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## **Public health research - multidisciplinary, high-benefit, undervalued**

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## RESEARCH NOTE

### Public health research – multidisciplinary, high-benefit, undervalued

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The major health problems faced by policy-makers and practitioners at national and local levels require public health approaches. However, public health research is the “poor relative” of biomedical research: it is worthy, but not rich. In the European Commission’s health research programme, biomedicine gets 90% of the funding, whereas public health research gets less than 10%. This pattern is repeated nationally in most countries, reflecting public policies to support industries – pharmaceuticals, biotechnology, medical devices – where profits are to be made, rather than not-for-profit, public health research. SPHERE, a study coordinated through the European Public Health Association, conducted bibliometric analyses across public health research themes and mapped the European and national structures and priorities for research. Whilst most European countries have national strategies (and some programmes) for public health, few have public health research strategies and the coordination of public health research is weak. Three further studies are being undertaken. In STEPS, the contribution of civil society organizations in the new EU member states to public health research will be discussed at national workshops with the ministries of health, the science/research councils and the national public health associations. In PHIRE, thematic Sections and the national member associations together evaluate the impact of European-funded health projects within member states. In FAHRE, the specific theme of food and health will be addressed, bridging industry and non-profit research sectors. Arguments for public health research can be made through lobbying at European level, but researchers and practitioners also need to influence the development of public health research within individual countries – leading to a European Public Health Research Area.

**Keywords:** public health; research; Europe; evidence; finance; publications

#### Why public health research for Europe?

Our contemporary health problems require public health approaches as well as medical treatments. In providing care and support for sick and disabled people, health services are more concerned with the management of disease after its onset than with its prior prevention or minimization. It has been estimated that in recent decades population health has improved by around one-quarter as a direct result of medical treatments, whereas improvements in public health – organizational, social and environmental – have contributed most of the increase in life expectancy (Mackenbach 1996, Bunker *et al.* 1994). Yet, while we know that new public health interventions are needed to control the main causes of disease and disability –

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including heart disease, cancer and mental illness as well as accidents – and to improve the organization, effectiveness and efficiency of health services, we are much less sure which, and how, interventions work.

“Health” research is a term that is used loosely. Here, it will indicate the full range of research from laboratory (sometimes so-called “life” sciences) and clinical research (involving patients) to public health research (at population and organizational level). (Laboratory and clinical research together are often described as biomedical research.) A second consideration, however, is also the use of research. Much life sciences research is “basic”, in the meaning of exploring natural phenomena, whilst clinical research is usually more “applied”, i.e. orientated to problem-solving for disease. Public health also involves “basic” research, including epidemiology, sociology, psychology and economics. It uses all these disciplines in applied research, however, when focusing on “what works” for health improvement. “Translational” research in both clinical and public health fields seeks to identify and demonstrate the effectiveness of interventions.

### **Limiting paradigms**

The contemporary paradigm for medical research is molecular biology. The human genome has been profiled, and it is now time to find the genes linked to diseases and disabilities. Moreover, this research is profitable for the individual scientist, funding company, university or company. Craig Venter raised capital to fund his description of the genome by selling his patent equipment to other scientists as well as the patents for genome sequences (Venter 2007). Pharmaceutical companies are able to exploit the findings of genomics and sell the drugs under patent at high prices to health systems, where patient organizations (perhaps also funded by pharmaceutical companies) lobby the public and insurers to pay for treatments (Rogers 2007).

Clinical medicine works with individual patients, but needs groups to undertake trials of drug effectiveness. Much clinical treatment is based on statistical probabilities, which can be refined by grouping together smaller clinical studies into larger “meta-analyses”, work undertaken by the Cochrane Collaboration. However, due to biological variation, multiple points of impact within the body, and perhaps lack of specific action, only a few drugs have a high probability of effectiveness; most are “effective” for only a proportion of the patients treated. There is the concept of the “number of people needed to treat” (NNT) – the number of patients who need to be treated to prevent one additional negative outcome (death, stroke, etc.). With an NNT = 10, for example, one person in 10 would be benefited by the drug, whilst nine would not. This one-in-10 chance can still be regarded as “effective”.

Public health research cannot be based on repeatable laboratory experiments or clinical trials with large numbers of individuals. Its evidence is usually observational rather than experimental, and often derived from just a few situations for comparisons. It is this lack of repetition that makes public health interventions difficult to prove. Nevertheless, public policy needs to know which interventions are effective, whether natural or policy-directed; this is the challenge now for public health research.

The health care industry is a large and growing section of the economies of most countries in the developed world. The proportion of national resources apportioned to health care has been rising; in Europe it now comes to 6–12%, and in the USA it is

moving towards 20%. Companies have positioned themselves to benefit from this market, as health care providers, manufacturers of equipment and drugs, and now increasingly in selling research. In Europe, one in six people working in the pharmaceutical industry is employed in R&D, with a total expenditure of 22 billion euros per annum directly on R&D (European Federation of Pharmaceutical Industries and Associations 2009). Looking at the world as a whole, the Global Forum for Health Research estimates that half of all health research is in the commercial sector (Burke and Matlin 2008), undertaken by manufacturers who gain profit from selling their products and often also tax relief for performing the development research.

Most of the rest of funded health research is in the public sector and is funded by tax revenue going to universities, institutes and clinical researchers. The emphasis is now on demonstrating the effectiveness of treatments which can then be put onto clinical markets. Public health, however, is mainly not-for-profit. Profits are not made by preventing disease, nor by changing people's behavior (although subscription gyms contribute to health). Therefore public health research needs to be funded for the public good without the incentive of profit.

### **European dimensions**

In its Sixth Framework Research Programme 2002–2006, the European Commission supported a multilateral collaborative study, SPHERE (Strengthening Public Health Research in Europe). The study broadly had two sections: a description of ongoing public health research and a description of the structures supporting research.

Public health research publications for 1995–2005 were assessed using contemporary bibliometric methods (McCarthy and Clarke 2007). Public health research itself was defined as the organized quest for new knowledge to protect, promote and improve people's health:

- undertaken at population or health services level;
- designed to obtain generalizable knowledge;
- goal-oriented, addressing questions of policy relevance;
- using a range of observational methods, including surveys, registers, datasets, case studies and statistical modeling.

Recognizing that public health research draws on several disciplines, including epidemiology, sociology, psychology and economics, the study interrogated computer databases across six interdisciplinary fields – environmental health, health promotion, disease prevention, health care management, health services research and health systems research.

Bibliometry using the full definition of public health research yielded contrasting data (Clarke et al. 2007). Total output averaged 7000 papers a year, about one-third of the world output. As a group, the “EU-15” countries (EU up to 2004) contributed the majority of papers. The Nordic countries showed the highest publication rates, followed by the British Isles, the Netherlands and Switzerland. Rates were lowest in the Baltic States, Slovakia, Hungary, Portugal and Cyprus (Figure 1).

Structures supporting public health research were present at both national and European levels. There has been increasing financial support for research and development as a result of the so-called “Lisbon Agenda”, which seeks to develop a

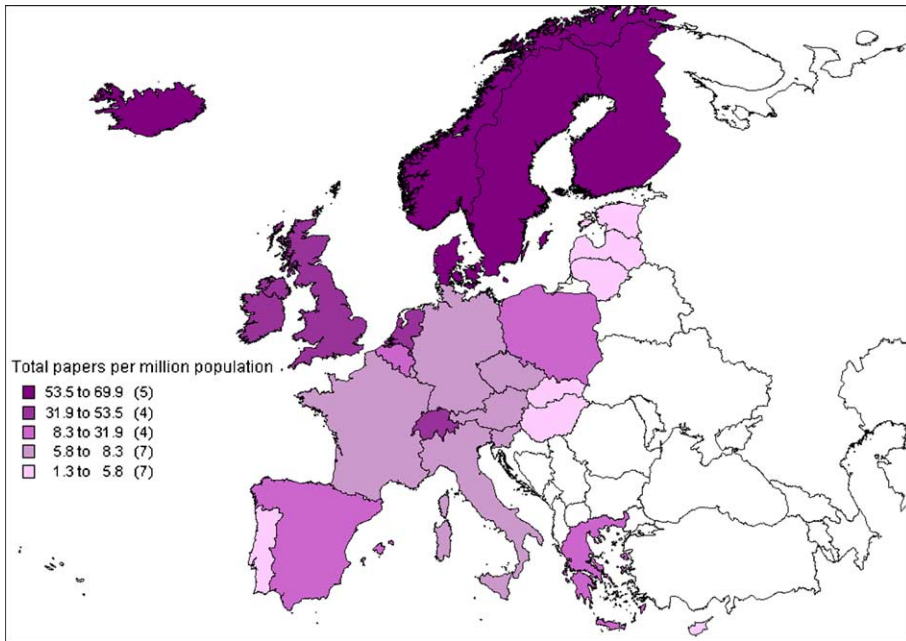


Figure 1. Public health research publications (year 2000) per million population for European Union countries.

“knowledge-based economy” across Europe and to promote economic competitiveness through innovation and markets. Within the overall research programme, health has increased proportionately to other fields and now lies second only to IT in expenditure, at around 650 million euros a year.

In the European Union’s Sixth Framework Research Programme (2002–2006), public health research was separated from the life sciences and placed in a separate category with other policy research. However, for the Seventh Programme (2007–2013), the theme “health” was divided into three sections, roughly corresponding to the cellular, disease/clinical and public health/organizational research fields (the third field is actually entitled “Optimizing the delivery of health care to European citizens”).

The range of activities within the Research Programme also includes support for doctoral and postgraduate exchanges, high-cost infrastructures, direct funding in the Joint Research Centre and open applications unspecified by theme in the “ideas” field. All of these are also potential areas for public health research, but not classified in this way.

Information is much less easy to get at national level (Conceição *et al.* 2009). Ministries of education are in contact with the European Directorate for Research for the applications and distribution of European research grants, and medical research councils (funding bodies) and science academies are in contact with the European Science Foundation in promoting research fields. However, ministries of education in most countries said that their national ministries of health were responsible for public health research – and thus not represented at the European level. Moreover, only some of the ministries of health had an identifiable contact route and health research programme, and this would be as likely to be supporting laboratory and clinical research as public health research.

Priorities for public health research were assessed from several perspectives (McCarthy *et al.* 2009):

- 17 of 28 (61%) national *ministries* described public health research thematic priorities, ranging widely across public health research fields;
- 22 of 39 (56%) national *public health associations* gave priorities by disease categories, with Eastern European countries tending to place more emphasis on the fields of environmental and infectious diseases;
- 80 *civil society organizations* (53% of the members of the European Public Health Alliance) gave replies mainly prioritizing health promotion fields and international research.

The results indicated the need for a consistent and agreed typology for public health research as well as for bringing these together to match researcher interests with policy needs.

### **Evidence and doing better**

The concept of health “evidence” has arisen over the last decade. Originally used for strictly designed interventions (clinical trials), its use has been expanded to reflect the broader range of influences and knowledge that are taken into account for decisions. To provide evidence, in the clinical field there is a call for “translational” research, which demonstrates the value of interventions. Yet, having evidence does not necessarily lead to their use in practice, perhaps because of limited delivery or access to care – barriers of cost or culture.

Public health research is not dissimilar to biomedical research: there is a hierarchy of values for research. The “basic” sciences of epidemiology, sociology and statistics draw prestige and funding for addressing common health complaints and disease distributions, yet they are reluctant to engage with real-world policies and interventions. In a review of health services research in the Netherlands (Advisory Council on Health Research 2008), researchers argued for both applied research *and also* centers of excellence – as though the two were incompatible.

Often research is constructed away from practitioners to serve the researchers’ agendas. This is partly because of the inherent difficulties of doing research in practice settings – there is less control of the interventions, and of the population under surveillance. In the government-funded evaluation of the Sure Start programme in Britain (for young children in deprived areas; Tunstill *et al.* 2002), the original design comparing “intervention” communities with “no intervention” communities had to be changed when the government extended the intervention into the “control” areas as well – albeit before any “success” had in fact been established. However, evaluation of public health interventions is also complex. The Sure Start interventions were in areas which had up to 12 other – potentially competing and contradictory – parallel, government-funded programmes (Table 1).

The extension of using systematic reviews of interventions, an approach of great importance for clinical research, into public health has shown the lack of studies which deal with practice – the lack of any evidence. Yet, public health practice is currently addressing critical issues in new ways deserving serious attention, e.g. in cardiovascular disease control (Heart of Mersey; Lloyd-Williams *et al.* 2008), social

Table 1. Special Grant Regimes (government-funded programmes) operating in Sure Start areas (1999).

Special grant regime	Operating in programme areas <i>n</i> (%)	Linked with programme %
Quality Protects	77 (65)	47 (61)
New Deal For Lone Parents	73 (62)	35 (48)
National Childcare Strategy	65 (55)	38 (58)
Neighbourhood Nurseries	56 (47)	43 (71)
Drug Action Team	55 (47)	15 (27)
Connexions	54 (46)	19 (35)
Local Agenda 21	30 (25)	9 (30)
UK Online	11 (9)	5 (45)
New Commitment To Regeneration	10 (8)	1 (10)
Housing Action Zone	4 (3)	1 (25)
Phoenix Fund	3 (2)	1 (33)

marketing (UK Department of Health 2008), Healthy Cities (Edwards and Tsouros 2008) and patient safety (Brookes and McCarthy 2008).

The need to link research to practice is recognized by the Netherlands in their joint service–academic research centres, ZonMw (<http://www.zonmw.nl/en/programmes/all-programmes/academic-collaborative-centres/>) and, indeed, in Britain there is also a move to connect researchers and practitioners at community level (CLAHRCs; National Institute for Health Research 2009). These platforms allow researchers to raise scientific standards, introduce new methodologies, develop and test innovations, work on medium-term results of health significance, and make international contributions.

### European public health research futures

To take forward the work of SPHERE, UCL and the European Public Health Association have three further collaborative projects funded by the European Commission (Figure 2).

STEPS (Strengthening Engagement in Public Health Research) works with civil society organizations, both professional associations of practitioners and thematic civil society organizations (CSOs) with specific fields of interest (such as a disease, behaviour or cultural group). It has a focus on the new member states, where SPHERE showed the lowest rates of public health research publications. CSOs, academics and research organizations with interests in public health were identified through a series of country visits. Contact has also been made with DG Research Framework Programme national contact points for the health theme – frequently at the national research agency or ministry – and also directly with the ministry of health. In 2010, leading CSOs in each country are holding national workshops describing the extent of CSO involvement in research, mapping national public health research and capacity and discussing priorities for national programmes. The national reports will be brought together for a one-day meeting during the European Public Health Association annual scientific conference, to be held in Amsterdam in 2010. Dissemination is foreseen via international meetings and agencies, including the Global Forum for Health Research and the Council for Health Research and Development.

<p><i>STEPS (Strengthening Engagement in Public Health Research)</i></p> <p>Project number 217605</p> <p>2010–2012 (30 months)</p> <p>Funding: DG Research 7th Framework Programme, “Science-in-Society”</p> <p>Coordination and Support Action</p> <p><a href="http://www.steps-ph.eu">www.steps-ph.eu</a></p>	<p><i>Coordinator:</i> Mark McCarthy, University College London, UK</p> <p><i>Partners:</i></p> <p>Dineke Zeegers, European Public Health Association, Utrecht, the Netherlands</p> <p>Dace Beinare, Skalbes, Riga, Latvia</p> <p>CSO workshop leaders in 12 new EU Member States</p>
<p><i>PHIRE (Public Health Innovation and Research in Europe)</i></p> <p>IT number 36513</p> <p>2010–2012 (24 months)</p> <p>Funding: DG Health Second Health Programme 2009</p> <p>(no website yet)</p>	<p><i>Coordinator:</i> Dineke, Zeegers, European Public Health Association, Utrecht, the Netherlands</p> <p><i>Partners:</i></p> <p>Karolinska Institutet, Stockholm, Sweden</p> <p>Maltese Association of Public Health Medicine, Valetta, Malta</p> <p>Ecole des Hautes Etudes en Santé Publique, Rennes, France</p> <p>Institute of Hygiene, Vilnius, Lithuania</p> <p>Slovak National Public Health Association, Kosice, Slovakia</p>
<p><i>FAHRE (Food and Health Research in Europe)</i></p> <p>Project number 245278</p> <p>2010–2011 (24 months)</p> <p>Funding: DG Research 7th Framework Programme</p> <p>Call: FP7-KBBE-2009-3 (Knowledge-based Bio-economy)</p> <p>Coordination and support action</p> <p>(no website yet)</p>	<p><i>Coordinator:</i> Rachel Newton, Sociedade Portuguesa de Inovação S.A.</p> <p><i>Partners:</i></p> <p>Euroquality SARL, Paris, France</p> <p>University College London, London, UK</p> <p>Skalbes, Riga, Latvia</p> <p>Università degli studi di Milano, Milan, Italy</p> <p>Dialogik Gemeinnützige Gesellschaft für Kommunikations- und -Kooperationsforschung mbH, Stuttgart, Germany</p> <p>SIK-Institutet foer Livsmedel och Bioteknik AB, Gothenburg, Sweden</p>

Figure 2. Studies on health research practice funded by the European Commission.

The second activity, led by EUPHA, is PHIRE (Public Health Innovation and Research in Europe), which addresses issues as to how national public health research organizations and individual researchers translate research into practice. The work is funded by the European Commission's Directorate General for Health and Consumers ("DG Health") as a proposal in response to their annual call for projects. Whilst DG Health formally states that this action is not "research", but service support, the projects funded are often performed by academics in cooperation with service practitioners and the creativity and new knowledge in these actions are comparable with research and innovation in the Frascati definition. PHIRE will assess the impact of the funding programmes of DG Health and works with two component structures of EUPHA – the (thematic) Sections that individual members can sign up to and the actions at national level monitored by national public health associations. Six DG Health projects funded in the period 2003–2005 will be chosen by the Sections and their results assessed. The Sections will develop evaluation criteria and determine if – and then how – the outcomes of the European projects have been translated into national policies and programmes. The national associations will then produce integrated national reports, which will be brought together for consideration by the main EUPHA annual scientific conference. This study thus provides an assessment both of the relevance of the EU programme to member states and also of the recognition given to it by researchers, policy-makers and practitioners at national level.

The third activity focuses on a specific research area – Food and Health Research in Europe (FAHRE). The study arises from a 2008 call within the Biotechnologies, Agriculture and Food Theme of the 7th Framework Research Programme. It seeks to map food and health research across Europe, drawing on a consortium of partners working with industry as well as the public sector, and gaining national information through experts. Research in this field is at present divided: food industry research is predominantly into biotechnology and ways of making food "safe" and nutritious, whilst the academic sector has led research on food causes of disease and public health measures for controlling and limiting marketing pressures. FAHRE provides an important model bringing industry and non-profit research together, and similar actions in other public health-related fields, such as transport, energy and environment, are to be expected.

STEPS, PHIRE and FAHRE should draw the attention of both ministries of health and the European Union institutions (including the European Parliament) to the need to strengthen public health research, through financing infrastructures, transnational coordination and greater levels of funding. Slowly, but inevitably, a market is developing for public health research in Europe (McCarthy 2007). Like all markets, it is strongly dependent on information, and the Internet now provides quicker and more detailed descriptions of national as well as European Commission research programmes. Similarly, there has been a structuring of research consortia, not unlike the growth of national and international companies, able to advance complex research topics, maintain investigative teams and compete for funds. Crucially, not-for-profit public health research needs to be recognized as providing value and returns at least equivalent to those achieved by the for-profit pharmaceutical field (McCarthy 2010), challenging the view increasingly presented by the European Commission that "applied" research equates with its application in the commercial sector.

As a coordinating organization, the European Public Health Association is capable of supporting these developments by bringing researchers together at conferences, through publications and through its thematic networks for individual members. Drawing on the concept developed by the European Commission, we can envisage a future European Public Health Research Area which will serve the public good through not-for-profit research and promote the transfer of knowledge through practitioners into improved public health services and national health care.

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