic roles and educate students enrolled in master and doctoral programmes.

Infectious diseases and environmental health

As stated earlier, infectious disease control has often been the historical basis of the NPHI and in several NPHIs it continues to form a significant part of the NPHIs work. In Europe, and increasingly elsewhere, other health problems such as non-communicable disease are crucial components of the health of the population but the national control of infectious diseases remains a key part of the NPHI and IANPHI. This work usually includes the running of national reference laboratories, infectious disease surveillance, responses to national threats, interaction and supervision of health services, advice and expert functions concerning national vaccinations and communication to the public. Several national institutes have important national functions in the area of environmental health.

Control of communicable diseases and the protection of food and water safety require well-defined strategies and effective techniques. Surveillance of infectious diseases and improvement and standardization of laboratory methods require strong technical support from central government and good collaboration between experts and primary health care and specialized care personnel. To improve quality and effect economies of scale centralization of some laboratory functions may be required.

Reference laboratory services are an important part of the infectious disease control system. As a rule NPHIs are the national counterparts of the international networks of reference laboratory organizations. A closely related activity involves accrediting and overseeing the quality control of laboratories providing routine diagnostic services in microbiology. To maintain a high level of expertise required for these functions the reference laboratories of NPHIs usually carry out active research in their respective fields.

In many countries NPHIs are responsible for the implementation of the national vaccination programme. They may produce vaccines, take care of procurement and quality control of purchased vaccines, and distribute vaccines to primary health care centres and hospitals. Monitoring of side effects, vaccination coverage and immune status of the population is an essential part of the monitoring system of communicable diseases.

Because of the international nature infectious disease epidemics NPHIs should actively participate in appropriate international networks. Within the EU, the ECDC is the central agency working with NPHIs to ensure good health protection and help harmonize national responses. Collaboration with WHO and participation in WHO networks is also an important task for NPHIs. In this respect the NPHI works very much within the framework of the International Health Regulation (IHR).

Noncommunicable disease prevention and health promotion

Public health in Europe, and in most parts of the world, is predominantly determined by a few chronic, noncommunicable diseases (NCDs). These include cardiovascular diseases, cancers, chronic respiratory diseases, diabetes and musculoskeletal diseases, as well as mental health problems (especially depression), and injury & violence.

Thus the role of NPHIs should increasingly be to help national work on the prevention and control of these diseases and their risk factors. This requires expertise and research in NCDs and the development and implementation of intervention measures, strategies and policies.

NPHIs should engage in systematic efforts to create the conditions that support healthy behaviors, often key issues for NCD prevention but also important for infectious disease control. These efforts might include informing and educating people about how to improve their health, as well as the use of legislation and regulation, environmental changes, and other approaches. As much as possible, prevention programmes and health promotion should be evidence-based.

For NCD prevention the key behavioral targets include tobacco use, alcohol consumption, dietary behaviors and physical activity. In addition, aspects of injury prevention and of preventive service use are important. NPHIs should have expertise in these areas, run national monitoring of risk factors and have partnerships and activities for population prevention.. Within the EU collaborative work on monitoring has been ongoing through the European Health Interview System (EHIS).

NPHIs should consider a range of possible partners for prevention programmes and health promotion efforts, including government and non-government organizations, healthcare workers, and community leaders. An NPHI may develop initiatives and support other organizers in designing or evaluation of health promotion activity in critical areas (e.g. smoking, alcohol abuse, exercise etc.) at national or local level. An NPHI may carry out pilot or demonstration projects that subsequently lead to a campaign or permanent programmes organized by other actors, e.g. the governmental health education office, various non-governmental organizations or local authorities.

In this work the NPHIs should, in addition to its close contacts with the Ministry of Health, work closely with other government agencies and other stakeholders, since successful prevention and control of NCDs call for attention to “Health in All Policies (HiAP)”.

Health Inequalities and the social determinants of health

Although health has improved greatly for many people in Europe there are major inequalities in health status and life expectancy between and within countries. These inequalities have huge human and economic costs. NPHIs have the opportunity and responsibility to ensure that their work takes these into account and that actions are developed to reduce these largely preventable inequalities.

Health monitoring and surveillance

Information on public health diseases, their determinants and their trends is a key component for planning, implementation and evaluation of public health programmes and national health policies. This applies to both infectious and noncommunicable diseases, their determinants and the nation's health as a whole. Monitoring of health status, major diseases, their risk factors and the health determinants of the population and population groups as well as the operation and organization of the health service organization is a crucial function of NPHIs. This requires the

availability of feasible and good data and the ability to evaluate and analyze that data. An NPHI should collect or have access to data on vital statistics, such as births and deaths; potential threats to health, such as unsafe drinking water; risk factors for disease and injury; and access to and use of personal health services.

The role of an NPHI in health monitoring varies between countries and depends on the history and resources and responsibilities of other national institutions. The surveillance systems operated by the NPHI may include monitoring of: (i) infectious diseases including outbreak investigations; (ii) health behavior such as nutrition, smoking, physical exercise, alcohol and drug abuse etc; (iii) risk factors of chronic diseases e.g. blood pressure, serum cholesterol, obesity; (iv) health and functional capacity (“national health examination survey”); and (v) environmental health hazards.

Infectious disease surveillance is usually a central task of the NPHI. Increasingly in Europe this takes place through electronic reporting systems. The NPHI uses its reference laboratories and maintains close contact with the health services reporting the cases. Information is often linked with national vaccination policies and international reporting.

For NCDs the challenges of monitoring and surveillance are somewhat different. “Epidemics” do not develop in an acute way. The main public health action is aimed at the causal risk factors – biological and behavioral, as well as the ‘causes of the causes’ such as social conditions, poverty, education, housing etc. Monitoring is needed for these different risk factors

Mortality data and disease specific registers are important sources of monitoring. The central statistical bureau usually collects information on total and disease-specific mortality. Incidence data is available in many countries through hospital discharge registers, disease registries (e.g. cancer register) and other registries (e.g. birth register). These registers can be operated by an NPHI or by other actors. Under all circumstances, the NPHI has a key role in collecting, analyzing and disseminating the information produced by different institutions.

Responses to threats, risks, emergencies and disasters

Health surveillance and monitoring is the ongoing systematic collection, analysis, interpretation of health data, and dissemination of the results, with the goal of using the data to guide public health action. Surveillance is critical for identifying disease outbreaks; changes in rates of death, illness, and injury from different causes; and population rates of risk and protective factors for death, illness, and injury.

Inherent in the idea of surveillance is that changes in rates of disease and risk result in prompt actions. These actions might include follow-up laboratory testing and epidemiologic investigation, followed by control measures. In several European countries, national surveillance, laboratory services, and epidemiologic capacity are housed in a single agency. In other countries, these functions are the responsibility of different organizations, so coordination and collaboration are essential.

Because so many public health threats are not limited to individual countries, NPHIs participate in multinational regional and global surveillance efforts. Within EU, ECDC works in partnership with public health institutions across Europe to strengthen and develop early warning systems for infectious disease epidemics. The WHO Global Influenza Surveillance Network is an example of a global surveillance network.

Mechanisms to react rapidly to emergencies that constitute a major public health problem are an essential part of the health systems of all countries. The NPHI should be an integral part of the government’s planning for and response to emergencies and disasters, such as major epidemics of infectious disease, serious environmental health problems, nuclear accidents and other major accidents, and bioterrorism. Planning will include determining in advance what serv-

ices the NPHI will provide in an emergency and developing agreements with organizations that will be involved in a response. The NPHI should assess its surge capacity and have written plans for how it will function during an emergency.

No emergency plan can be expected to function properly, if it is not an extension of the normal activities of the society. Emergency preparedness is always a part of broader preparedness strategy that includes monitoring of health and environment under normal circumstances and plans for responding to various acute situations. For instance, routine monitoring of infectious diseases conducted by an NPHI combined with an effective outbreak investigation system forms the basis for reacting to various microbiological emergencies including threat of bioterrorism.

In cases of suspected environmental health problem, the immediate action is to determine the true extent of human exposure. Initial studies may be followed by epidemiological investigations using various registries and other data sources. Under all conditions, the response should be fast and vigorous. Experience from many countries shows that if action is not taken rapidly, fears and rumours may cause more difficulties than the environmental problem itself.

Evaluation of the health of the nation

Most NPHIs have important functions in the health evaluation, information and communication system of the nation. These include: (i) development of national and local indicators of health; (ii) monitoring and surveillance of health and health determinants of the population and population groups; (iii) collecting and analyzing data produced by the institute itself and by other actors (e.g. mortality statistics); (iv) systematic reviews of all major national monitoring and surveillance data with relevance to health development (“national health report”); and (v) dissemination of information to politicians, managers, health and other professionals, as well as the general public. This comprehensive evaluation of the health of the nation and its determinants forms a firm basis for national health policy decisions.

Ideally, an NPHI will be able to link data sets to conduct a more complete assessment of the country’s health status and to understand the relationships between health status and a range of factors that affect health. Nordic countries have established many registries for health-related data, like cancer and hospitalizations, and factors that can influence health, like income and employment. Every citizen has a unique personal identity number that is recorded any time they receive a government service and for many private-sector services as well. The NPHIs are usually permitted to link registries in order to conduct studies and evaluations.

Linked data are being used as a basis for public health and hospital planning and for distributing human and other resources. They are also used to answer questions about such diverse challenges as risk factors for suicide, and the impact of environmental exposures on health. Although the primary benefits of the comprehensive health information system are within the country, this excellent source of information has provided the world’s public health community with valuable public health insights.

Health information must be made widely available and easily accessible. Decision-makers, health professionals, the media, and the general public all need to be informed about health issues in a way which arouses their commitment to the implications and processes of health improvement. The information should be available on electronic media and be published regularly in a publicly accessible form, in order to promote an informed debate concerning health policies and actions.

Health systems, health economics and promotion of coverage and access to health services

Recent years have seen a great evolution in healthcare systems in Europe and elsewhere, and the changes are likely to continue. Health care is becoming increasingly patient-centered and individualized, with the patient becoming an active subject rather than a mere object of healthcare. Demographic changes including population aging are altering disease patterns and putting pressure on the sustainability of the health systems. Health policy and health care systems are expected to be based on the best scientific evidence derived from sound data, and relevant research.

Although financing and provision of health care is not a core NPHI Function, NPHIs might monitor access to health care and carry out systematic research on health systems, health services and health economics. An important topic in all European countries is the barrier to care for vulnerable groups (including migrants) and strategies and plans for overcoming these barriers. Responding to this challenge requires a multisectoral, multiethnic, and multicultural approach, as well as close collaboration with governmental and nongovernmental agencies.

Health service systems of European countries are under pressure to respond to the challenges of population aging, citizen's rising expectations, migration, new technologies, and mobility of patients and health professionals. Several areas would be important for research and implementation in this field e.g. frameworks for safe, high quality and efficient services; managing innovation in health systems; supporting implementation and interoperability of e-health systems; and analytical studies of relationships between health status, health investment and economic growth and development.

NPHIs should contribute to evidence-based public practice and policies and capacity building. The growing need for scientific evidence in public health should be pointed out. This kind of work is at its start. For instance the Swedish National Institute of Public Health has started to review the relevance of GRADE (often used in health care settings) in grading scientific evidence in public health practice and policies at community level. Similar reviews have also been started in some other countries.

The populations' health is not an issue for health policy alone. Other policies play a key role, for example regional and environmental policy, tobacco taxation, regulating pharmaceuticals and food products, animal health, health research and innovation, coordination social security schemes, health and safety at work, information and communication technology, as well as coordination of agencies and services regulating imports. Developing synergies with these and other sectors is an important function of the NPHIs.

Information on health policy, health systems and health services in European countries is currently collected and analyzed by the European Observatory on Health Systems and Policies, an institute with its secretariat in Brussels and offices in London and Berlin. The Observatory, a partnership between the governments of several countries, supports and promotes evidence-based health policy-making through comprehensive and rigorous analysis of the dynamics of health care systems in Europe. Close collaboration with the Observatory would strengthen the work of the European NPHIs in this important sector.

NPHIs may work closely with the healthcare system to achieve continuous quality improvement for personal and population-based health services. Activities may include conducting surveillance for healthcare-related infections, helping to set standards that permit evaluation of quality, collecting data or making recommendations about patient safety, and conducting evaluations or reviewing data to assess quality.

Social participation in health

An NPHI should strengthen the power of civil society to play an active role in public health. This includes providing information and tools that help people achieve healthy lifestyles, both through their behaviors as individuals and through their ability to influence decisions about the environment and conditions that affect health in their communities. NPHIs can consider making information easily accessible to individuals and also providing technical assistance and information to other organizations that are active in communities.

Prevention programmes and health promotion efforts should be culturally and linguistically appropriate. Because minority populations often have relatively poor health status, special efforts should be taken to reach these groups in ways that they find acceptable. RIVM, the Netherlands' NPHI, organizes a cervical cancer screening programme for women aged 30–60 years. Screening rates have been particularly low among younger women, and especially among younger immigrant women. To guide further efforts to increase screening rates, RIVM is evaluating levels of awareness about the screening programme, especially among populations with historically low participation; the need for leaflets and other materials in different languages; and the adequacy and effectiveness of the information provided.

Encouraging social participation in health includes involving the community in the development and design of programmes to promote health and prevent disease. The attitudes of the public towards health promotion and prevention of diseases are critical for the success of health campaigns and for the implementation of the health policy.

Most NPHIs participate in dissemination of health information to the public. The health knowledge that the NPHI has should be actively communicated not only to decision-makers and other stakeholders, but in an appropriate way also to the wider public. Here the media plays a key role. Therefore, the credibility of the institute and good relations with press are vital for its success. The NPHI should also carefully develop modern communication methods including social media. NPHI websites can also form an important role in communication.

Human resource development and training

A strong public health system requires workers with training in a wide range of fields, including epidemiology, laboratory sciences, health policy, health communications, information technology, and management. An NPHI may have a responsibility to help develop a public health workforce that is adequate for national needs, both for the NPHI itself and to support the broader public health infrastructure. This responsibility might include monitoring the workforce in terms of existing capacity and unmet needs, providing training and continuing education for public health professionals (for example, in laboratory techniques or epidemiology), advocating for strong public health departments in universities, and forming partnerships with universities and other places where public health training is conducted.

The NPHI can best see the needs for specific skills in the national public health work that the institute implements, coordinates or supervises. Thus the institute should actively be involved in planning and often in implementing such specific training.

The mix of activities related to workforce development and retention will depend on the resources of the NPHI, the roles of other organizations, and the needs of the country. The priority will usually be on training that is practical and provides specific skills, rather than degree programmes. However, in addition to providing skills-based training, some comprehensive NPHIs have degree programmes that make important contributions to their country's public health infrastructure.

NPHIs are not primarily responsible for the basic education of health professionals. Nevertheless, close collaboration with the universities and nursing schools may lead to important changes in the content of education. As a result, health professionals are better fitted for carrying out the functions of public health service practice in which greater emphasis is placed on health promotion and disease prevention.

NPHIs are valuable training resources for those who plan to pursue a career in public health research and potentially for those who will follow a service career in public health. Research oriented national public health institutes have an important role in postgraduate training in public health. Training at this level consists mainly of supervised research work as a part of ongoing research projects. The responsibilities of the institution include the planning of research and supporting the student in the different phases of the work. The universities formally grant the degrees, although the actual research work is carried out at the institute.

An NPHI often contributes to the continued education of health professionals by giving lectures, organising seminars and teaching practical courses. Senior scientists may take part in the Ph.D. teaching programmes as teachers and as coordinators of specific courses or may help universities in setting up curricula for degrees in public health. In some countries the national public health institutes have organized a graduate school of public health in collaboration within the universities.

Some NPHIs are closely linked with a school of public health, or a school may even be part of the NPHI. In any case, close links between the institute and schools of public health and universities are essential.

An NPHI itself should have staff that is trained in the systems needed for efficient functioning of an organization. This includes people who can ensure smooth operation of areas as diverse as personnel and information technology, as well as high-level managers who can help ensure that the highest priority needs are addressed.

Regulation and enforcement

Three potential areas of NPHI regulatory responsibility are: food and drug safety, quality and safety in healthcare settings, and reduction of community and worker risks from the environment and workplace (occupational health). During major emergencies, NPHIs might have additional authorities (for example, to isolate or quarantine individuals). In countries for which agencies other than the NPHI are responsible for public health regulation and enforcement, the NPHI should be involved in providing the scientific basis for regulatory decision-making. In addition, NPHIs may have important roles in providing information to legislative and regulatory agencies on a range of topics that affect public health.

Planning and management

The NPHI should conduct periodic strategic planning, using data and information to identify priorities and set measurable goals and targets both for itself and for the Government. Concrete targets should relate not only to what will be done but also to the likely impact of actions taken.

The NPHIs should use the best possible data and knowledge to set priorities, and to develop and to evaluate policies and programmes. This includes using data to guide strategic planning, as well as developing or disseminating evidence-based guidelines for public health practice.

In addition to qualified scientific and programme staff, an NPHI needs trained managers who can oversee development and implementation of a strategic plan, policies, and programmes and ensure that systems are in place to help the NPHI be as efficient and successful as possible. Every NPHI should have a clear vision and mission statement that are understood and shared by staff.

Public health research

All policies and actions to improve health need a firm knowledge base. Systematic search for better ways of health promotion, disease prevention, and clinical care ensures that current practices are sufficiently evidence-based. Research is needed to anticipate future trends, needs and challenges, covering not only direct indicators of health but also indicators of structural, behavioral and social determinants.

The primary goal of research carried out in an NPHI is promotion of health and reduction of the risks of diseases of public health importance. Information on the health and health determinants of the populations and on the prevalence of risk factors of target diseases is necessary for the formulation and implementation of health policy. Research on health systems, health services and health economics has a high priority, if included in the mission of an NPHI. Occupational health, radiation safety and various aspects of pharmacology and toxicology are important research topics in some NPHIs.

Strategic research (fundamental research creating optimal conditions for responding to the challenges of the future) is a part of the research strategy of many national public health institutes. Strategic research is important as a means of building and maintaining knowledge, methods and skills for all research, and as an entry into the international research community. The international research community produces most of new information relevant to public health. Interpretation and implementation of this information is an important function of the NPHIs and is not possible without knowledge and skills acquired through own strategic research.

The quality of public health research must meet particularly high standards as the results are applied to large populations. Scientific quality also rewards the institute by increasing its attraction to top researchers both at home and abroad, and by improving its possibilities of obtaining funds and participating in international projects relevant to public health. Systems should be in place to ensure that research findings are translated into decisions, policies, and programmes. The NPHI must have procedures to protect human subjects who participate and animals used in research.

Active collaboration with universities and with other research institutes is an essential part of the strategy of any NPHI. Research networks increase the critical mass and provide expertise not available in the institute. Collaboration makes it possible to recruit talented graduate students and senior scientists and helps to prevent destructive competition seen in some countries between the universities and governmental research institutes.

Conducting research is a critical function and is important for the credibility of an NPHI. In a fledgling NPHI, research might consist of simple studies to characterize the most important public health problems in the country, provide other data important for decision-making, and evaluate the effectiveness of interventions to improve public health. Regardless of the extent of its programme, an NPHI should focus its research on high priorities, particularly those that are not being addressed by universities or other research institutions. In many countries, these priorities will include epidemiologic and laboratory studies of specific health problems and evaluation of the effectiveness of interventions.

THE NPHIs AND THE EU HEALTH POLICY

The Health Strategy of EU reinforces the importance of health in all policies, emphasizes the link between health and economic prosperity, and recognizes people's right to be empowered in relation to their health and health care. The Strategy emphasizes that the Member States have the main responsibility for health policy and provision of health care to European citizens, but notes that there are areas where cooperative action at Community level is indispensable. Such actions are particularly important e.g. in the area of prevention of illness, including work on food safety and nutrition, tackling smoking, and water and air quality.

The European network of NPHIs should also actively be engaged with public health development in Eastern Europe, outside of EU. This is because of the great health divide between these two areas. Particularly the EU accession countries should be encouraged to consider EU Twinning Programmes to access funding to help them align their national policies with EU Member States. The NPHIs of EU countries should actively contribute to this and the IANHI network should help develop NPHIs of non EU countries.

The NPHIs of the Member States have a key role in the implementation of the EU health strategy as one of the main sources of technical and scientific information for policy decisions. They provide systematic and up-to-date information on disease outbreaks; changes in rates of death, illness, and injury from different causes; and population rates of risk and protective factors for death, illness, and injury. Collaboration of the NPHIs with the European institutions on infectious diseases, food safety, chemicals, pharmaceuticals and environment and with the Joint Research Center is crucial for EU health policy.

Infectious diseases

The European Community is committed as priority to protect and improve human health by the prevention of human disease, in particular communicable diseases, and to counter potential threats to health with a view to ensuring a high level of protection of health of European citizens. Effective response to disease outbreaks requires a coherent approach among Member States and input from experienced public health experts, coordinated at community level.

All European NPHIs have important functions in the control and prevention of infectious diseases. Member States must provide information on communicable diseases through the appropriate designated structures and/or authorities setting up a network for the epidemiological surveillance and control of communicable diseases in the Community. In several European countries, national surveillance, laboratory services, and epidemiologic capacity for infectious diseases are housed in the NPHI. In other countries, these functions may occur in different organizations, but the coordination of the infectious disease prevention has been delegated to the NPHI.

The European Centre for Disease Prevention and Control (ECDC) was established in 2005 as an EU Agency to strengthen Europe's defenses against infectious disease. The main task of ECDC is to identify, assess and communicate current and emerging threats to human health from communicable disease. In the case of outbreaks of illness of unknown origin which may spread within or to the Community, the centre is empowered to act on its own initiative until the source of the outbreak is known and in cooperation with the relevant competent authorities at national and Community level as appropriate. Close collaboration of the ECDC with the NPHIs in the Member States is critical for the success of prevention of infectious diseases on a long-term and for the control of disease outbreaks on a short-term view.

Health and environment

The impact of environmental factors on human health has received high visibility in the European policy debate, e.g. by its inclusion as one of the main priorities of the 6th Environmental Action Plan, followed by the adoption by the Commission of the European Environment and Health Strategy (2003) and the European Environment and Health Action Plan 2004-2010. Ultimate objectives of these initiatives are: (i) to reduce the disease burden by environmental factors; (ii) to identify and to prevent new health threats by environmental factors; and to strengthen EU capacity for policy-making in this area.

Many European NPHIs focus on the integration of health and environment on a common platform and on the development of methodologies to analyze causal relationships between environmental risk factors and human health outcomes. The overall purpose of integrating environment and health information is to create a coherent system for assessment of environment and health interactions. The work is often carried out as a part of the European Environment and Health Action Plan and close collaboration with the European Environment Agency (EEA) and WHO-Europe.

Some European NPHIs have long-standing experience in monitoring indoor and outdoor air quality, and water quality, and significant expertise risk assessment, and exposure to physical environmental factors, contaminants in food and water and microbiological hazards in food and waste. In addition, they carry out experimental work *in vivo* and *in vitro* to evaluate toxicological impacts based on classical and new approaches. The focus is on the development of appropriate methodologies, techniques, approaches and models to address the complexity in environmental health interactions with special attention to susceptible groups.

Health promotion and risk factors for chronic diseases

The relationship between smoking, diet, physical activity and health has been firmly established, in particular regarding chronic non-communicable disease and conditions such as obesity, heart disease, type 2 diabetes, hypertension, cancer and osteoporosis. The underlying determinants of the risk factors for the chronic diseases are largely the same. Addressing lifestyle factors such as smoking, nutrition and physical activity offers enormous potential for the prevention of severe morbidity and mortality.

The Commission collects a large amount of information on issues relating to lifestyle factors related to health. However, there is little harmonization of the way the national data is collected making comparisons across the EU difficult. Existing systems have mostly been developed independently from each other and therefore coordination of the different sources of information is not always done. Moreover, a large amount of the available information is not fully exploited. Integration of data collection systems and analysis of data should be the two guiding principles in this area in order to draw maximum benefits from the current systems for data gathering.

To support macro level monitoring, the Commission has developed the concepts of a European Health Interview Survey, a harmonized approach to the regular collection through the European Statistical System of statistical data on several indicators related to health, and a European Health Examination Survey to obtain objective information on a range of risk factors for chronic diseases including BMI, cholesterol and hypertension in a randomly selected population. Eurostat is in the process of building a first set of food consumption indicators in order to monitor nutrition patterns and trends. The emphasis of all three activities is on developing quality data and indicators on health status as well as on lifestyles.

All European NPHIs are currently working on several themes relevant directly or indirectly to the determinants of health such as nutrition, physical activity, obesity, smoking and alcohol consumption. A comprehensive system based on the collaboration of the NPHIs would enable the Commission to develop a more proactive and forward looking role in health promotion. The NPHI network could be used to collect information on the determinants of health in European citizens and on health promotion actions and programmes underway in the Member States so that these can be monitored and evaluated for impact.

European Health Information System

European and national public health policy needs solid and comprehensive health information derived from valid and comparable sources. This information should be relevant and cover all necessary aspects of health status, determinants of health and health care. The main problems are lack of data for many indicators and the poor comparability of health data between countries and regions within them. The current situation is reflected in the inadequate use of information as a basis for health policy and health policy development.

A health information system can be defined as a dynamic and flexible infrastructure for monitoring health activities and population health outcomes that is active at the national and sub-national level. The system encompasses the collection, analysis, storage, transmission, display, dissemination and further utilization of data and information relevant to different user groups. This information concerns health status, health determinants, lifestyles and health habits, living and working conditions, demographic factors and socio-cultural facts.

Most of EU Member States have long traditions of gathering and analyzing data that are relevant for public health and for various aspects of the health care system (e.g. health care planning and financing). Typically, national information systems compile data from several sources based on national data gathering routines. The processing and analysis is performed in diverse organizational structures, usually under the responsibility of different authorities. Integration of this fragmented information and the underlying distributed data sources are issues that have to be resolved in the development of national and European health information systems.

A key action for the development of the EU health information system has been the European Health Indicators Monitoring Project (ECHIM). ECHIM has played a central role by drawing experts from all Member States and international organizations to consider what health indicators are needed at EU level, what data would be needed to establish them, and what actions would be needed to implement the plan. The principal outcome of this work has been a proposal for the key indicators of health. Furthermore ECHIM has analyzed health information available in EU countries and most relevant international sources and made plans for the European Health Interview Survey and European Health Examination Survey.

It has repeatedly been emphasized that the European Health Information System cannot be developed and maintained without a permanent organization with sufficient resources and a mandate to develop and coordinate activities. Several organizational structures have been considered, but none have gained wider acceptance. Irrespective of the organizational structure, the NPHIs of the Member States will play a central role in creation, maintenance and exploitation of the system.

Contribution to global health

Strong EU NPHIs and their network should also contribute to global health efforts. The European NPHIs have great expertise in infectious disease control, but also with noncommunicable diseases that are rapidly becoming the main global public health problem. As WHO recognizes, NCDs contribute to over 60 % of all deaths in the world – 80 % of these occurring in the developing world. The potential of prevention and control is great and the expertise of European NPHIs would be valuable in international and global health work. This concerns both NCD monitoring activities and programmes for risk factor reductions.

Because of the great burden of NCDs, they also contribute to poverty and development issues. Thus the work of European NPHIs should assist EU health development work in low and middle income countries – of course not neglecting the possibilities of helping with infectious disease control. Because of the important role that the EU has in global health development work, European NPHIs and IANPHI/Europe should actively contribute to the EU's work in low and middle income countries, just as CDC has a strong presence in US health development work.

CHALLENGES IN CREATING AND SUSTAINING NPHIs

Long-term commitment

It often takes decades from the time an NPHI is first created until it can perform many or most of the core NPHI functions and address a range of health problems. This is particularly true when NPHIs are created in countries with limited national public health infrastructure and limited resources. However, even fully developed NPHIs are constantly changing as a result of new situations, new initiatives, political concerns, or emergencies. Creating an NPHI and continuing to reshape it to meet new challenges requires a long-term commitment to the health of a country's population. It also requires flexibility and adaptability to address issues and priorities as they arise.

As NPHIs move along the NPHI continuum, they should be envisioning a future in which they address infectious and non-communicable diseases and conditions, as well as injury and violence prevention, environmental and occupational health, health inequalities and health systems and health services research. Focusing on the major public health issues means that an NPHI is a dynamic organization—one that changes to meet short and long-term challenges. The NPHI must also have built-in flexibility. For example, an NPHI might have to divert resources from a variety of endeavors to support the response to a major outbreak or disaster.

Need for resources

Providing high-quality public health services requires financial, human, and technologic resources. However, many NPHIs struggle to find resources to conduct surveillance, do research, and perform other core public health functions. Public health often receives inadequate funding even to implement interventions, such as specific childhood immunizations, that are considered highly cost-effective and cost relatively little per person helped.

Public health research is critical to characterizing and solving public health problems, but it is frequently underfunded, in part because the results often take time to decrease national disease burdens. Many public health interventions, such as efforts to prevent chronic diseases, take years to show benefit, and, therefore, positive reinforcement for decision-makers who invest in public health may be slow in coming. History is replete with examples of effective public health programmes that received reduced funding after decreases in disease burden. Sometimes these cuts resulted in resurgences of disease and the need for a costly re-infusion of resources.

Coordination of the NPHI activities

In many countries, the core public health functions are carried out by more than one agency, requiring these agencies to work closely together. For example, national public health laboratory services are a critical part of the public health infrastructure. These services include reference laboratory functions, such as providing assistance to laboratories at sub-national levels and in clinical settings, providing high-throughput testing of samples during emergencies, conducting training and developing and disseminating new methodologies. Sometimes the national laboratory will be part of the NPHI, with the laboratory experts in the same organization as other professionals, like epidemiologists, who work on similar diseases and health problems. In oth-

er countries, the national laboratory is a separate organization. If the national laboratory is separate from the NPHI, close collaboration, data-sharing protocols, and regular communication are essential.

A NPHI may also consist of a loose confederation of organizations acting independently. An NPHI that is comprised of many subunits must be capable of functioning like a single organization, especially during emergencies. A multi-agency NPHI should have the following in place: leadership that can ensure that the organizations function as one; clear definition of responsibilities among the organizations; agreements that allow rapid and efficient sharing of data; notification procedures for emergencies; ability to share resources during emergency responses; consistent policies related to such issues as human subjects, data integrity, and privacy; public and governmental recognition of the NPHI and not just of the organizational units that comprise it. Both NPHIs and Ministries of Health should be committed to ensuring high level of cooperation.

Communication and networking skills

Several themes recur in the core attributes and functions of NPHIs as defined by IANPHI. One is the importance of communications. Communications capabilities are essential for educating the public and policy-makers, ensuring that data about the country's health are accessible, and responding to problems and crises. Another theme is the importance of multinational, regional, and global linkages and networks, particularly given the propensity for public health problems to cross borders and the efficiencies that result when countries share information and solutions.

CONCLUDING REMARKS

The roles and functions of the national public health institutes of the world differ widely. Some institutes focus on infectious diseases, while others have wider responsibilities in health promotion, such as prevention of non-communicable diseases and control of environmental health problems. This variation also applies to European NPHIs. Their activities range from strategic research and health monitoring to service and reference functions, health campaigns and continued education of health professionals.

The primary goal of research carried out in a public health institute is promotion of health and reduction of the risks of diseases of public health importance. Research is needed to anticipate future trends, needs and challenges. Systematic search for better ways of health promotion, disease prevention, and clinical care ensures that current practices are sufficiently evidence-based.

Monitoring of health and health determinants is necessary for the formulation and implementation of health policy, and is one of the core functions of the national public health institutes. Control of infectious diseases, another responsibility of many national public health institutes, requires well-defined strategies; a national vaccination programme, a good laboratory-based surveillance system; standardization of laboratory methods and training and supervision of public health personnel.

Mechanisms to react rapidly to emergencies are an essential part of the health systems of all countries, and often included in the functions of the national public health institute. Such situations include major epidemics of infectious disease and serious environmental health problems, other major accidents and bioterrorism.

National public health institutes may participate in health promotion activities in several ways. The institutes may organize or commission other actors to organize national or local health campaigns in critical area, support other actors in designing or evaluation of health promotion activity or carry out pilot projects that subsequently lead to campaigns organized by other actors.

Public health institutes are not primarily responsible for the basic education of health professionals. Nevertheless, national public health institutes may be valuable training resources for those who plan to pursue a career in public health research and potentially for those who will follow a service career in public health.

International collaborations offer some particular advantages for national public health institutes and for public health research in general. These include access to the larger populations and cohorts for research purposes. The international scientific community produces much of the information needed in disease prevention and health promotion at the national level.

The work of a national public health institute has true value only if the results are used in promotion of health in the own country or elsewhere. The institute should make every effort to facilitate and encourage the exploitation of the results through other actors.

Challenge for Europe

European Union countries are actively developing their collaboration, not only for economic development, but also for improving the health and well being of their citizens. In the implementation of this work, the NPHIs and their networks are important instruments. This paper should be a tool in this development and further encourage the collaborative work between the NPHIs and also with the European Commission and especially DG/SANCO.

At the same time there is a big challenge to develop NPHIs in other European countries. The all-European network of NPHIs should help to bridge the health divide in Europe, help to harmonize activities and strengthen public health collaboration in all Europe.

Annex

European Members of the International Association of the National Public Health Institutes
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Albania

Institute of Public Health
Aleksander Moisiu Str. 80
Tirane, Albania
Website: www.ishp.gov.al
Director: Enver Roshi
E-mail: roshienvi@gmail.com

Belgium

Scientific Institute of Public Health
Rue Juliette Wytzman 14
B-1050 Brussels
Website: www.wiv-isp.be
Director: Johan Peeters
E-mail: johan.peeters@wiv-isp.be

Croatia

Croatian National Institute of Public Health
Rockefellerova 7
10000 Zagreb
Website: www.hzjz.hr/epocetna
Director: Zejko Baklaic
E-mail: ravnatelj@hzjz.hr

Czech Republic

National Institute of Public Health (SZU)
Srovarova 48
100 42 Prague 10
Website: www.szu.cz
Director: Jitka Sosnovcová
E-mail: sosnovcova@szu.cz

Denmark

Statens Institut for Folkesundhed
Øster Farimagsgade 5 A
DK-1399 København K
Website: www.niph.dk
Director: Morten Grønbaek
E-mail: mg@niph.dk

Estonia

National Institute for Health Development
Hiiu 42
11619 Tallinn
Website: www.tai.ee
Director: Maris Jesse
E-mail: maris.jesse@tai.ee

Finland

National Institute for Health and Welfare
Mannerheimintie 166
00300 Helsinki
Website: www.thl.fi
Director: Pekka Puska
E-mail: pekka.puska@thl.fi

France

Institut de Veille Sanitaire
12, rue du Val d'Osne
94415 Staint-Maurice Cedex
Website: www.invs.sante.fr
Director: Françoise Weber
E-mail: f.weber@invs.sante.fr

National Institute of Health and Medical Research
INSERM
101, rue de Tolbiac
75654 Paris Cedex 13
Website: www.inserm.fr
Director: André Syrota
E-mail: andre.syrota@inserm.fr

Germany

Robert Koch-Institut
Nordufer 20,
D-13353 Berlin
Website: www.rki.de
Contact: Reinhard Burger
E-mail: burgerR@rki.de

Hungary

National Centre of Epidemiology
Gyáli út 2-6
H-1097 Budapest
Website: www.oek.hu
Director: Márta Melles
E-mail: melles.marta@oek.antsz.hu

Iceland

The Directorate of Health
Laugavegur 116
105 Reykjavik
Website: <http://www.landlaeknir.is/>
Director: Geir Gunnlaugsson
E-mail: geir@landlaeknir.is

Ireland

Institute of Public Health in Ireland
5th Floor
Bishop's Square
Redmond's Hill
Dublin 2
Website: www.publichealth.ie
Director: Owen Metcalfe
E-mail: owen.metcalfe@publichealth.ie

Italy

Istituto Superiore di Sanita
Viale Regina Elena 299
00161 Roma (I)
Website: www.iss.it
Director: Enrico Garaci
E-mail: presidenza@iss.it

Macedonia

Republic Institute for Health Protection
Skopje 1000
50 Divizija 6, Republic of Macedonia
Website: -
Director: Shaban Memeti
E-mail: shmemti@iph.mk

Moldova

National Scientific & Practical Center of Preventive Medicine
67-A, Gheorghe Asachi str. 2028
Chisnau, Moldova
Website: www.sanepid.md
Director: Oleg Benes
E-mail: obenes@sanepid.md

The Netherlands

National Institute for Public Health and the Environment (RIVM)
P.O. Box 1, Antonie van Leeuwenhoeklaan 9
3720 BA Bilthoven
Website: www.rivm.nl
Director: Andre van der Zande
E-mail: andre.van.der.zande@rivm.nl

Norway

Nasjonalt folkehelseinstitutt (Norwegian Institute of Public Health)
PB 4404, Nydalen
0403 Oslo
Website: www.fhi.no
Director: Geir Stene-Larsen
E-mail: geir.stene-larsen@fhi.no

Poland

National Institute of Public Health (NIH)
str. Chocimska 24
00-791 Warsaw, Poland
Website: www.pzh.gov.pl
Director: Mirosław J. Wysocki
E-mail: mjwyssocki@pzh.gov.pl

Portugal

Instituto de Higiene e Medicina Tropical
Rua da Junqueira 96
1349-008 Lisboa
Website: www.ihmt.unl.pt
Director: Paulo Ferrinho
E-mail: PFerrinho@ihmt.unl.pt

National Institute of Health Dr. Ricardo Jorge (INSA)
Av. Padre Cruz, 1600 - 560 Lisboa
Website: www.insa.pt
Director: José Pereira Miguel
E-mail: jomiguel@mail.telepac.pt

Russian Federation

National Research Center for Preventive Medicine
Petroverigsky 10
Moscow
Website: -
Director: Sergei Boytsov
E-mail: prof-boytsov@mail.ru

Serbia

Institute of Public Health of Serbia
Dr Subotic 5
11 000 Belgrade
Website: www.batut.org.rs
Director: Tanja Knežević
E-mail: tanja_knezevic@batut.org.rs

Slovenia

Institute of Public Health of the Republic
of Slovenia
Trubarjeva 2
1000 Ljubljana
Website: www.ivz.si
Director: Marija Seljak
E-mail: marija.seljak@ivz-rs.si

Spain

Instituto de Salud Carlos III
Monforte de Lemos 5
28029 Madrid
Website: www.isciii.es
Director: José Jerónimo Navas Palacio
E-mail: direccion@isciii.es

Sweden

Swedish National Institute of Public Health
831 40 Östersund
Website: www.fhi.se
Director: Sarah Wamala
E-mail: sarah.wamala@fhi.se

Turkey

Refik Saydam Hygiene Center
Cemal Gürsel Cad. No: 18
Sihhiye, 06100
Website: www.atauni.edu.tr
Director: Mustafa Ertek
E-mail: ertekmus@atauni.edu.tr

United Kingdom

Health Protection Agency
Holborn Gate, 330 High Holborn
London WC1V 7PP
Website: www.hpa.org.uk
Director: Justin McCracken
E-mail: justin.mccracken@hpa.org.uk