UK Research Landscape for Population Health Research and Public Health Practice

Report for the Academy of Medical Sciences

- prepared by Norman Freshney Consulting *January 2016*

1 Executive Summary

- The UK has a very strong and diverse research portfolio for population health research
- In the ten years from 2004/05 to 2014, public spend on prevention research increased threefold, from £29.6m (in real terms) in 2004/05 to £102m in 2014
- Despite this increase, prevention research only receives 5.4% of all public spend on health research
- Within research funding spent on understanding the causes of disease (£473m in 2014), 20% is spent on understanding the environmental, psychological, social and economic factors, and 80% on the biological and endogenous factors
- 56% of all research spend in the field of population screening is for cancer-related programmes
- Recent evaluations of population and public health research in the UK and EU have recommended that there should be greater emphasis on:
    - research to narrow health inequalities
    - translating research findings into policy or practice
    - developing interventions that may act at group, community or population-level, rather than at individual level
- A wide range of funding opportunities exist in health research, however there are few schemes dedicated for population health researchers
- There may be a need for more dedicated funding streams for population health researchers that take into account the cross-disciplinary nature of this specialty and support individuals to conduct research alongside practice
- The UK has a very strong and diverse range of centres of excellence that carry out population and public health research
- The UK has a particularly strong portfolio of large scale, longitudinal population studies, some of which began decades ago
- Whilst UK infrastructure for clinical research is strong, there are fewer activities that are dedicated to supporting population health research
- Responsibility for most public health commissioning is moving from the NHS to local authorities, which brings new opportunities for engaging a wide and diverse workforce in delivering goals to improve public health

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2 Introduction

The overall aims of this review are to provide a clear picture of the UK research landscape for population health research and public health practice. This review will inform the Academy's Health of the Public in 2040 project.

2.1 Background - Health of the Public in 2040

Many of the health challenges of the future, arising from an ageing population, pandemics and obesity, can only be fully addressed through measures to improve the physical and mental health of the population as a whole and by preventing disease. Robust evidence on how to improve the health of the public must be generated through research and translated effectively into policy and practice.

The Academy's 'Health of the Public' project offers an opportunity to introduce new thinking in this area, and to ensure that by 2040 multidisciplinary research underpins interventions to improve the health of the public, with a highly skilled research workforce and strong links between evidence, policy development and service delivery.

As part of this initiative, the project's Working Group are likely to make recommendations concerning the current infrastructure, capacity, training and development pathways for individuals working in both academic population health research and public health practice. To inform such recommendations, a clear picture of the current landscape in the fields of population health research and public health practice is required.

2.2 Definition & Scope

Population Health has been defined as "the health outcomes of a group of individuals, including the distribution of such outcomes within the group," Kindig and Stoddart, 2003). Within this definition it is proposed the field of population health includes "health outcomes, patterns of health determinants, and policies and interventions that link these two". A major focus of population health research is the distribution of health across a population and the study of health inequalities to develop interventions that reduce such disparities. Outcomes from this field of research are to develop evidence-based policies that improve population health.

Population health research is a diverse and interdisciplinary field focusing on the health outcomes of groups of individuals. Many factors influence population health – biological, genetic, behavioural, social, economic and environmental – and their study is important to characterise, explain and control poor health within and across populations.

Public Health has been described as "the science and art of preventing disease, prolonging life and promoting health through organised efforts of society"[1]. Traditional understanding of public health includes aims to prevent epidemics, contain environmental hazards and encourage healthy behaviours through the action of government at local, national and international levels. More recent definitions of public

[1] Sir Donald Acheson, Chief Medical Officer 1983-91

health reach beyond the role of governments to engage diverse communities in health action (Institute of Medicine, 2002; Faculty of Public Health, 2007).

As David Kindig notes in a blog for the University of Wisconsin, "for those who define public health as the 'health of the public', there is little difference from the population health framework" as described in his article.

Public health practice is the means by which evidence can be translated to policy and practice for improving public health. The scope of this field includes, for example:

- Evidence-based methods for health improvement e.g. reducing inequalities, improving education, promoting healthier lifestyles, surveillance and monitoring of specific diseases and risk factors
- Improving healthcare systems and services e.g. clinical effectiveness, clinical governance, audit and evaluation
- Health Protection e.g. control of infectious diseases, chemicals and poisons, environmental health hazards and emergency response

A wide range of practitioners deliver public health policy and practice within the NHS, Public Health England, social care, local authorities and education.

3 Research Funding Landscape

This section describes population health research in the UK by analysing spend by the main funders in this field. Data has been extracted from UK's Health Research Analysis, conducted on behalf of the UKCRC and presenting annual spend at three points over a 10 year period: 2004/05, 2009/10 and 2014. Only data from the 12 largest funders (Health Research Analysis Forum – HRAF) has been collected for all three points and therefore figures showing spend across the 10 years contain figures from these funders only. Figures showing research spend in 2014 only includes data from the wider cohort of research funders (including other AMRC charities).

For summaries of:

- the Health Research Classification System, see Appendix 1
- the methodology used to analyse health research data, see Appendix 2

3.1 Key Points

- Since 2004/5, prevention research spend has increased from 2.5% (£29.6m in real terms) of the portfolio to 5.4% (£102m) in 2014[2]
- The largest increases in spend have been for primary prevention interventions to modify behaviours or promote well-being and interventions to alter physical and biological environmental risks
- Research into the prevention of infection receives the greatest proportion of prevention research spend (30%) followed by cancer (11%) and cardiovascular disease (6%)
- Aetiology research represents the largest proportion (29%) of funder spend within the HRA portfolio with research into biological and endogenous factors representing 63% of this spend
- In real terms, spend on aetiology research has increased from £414m in 2004/05 to £558m in 2014
- Of research funding spent on understanding the causes of disease (£473m in 2014), 20% is spent on understanding the environmental, psychological, social and economic factors, and 80% on the biological and endogenous factors
- Within these three categories, research into infection receives the highest proportion of spend (45%) followed by mental health (9.4%) and cancer (8.3%)
- Spend on research into population screening has doubled in the last ten years, with 56% of spend in this field being for research into cancer screening programmes

3.2 UK Health Research Analysis – all Research Activity Codes

In the latest HRA analysis, all participating funders had a combined spend on health research in 2014 of £2.03bn. Of this total, 29% was classified as aetiology and 5% as

[2] These figures are for the 12 largest funders (HRAF); total prevention research spend for all 64 funders was £106m in 2014

prevention (figure 3.1). This review primarily analyses spend within these two research activities.

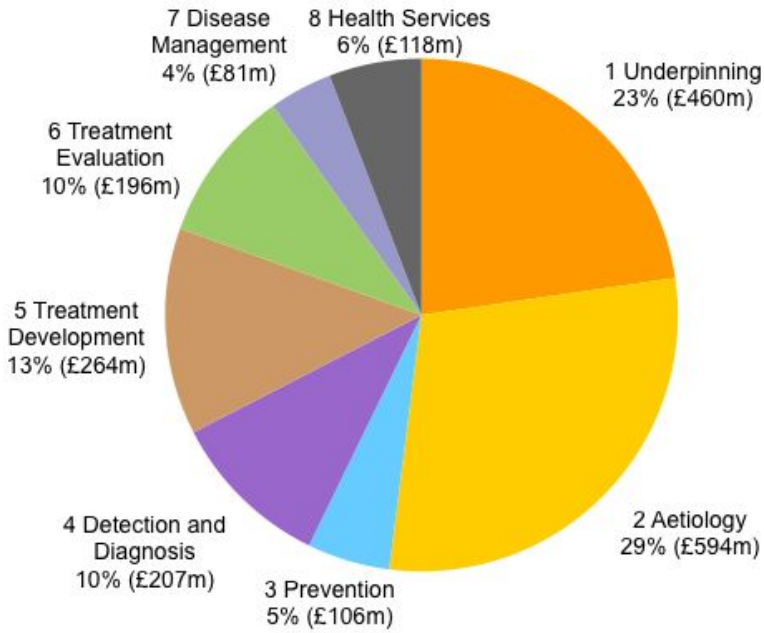

Figure 3.1 - Proportion of combined spend total by research activity for all 64 funding organisations in 2014; total spend = £2.03bn (source: UK Health Research Analysis 2014[3], figure 3)

Since 2004/05, prevention research has seen the highest rate of increased spend, albeit from a very low base. In 2004/05, 2.5% (£29.6m in real terms) of the portfolio was for prevention research, which has increased to 5.4% (£102m) in 2014 (figure 3.2).

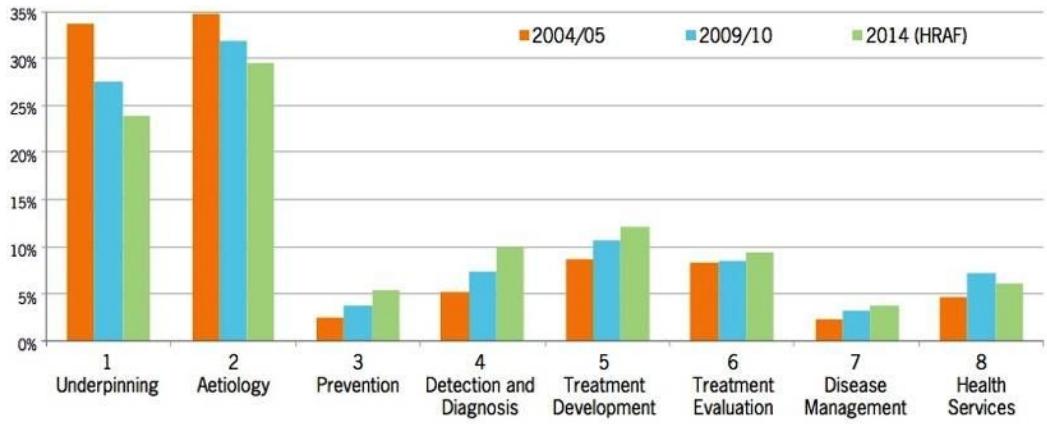

Figure 3.2 - Proportion of combined health research analysis spend (real terms) by research activity for 12 HRAF funders for 2004/05, 2009/10, and 2014 (source: UK Health Research Analysis 2014[2], figure 5)

[3] http://www.hrcsonline.net/sites/default/files/UKCRCHealthResearchAnalysis2014%20WEB.pdf

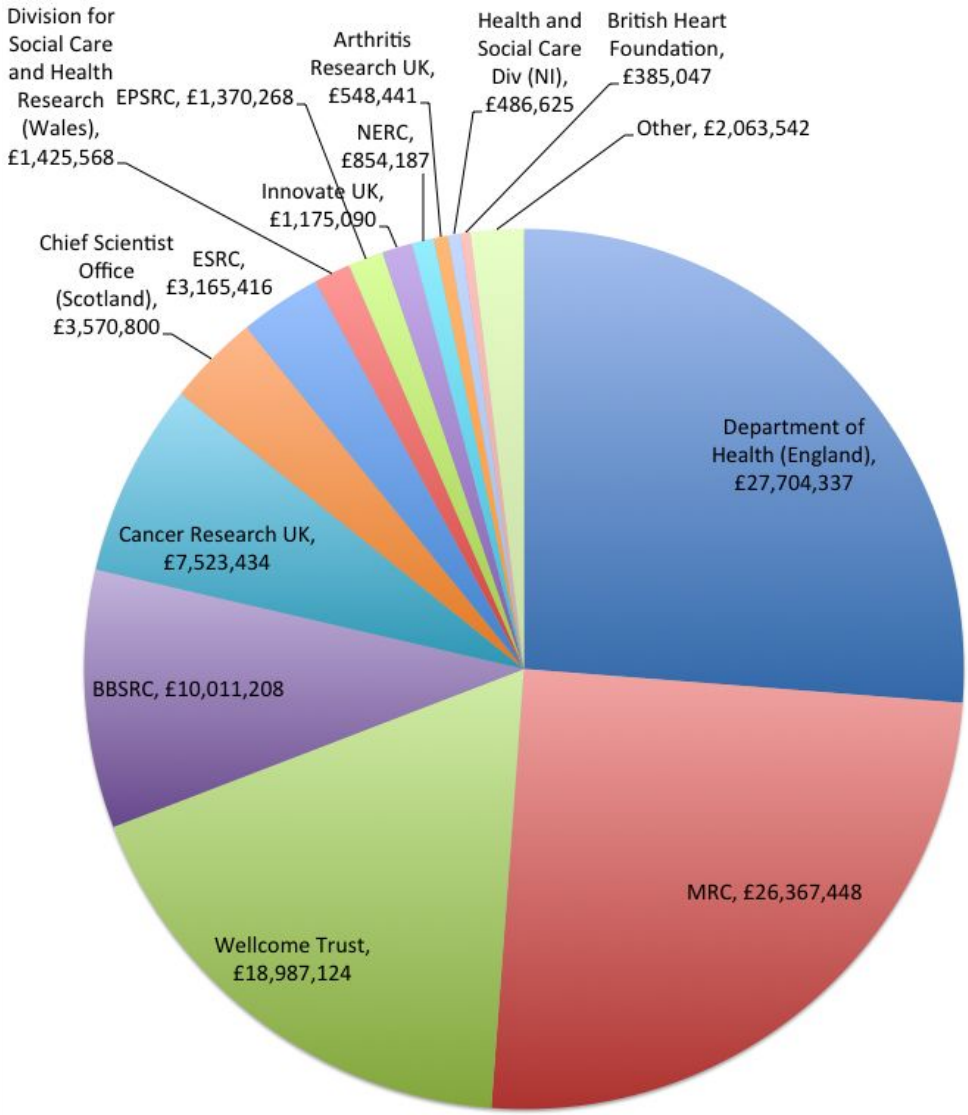

Figure 3.3 - Proportion of combined health research analysis spend on prevention by each funder in 2014 (source: UK Health Research Analysis 2014 data); total spend = £106m

3.3 Spend on prevention research

The major funders of prevention research in the UK are the Department of Health, MRC and Wellcome Trust, which together support almost 70% of the prevention research portfolio (figure 3.3). During the last ten years, all funders have increased the amount that they spend on prevention research (figure 3.4).

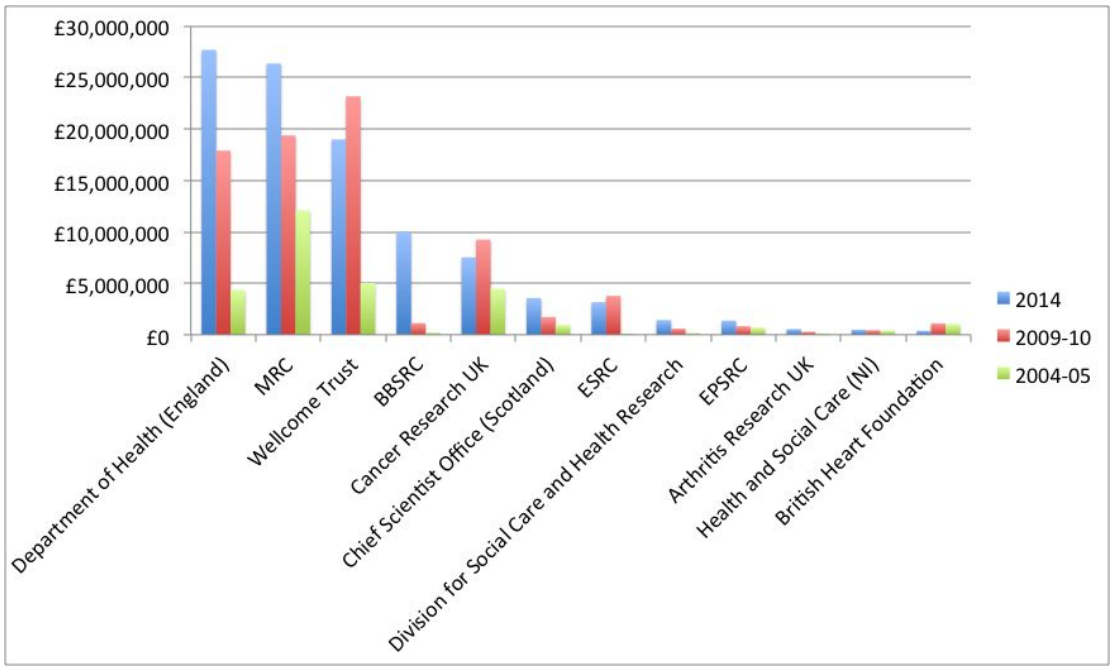

Figure 3.4 – Prevention research spend (real terms) by HRAF funders during 2004-05, 2009-10 and 2014 (source: UK Health Research Analysis data)

When looking at specific Research Activities within prevention (figure 3.5), the largest increases have been in the following categories, which have increased 6-7 fold since 2004/05:

3.1 Primary prevention interventions to modify behaviours or promote well-being

3.2 Interventions to alter physical and biological environmental risks

Research spend on nutrition, chemoprevention and vaccines have also increased during the last ten years, albeit at a more modest level.

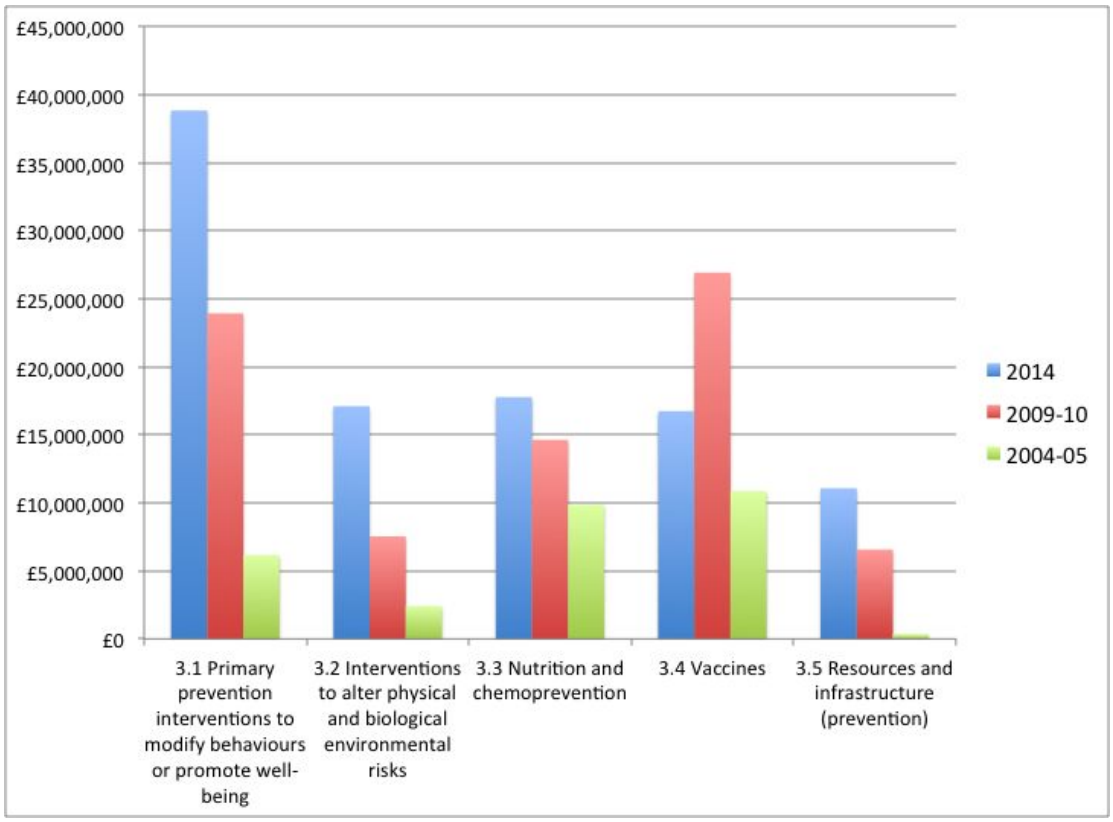

Figure 3.5 – Prevention research spend (real terms) on each Research Activity during 2004-05, 2009-10 and 2014 (source: UK Health Research Analysis data)

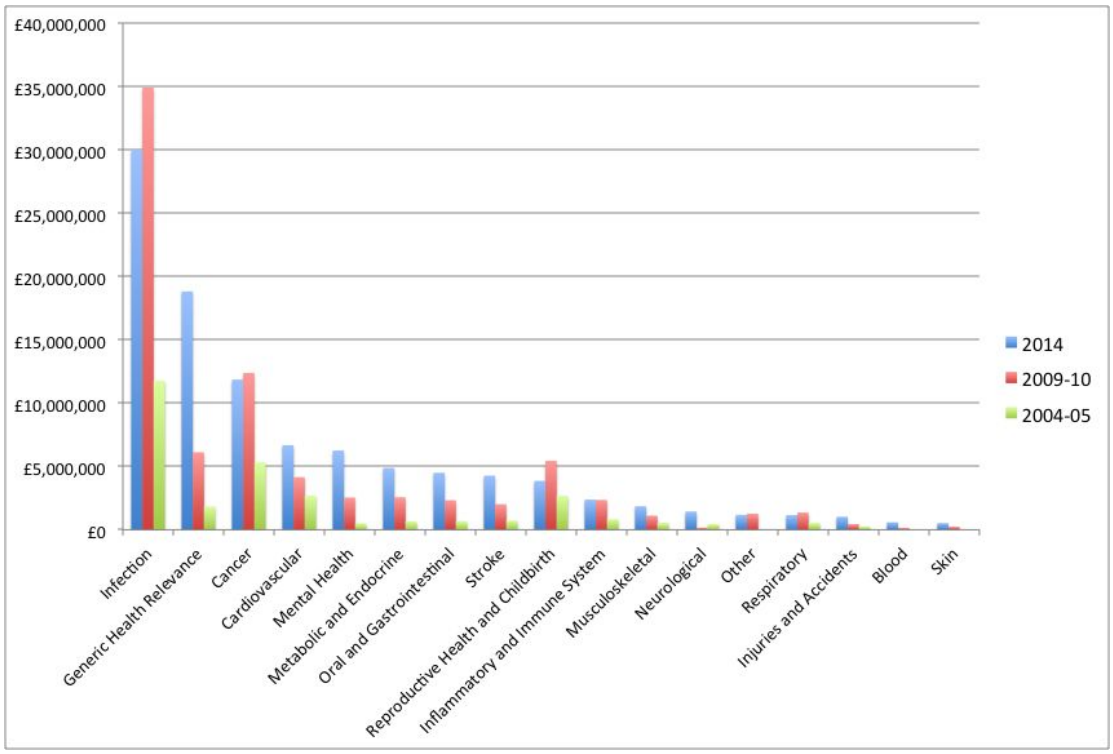

Figure 3.6 – Prevention research spend (real terms) on each Health Category during 2004-05, 2009-10 and 2014 (source: UK Health Research Analysis data)

When looking at each Health Category (e.g. infection, cancer, cardiovascular disease; figure 3.6), infection receives the greatest proportion of prevention research spend (30% in 2014)) followed by cancer (11%).

Universities have also increased their spend on prevention research, with the highest volumes taking place at Oxford, London School of Hygiene and Tropical Medicine and UCL (figure 3.7). For comparison, related research activity within these universities has also been considered using data from the Research Excellence Framework (2014) - see table 4.2.

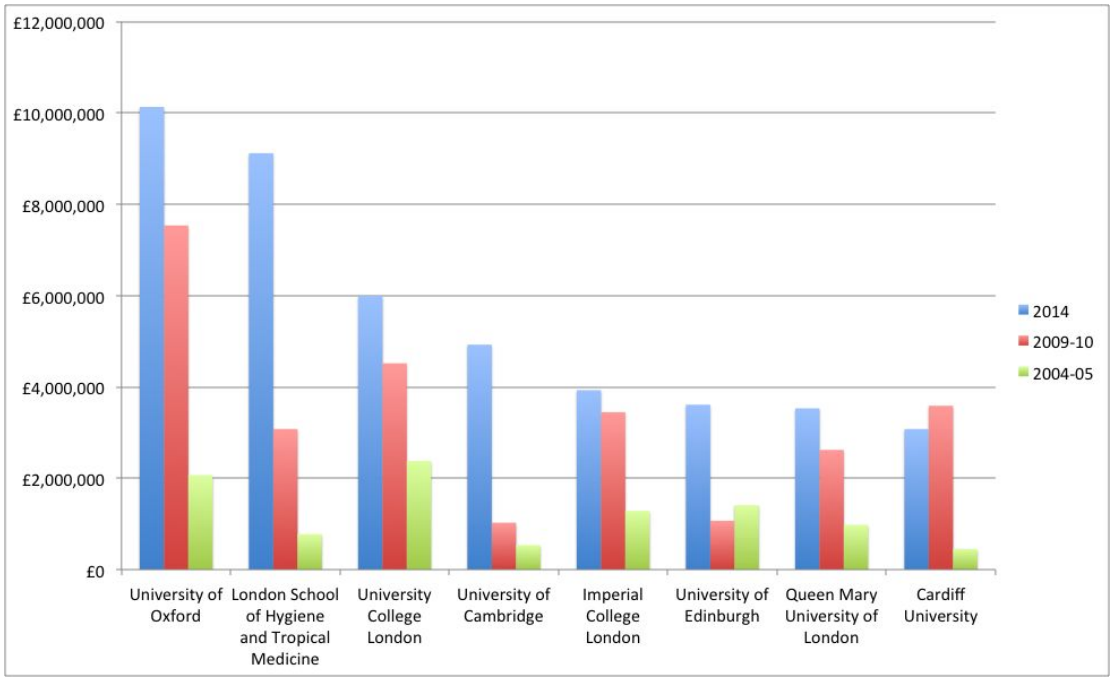

Figure 3.7 – Prevention research spend (real terms) at universities during 2004-05, 2009-10 and 2014 (source: UK Health Research Analysis data); only universities where spend was >£2.5m in 2014 are shown

3.4 Spend on aetiology research

Aetiology research represents the largest proportion (29%) of funder spend within the HRA portfolio (figure 3.1). Whilst the proportionate spend on aetiology research has decreased during the last ten years (figure 3.2), in real terms spend has increased from £414 in 2004/05 to £558m in 2014 (data for the top 12 funders only).

The major funders of aetiology research are the MRC, Wellcome Trust and Cancer Research UK, which together support almost 80% of research in this field (figures 3.8 and 3.9).

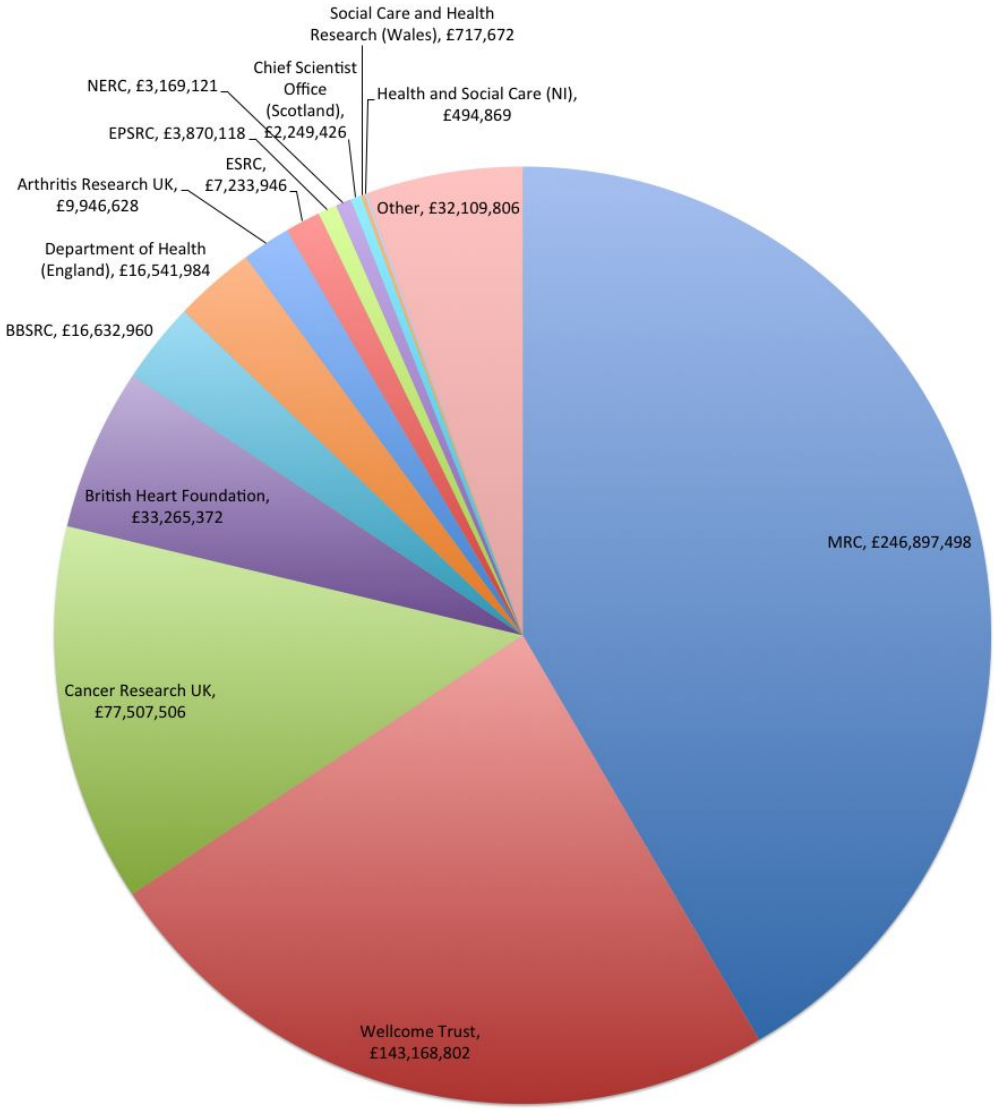

Figure 3.8 - Proportion of combined health research analysis spend on aetiology by each funder in 2014 (source: UK Health Research Analysis 2014 data); total spend = £594m

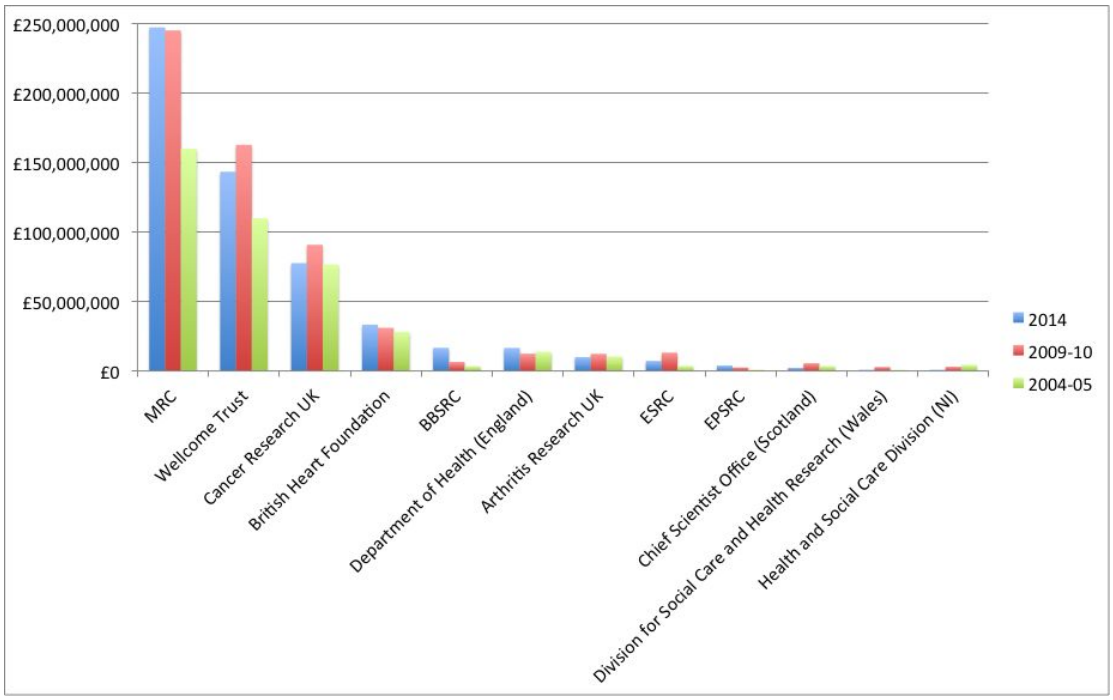

Figure 3.9 – Aetiology research spend (real terms) by each funder during 2004-05, 2009-10 and 2014 (source: UK Health Research Analysis data)

When looking at specific Research Activities within aetiology (figure 3.10a), there have been increases to spend in real terms across all categories, from 2004/05 to 2014. Research into biological and endogenous factors (RAC 2.1) represents 63% of the total spend on aetiology research.

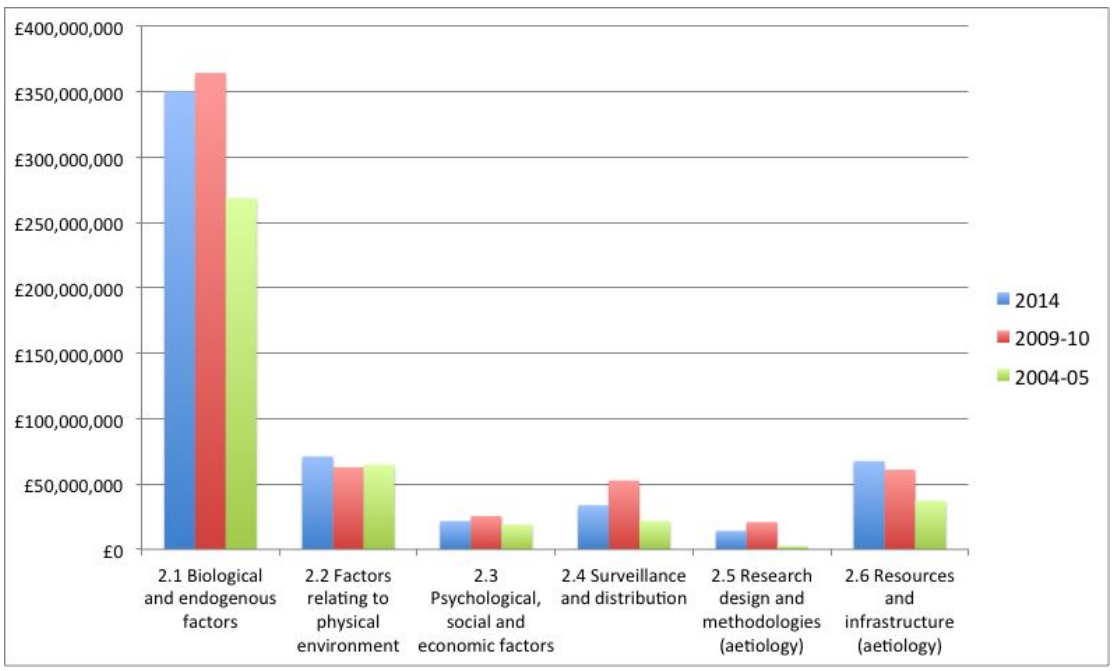

Figure 3.10a – Aetiology research spend (real terms) by each Research Activity during 2004-05, 2009-10 and 2014 (source: UK Health Research Analysis data)

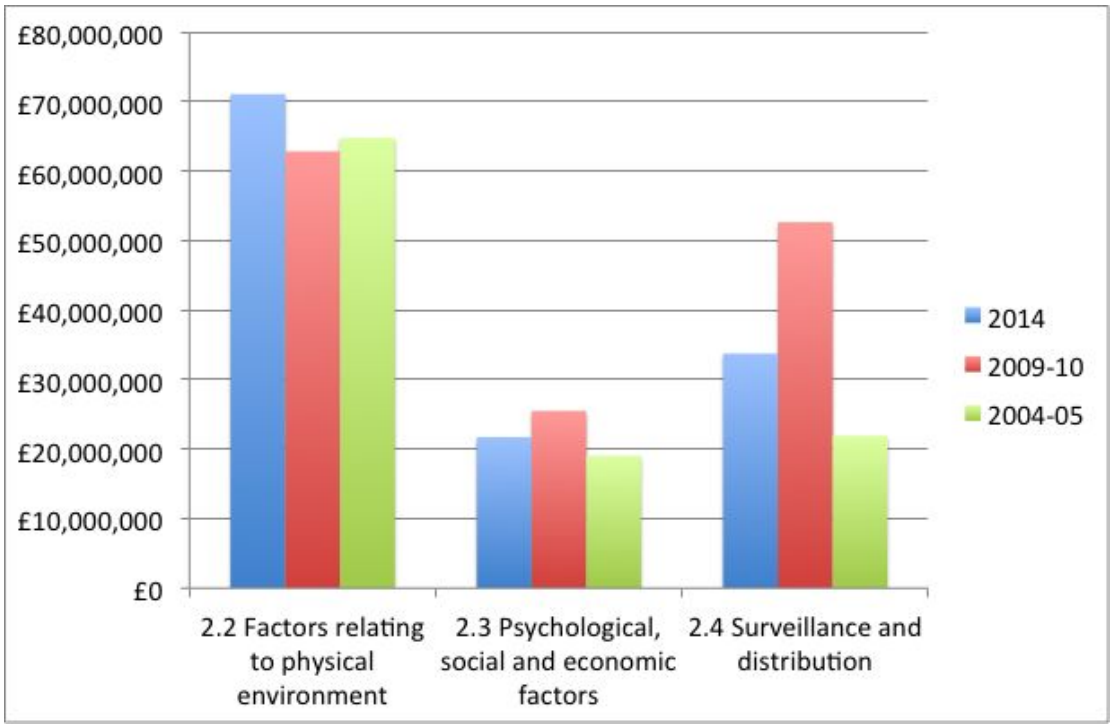

Figure 3.10b – Aetiology research spend (real terms) by Research Activities 2.2-2.4 only for research during 2004-05, 2009-10 and 2014 (source: UK Health Research Analysis data)

3.4.1 Spend on aetiology research activities: 2.2-2.4

The following Research Activities (2.2-2.4) are of most relevance to the study of modifiable factors linked to the health of the public and therefore have been selected for sub-analysis in this section:

2.2 Factors relating to physical environment
2.3 Psychological, social and economic factors
2.4 Surveillance and distribution

Further descriptions of these research activities (2.2-2.4) can be found in appendix 1.

22% of the aetiology portfolio involves research into these three categories. Since 2014/15, there has been a modest increase in spend (in real terms) within these three areas (figure 3.10b). For comparison, more significant increases in specific aspects of prevention research were seen during this period (figure 3.5).

Furthermore, in 2014 total spend on research into the environmental, psychological, social and economic factors (research activities 2.2 and 2.3) was £97m. In contrast, total spend on biological and endogenous factors was £376m. Therefore, only 20% of research spend towards understanding the causes of disease is for environmental, psychological, social and economic factors.

As an example, when looking at the aetiology research spends of the ESRC and EPSRC in 2014 (figure 3.11), perhaps unsurprisingly, the major spend for ESRC is within psychological, social and economic factors (activity code 2.3).

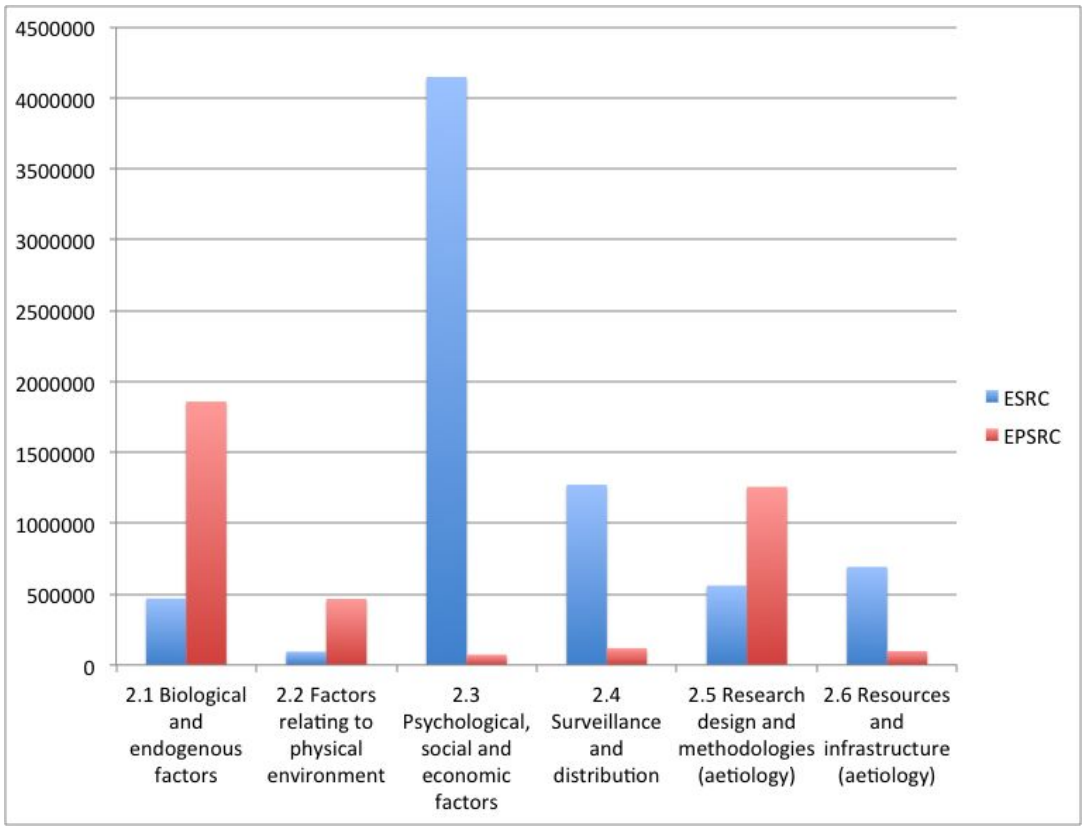

Figure 3.11 – Aetiology research spend by ESRC and EPSRC on specified Research Activities during 2014 (source: UK Health Research Analysis data)

Figures 3.12a and 3.12b show the amounts spent by each of the 12 largest funders in these three areas of aetiology research (Research Activities 2.2-2.4). Whilst some increased spend has been observed during the last ten years (Wellcome, BBSRC, DH, EPSRC), decreased spend has been seen in all three devolved nations (figure 3.12b).

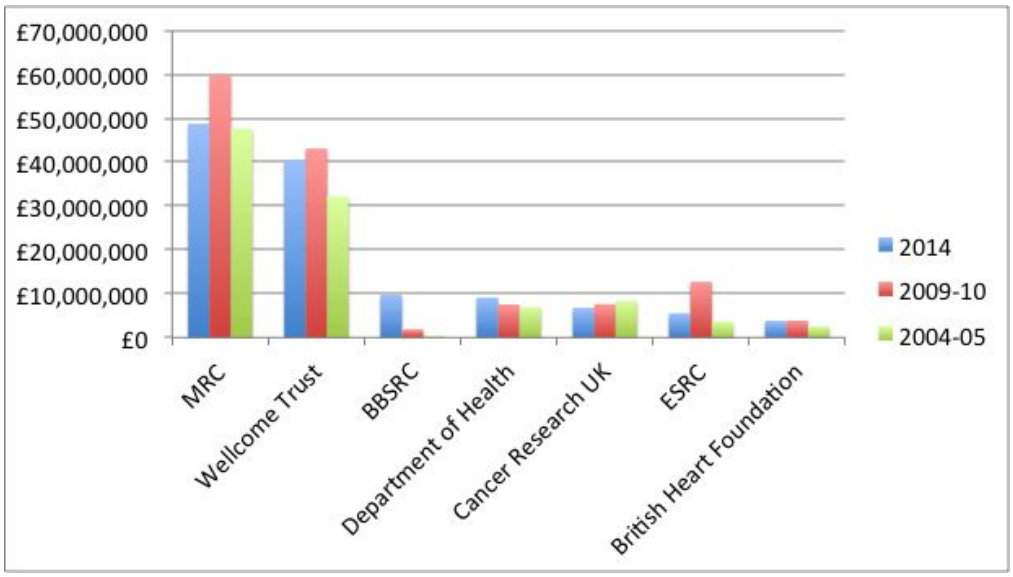

Figure 3.12a – Aetiology research spend (real terms) within Research Activities 2.2-2.4 by funder (top 12 (HRAF), with spend >£1m pa in 2014) during 2004-05, 2009-10 and 2014 (source: UK Health Research Analysis data)

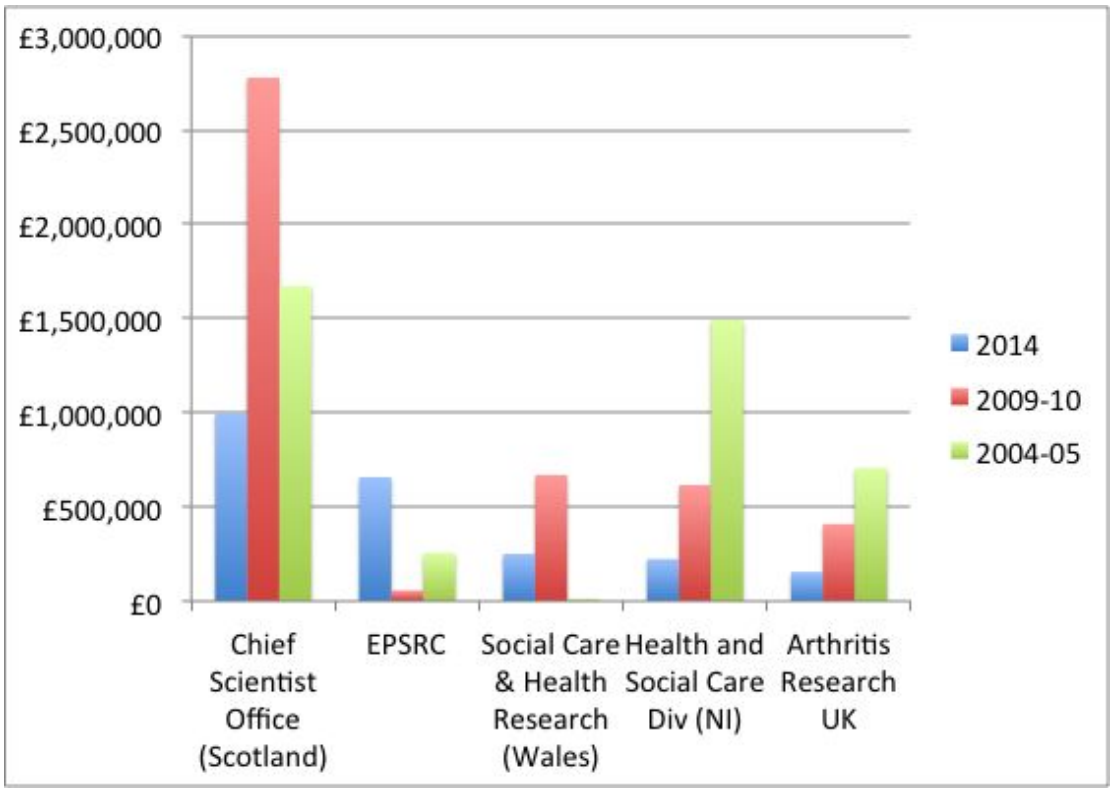

Figure 3.12b – Aetiology research spend (real terms) within Research Activities 2.2-2.4 by funder (top 12 (HRAF), with spend <£1m pa in 2014) during 2004-05, 2009-10 and 2014 (source: UK Health Research Analysis data)

Research spend on most disease areas (Health Categories) has increased during the last ten years (figures 3.13a and b). Infection research receives the highest proportion of spend (45% in 2014) followed by mental health (9.4%) and cancer (8.3%) – see figure 3.13a.

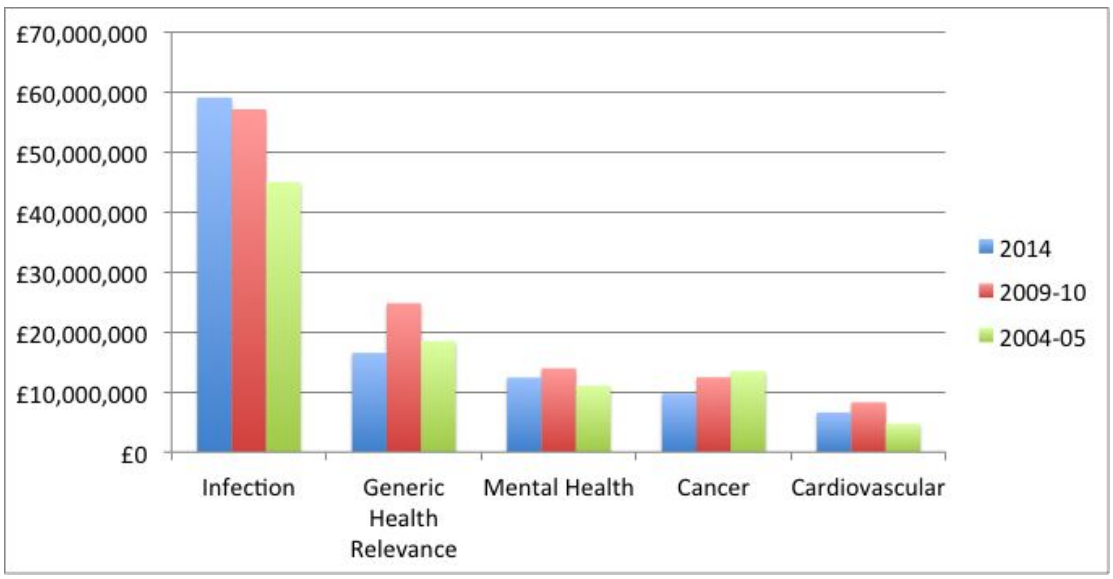

Figure 3.13a – Aetiology research spend (real terms, >£7m pa) on each Health Category (for Research Activities 2.2-2.4 only) during 2004-05, 2009-10 and 2014 (source: UK Health Research Analysis data)

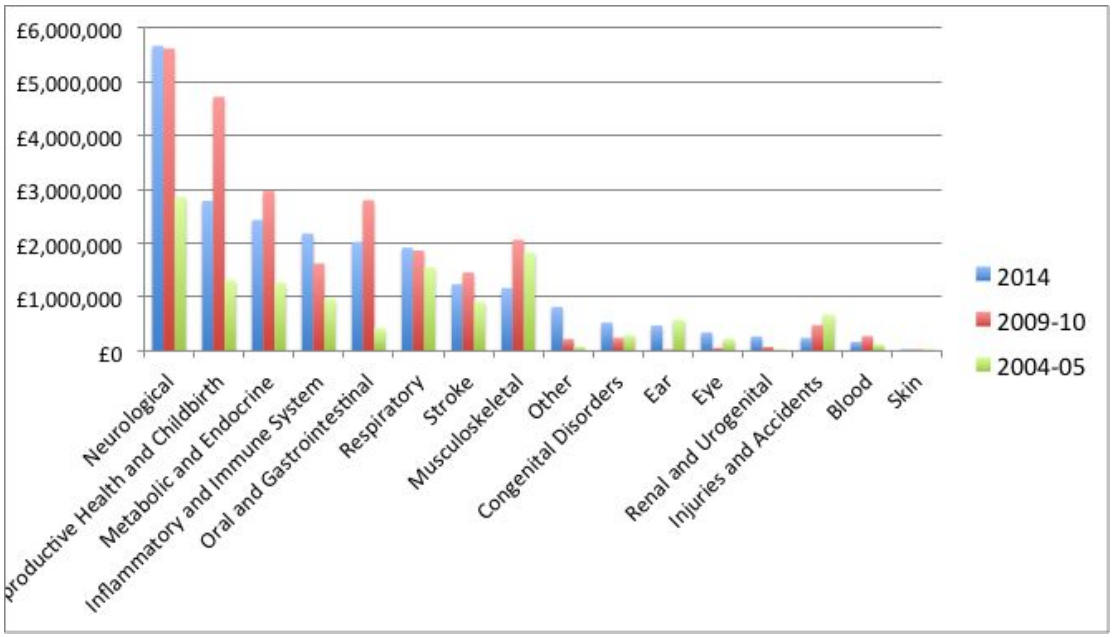

Figure 3.13b – Aetiology research spend (real terms, <£7m pa) on each Health Category (for Research Activities 2.2-2.4 only) during 2004-05, 2009-10 and 2014 (source: UK Health Research Analysis data)

The most research active universities within these fields of aetiology (2.2-2.4) were: Cambridge, Oxford, UCL, Imperial College and Glasgow (figure 3.14).

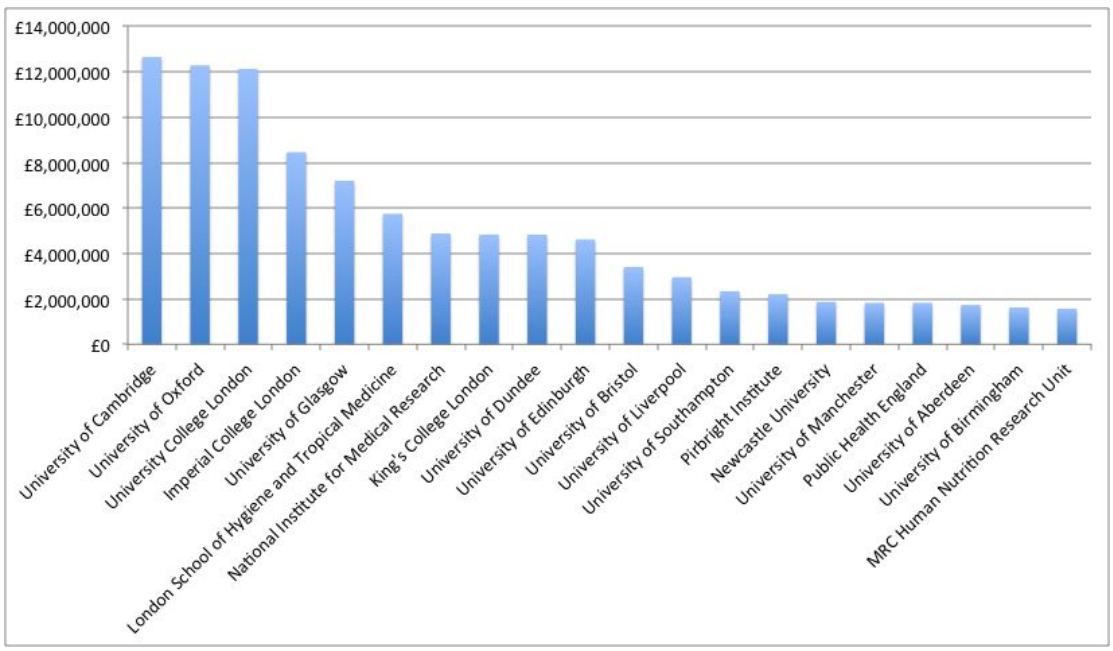

Figure 3.14 – Spend on aetiology research (2.2-2.4) at universities during 2014 (source: UK Health Research Analysis data); only universities where spend was >£1.5m are shown

3.5 Spend on research into population screening, uptake and impact

Within the Research Activity of 'Detection, Screening and Diagnosis', the dataset includes information on research that investigates population screening. Selected Research Activities (codes 4.3 and 4.4) include data on the development and evaluation of screening programmes and the analysis of factors that influence uptake – see Appendix 1 for further information on the topics covered.

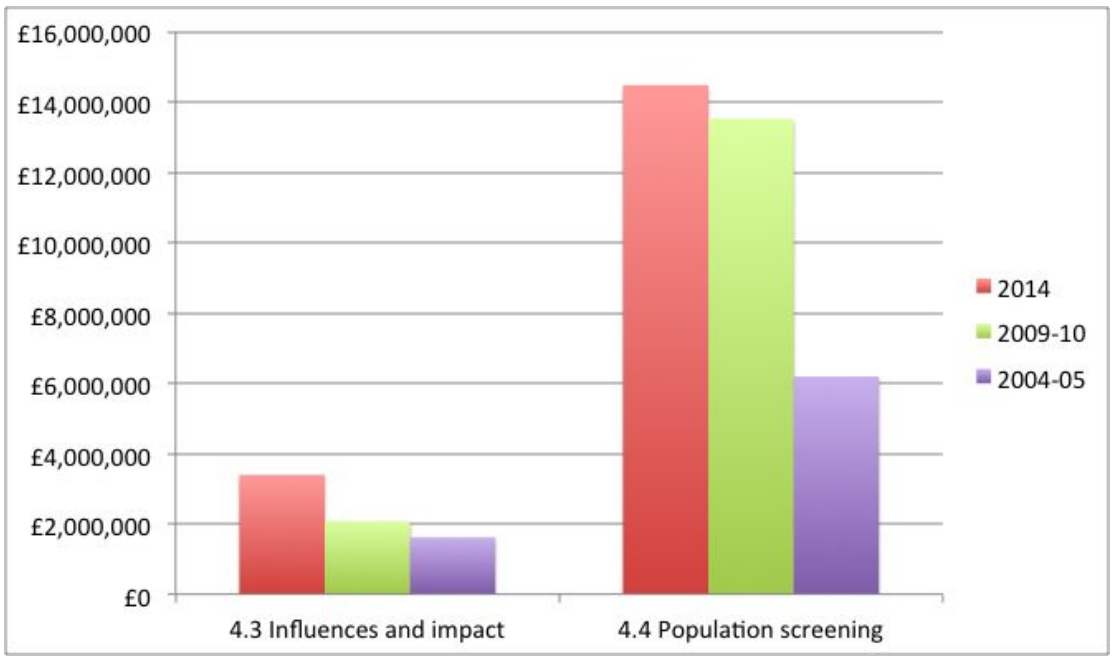

Figure 3.15 – Research spend (real terms) on population screening (Research Activities 4.3-4.4) during 2004-05, 2009-10 and 2014 (source: UK Health Research Analysis data)

Spend on research within each category of population screening has doubled in the last ten years (figure 3.15). 56% of research spend in this field in 2014 was for cancer screening programmes and 15% for infection-related programmes (figure 3.16a). Screening programmes for all other conditions described make up the remaining 29% of this part of the portfolio (figure 3.16b). 85% of funding is this area is provided by Cancer Research UK (45%) and the Department of Health (40%).

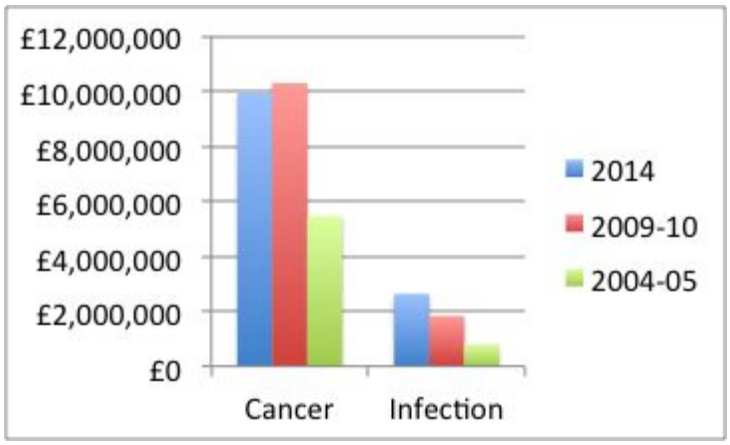

Figure 3.16a – Research spend (real terms, >£1m) on population screening (Research Activities 4.3-4.4) by Health Category during 2004-05, 2009-10 and 2014 (source: UK Health Research Analysis data)

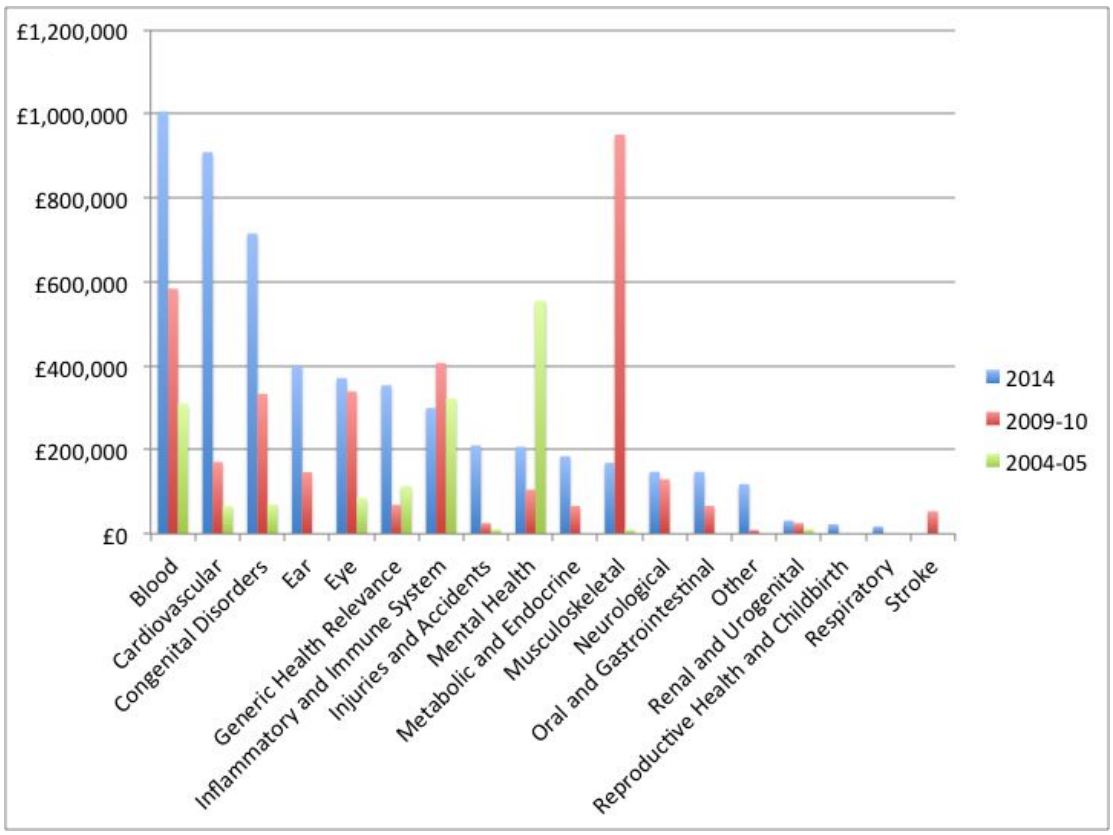

Figure 3.16b – Research spend (real terms, <£1m) on population screening (Research Activities 4.3-4.4) by Health Category during 2004-05, 2009-10 and 2014 (source: UK Health Research Analysis data)

In 2014, the Higher Education Institutes with the highest research activity in the field of population screening were Queen Mary (University of London), the Institute of Cancer Research and University College London (figure 3.17).

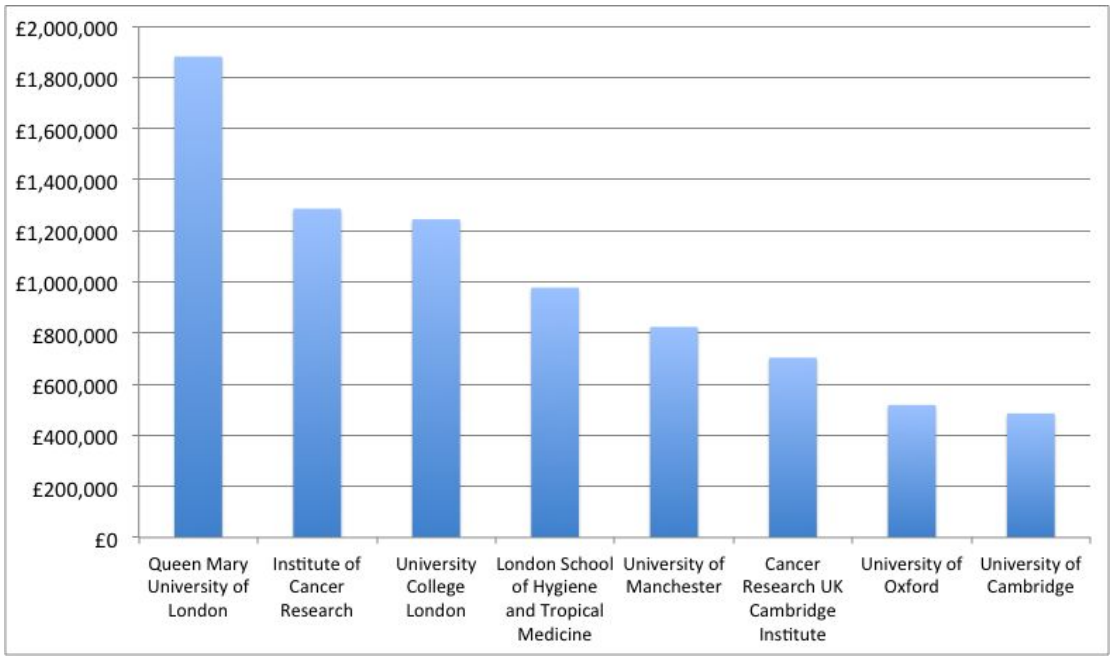

Figure 3.17 – Research spend in 2014 on population screening (Research Activities 4.3-4.4) by Higher Education Institute (source: UK Health Research Analysis data)

3.6 Spend on research into infection

Research into infection receives the largest proportion of spend across both aetiology and prevention (figures 3.6 and 3.13a). Furthermore, when looking across the whole portfolio, 63% of spend on infection research is within aetiology and prevention. The MRC and Wellcome Trust are the largest funders of research into infection, supporting 77% of research in this health category (figure 3.18).

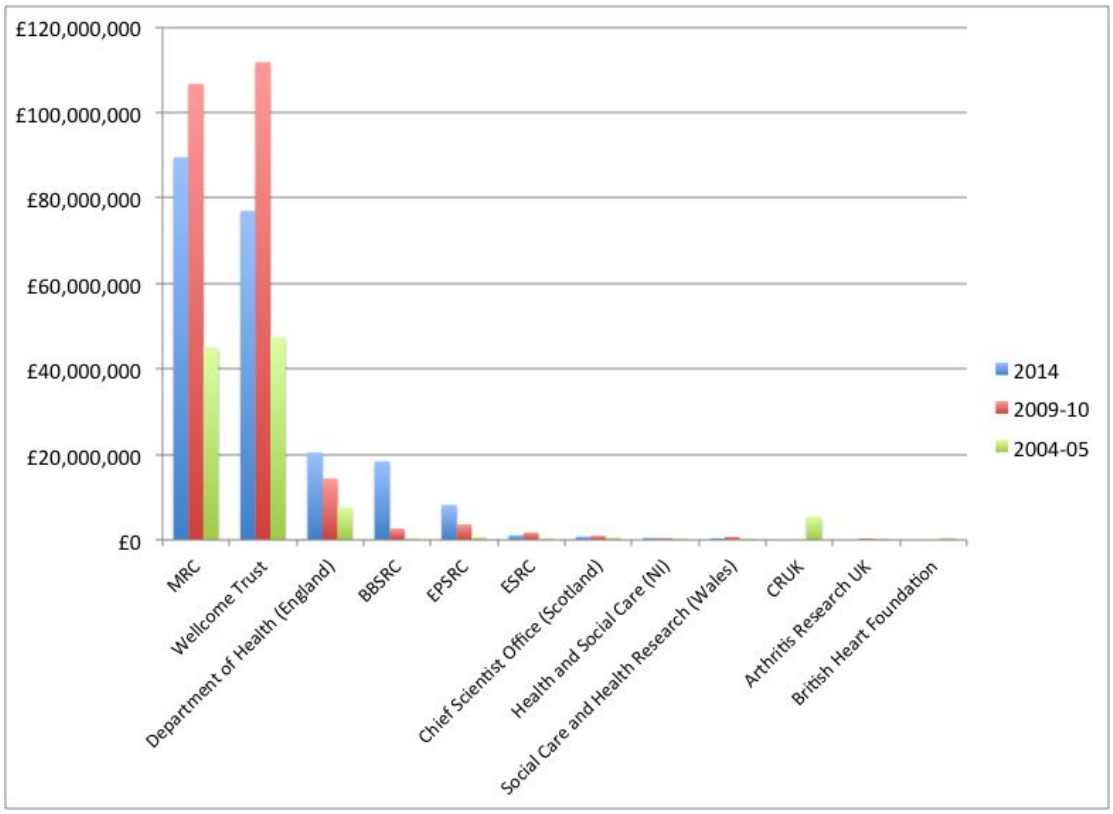

Figure 3.18 – Research spend (real terms) on infection by each funder across all Research Activities during 2004-05, 2009-10 and 2014 (source: UK Health Research Analysis data)

4 Research outputs, outcomes and impact from population health research in the UK

This section assesses the strength of the UK's research in the fields of population and public health research. The analysis considers the strengths of research institutions within the UK and, where data is available, draws on international comparisons.

4.1 Key Points

- Between 1995-2004, the UK had the highest numerical output of publications in public health research within all European countries
- A review of public health research projects funded by the European Commission, recommended that:
  - Research on the effect of economic policies on equity and inequalities in health, with specific reference to impact of changes in health and welfare provision and public health should be a priority
- Research across a wide range of 'health' and 'non-health' subjects contribute impacts to public health and prevention, highlighting the importance of multidisciplinary research in this field
- Key recommendations arising from a review of the impact of the National Prevention Research Initiative (NPRI) are:
  - A greater emphasis is needed on research to narrow health inequalities and research into mental health and wellbeing
  - More needs to be done to enhance the translation of research findings into policy or practice
  - A greater focus on developing interventions that may act at e.g. group, community or population-level, rather than at individual level

4.2 Methodology

A range of published sources have been used to analyse the outputs, outcomes and impact from population and public health research (also described in the bibliography):

- *A bibliometric overview of public health research in Europe - Clarke et al (2007)*
  This publication provided results from the collaborative, an EC-funded study SPHERE (Strengthening Public Health Research in Europe), which had the aim of producing a bibliometric overview of public health research literature for Europe.

- *Public health research in the UK: a report with a European perspective – McCarthy et al (2013)*
  A report from PHIRE (Public Health Innovation and Research in Europe), an EC-funded study to assess the national impacts of eight innovation projects of the European Union's first Public Health Programme 2003-2005.

- *Review of Public Health Research Projects Financed under the European Commission's Framework Programmes for Health Research (2013)*

- *The Research Excellence Framework (REF) 2014*, including an analysis of case studies from the REF, conducted by King's College London

- *An evaluation of the National Prevention Research Initiative (NPRI)*

- Outcome and impact analyses conducted by the MRC

4.3 Bibliometric analysis

An analysis of the outputs from public health research in Europe was conducted within the EC-funded SPHERE (Strengthening Public Health Research in Europe) project and reported by Clarke et al (2007). This bibliometric analysis looked at publications (1995-2004) from six areas of public health research: infectious disease and control, health promotion, health management, genetic epidemiology, health services and environmental health. The report showed that Europe contributed around one-third of world output in public health research. Within Europe, the UK had the highest numerical output of European countries, although the Scandinavian countries have higher per capita output (figure 4.1).

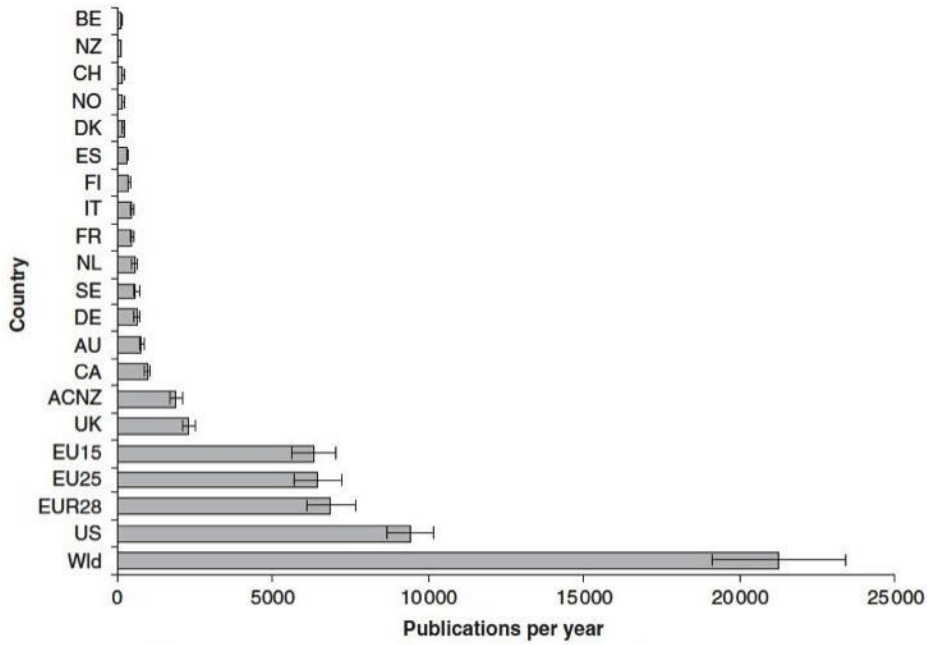

Figure 4.1 - Average annual public health publications (with 95% confidence intervals) for countries with more than 100 publications pa and by clusters of countries, allocated to countries on a fractional basis, in the 10-year period from 1995 to 2004. Source: SPHERE, Clarke et al (2007)

The SPHERE study reported considerable differences in research output between countries, with a relative underinvestment in public health research by many European countries.

4.4 European Commission

The EC's Horizon 2020 Research and Innovation programme plans to distribute nearly €80 billion in funding over 7 years (2014 to 2020). A priority within Horizon 2020 is 'Health, Demographic Change and Wellbeing', with €1.2 billion invested during 2014/15. To inform Horizon 2020, the EC undertook an evaluation of the impacts, challenges and limitations of EU-funded public health research under the current and previous research

framework programmes. The findings of this review were published in 2013 – Review of Public Health Research Projects Financed under the Commission's Framework Programmes for Health Research. Recommendations of particular relevance to this report are summarised in Table 4.1.

1	Research on the effect of economic policies on equity and inequalities in health, with specific reference to impact of changes in health and welfare provision and public health should be a priority.
2	Public health research should be supported more strongly within the EU and nationally and must continue to be free of commercial conflicts.
3	Priority setting must review and take into account the outcomes and recommendations of previous EU-funded public health research and focus, the European dimension of research as well as needs of Member States and global public health priorities.
4	An international public health advisory board made up of public health research experts, user groups and health policy makers should be considered to assist DG RTD with priority setting for calls and projects. It should have a strong governance structure.
5	The active involvement of end users, robust dissemination plans with appropriate resources and mid-term reviews should be mandatory for all projects.
6	A readily accessible, flexible, repository of outputs must be established and should incorporate long-term follow-up.
7	There is a need to develop a public health framework to evaluate EU funded research from the perspective of equity, universality and solidarity, and public health goals.

Table 4.1 – Summary of selected recommendations for Horizon 2020 based on the evaluation of previous EC framework programmes in Public Health Research. Source: European Commission (2013)

4.5 Research Excellence Framework (REF) 2014

The most recent REF assessed the outputs, outcomes and impact from population and public health research within Unit of Assessment 2: 'Public Health, Health Services and Primary Care'. The top universities when considering quality of research output were Oxford, Imperial College London and Cambridge (table 4.2). In terms of research power (quality and volume), UCL and the London School of Hygiene and Tropical Medicine were strongest.

Rank	Institution name	Total number of FTE staff submitted	% of 4* research activity	GPA	Research power
1	University of Oxford	48	57	3.48	166
2	Imperial College London	55	57	2.46	189
3	University of Cambridge	57	50	3.41	195
4	University of Bristol	75	50	3.34	249
5	Queen Mary University of London	21	44	3.29	68
6	Keele University	9	36	3.27	30
=7	University College London	160	46	3.24	518
=7	University of York	53	42	3.24	171
=9	King's College London	24	37	3.23	76
=9	University of Southampton	11	37	3.23	34
11	London School of Hygiene & Tropical Medicine	257	43	3.22	828

Table 4.2 – Top 11 Higher Education Institutions within 'Public Health, Health Services and Primary Care' (Unit of Assessment 2) of REF 2014. Institutions are ranked according to Grade Point Average (GPA), which is an indicator of overall quality. Figures for Research Power are also shown, which combine quality and volume based on the numbers of FTE staff submitted. Source REF (2014).

In their report, 'The nature, scale and beneficiaries of research impact', King's College London and Digital Science (2015) assessed how research has contributed to the economy, society, culture, public policy and services, health, the environment and quality of life. The group analysed 6,679 non-redacted case studies that were submitted to REF 2014.

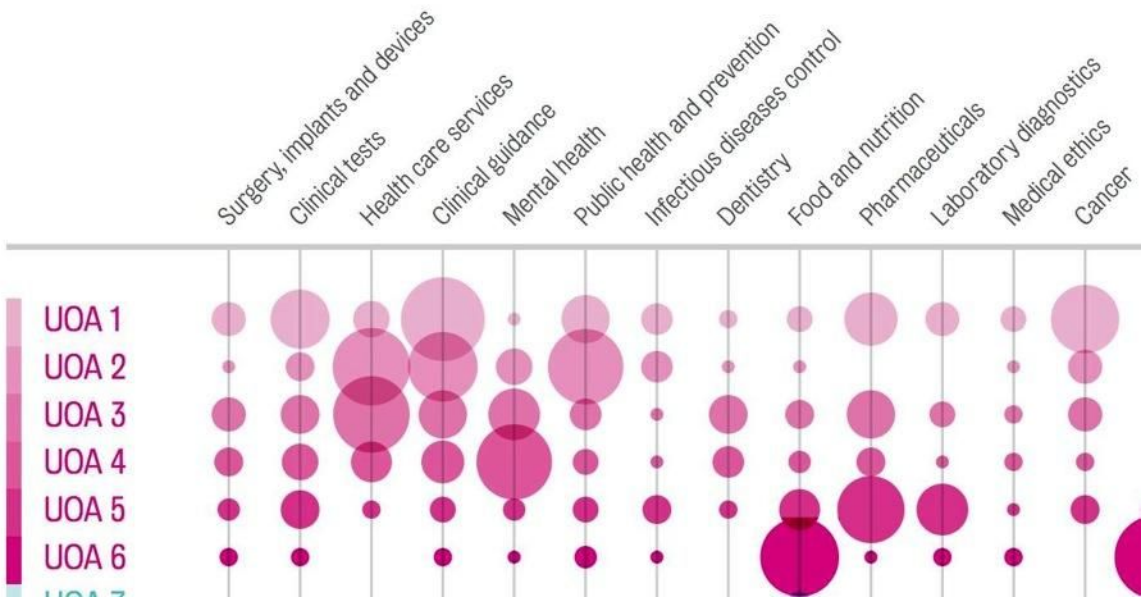

Figure 4.2 - Heat map illustrating distribution of topics by Unit of Assessment (UOA) and main panels. The size of each circle illustrates the proportion of case studies that have been allocated to a specific topic for the given UOA. E.g. within UOA2, 30% of cases studies were allocated to the topic of 'public health and prevention'. A small segment of the original figure is shown. Source: King's College London and Digital Science (2015)

The heat map in figure 4.2, published by King's College London and Digital Science (2015), illustrates the distribution of topics in REF case studies by Unit of Assessment (UOA) and topic. This figure shows that case studies within UOA2 encompass a wide range of topics such as 'Health Care Services' and 'Clinical Guidance' as well as 'Public Health and Prevention'.

Whilst most case studies describing 'Public Health and Prevention' (n=195) were submitted within health-related UOAs (1-6), several case studies also described research within a range of other UoAs (figure 4.3). A selection of these 'non-health research' UOAs is summarised below:

UOA 10	Mathematical Sciences
UOA 22	Social Work & Social Policy
UOA 23	Sociology
UOA 24	Anthropology & Development Studies
UOA 32	Philosophy
UOA 33	Theology and Religious Studies

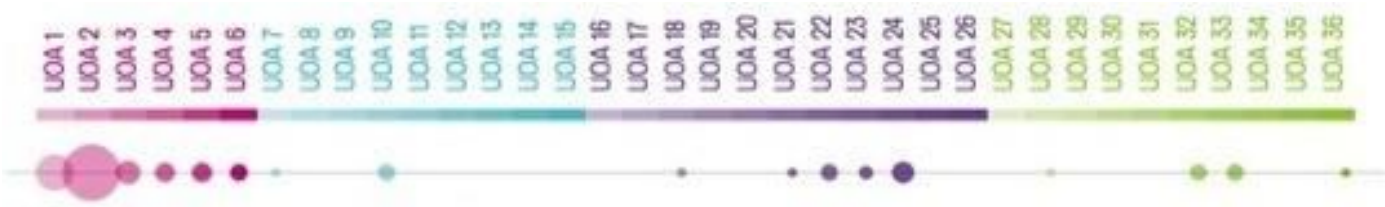

Figure 4.3 - Heat map illustrating distribution of cases studies describing 'public health and prevention' topics across the Units of Assessment (UOA). Source: King's College London and Digital Science (2015)

To further illustrate the degree of multiple impacts, King's College London and Digital Science (2015) analysed the distribution of UOAs within the specific topics, as shown in the impact wheels in figure 4.4.

A B C

Figure 4.4 – Impact wheels illustrating distribution of cases studies across different UOAs for A) public health and prevention, B) infectious disease control and C) figure key, showing UOA1 to UOA36 (clockwise from top). UOAs are colour coded as in figure 4.3. Source: King's College London and Digital Science (2015)

These analyses highlight that research across a wide range of areas (as defined by UOA) deliver impacts for public health, prevention and infectious disease control.

4.6 National Prevention Research Initiative (NPRI)

The NPRI was a national initiative made up of government departments, research councils and major medical charities that worked together to encourage and support research into chronic disease prevention. Its core aim was to develop and implement successful, cost-effective interventions that reduce people's risk of developing major diseases by influencing their health behaviours.

The NPRI partners committed £34m for four funding calls (awards made in 2005, 2007, 2008 and 2011), which have supported 74 research projects of variable size and duration. An evaluation of the initiative by the MRC (2015) reviewed outputs from individual projects and advised on future opportunities in prevention research.

4.6.1 NPRI - achievements

An explicit aim of the NPRI was **to build capacity in public health / prevention research**. The evaluation identified evidence of this aim being achieved by:

- Acquisition of new skills by the NPRI Principal Investigators
- Additional grant funding obtained, including studentships
- Development of new collaborations (sometimes with disciplines not traditionally associated with public health research at the time)
- Formation of new scientific and policy/practice networks
- More collaborative patterns of working in this area
- Creating a focus on behaviour and prevention that had not existed previously
- Enabling some funders to support aspects of public health prevention research that previously would have been outwith their remit or usual range of activities.

4.6.2 Future Directions (and infrastructure and careers)

In considering the future direction of NPRI, and more generally future priorities in public health and prevention research, the following points were highlighted in the report:

- There is a paucity of interventions that produce large and sustained change in the 'real world'. Larger effect sizes may be achieved by the use of theory-based interventions.
- Key areas to be addressed include work to narrow health inequalities and research into mental health and wellbeing
- More needs to be done to enhance the translation of findings into policy or practice. This could require improved resources, methods, structures, networks and processes are needed for summarising evidence for decision makers

The report identified the following key recommendations for the future:

- There should be a better balance between observational, developmental, and intervention studies, with increased emphasis on solving problems rather than simply describing them

- Future programmes should have greater focus on developing interventions that may act at a level other than the individual (e.g. at group, community or population-level), or at more than one level
- There should be more work on the cost-effectiveness of public health prevention strategies, as well as the modelling of likely long-term impact on disease outcome
- A key priority is research into the development and testing of interventions in groups with particular needs, such as those with poor mental health, and in lower socioeconomic and minority ethnic groups
- Support should be given to researcher/practitioner teams to effect sustainable change. There should also be strengthened engagement and collaboration between research funders and researchers to build capacity and expertise in knowledge exchange.
- There should be increased focus on studies addressing low socioeconomic status (SES), deprivation, or health inequalities, where the need for research is disproportionately high

4.7 Outcome reporting by other funders

The MRC provides a range of information describing the outputs, outcomes and impact of its research. Links to several examples are provided below, which describe how MRC research has influenced policy on a range of areas:

- NICE guidelines on Managing overweight and obesity in adults – lifestyle weight management services
- Smoking reduction
- Public health guidelines on physical activity

The Wellcome Trust (2013) has conducted a review of its portfolio for research into Population and Public Health. Their main conclusions were that, through the charity's support it had:

- helped to nurture some of the current leaders in the field
- enabled several major discoveries of relevance to endemic health issues through its investment in research capacity and infrastructure in low- and middle-income countries
- enabled major commitments to support longitudinal studies, open access and data sharing, which together are having positive impacts on research and policy in the field of population and public health

Cancer Research UK has identified behavioural research in prevention (BRP) as an area of strategic need in order to 'save more lives, sooner'. A workshop held in April 2013 identified the following recommendations (a selection is presented here):

- More trans-disciplinary work is needed. This should span basic, medical and translational research as well as cancer control and policy-focussed work.
- Research funders need to support the next generation of researchers in BRP and should provide clear career pathways as well as fellowships.
- Alternative models to translate basic behavioural research should be developed, engaging e.g. NGO-based institutes or externally funded academic research centres.

5 UK workforce in academic population health research (clinical and non-clinical)

5.1 Key Points

- There are approximately 300 public health academics in active practice in the UK
- The number of Clinical Academics in medical schools working in Public Health has decreased by 20% since 2000
- From 2000 to 2013, the number of Clinical Academic Lecturers in Public Health decreased by 71%
- Government strategy (through NIHR, HEE and PHE) aims to strengthen Clinical Academic Careers, including Public Health Academics

5.2 Survey of Clinical Academics

The Medical Schools Council (2014) conducts an Annual Survey of Staffing Levels of Medical Clinical Academics in UK Medical Schools. Clinical academics make up around 5% of the medical consultant workforce. They are university employees and, as well as spending about half of their time as practising doctors, they are also responsible for educating medical and dental students and for carrying out research into all aspects of health and disease.

Since 2000 the Medical Schools Council and the Dental Schools Council have undertaken a regular (annual since 2003) survey of clinical academic staffing levels in UK medical and dental schools. These reports include analysis by clinical specialty, vacancies, medical school/ region, funding source, age, gender and ethnicity.

In 2013 there were 3,131 Full-Time Equivalent (FTE) clinical academics in UK medical schools (Professor, Reader / Senior Lecturer, Lecturer). In 2013, 5.5% of all clinical academics (171 FTE) worked in the field of Public Health. In addition, 26 FTE clinical academics were identified in dental public health from the Dental Schools Council survey.

The number of Clinical Academics working in Public Health has decreased in size by 20% since 2000 (figure 5.1). For comparison, over the same period, the FTE clinical academic workforce in Pathology has fallen by 63%, which has generated particular concern for many years. During the same period, the number of Clinical Academics working in General Practice has increased by 45%.

18% of the clinical academic workforce held a Lectureship (in 2013), compared with 24% in 2000. There were 18 (FTE) Clinical Academic Lecturers in Public Health in 2013 compared with 62 (FTE) in 2000 (figure 5.2). This represents a decrease of 71% during that period. Substantial decreases have also been seen in pathology (83%) and psychiatry (74%). The number of Clinical Academic Lecturers in general practice increased by 9.6% between 2000 and 2013, whilst the number of Lecturers in oncology increased by 36% between 2011 and 2013.

The above evidence highlights substantial declines in the workforce for Clinical Academics working in public health.

	2000	2011	2012	2013	Change since 2000	Change since 2011	Change since 2012
Anaesthetics	100.3	51.2	56.8	54.4	-45.8%	6.3%	-4.3%
Emergency Medicine	*	9.0	12.5	9.9	*	10.0%	-20.8%
General Practice	152.9	204.9	193.8	221.1	44.7%	7.9%	14.1%
Infection/ Microbiology	*	94.8	83.3	82.6	*	-12.9%	-0.9%
Medical Education	*	23.6	21.8	15.2	*	-35.7%	-30.4%
Obstetrics & Gynaecology	176.3	118.9	124.2	130.4	-26.0%	9.7%	5.0%
Occupational Medicine	14.7	8.6	7.8	6.6	-55.3%	-23.4%	-15.9%
Oncology	*	150.0	150.2	152.6	*	1.8%	1.6%
Ophthalmology	40.2	43.2	43.5	54.7	36.1%	26.6%	25.7%
Paediatrics & Child Health	246.1	201.8	198.3	205.7	-16.4%	1.9%	3.7%
Pathology	371.5	143.3	148.7	138.2	-62.8%	-3.6%	-7.1%
Physicians/ Medicine	972.6	1,271.7	1,265.2	1,223.6	25.8%	-3.8%	-3.3%
Psychiatry	392.9	287.6	277.3	262.0	-33.3%	-8.9%	-5.5%
Public Health	214.8	172.6	171.0	171.2	-20.3%	-0.8%	0.1%

Figure 5.1 – Clinical academic staffing levels by specialty since 2000 (FTE). Source: Annual Survey of Staffing Levels of Medical Clinical Academics, Medical Schools Council

	2000	2011	2012	2013	2013 as a % of total staffing level	Change since 2000	Change since 2011	Change since 2012
Anaesthetics	23.0	8.0	13.0	10.0	18.4%	-56.5%	25.0%	-23.1%
Emergency Medicine	*	1.0	2.0	1.0	10.1%	*	0.0%	-50.0%
General Practice	40.2	35.9	30.1	44.0	19.9%	9.6%	22.4%	46.3%
Infection/ Microbiology	*	16.3	14.7	14.6	17.7%	*	-10.3%	-0.6%
Medical Education	*	5.6	5.7	4.5	29.7%	*	-19.6%	-21.1%
Obstetrics & Gynaecology	38.6	33.3	33.9	29.9	22.9%	-22.7%	-10.4%	-11.8%
Occupational Medicine	3.2	0.4	0.0	0.0	0.0%	-100.0%	-100.0%	0.0%
Oncology	*	19.6	22.7	26.7	17.5%	*	36.4%	17.8%
Ophthalmology	15.0	8.0	8.0	13.0	23.8%	-13.3%	62.5%	62.5%
Paediatrics & Child Health	65.6	28.0	27.4	41.2	20.0%	-37.3%	46.7%	50.4%
Pathology	64.0	8.0	12.6	11.0	8.0%	-82.8%	37.5%	-12.7%
Physicians/ Medicine	188.0	220.0	223.4	200.9	16.4%	6.9%	-8.6%	-10.1%
Psychiatry	114.1	54.2	51.1	29.0	11.1%	-74.5%	-46.4%	-43.2%
Public Health	62.2	15.8	19.2	18.2	10.6%	-70.7%	15.3%	-4.9%

Figure 5.2 – Clinical academic staffing levels by specialty since 2000 – Lecturers (FTE). Source: Annual Survey of Staffing Levels of Medical Clinical Academics, Medical Schools Council

5.3 National strategy and initiatives to support Clinical Academics in Public Health

5.3.1 Health Education England (HEE)

A key objective described in the Health Education England (2014) Research and Innovation Strategy is to "Develop a multi-professional Clinical Academic Careers Framework for patient benefit".

To deliver this objective, HEE is developing an over-arching framework for Clinical Academic Careers and will facilitate the development of joint academic appointments between healthcare providers and HEIs to support clinical academic career developments. These activities seek to increase the numbers of staff across all clinical and public health professions with a good understanding of research and its role in improving health outcomes.

HEE has launched, with NIHR, the Integrated Clinical Academic Programme (ICAP) to provide personal research training awards for healthcare professionals (excluding doctors and dentists) who wish to develop careers that combine clinical research and research leadership with continued clinical practice and clinical development. Applicants must belong to one of these eligible professions: Healthcare Scientists, AHP Professions, Nurse/Midwife, Wider Dental Team Professions, Pharmacy Professions, Osteopath, Optometrist, Operating Department Practitioner or Clinical Psychologist.

5.3.2 National Institute for Health Research (NIHR)

The NIHR provides a range of programmes to support Integrated Academic Training for Doctors and Dentists. Academic Clinical Fellowships (ACFs) allow medical and dental trainees to undertake 25% research and 75% clinical training over 3 years (4 years for GPs) and Clinical Lectureships (CLs) allow trainees to undertake 50% research and 50% clinical training over 4 years. Academic trainees are recruited by Local Education Training Boards (LETBs) through open competition via a nationally developed process for academic recruitment run by NIHR.

There does not appear to be any particular emphasis placed on training Clinical Academics in Public Health in any of the NIHR or HEE schemes.

5.3.3 Public Health England (PHE)

A key priority within Public Health England's (2015a) Research Strategy is to "support development of public health research capacity in PHE and elsewhere and inspire public health research careers". To help inform the development of this strategy, The Academy of Medical Sciences hosted two meetings with PHE in 2013 to examine the interface between research and practice in public health.

Together with PHE, the Department of Health (2013) published the Public Health Workforce Strategy (updated in 2014), which describes plans to support academics in public health through engagement with PHE. It has established a nationwide Academic Public Health Research Support Network, based largely upon the holders of honorary contracts from PHE. The status and extent of this network is not entirely clear, however its members are expected to provide career-long research training for public health researchers and work with partner organisations to highlight and support a coordinated clinical–academic career pathway for public health.

5.3.4 The Centre for Workforce Intelligence (CfWI)

The CfWI has been commissioned by the DH, PHE and HEE to carry out a long-term review of the public health workforce of the future. The major focus of this review is on the workforce for public health practitioners, which is discussed in more detail in section 9.

The CfWI (2014) has gathered information on the core public health workforce for England. Their report includes an estimate of the numbers of staff in each part of the core workforce. The relevant information collected on numbers of public health academics and scientists is shown in table 5.1.

Role	Summary description	Estimated numbers (headcount)
Public health academics	Lecturers, researchers and teachers employed in higher or further education sectors, whose primary focus is public health May also be consultants/specialists, most likely regulated by GMC or UKPHR	200–300 Numbers primarily relate to senior academics based at universities with medical and dental schools; therefore actual numbers may be higher Source: Medical and Dental Schools Council; Faculty of Public Health
Public health scientists	Generally employed by PHE or NHS Perform scientific role in support of public health objectives, at all grades May be regulated by the Health and Care Professions Council (HCPC) depending on scientific specialty and protected title (Biomedical or Clinical Scientist)	1,500–2,500 Numbers based primarily on staff working previously for the Health Protection Agency (HPA) and currently working within PHE; numbers may therefore be higher Source: Health and Social Care Information Centre (HSCIC) and PHE

Table 5.1 - Summary of the public health workforce in the UK: academics and scientists; Source: CfWI (2014)

Public Health Academics

Using figures collected by the Faculty of Public Health (FPH), the CfWI estimated that there are approximately 295 public health academics in active practice in the UK.

The CfWI notes that their estimate of 200-300 public health academics in active practice in the UK may be low, since some academics will be from non-medical and dental backgrounds, or from universities with public health courses but no medical or a dental school. N.B. figures for public health academics in medicine include only professors and lecturers.

Public Health Scientists

The estimates for public health scientists are based on the following:

- 1,475 qualified healthcare scientists (i.e. scientists qualified and registered as a clinical or biomedical scientist) working for PHE in September 2013 (HSCIC)
- 2,730 scientific staff working in health protection, microbiological and development production services in October 2013, including 872 working in health protection roles (excluding strategy and other health protection directorate staff) and 1,858 working in microbiological and development production services (PHE). These numbers include people in support functions and other roles.

Scotland

The CfWI (2015a) has also mapped the core public health workforce in Scotland. This report looked at a wider range of academic roles in public health encompassing Professors, Senior Lecturers, Lecturers, University teachers and Research Fellows. At least 360 public health academics were identified, 247 working at the main medical universities and 112 working at other universities in Scotland.

The CfWi identified at least 50 public health scientists working in Scotland. 35 were specifically recognised as working with Health Protection Scotland, mostly within epidemiology. Approximately another 20 were employed by Public Health England in Scotland in work relating to radiation, chemical and environmental hazards.

5.4 Clinical and non-clinical academics at Higher Education Institutes

The aim of this section is to identify UK academic staff working in population health research. Data has been provided by the Higher Education Statistics Agency (HESA) and the methodology for this section is described in appendix 3.

5.4.1 Results - Academic staff profiles

Employment Profile

The employment profile for academic staff working in population health research is shown in figure 5.3. Profiles are shown by contract level for staff who do research and teaching, research only, and teaching only.

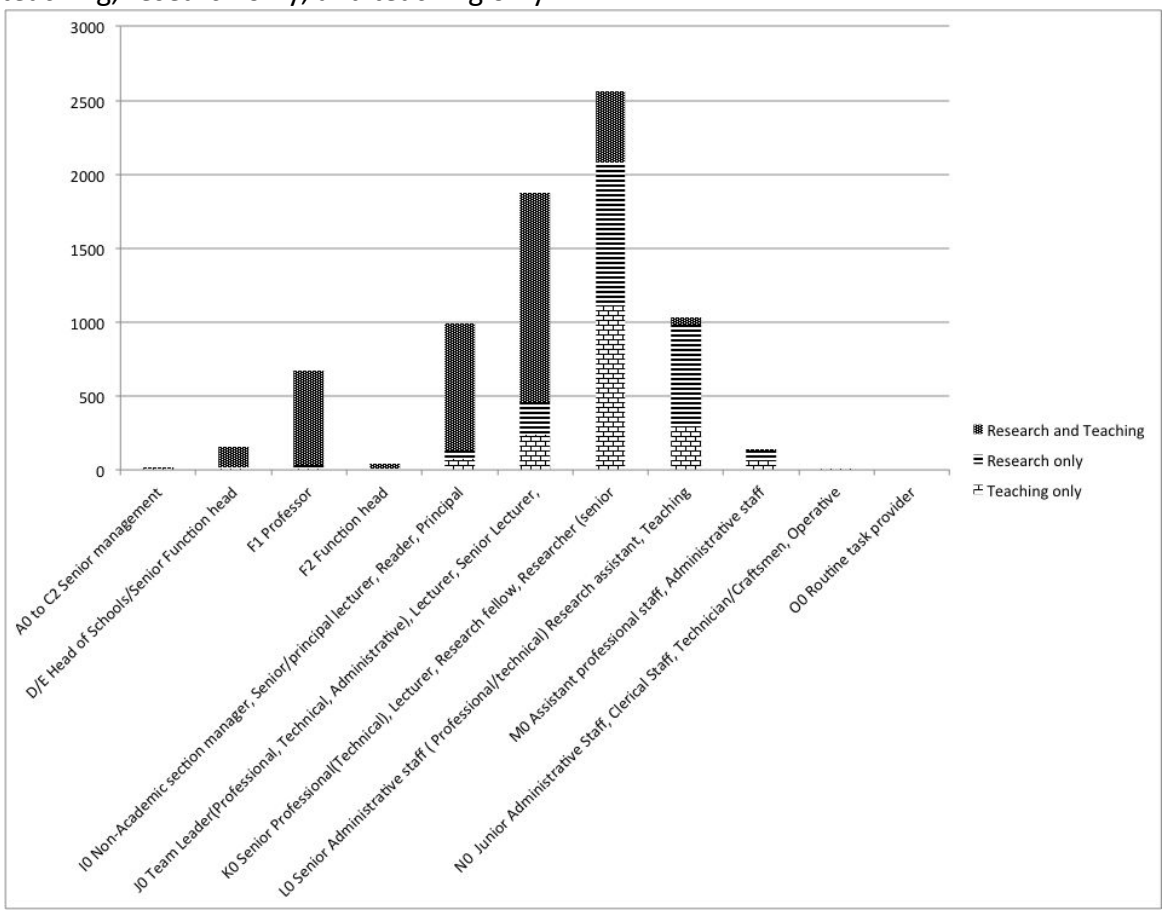

Figure 5.3 – Summary of selected staff (2013/14) by contract level (n=7485); see table M1 in appendix 3 for full descriptions of each contract level. The HESA Services Standard Rounding Methodology has been applied.

Employer Profiles

124 Higher Education Institutions employ research active staff in population health research. The top 15 employers are shown in figure 5.4A. The employer profile for teaching only staff is shown in figure 5.4B.

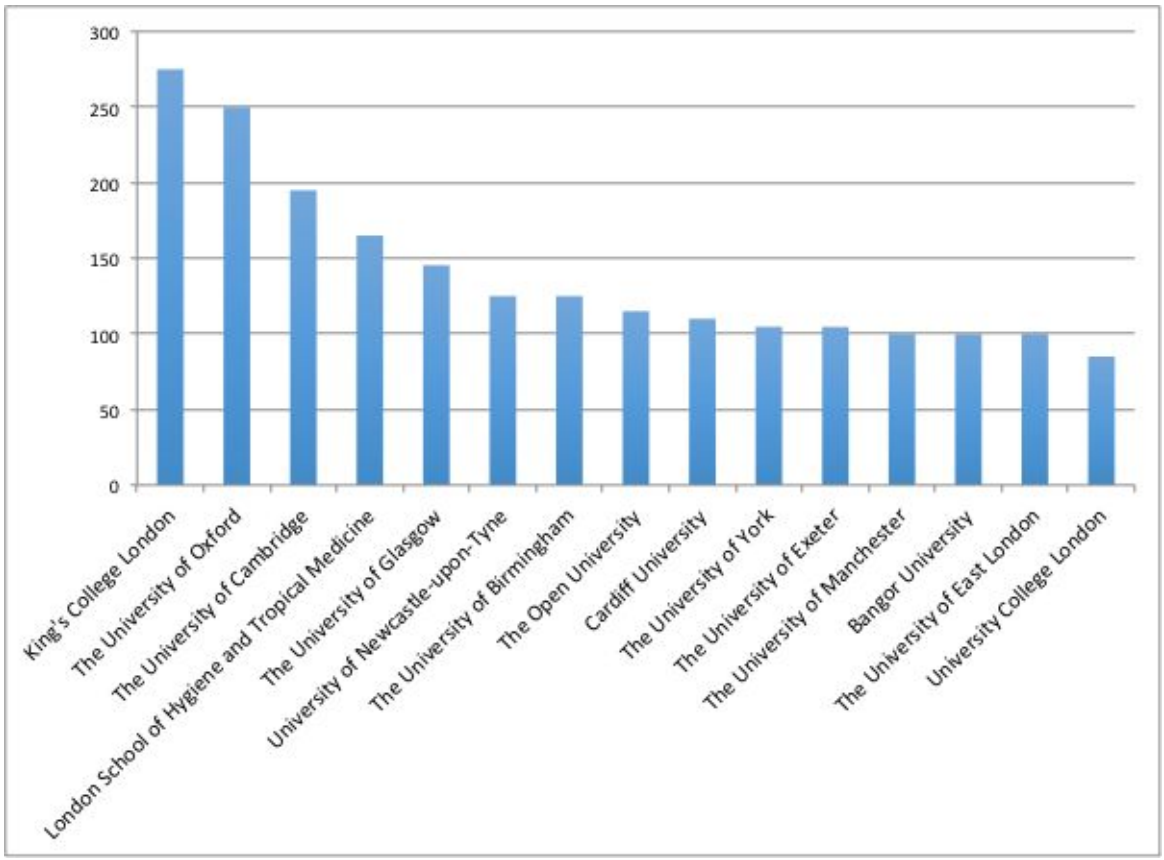

Figure 5.4A – Employment by Higher Education Institution (HEI) for selected staff (research; teaching and research; 2013/14). The top 15 HEIs are shown (n=2100); for all 124 HEIs, n=5680. The HESA Services Standard Rounding Methodology has been applied.

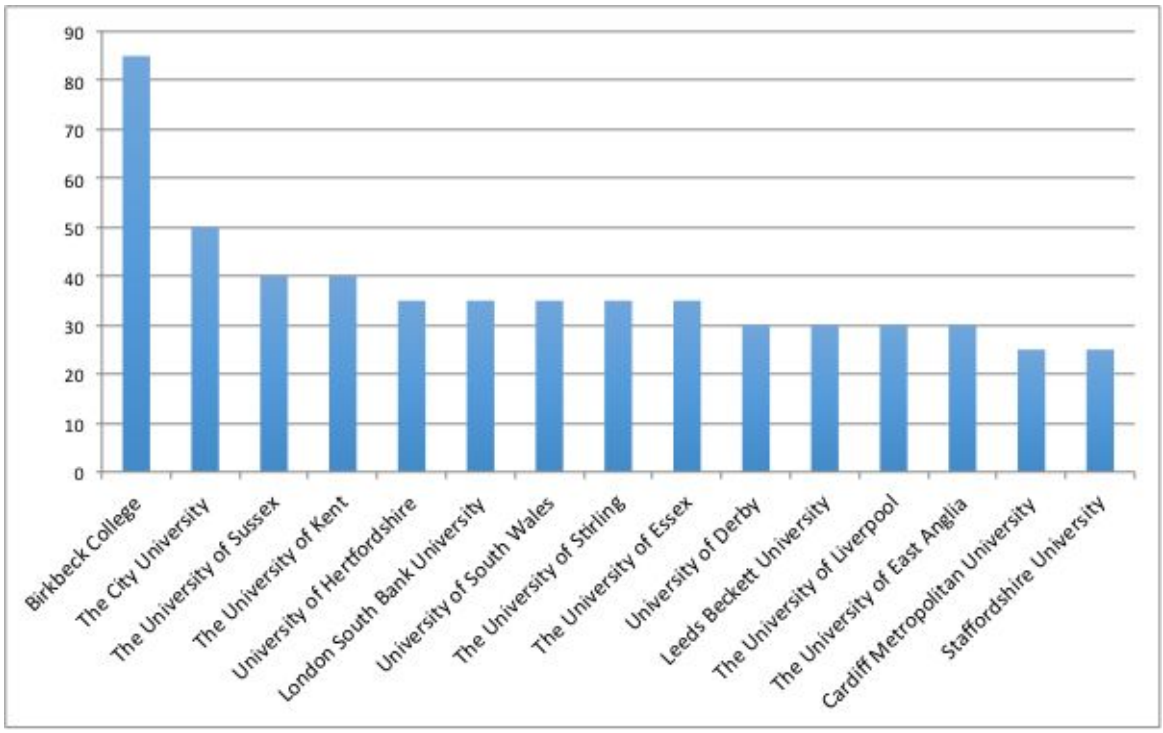

Figure 5.4B – Employment by Higher Education Institution (HEI) for selected staff (teaching only; 2013/14). The top 15 HEIs are shown (n=560); for all 124 HEIs, n=1800. The top 15 HEIs

are shown (n=2100); for all 124 HEIs, n=5680. The HESA Services Standard Rounding Methodology has been applied.

Funder Profile

Population health researchers are supported by a wide range of funders, as shown in figure 5.5. The majority of research only or research and teaching roles are supported by the Higher Education provider.

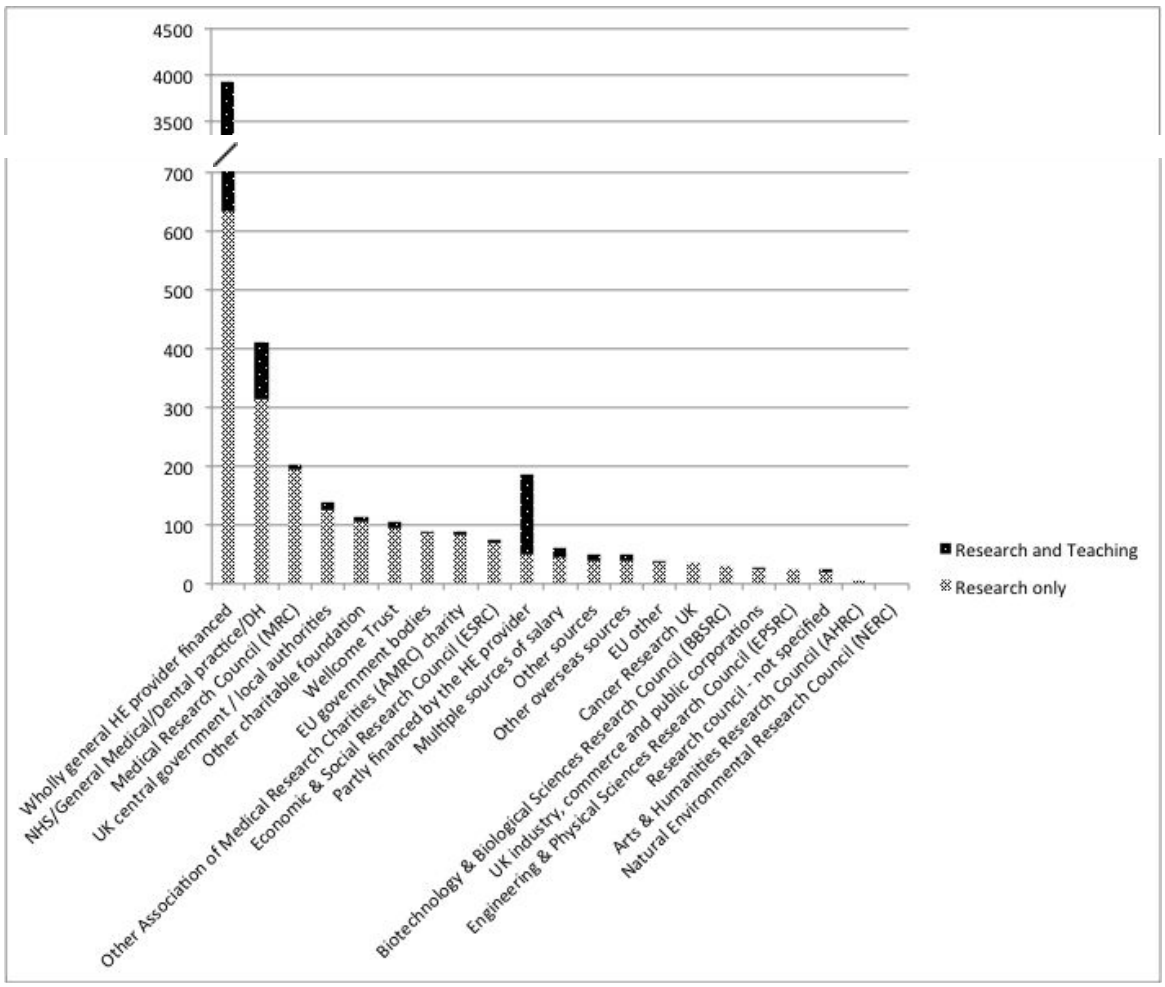

Figure 5.5 – Academic staff shown by source of funding (research only, n=2055; research and teaching, n=3625). The HESA Services Standard Rounding Methodology has been applied. N.B. please note the scale break on the y-axis.

Profiles by selected subjects

A wide range of sub-analyses of current academic disciplines can be conducted using the HESA data. Some examples are provided below.

Public Health Engineering

Public Health Engineering is described by HESA as, "the study of engineering principles, design and construction, with particular emphasis on public health and safety". A total of 75 research staff were identified in this category, 61% of whom were based at the University of Cambridge (figure 5.6).

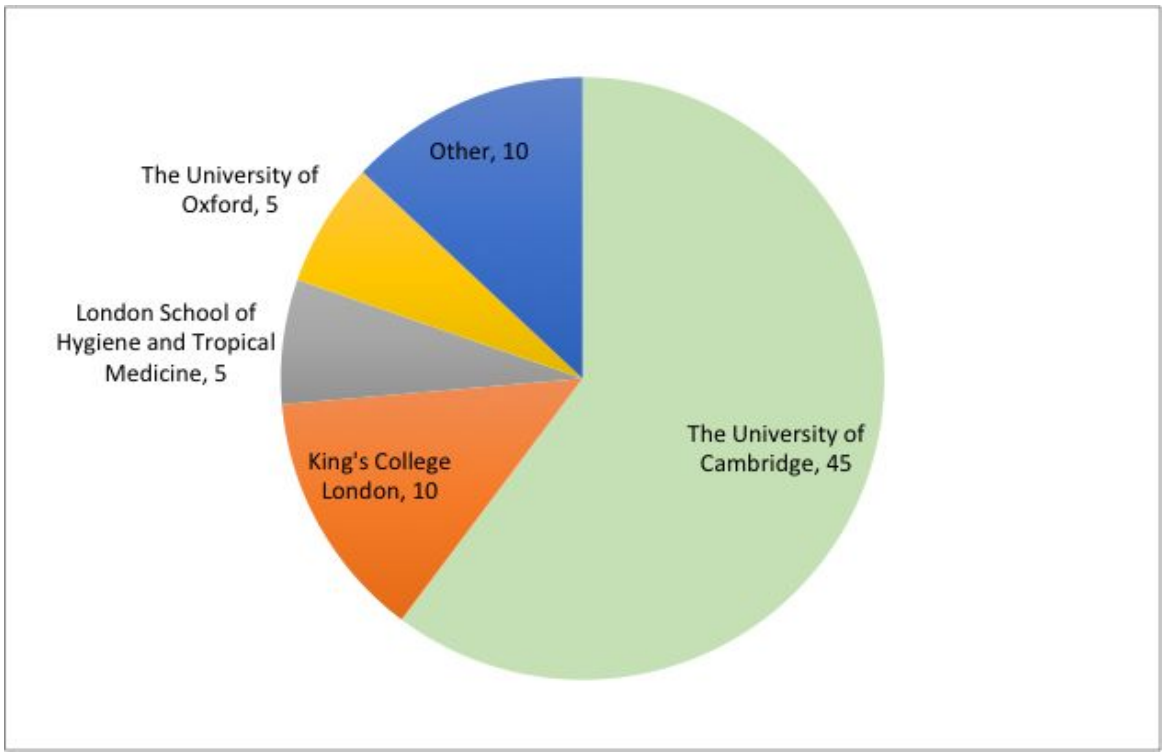

Figure 5.6 – Employment by Higher Education Institution (HEI) for academic staff working in Public Health Engineering (research; teaching and research; 2013/14; n=75). The HESA Services Standard Rounding Methodology has been applied.

Psychology related disciplines

The employer profile for academics working in Psychology related disciplines was also analysed and is shown in figure 5.7. The following Psychology related disciplines were selected for this analysis:

(C800) Psychology
(C810) Applied psychology
(C811) Occupational psychology
(C822) The psychology of ageing
(C840) Psychology in health & medicine
(C841) Health psychology
(C848) Psychology of mental health
(C880) Social Psychology

King's College London employed the largest volume of academic researchers working in Psychology related disciplines. A wide range of funders supported academic researchers in Psychology related disciplines (figure 5.8)

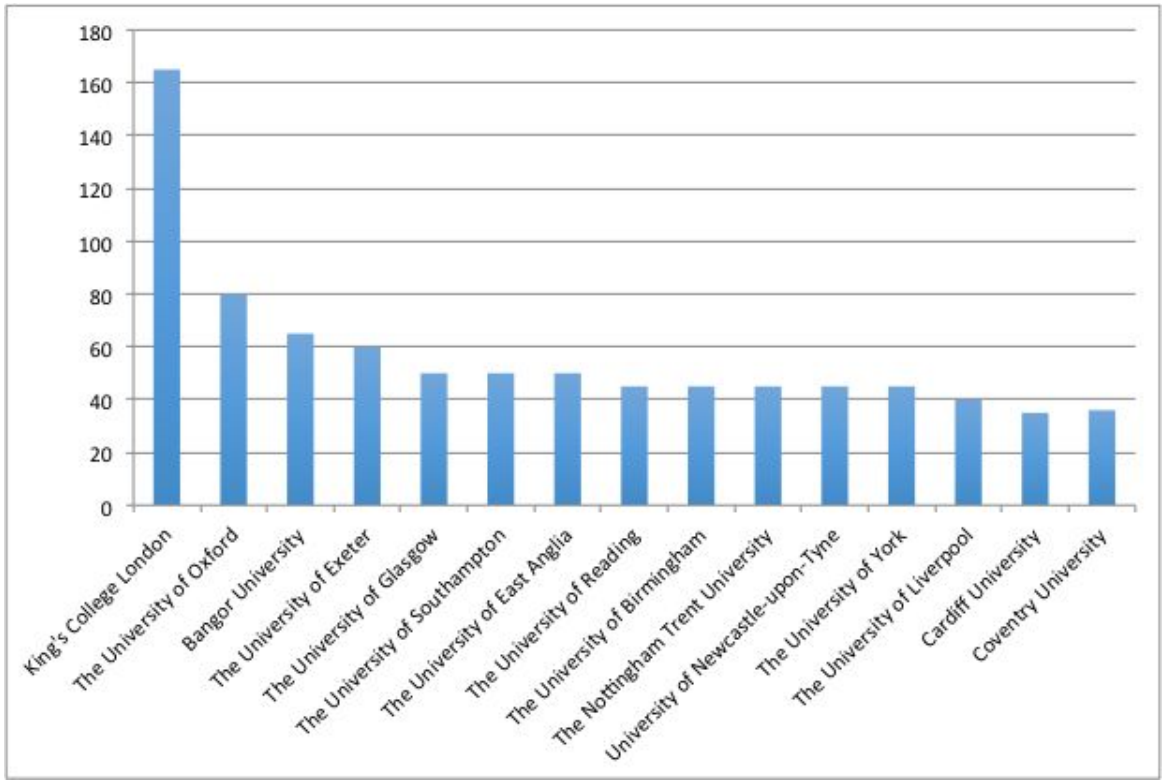

Figure 5.7 – Employment by Higher Education Institution (HEI) for academic staff working in Psychology related disciplines (research; teaching and research; 2013/14). The top 15 HEIs are shown (n=860); for all 124 HEIs, n=2290. The HESA Services Standard Rounding Methodology has been applied

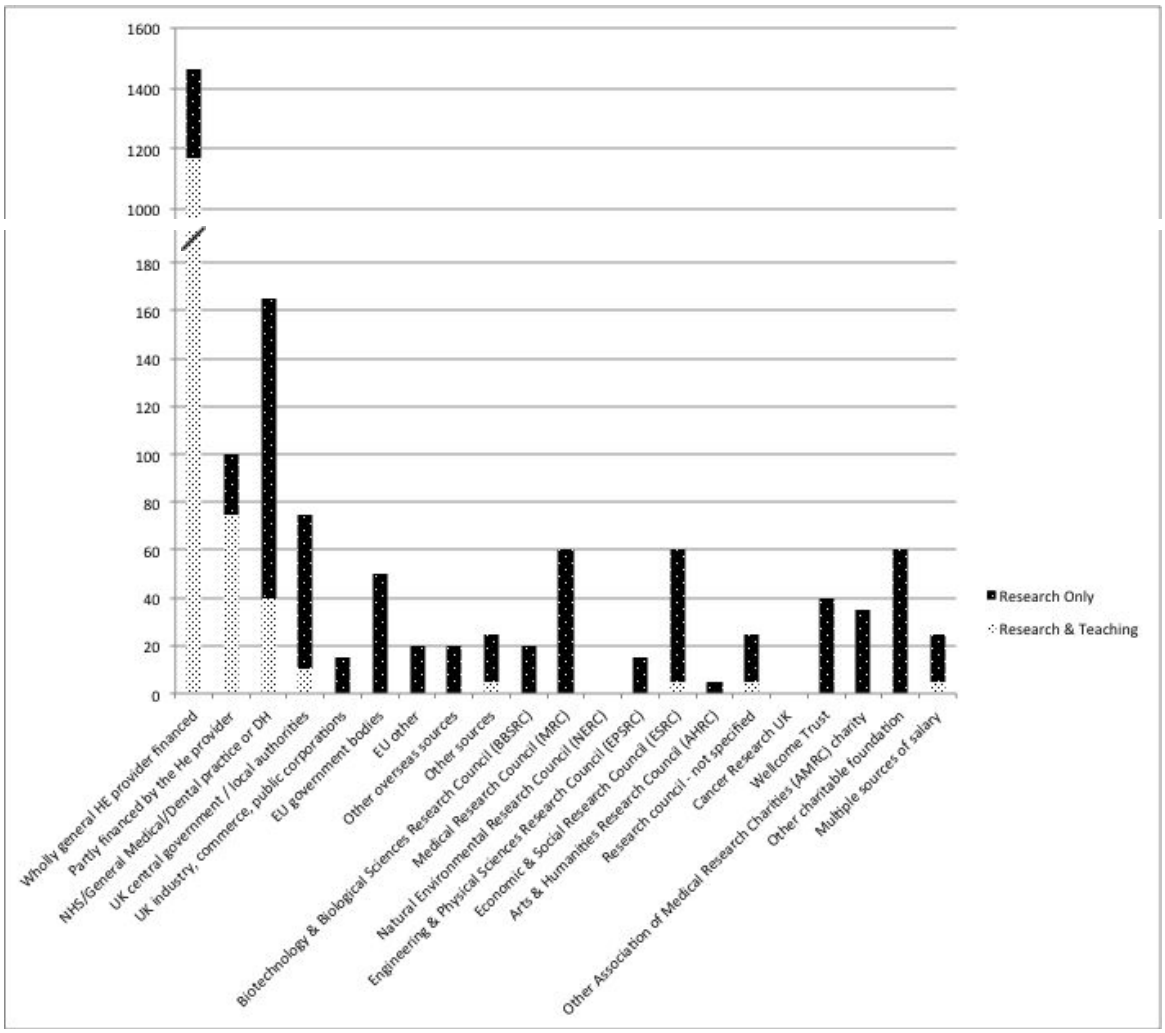

Figure 5.8 – Academic staff working in Psychology related disciplines shown by source of funding (research only, n=970; research and teaching, n=1320; 2013/14). The HESA Services Standard Rounding Methodology has been applied. N.B. please note the scale break on the y-axis.

5.5 Doctoral training

In addition to PhD fellowships supported to many funders across the country, the ESRC has established a national network of 21 institutional and consortia level Doctoral Training Centres (DTCs), through which they deliver all studentship funding. These DTCs cover the full disciplinary range of the social sciences as well as areas of interdisciplinary research. For example, the North East Doctoral Training Centre (NEDTC), a joint venture between the universities of Durham and Newcastle, is one of the largest in the ESRC's national network. Studentships are offered across a wide range of subjects, including e.g. Environmental Planning, Finance and Economics, Human Geography, Psychology, Social Policy, Social Work, Social Sciences and Health and Sociology.

6 Career pathways for population and public health researchers

6.1 Key points

- A wide range of career development routes exist for population health research in academia
- The establishment of integrated clinical academic training pathways is helping the career development of clinical academics
- Medical schools have reported increasing difficulties in recruiting to clinical academic posts, often due to the challenges of managing clinical and academic workloads
- A range of funding opportunities exist, however there are few schemes dedicated for public health researchers
- Given the diverse experience of public health researchers, funding schemes should be developed so that applicants across many disciplines are eligible to apply
- There may be a need for cross-discipline fellowship funding / structures for public health research, which enable applicants to conduct research alongside practice

6.2 Overview

As shown in the previous section, there is a wide range of roles within public health research in academia, with few fixed routes for career development. The majority of roles are clinical or non-clinical, where individuals have progressed their education and training through medical / dental school or in the life sciences. There is also a cohort of academics in public health who have developed careers from non-health specialties such as social science, economics, engineering, architecture, town planning or informatics.

Academic roles typically require a higher qualification (Masters or Doctoral level studies). Lecturers in public health medicine or dental public health will usually have a doctoral qualification; lecturers in other areas such as health promotion may have a Masters level qualification. Academics may also have qualified via other routes (e.g. specialty training).

6.3 Career challenges identified previously

Some years ago, the UKCRC (2008) published its review towards Strengthening Public Health Research in the UK. The report looked at the public health research workforce and the following is a summary of the findings

- UK Strengths: epidemiologists
- Shortages: health economists, statisticians, health psychologists and academic /public health services research interdisciplinary
- Opportunities: enticing researchers from public health services into the academic sector
- Clear career pathways in public health research must be developed and implemented
- More investment in academic infrastructure for public health research at all levels of career development

- Establish joint appointments between health service and academia
- Greater investment in personal awards e.g. senior tenured posts for public health researchers from a wide variety of backgrounds in both service and academic public health
- New mid-level, limited-tenure, early-career posts and fellowships designed to provide a stepping stone from postdoctoral fellowships to senior positions
- Increased opportunities for public health trainees to pursue academic public health careers
- Discipline-hopping awards; exchange opportunities for policy developers and NHS public health staff

Since 2008, progress has been made in some of these areas, such as improved infrastructure and support for clinical academic training provided through NIHR.

6.4 Clinical career pathways in population and public health research

The Medical Schools Council's (2014) Survey of Staffing Levels of Medical Clinical Academics in UK Medical Schools provides insight on career pathways and challenges in academic medicine:

> The establishment of integrated clinical academic training pathways, for example the dedicated Academic Foundation Programme, and programmes funded by NIHR and SCREDS (Scottish Clinical Research Excellence Development Scheme), is helping to ensure aspiring clinical academics are able to progress through training into the clinical academic workforce.
>
> Typically, a Lectureship is held for a minimum of four years post-doctorate before promotion to Senior Lectureship or equivalent at consultant level. Promotion to Professorship is usually reserved for those academics at the very top of their field, i.e. those with international recognition.
>
> In 2013, the NHS provided funding for two thirds of Lecturer posts, an increase from 154 in 2006 to 372 in 2013 (+142%), largely through the NIHR Integrated Academic Training Pathways (IATP) in England, and the structured clinical academic training pathways established and funded in Scotland through SCREDS, in Northern Ireland through NIMDTA, and the Wales Clinical Academic Track (WCAT). The NHS funds a significant proportion of academic posts at Senior Lecturer (46%) and Professor grades (32%), but the majority of Chair appointments are funded by the four UK Higher Education Funding Councils (58%). Other sources of funding, including research charities and endowments, fund a smaller but significant proportion of posts at all grades.
>
> In 2013, more than half of all medical schools reported increasing difficulties in recruiting to clinical academic posts, often due to difficulties in attracting clinicians into the academic training pathway owing to increasing pressures of simultaneously managing clinical and academic workloads. Clearly defined structures and processes are needed to enable trainees to integrate postdoctoral academic training with clinical training. Limited postdoctoral experience can prevent individuals from gaining the necessary expertise to be competitive for prestigious externally funded Intermediate Fellowships/ Clinician Scientist Fellowships. Whilst such Fellowships

enable the smooth transition from postdoctoral to independent researcher, their limited number may be perceived as a 'bottleneck', particularly if alternative academic positions are not available at the end of clinical lecturer training.

Career pathways for clinical academics have developed considerably during the last ten years, particularly since publication of the Walport report in 2005. Figure 6.1 describes the Integrated Academic Training Pathway for clinical researchers as supported by the NIHR. The NIHR also offers a range for funding for clinical and non-clinical researchers, as shown in figure 6.2. Many other funders offer support through fellowships or other grants at various stages in this pathway.

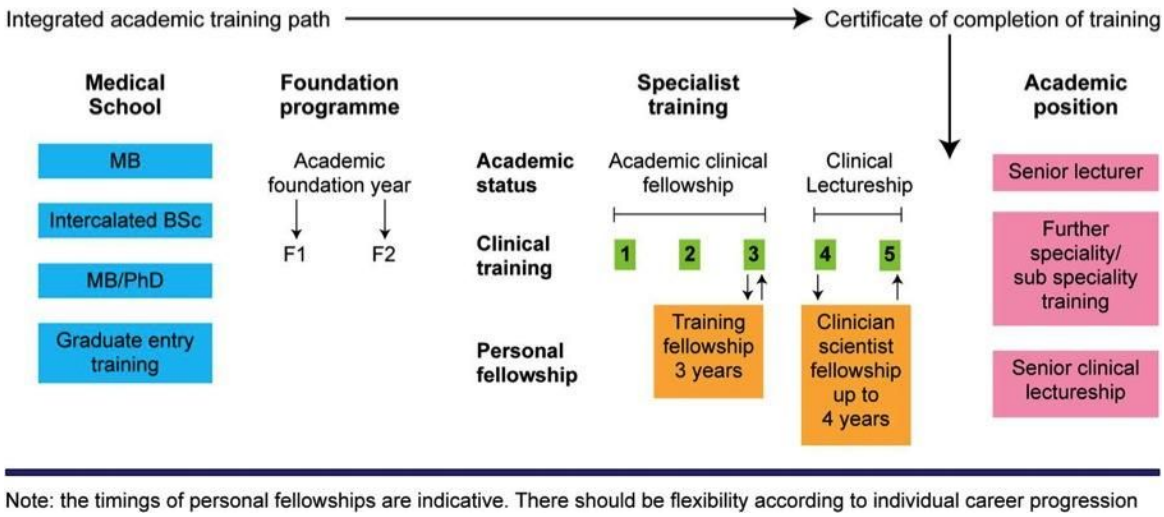

Figure 6.1 – Integrated Academic Training Pathway for clinical researchers (source: NIHR)

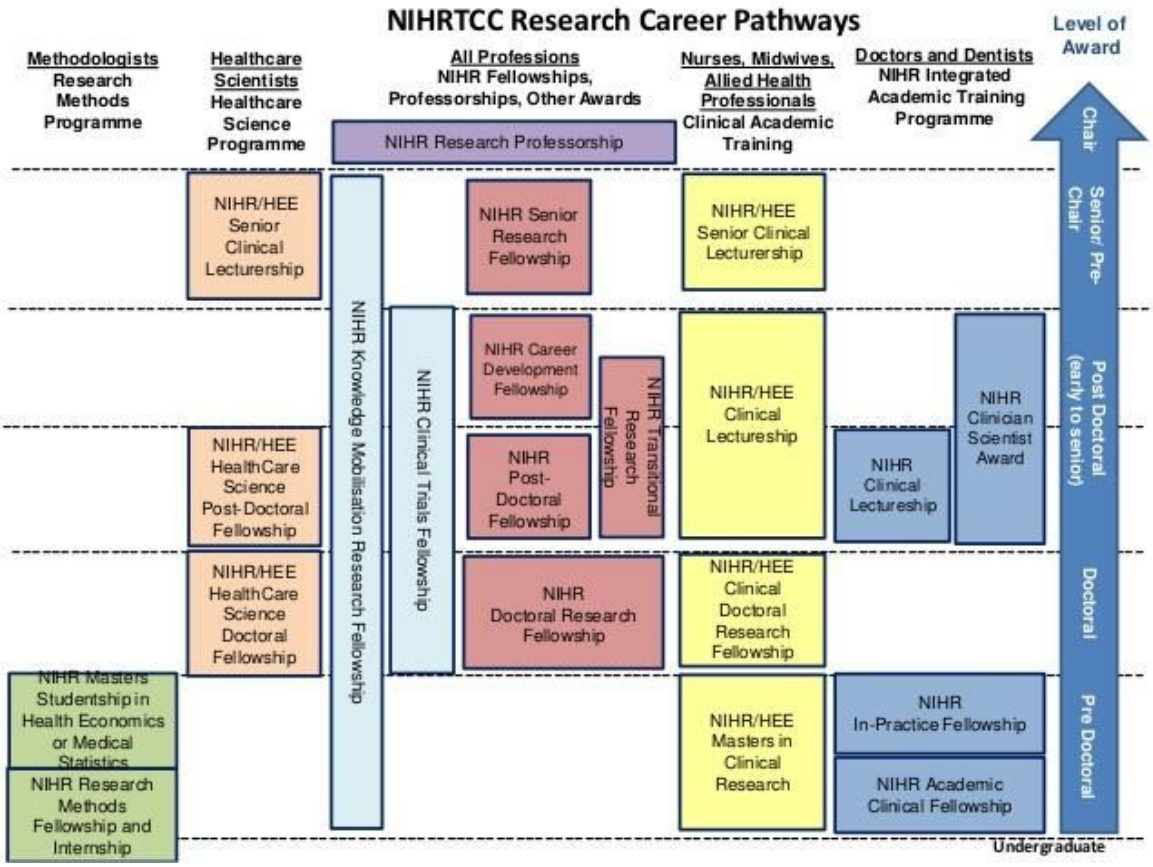

Figure 6.2 – NIHR Research Career Pathways (source: NIHR)

6.5 Non-clinical career pathways in population and public health research

The Council for Science and Technology (2015) recently undertook a review of the landscape in population health sciences. Their report, published in 2015, highlighted a range of issues to be addressed in relation to skills for the Population Health Sciences:

- As new challenges develop, skills requirements and training needs will evolve. For example, one major emphasis in the past was on quantitative skills. These are still needed, but coding and computing skills are likely to become increasingly important. Population health sciences will need to look forward in developing training packages and find ways to ensure that these are fit for the future and are appropriately quality assured.
- Fewer Master's students are choosing to specialise in population health sciences. The risk of a lack of graduates with the right skills is worsened by the time it takes to deliver new, up-to-date courses, combined with a lack of places for students on existing courses.
- UK universities tend to attract high numbers of overseas Master's students and fewer domestic students. This means we can build strong international links but creates a risk of insufficient domestic expertise in the future.
- There is a real need to make the case for talented people to move into population health sciences from other disciplines – for instance, expertise from the data and behavioural sciences is needed.

- It remains important to ensure that an understanding of population health sciences is still sufficiently embedded in medical training.
- There are limited incentives to get involved in research strategy and leadership: there is a common perception that engaging with these as well as policy may impact adversely on the individual's core career. However, it is important that there are sufficient skilled individuals to work in this translational role.
- Pathways to careers in population health sciences need to be clearer, as should our articulation of the specific skills needed in different areas.

6.6 Public health scientists

As part of its review to map the core public health workforce, the Centre for Workforce Intelligence (CfWI) looked at training routes for public health scientists. As for public health academics, there currently are no fixed routes specifically for this discipline. New entrants to healthcare science degrees since 2010 have come under the Modernising Scientific Careers (MSC) Framework (figure 6.3), with four levels of qualifications (associate / assistant, practitioner, scientist and higher specialist scientific). These levels equate to National Vocational Qualifications (NVQ), degree, Master's and doctoral levels. The intention was to provide a more systematic framework for healthcare science degrees; this has had and will have implications for healthcare scientists who decide to specialise in public health.

MSC practitioner training covers five areas: cardiovascular, respiratory and sleep; neurosensory sciences; life sciences, medical physics technology and clinical engineering. MSC scientist training covers seven areas: infection sciences; blood sciences; cellular sciences, neurosensory sciences, cardiovascular, respiratory and sleep; clinical engineering; and medical physics.

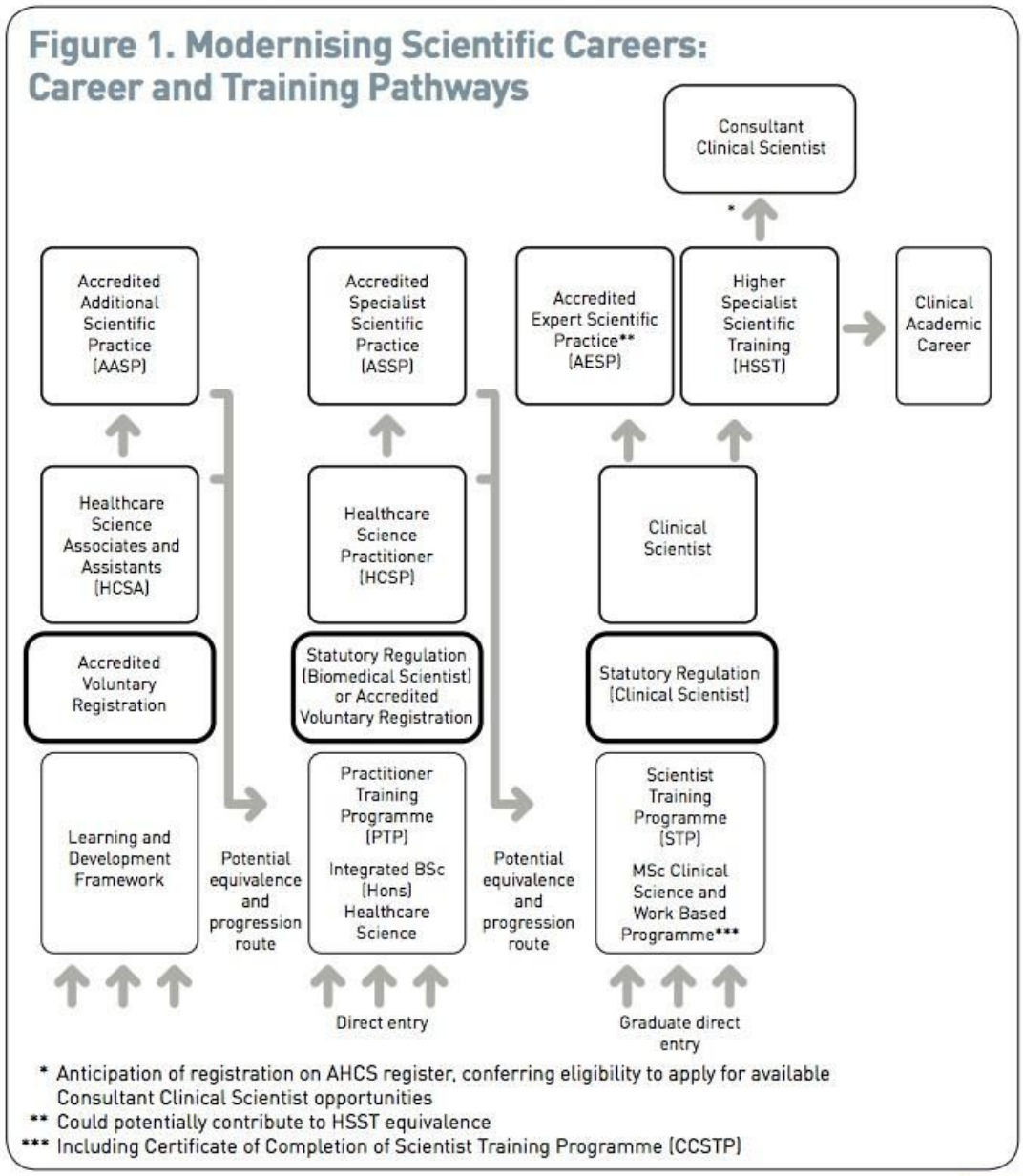

Figure 6.3 – Modernising Scientific Careers in the NHS – career and training pathways (source: NHS Employers (2014) and Health Education England)

6.7 Registration bodies

There are no specific registration bodies for public health academics or scientists. Academics may be registered with a registration body, if they are qualified in a particular profession (e.g. nurse/midwife, scientist, consultant). Scientists may be registered with another body (e.g. HCPC, GMC, UKPHR) if qualified as a biomedical or clinical scientist, a doctor in microbiology, or public health specialist.

6.8 Funding opportunities

A wide range of funding opportunities are open to academics working in population and public health research. Some examples are provided below. Given the interdisciplinary nature of this field, individuals progressing their careers from a non-health research background can find it difficult to access funding as they may not be eligible to apply to many existing schemes. Therefore, there may be a need for cross-discipline fellowship funding / structures for public health research, which enable applicants to conduct research alongside practice.

Wellcome Trust Training Fellowships in Public Health and Tropical Medicine

PhD fellowships for researchers from low- and middle-income countries - who are at an early stage in the establishment of their research careers - with opportunities for research experience and high-quality research training in public health and tropical medicine.

Wellcome Trust Intermediate Fellowships in Public Health and Tropical Medicine

Five-year fellowships for researchers from low- and middle-income countries with 3-6 years postdoctoral experience

Cancer Research UK Population Research Postdoctoral Fellowship

Early career funding (post-PhD) for 3 years

Public Health Fellowships 2016

Health Education England is sponsoring a second year of the pilot initiative supported by the Chief Medical Officer to provide aspiring Public Health Registrars the opportunity to pursue a Fellowship in Academia, Global Health or Systems Leadership.

The Academic Fellowships are suitable for Registrars considering exploring an academic career to further develop their academic and research skills and perhaps apply for further fellowships or a PhD. This fellowship offers Registrars from non-medical backgrounds an opportunity similar to the medical academic clinical fellowships.

The Global Health Fellowships are suitable for Registrars who are particularly keen to further develop their skills and knowledge in this field and pursue a career in Global Health. Candidates can identify appropriate overseas placements in international agencies such as the World Health Organization or by other means.

The Systems Leadership Fellowships is a bespoke, enhanced training placement offering senior Registrars an opportunity to lead on a specific project for the host organisation, whilst being mentored by the Chief Executive. The purpose of this Fellowship is to provide Registrars, nearing the end of their training, an opportunity to refine their political, strategic and influencing skills needed to lead collaboratively across systems and organisations.

The Public Health at Cambridge Funding Hub provides a searchable database of funding opportunities in this field.

7 Key UK centres of population health research

7.1 Introduction

A diverse portfolio of population and public health research takes place across a wide range of research centres in the UK. This section describes the main centres and initiatives funded by the Research Councils and medical research charities. Research activities supported by NIHR and through UKCRC are summarised in the next section – infrastructure.

Many of the research activities described here encompass programmes of multidisciplinary research, investigating the biological cause of disease as well as approaches to develop interventions and new disease prevention strategies. Where available, the level of funding for each unit / centre is provided. Information describing research focus has been obtained from the websites for each funder or research unit / centre. Where available, information on research spend has been obtained from Gateway to Research or the UK Health Research Analysis dataset.

Centres of excellence for conducting population health research are also highlighted in section 3 (funding landscape, figure 3.7) and section 4 (top universities from REF 2014, figure 4.2).

7.2 Research Council - Centres and Units (mainly MRC)

The **MRC Centre for Cognitive Ageing and Cognitive Epidemiology** at the University of Edinburgh (CCACE) focuses on the reciprocal influences of cognition and health across the human life course. The Centre is part of the Research Councils' Lifelong Health and Wellbeing (LLHW) programme and is funded by the Medical Research Council (MRC) and the Biotechnology and Biological Sciences Research Council (BBSRC).
Funding: £716k pa

The MRC Unit for **Lifelong Health and Ageing** at UCL is home of the National Survey of Health and Development (NHSD) and other population-based studies. The Unit's mission is to identify social and biological factors that affect lifelong health, ageing and the development of chronic disease risk by: using and enhancing the NSHD and other population-based studies; and exchanging knowledge gained with policymakers, health practitioners and other research users, and promoting public understanding of healthy ageing.
Funding: £416k pa

The **MRC Biostatistics Unit** (MRC BSU) aims to advance understanding of the cause, natural history and treatment of disease, and to evaluate public health strategies, through the development of statistical methods and their application to the design, analysis and interpretation of biomedical studies.
Funding: £2.64m pa

The **MRC/Cancer Research UK/BHF Clinical Trial Service Unit & Epidemiological Studies Unit's** (CTSU) mission is to generate and disseminate reliable evidence from large-scale

randomised trials, genetic or classical epidemiological studies, and meta-analyses that leads directly to practical methods of avoiding premature death and disability or to an understanding of disease mechanisms. Chronic diseases such as cancer, heart attack and stroke, which collectively account for most adult deaths worldwide, represent the main focus of the Unit's activities.
Funding: £3.31m pa

The **Centre for Environment and Health** is a partnership between Imperial College London and Kings College London supported jointly by the MRC and Public Health England. Research pursues a multi-disciplinary approach to address the epidemiology of environmental pollutants, and to translate this knowledge to inform national and international policymakers and industry in order to improve health. The Centre achieves this through key health-driven research programmes in air pollution & noise, the 'exposome' and small area studies of the environment. The programmes are underpinned by cross-cutting research themes on cohorts, biostatistics and systems toxicology, together with a risk assessment and policy translation programme.
Funding: £198k pa

The MRC **Epidemiology Unit** at the University of Cambridge (MRC EU) studies the genetic, developmental and environmental factors that cause obesity, diabetes and related metabolic disorders. The outcomes from these studies are then used to develop strategies for the prevention of these diseases in the general population.
Funding: £4.3m pa

MRC **Human Nutrition Research's** (MRC HNR) mission is to conduct nutrition research and surveillance to improve the health of the population with a focus on obesity and metabolic risk, musculoskeletal health, intestinal health and nutritional inequalities.
Funding: £4.43m pa

The MRC **Integrative Epidemiology Unit** at the University of Bristol (MRC IEU) seeks to integrate molecular, cellular, clinical and population data to optimise the identification of causal associations between potentially modifiable exposures and health outcomes. The Unit will adopt a multidisciplinary approach to address major public health issues of relevance to the UK and global health agenda, drawing upon disciplines that extend beyond the conventional realms of epidemiology, to enhance causal and translational epidemiology.
Funding: £496k pa

The MRC **Lifecourse Epidemiology Unit** at the University of Southampton (MRC LEU) at the University of Southampton aims to elucidate important, preventable causes of common chronic disorders and their complications. It focuses on the interplay of causes acting at different stages of the lifecourse from before conception through to old age, and the ways in which environmental influences modulate gene expression to produce disease.
Funding: £2.98m pa

The MRC **Metabolic Research Laboratories** at the University of Cambridge has been developed to improve understanding the mechanisms responsible for obesity and

related metabolic diseases with the eventual goal of developing interventions to prevent and treat them. The MRL also hosts the MRC Metabolic Diseases Unit.

The MRC **Centre for Molecular Bacteriology and Infection** at Imperial College London is a cross-faculty, multidisciplinary research centre comprising over 55 academic and postdoctoral research staff and 35 postgraduate students. Research themes include infection genomics, cellular and structural microbiology, host innate immunity and antimicrobial resistance and persistence. The overall mission is to be at the forefront of research on bacterial infection and immunity, with significant critical mass to cover major areas of scientific interest and clinical importance. To ensure critical mass, there is an active masters and PhD programme aimed at basic and clinical researchers.
Funding: £754k pa

The MRC **Centre for Outbreak Analysis and Modelling** is an international resource and centre of excellence for research on the epidemiological analysis and modelling of novel infectious disease outbreaks with a strong emphasis on public health translation. The Centre's objectives have also evolved with the priorities of many key public health partners. Pandemic influenzaopens in new window has been the Centre's greatest area of activity, however it has also increased focus on other infectious disease threats: malariaopens in new window control and possible elimination, polioopens in new window eradication, the potential of new interventions to revolutionise control of the sub-Saharan Africa HIVopens in new window epidemic, and the growing public health challenge posed by dengue in many middle income countries. They have developed methodological tools for outbreak analysis that will now also be applied to tracking transmissibility of seasonal endemic diseases.
Funding: £518k pa

The **Scottish Collaboration for Public Health Research and Policy** (SCPHRP) jointly funded by MRC and the Chief Scientist Office (CSO) is based at the University of Edinburgh. SCPHRP facilitates collaborations between all sectors of the public health community seeking to develop Scotland as a leader in public-health intervention research for equitable health improvement.
Funding: £666k pa

The MRC/Chief Scientist Office **Social and Public Health Sciences Unit**, University of Glasgow (MRC/CSO SPHSU) promotes human health by the study of social, behavioural, economic and environmental influences on health with the aim of providing robust evidence to inform policies to improve population health and reduce social inequalities in health.

The MRC **Social, Genetic and Developmental Psychiatry (SGDP) Centre's** mission is to undertake research on the impact and interplay between genetic, environmental and developmental factors, and their roles in the causal processes underlying the origins and course of multifactorial mental disorders; to consider the implications for clinical practice and public health policy; and to train others in the methodologies involved. The MRC Social, Genetic & Developmental Psychiatry Centre focuses is on common psychiatric disorders that emerge in childhood such as mood disorders (anxiety and

depression), 'externalising' disorders (disruptive behaviour including hyperactivity and addictions), and cognitive disorders (learning disabilities and the autistic spectrum).

The MRC Unit, **The Gambia** is the UK's single largest investment in medical research in a developing country and is internationally recognised for its track record of research into tropical infectious diseases. Its success is based on innovative lab-based research, excellent clinical studies and field-oriented science, and the translation of research into clinical and public health practice. The Unit's vision is to lead scientific research to save lives and improve health across the developing world. It aims to deliver this through investment in four major research themes: Child Survival, Vaccinology, Disease Control and Elimination, and most recently Nutrition, following the integration of the International Nutrition Group into the Unit to further enhance investigations of the important role of nutrition in each of the research themes.
Funding: £638k pa

The **MRC/UVRI Uganda research Unit on AIDS** conducts research on HIV disease and related infections to facilitate their control in Uganda and elsewhere in Africa. Specifically it investigates the determinants of HIV infection and subsequent disease progression in the African context; to identify and evaluate new strategies aiming at the prevention of HIV infection as well as interventions aiming to alleviate the clinical and social consequences of the infection. The work is multidisciplinary, reflecting the wide ranging nature of the problems caused by HIV. Activities range from virology, and immunology to clinical studies and intervention trials, epidemiological studies, behavioural research and health economy studies, supported by strong statistical and laboratory services and a community development programme.

The **MRC/NIHR Phenome Centre** aims to understand and tackle diseases that are triggered by environment as well as genetic causes, and increase the potential to develop strategies for their prevention and treatment. Studying the phenome will help determine how the environment and genes combine to affect biochemical processes that lead to disease. The new centre is a collaboration between Imperial College London, King's College London, and analytical technology companies the Waters Corporation and Bruker Biospin, and is funded by the MRC and NIHR.
The new centre officially opened on 5 June 2013.
Funding: £2m pa (£1m pa each from MRC and NIHR)

The **Lifelong Health and Wellbeing Centre for Ageing and Vitality** at Newcastle University (LLHW CAV) aims to increase understanding of the biological processes of ageing, and how physical activity/exercise and nutritional interventions influence these mechanisms. The Centre is part of the Research Councils' Lifelong Health and Wellbeing (LLHW) programme and is funded by the Medical Research Council (MRC) and Biotechnology and Biological Sciences Research Council (BBSRC).
Funding: £488k pa

The MRC's **Population Health Sciences Research Network** is a network of MRC research units and centres, bringing together efforts by:

- Developing methodological approaches to population health sciences research

- Pooling and sharing resources to create a more effective critical mass in population health sciences
- providing a coordinated voice on research and policy issues in population health sciences

The network includes many of the centres and units listed above, as well as the 5 UKCRC Centres of Excellence in Public Health Research.

The PHSRN funds research workshops and projects with a focus on methodological knowledge transfer in the following areas:

- translating population health sciences research into policy and practice
- changing behaviour
- improving the measurement of exposure, development and function
- overcoming barriers to population health sciences research
- synthesising evidence

Centre for Longitudinal Studies

The Centre for Longitudinal Studies (CLS) is an ESRC resource centre. It is based at the Department for Quantitative Social Science, Institute of Education, University of London. CLS is responsible for running three of Britain's internationally-renowned birth cohort studies: 1958 National Child Development Study (NCDS), the 1970 British Cohort Study (BCS70), and the Millennium Cohort Study (MCS).

UK Longitudinal Studies Centre

The UK Longitudinal Studies Centre (ULSC) was established by the ESRC in 1999 and is the national resource centre for promoting longitudinal research and for the design, management and support of longitudinal surveys. Its goal is to ensure the collection of longitudinal data of the highest quality to meet UK social research needs and to promote its widest and most effective use. In achieving this, the centre makes a major contribution to the UK's portfolio of longitudinal studies and to the advances they help us make in advancing the social sciences and in understanding society.

Consumer Data Research Centre

The Consumer Data Research Centre (CDRC) is a Business and Local Government Data Research Centre in the ESRC Big Data Network. The Centre focuses on the ways in which new forms of data can be of value to social scientists and to research generally, and will particularly focus on data arising from transactions between customers and commercial organisations or service providers.

ESRC Centre for Population Change

The ESRC Centre for Population Change was established in January 2009. It is funded by the ESRC and is the UK's first research centre on population change. Based jointly at the Universities of Southampton, St. Andrews, Edinburgh, Strathclyde and Stirling, in partnership with the National Records of Scotland and the Office for National Statistics, their aim is to improve the understanding of the key drivers and implications of population change.

7.3 Other UK Research Centres and Institutes

Social Dimensions of Health Institute

The Social Dimensions of Health Institute, at the universities of Dundee and St Andrews, is a platform for a broad interdisciplinary research and knowledge exchange network. It brings together researchers with complementary expertise and skill profiles to enhance efforts to understand and explain the social dimensions of health and healthcare. The Institute subscribes to a broad conceptualisation of health that encompasses well-being, social participation and societal inclusion. SDHI promotes research and knowledge exchange at the intersection of global challenges.

Centre for Sustainable Work and Employment Futures (CSWEF)
CSWEF, at the University of Leicester, aims to shape and improve work and employment policy analysis and inform practice by bringing together a team of networked researchers to produce systematic theory and a secure evidence base to address existing knowledge gaps. Research is concentrated on six inter-connected themes: Age, productivity and employment change; financial capitalism and employment relations; labour markets: structural change and transitions; Workplace industrial relations in the shadow of recession; shrinking the state: the shifting boundaries between public and private sectors; globalisation, technology and new international divisions of labour.

The Work Foundation
A registered charity and think tank, Lancaster University's Work Foundation produces independent research focused on innovation and economic change, the role of cities, labour market disadvantage, health and wellbeing at work and how organisational change can promote good work.

Centre for Comparative Social Surveys
The Centre for Comparative Social Surveys is based in the Department of Sociology, City University London and is host to the European Social Survey (ESS), a multi-nation initiative designed to monitor and explain trends in attitudes, beliefs and values across countries in Europe (and its close neighbours).

Centre for Time Use Research
The aim of the CTUR at the Department of Sociology, University of Oxford, is to arrive at a well-coordinated scientific approach to the understanding of time allocation, founded on rigorous historical and cross-national comparative evidence, which starts at the micro-sequential level of individuals' everyday life and builds progressively to a macro understanding of social change. The centre seeks to use innovative models of the determinants of the balances among the various sorts of work and leisure, based on observations of how representative samples of people spend their time.

Longitudinal Studies Centre - Scotland
The Longitudinal Studies Centre Scotland has a broad set of projects focusing on linking data over time to produce a unique set of longitudinal research resources. The Centre's aim is to become an internationally renowned resource for longitudinal data development and analysis. The LSCS is based at the University of Edinburgh, as well as Ladywell House, home to the Scottish Longitudinal Study Development and Support Unit (SLS-DSU).

7.4 Research Councils and Government Depts – Funding Calls and Initiatives

Public Health Intervention Development Scheme (PHIND)
- supports the early stages of development of public health interventions

- studies funded by the scheme will develop a solid theoretical framework and generate evidence on the design specification and feasibility of the intervention
- essential knowledge obtained from these preliminary studies will provide the foundation for future pilot testing and evaluation, with the ultimate aim of improving the effectiveness of public health interventions

Lifelong Health and Wellbeing
Between 2008 and 2015, the LLHW programme committed £51m supporting multidisciplinary ageing research to meet the challenges and opportunities of an ageing population. Through LLHW, the Research Councils facilitated new multidisciplinary research collaborations, built capacity, and worked with a wide variety of cross-sector stakeholders to raise the profile of ageing research in the UK.

Whilst ageing research remains a priority for the Research Councils, the LLHW programme closed at the end of March 2015.

https://www.mrc.ac.uk/documents/pdf/llhw-phase-4-extending-working-lives/

National Prevention Research Initiative (NPRI)
See section 4.6

Antimicrobial resistance:
A number of funding schemes have been established to tackle antimicrobial resistance through support for multidisciplinary approaches. The research councils, along with other UK funders, have been working together to identify a number of research opportunities and challenges to tackling the rise in AMR within four themes:

- Understanding resistant bacteria
- Accelerating therapeutic and diagnostics development
- Understanding the real world interactions
- Behaviour within and beyond the health care setting

www.mrc.ac.uk/research/initiatives/antimicrobial-resistance/

The MRC, ESRC, BBSRC and the National Natural Science Foundation of China (NSFC) are collectively making up to £9m available to fund collaborative research projects focusing on antibacterial resistance as part of the UK-China Antimicrobial Resistance Initiative.

Valuing Nature programme: Understanding the Value of the Natural Environment for Improving Human Health & Wellbeing
Targeting natural and social scientists, arts and humanities researchers to form substantial interdisciplinary research collaborations (with relevant reference to health sciences), to increase understanding of the role and value of biodiversity and ecosystem processes in relation to human health and wellbeing.

The focus of the call will be on understanding the value of the UK's natural environment for human health (physical and mental) and wellbeing within and across the following three areas:

- natural hazards and extreme weather events
- human exposure to pathogens and aquatic toxins
- urban ecosystems

Funding of up to £3·96m (80% FEC) is available, which is expected to support between three and six interdisciplinary proposals of up to three years duration. Supported by NERC, AHRC and ESRC; the call for applications closed in September 2015.

Urban Living Partnership

The Urban Living Partnership brings together all seven Research Councils and Innovate UK to promote integrated research and innovation to address the challenges faced by urban areas in the UK and to help them realise their visions for future urban living. Challenges can range from infrastructure and environment to crime and social inclusion, from health and wellbeing to heritage and culture, from economy and employment to smart cities and big urban data.

Combined funding of £2 million is available from RCUK and Innovate UK for the pilot call to be distributed between up to five projects, each focused on a different city / urban area. Funding of up to £400,000 will be awarded to support each pilot project to conduct a 'diagnostic' phase commencing in April 2016 and running initially for up to 18 months.

Urban Transformations and Foresight Future of Cities Knowledge Exchange Fellowship

This initiatives supports research and knowledge exchange in the area of Urban Transformations to critically assess and understand the impact and significance of urban transformations for the welfare and wellbeing of urban citizens across the globe. Knowledge Exchange Fellowships are being considered in partnership with the government's Foresight Future of Cities project.

The Environment & Human Health Programme, supported by NERC aimed to strengthen the UK's capacity for multidisciplinary studies into environment and human health issues. Designed as an inter-disciplinary capacity building programme, it helped to identify and prioritise research areas where the natural environment and human health interact. It also aimed to strengthen the UK science community's ability to undertake multi- and inter-disciplinary research to investigate such interactions. The programme ran from 2006-2010 and was co-funded by EA, DEFRA, MOD, MRC, The Wellcome Trust, ESRC, BBSRC, EPSRC and HPA.

The Environmental Microbiology & Human Health programme are to provide the scientific evidence to support fast and efficient identification of pathogenic/allergenic microorganisms and biological material in environmental media, which can be used in appropriate tools and models for the protection of public health.

The programme will run from 2015–2019 and is co-funded by the Defence Science & Technology Laboratory (Dstl) and Food Standards Agency (FSA), with a budget of £5.15m.

The Environmental Exposure & Health Initiative will provide important new knowledge on the interconnections and pathways between environmental pollutants and interacting stressors, exposure routes and health effects in humans, including variations in susceptibility and the definition of health risks. This integrated understanding is vital for the development of evidence-based policies and practices that will reduce the adverse health effects of contaminated water, land, food or air.

The programme ran from 2009–2015 and was co-funded by NERC, MRC, DH, ESRC, and DEFRA. £7m was awarded in 2010.

The Environmental & Social Ecology of Human Infectious Diseases programme will enable society to respond proactively to the threat from novel pathogens and emerging infections by generating knowledge on the ways in which the natural and social environments affect the emergence and spread of infectious disease. The programme recognises that important new insights into the drivers and control of infectious diseases in human populations can only be achieved by taking a holistic systems approach.

The programme is running from 2009–2017 and is co-funded by NERC, MRC, ESRC and BBSRC. The total budget is £10m.

The NERC, MRC and the National Natural Science Foundation of China (NSFC) are supporting a strategic research programme on Atmospheric Pollution & Human Health in a Developing Megacity. The programme is split into four themes:

- sources and emissions of urban atmospheric pollution
- processes affecting urban atmospheric pollution
- exposure science and impacts on health
- interventions and solutions.

NERC and MRC have a budget of £5.5m (£3m of which is from the Newton Fund) for the overall programme and NSFC have 40m YUAN. The call for applications closed in March 2015.

DEFRA provides funding for research through competitions, non-competitive arrangements through their our science agencies or in partnership with others, such as through LINK programmes. DEFRA's strategy, Making the most of our Evidence, highlights, amongst other areas, its focus on evidence to inform policy on the sustainable management of natural resources to promote economic growth, public health and healthy ecosystems.

7.5 Other funders

Since 2013, the Wellcome Trust's Our Planet, Our Health programme has committed £5m to support pilot projects investigating the connections between environment, nutrition and health. This funding was done under the name 'Sustaining Health'.

From 1990-2011, more than £204m was allocated by the Wellcome Trust for core support and infrastructure at Wellcome Trust Centres and Major Overseas Programmes (MOPs) in South-east Asia, Kenya and Malawi; much of their research has ultimate implications for population and public health research.

The Wellcome Trust has also supported a large volume of population and public health-related research through its Medical Humanities and Engagement funding stream, which has taken an approach based largely in social science. Between 1990 and 2011, 259 grants – totaling more than £10m – were made. Examples include:

- The Centre for the Study of Incentives in Health, funded by a Strategic Award in Biomedical Ethics, which studied whether it is right to use financial incentives to improve health. The Centre was a collaboration between King's College London, Queen Mary (University of London) and the London School of Economics.
- The Centre for History in Public Health at the London School of Hygiene and Tropical Medicine, funded by an Enhancement Award, was established in 2003 and contributes to the historical understanding of population and public health research.

8 Review of UK infrastructure for conducting population health research

The infrastructure for conducting health research in the UK has changed substantially during the last ten years, largely due to the development of NIHR. Key initiatives are summarised below where they have particular relevance to population and public health research. The UK also has an outstanding record of developing large scale, longitudinal population studies (cohorts), some of which began decades ago. These resources provide an invaluable library of information on the development of disease within healthy populations.

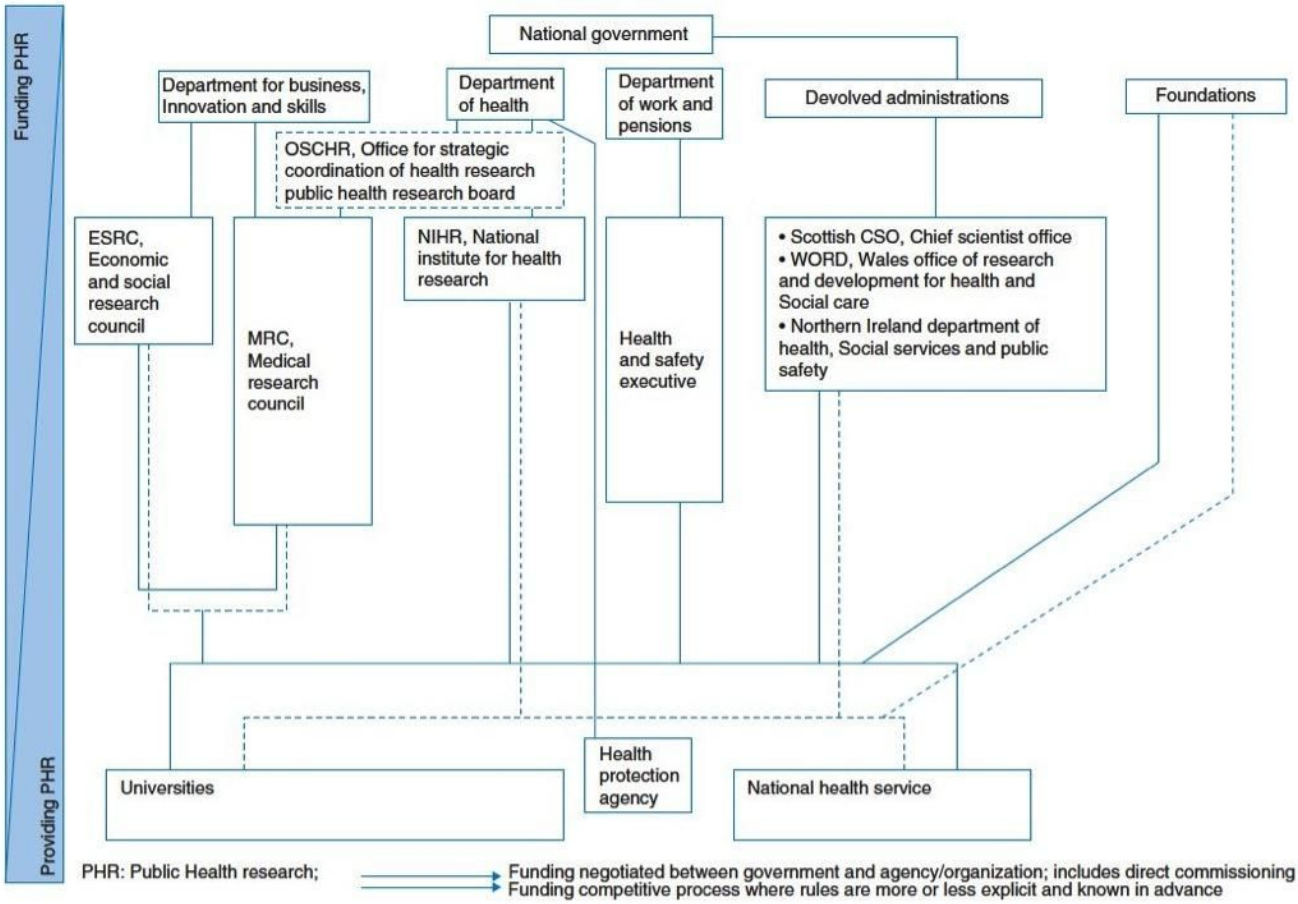

Figure 8.1 – UK public health research funders and providers; source: McCarthy et al (2013), from PHIRE (Public Health Innovation and Research in Europe), supported by the European Commission under the Second Public Health Programme (no. 2009 1214). N.B. this diagram pre-dates the establishment of Public Health England.

8.1 NIHR

The NIHR provides support and facilities for population and pubic health research through a range of infrastructure and initiatives, coordinated by the NIHR Office for Clinical Research Infrastructure (NOCRI).

NIHR School for Public Health Research (SPHR)

- Established in April 2012 with a budget of £20m over five years, the NIHR SPHR is a partnership between eight leading academic centres with excellence in applied public health research in England
- UCL, Bristol, Cambridge, LSHTM, Sheffield, Exeter, Liverpool / Lancaster PHR, FUSE (NE partnership)
- The SPHR set up and runs the Public Health Practice Evaluation Scheme (with PHE)
  - to evaluate innovative interventions proposed by local public health practitioners

NIHR School for Primary Care Research (SPCR)

- To increase the evidence base for primary care practice through high quality research and strategic leadership
- Key programmes:
  - **Disease prevention and diagnosis**
  - **Non-communicable disease and ageing**
  - Acute care
  - Organisation and delivery of care
  - Research innovation and new technologies.
- Partnership between nine leading academic centres for primary care research in England: Birmingham, Bristol, Cambridge, Keele, Manchester, Newcastle, Nottingham, Oxford, Southampton and UCL
- Established in 2006
- £32m from 2015-2020

NIHR Biomedical Research Centres

BRCs are set up as university / NHS partnerships and their primary focus is to undertake translational research in priority areas of high disease burden and clinical need. Whilst a key aim of the BRCs includes driving innovations in the prevention of disease, their main focus is to advance diagnosis and treatments. BRCs with a particular focus on public health or prevention are listed below:

Name	*Name including host organisation and academic partner*	*Research themes*	*Funding for 5 years from 1 April 2012*
NIHR Newcastle Biomedical Research Centre	NIHR Biomedical Research Centre at Newcastle upon Tyne Hospitals NHS Foundation Trust and Newcastle University	The Ageing Body; The Ageing Brain; The Ageing Limbs; Genomics; Fibrosis & Repair; Mitochondria & Neuromuscular Disease	£16,636,125

NIHR Southampton Biomedical Research Centre	NIHR Biomedical Research Centre at University Hospitals Southampton NHS Foundation Trust and the University of Southampton	Nutrition, Growth and Development; Nutrition, Lifestyle and Healthy Ageing	£9,677,372

Table 8.1 - Biomedical Research Centres with a particular focus on public health or prevention

NIHR Biomedical Research Units

As for the BRCs, the primary focus of the BRUs is undertake translational research in priority areas of high disease burden and clinical need. BRUs with a particular focus on public health or prevention are listed below:

Name	*Name including host organisation and academic partner*	*Research themes*	*Funding for 5 years from 1 April 2012*
NIHR Bristol Nutrition Biomedical Research Unit	NIHR Biomedical Research Unit in Nutrition, Diet and Lifestyle at University Hospitals Bristol NHS Foundation Trust and the University of Bristol	Nutrition	£4,500,000
NIHR Leicester-Loughborough Diet, Lifestyle and Physical Activity Biomedical Research Unit	NIHR Biomedical Research Unit in Nutrition, Diet and Lifestyle at the University Hospitals of Leicester NHS Trust and Loughborough University	Nutrition	£4,500,000

Table 8.2 - Biomedical Research Units with a particular focus on public health or prevention

Collaborations for Leadership in Applied Health Research and Care (CLAHRCs)

- Bring together a collaboration of the local providers of NHS services and NHS commissioners, universities, other relevant local organisations and the relevant AHSN
- Conduct applied health research across the NHS, and translate research findings into improved outcomes for patients
- 13 NIHR CLAHRCs primarily focus on research targeted at chronic disease and public health interventions

The aims of the NIHR CLAHRCs are to:

- Connect those who conduct applied health research with all those who use it in practice across the health community: linking evidence, policy & practice

- Create and embed approaches to research and its dissemination that are specifically designed to take account of the way that health care is delivered across the local AHSN
- Increase the country's capacity to conduct high quality applied health research focused on the needs of patients, and **particularly research targeted at chronic disease and public health interventions**
- Improve patient outcomes locally and across the wider NHS

£124 million has been allocated to 13 new Collaborations for a five-year period from 1 January 2014. These Collaborations all demonstrated a substantial portfolio of world-class applied health research, particularly in research targeted at **chronic disease and public health interventions**, and significant track records in translating research findings into improved outcomes for patients. The CLAHRCs are summarized below highlighting specific relevance to population and public health research:

Name	***Name including host organisation***	***Research themes***	***Funding for 5 years from 1 Jan 2014***
NIHR CLAHRC East Midlands	Nottinghamshire Healthcare NHS Trust	**Preventing chronic disease**, Managing chronic disease, Caring for older people and stroke survivors, Enhancing mental health, Implementing evidence and improvement	£9,998,421
NIHR CLAHRC North West Coast	NHS Liverpool Clinical Commissioning Group	**Improving public health and reducing health inequalities**, Improving mental health, Managing complex needs arising from long term conditions, Delivering personalised health care. Evidence synthesis and implementation, Public and stakeholder management, Knowledge exchange and implementation.	£9,000,000
NIHR CLAHRC Northwest London	Chelsea and Westminster Hospital NHS Foundation Trust	Early years, Frailty, Breathlessness, Improvement science and quality improvement, Public and patient engagement, Mental and physical wellbeing, Public health and information, **Intelligence, collaborative learning and partnerships**	£10,000,000
NIHR CLAHRC Oxford	Oxford Health NHS Foundation Trust	**Early intervention and service innovation, Health behaviours and behavioural interventions**	£9,000,000

NIHR CLAHRC South London	King's College Hospital NHS Foundation Trust	**Alcohol, Diabetes, Infection**, Palliative and End of life care, Psychosis, **Public Health**, Stroke, **Women's health**, Patient and public involvement	£9,000,000
NIHR CLAHRC South West Peninsula	Royal Devon and Exeter NHS Foundation Trust	Mental health and dementia, Diagnostics and stratified medicine, **Healthy people, Healthy environments**, Person-centred care, Evidence for policy and practice	£10,000,000
NIHR CLAHRC Wessex	University Hospital Southampton NHS Foundation Trust	Achieving sustainable patient health improvements in respiratory health through integrated care, Ageing and dementia: improving routine clinical care, Delivering high quality fundamental care in hospital, **Public health and primary care: targeting antibiotic use and preventing chronic liver disease**, Patient engagement with self-directed support for long term conditions, Minimally disruptive healthcare, patient experience, and organisational behaviour	£8,997,942
NIHR CLAHRC West	University Hospitals Bristol NHS Foundation Trust	Delivering equitable, appropriate and sustainable health and healthcare; Improving the management of chronic diseases (e.g. dementia, musculoskeletal, vision, kidney, pain, depression, Parkinson's, and avoiding hospital admissions); **Public health interventions (e.g. reducing child injury and infections, improving sexual health, supporting healthy neighbourhoods, improving services for self-harm and addictions, and innovation in vaccines)**. Research methodology themes: Evidence synthesis; Effectiveness and evaluation; Efficiency; Ethnography; Epidemiology	£8,970,965
NIHR CLAHRC West Midlands	University Hospitals Birmingham NHS Foundation Trust	**Maternity and child health, Prevention and early intervention in youth mental health, Prevention and detection,** Chronic diseases (integrated and holistic care, Implementation and Organisational Studies (IOS), Research methods	£9,996,824
NIHR CLAHRC Yorkshire	Sheffield Teaching Hospitals NHS Foundation Trust	Evidence Based Transformation with the NHS (EBT), Translating Knowledge into Action (TK2A), Health Economics and Outcomes Measurement (HEOM),	£10,000,000

and Humber		Telehealth and Care Technologies (TaCT), **Public Health and Inequalities (PHI), Healthy Children, Healthy Families (HCHF), Primary Care-Based Management of Frailty in Older People**, Avoiding Attendance and Admission in long term conditions (AAA), Mental Health and Co-Morbidities (MHCM)	

Table 8.3 - Collaborations for Leadership in Applied Health Research and Care (CLAHRCs) highlighting their focus on public health or prevention

Academic Health Science Networks (AHSNs)

There are 15 Academic Health Science Networks (AHSNs) in England – established during 2013/14 by NHS England as a product of the Government's Innovation, Health and Wealth strategy.

The two key objectives of the Networks are to improve health and generate economic growth. They do this through connecting academics, NHS, researchers and industry to accelerate the process of innovation and facilitate the adoption and spread of innovative ideas and technologies across large populations.

AHSNs aim to be catalysts and facilitators of change across whole health and social care economies, with a clear focus on improving outcomes for patients. They seek to open doors to create a more conducive environment for industries to work more effectively with the NHS and other parts of the UK healthcare sector. The diversity of AHSN priorities and programmes reflects the diversity of the challenges of improving health and wealth in each region. However every AHSN shares a focus on:

- Promoting economic growth
- Diffusing innovation
- Improving patient safety
- Optimising medicine use
- Improving quality and reducing variation
- Putting research into practice

The key priorities of each AHSN are wide-ranging, with the major emphasis on clinical care, uptake of new technologies and improving outcomes for patients. The focus on diffusing outcomes from public health research within the AHSNs appears to be quite low.

NIHR Public Health Programme

The PHR Programme funds research to evaluate non-NHS interventions intended to improve the health of the public and reduce inequalities in health. The scope is multi-disciplinary and broad, covering a wide range of interventions that improve public health.

Spend: £9.9m (2014/15)

NIHR Clinical Research Network (CRN)

A wide range of observational studies and interventions are included in the CRN. Studies included in the CRN Portfolio have access to NHS infrastructure for research, training and registration.

NIHR / Department of Health Policy Research Programme (PRP)
The function of the Policy Research Programme (PRP) is to commission, fund and manage leading edge research that is focused on the needs of Ministers and policymakers for evidence to inform policy. It provides timely evidence for current policy needs and builds the evidence-base for future policy-making. 12 Policy Research Units (PRUs) are supported through the PRP. The units working most closely on public health research and policy are listed below:

Title	*Focus*	*Location*	*Director(s)*
Behaviour and Health Research Unit	Evidence to achieve sustained behaviour change that improves health outcomes and reduces inequalities	Cambridge	Theresa Marteau
Children's Policy Research Unit	Health and wellbeing of children, young people and families	UCL	Terence Stephenson Catherine Law
Policy Innovation Research Unit	To improve evidence-based policy-making and its implementation	London School of Hygiene & Tropical Medicine	Nicholas Mays
Public Health Research Consortium	Strengthening the evidence base for interventions to improve health, with a strong emphasis on tackling socioeconomic inequalities in health	London School of Hygiene & Tropical Medicine	Mark Petticrew

Table 8.4 – DH / NIHR Policy Research Units focusing on public health or prevention

8.2 UKCRC Public Health Research Centres

Five Public Health Research Centres of Excellence were established in 2008, supported by eight funders through the UKCRC. The aims of these centres are to build capacity across public health research career pathway and increase UK infrastructure for high quality public health research. A priority of the centres is to engage with stakeholders, translating research to policy and practice.

Total funding for the five UKCRC Public Health Research Centres:

- £20m (2008-2013)
- £16m (2013-2018)

Name	*Director*	*Location*
Centre for Diet and Activity Research (CEDAR)	Professor Nick Wareham	MRC Epidemiology Unit Cambridge
Centre of Excellence for Public Health Northern Ireland	Professor Frank Kee	Queens University Belfast
Centre for Development and Evaluation of Complex Interventions for Public Health (DECIPHer)	Professor Laurence Moore	Cardiff University
Centre for Translational Research in Public Health (Fuse)	Professor Martin White	Newcastle University
UK Centre for Tobacco Control and Alcohol Studies (UKCTAS)	Professor John Britton	University of Nottingham

Table 8.5 – UKCRC Public Health Research Centres of Excellence

8.3 Public Health England (PHE)

A key priority within PHE's Research Strategy (July 2015) is to build, share and sustain high-quality infrastructure to enable research by PHE and others. Key objectives of PHE are to:

- support infrastructure for public health research
- continue its strong support for the National Institute for Health Research (NIHR) Health Protection Research Units (HPRUs) both to achieve evidence for PHE actions and to build research capacity, capability and excellence, leveraging the initial investment

NIHR has the primary role for providing relevant infrastructure as described above. Most of PHE's past success in external funding relates to Health Protection – whether infectious disease or chemical, radiation or other environmental hazards. A step change in infrastructure support in these areas is provided by the five-year, £47.5 million NIHR Health Protection Research Unit (HPRU) initiative. Thirteen NIHR HPRUs were established in 2013 with the aim of supporting PHE to achieve its objectives and functions for the protection of the public's health. PHE are full partners in each Unit.

PHE has commissioned RAND Europe (2013) to conduct a Horizon Scanning exercise to explore the future of public health and related scientific services & to inform

- PHE strategy
- proposals for the creation of an integrated public health science hub

Key points from RAND Europe's analysis are summarized below:

On the question of those **technological and research trends** that would be influential in future public health, **genomics** featured prominently, as did **informatics** and **'big data'**. Challenges facing public health included the involvement and **regulation of the private sector's activities** within this traditionally public sector-dominated field.

The **capabilities** that were regarded as being important for future public health needs spanned wet lab disciplines (epidemiology, microbiology, virology, genetics, etc.) and 'dry lab' capabilities (including statistics, economics, mathematics, behavioural science and bioinformatics and other IT-related disciplines).

The **challenges for public health** over the next 20 years will be multi-faceted and affect the population at many levels. **Integration of data** will play a significant role. The future will be dominated by many different kinds of data and these will all need to be collected, mined, fused, integrated and managed in order to maximize positive outcomes for public health. Finally, there is no single technology or capability that dominates the field. **Multiple platforms will be required**, and need to be brought together across both wet and dry laboratory spaces in order to make the most of the data and knowledge that emerge from each space

A recent article in *Nature* by Elliot et al (2015) highlights the significant opportunities arising from integrating successfully different health datasets.

Following a broad review of future developments in public health, the RAND Europe report identified the following areas as particular priorities for further research:

- Behavioural sciences
- Informatics
- Simulation and modelling
- Genetic technologies
- Infectious disease
- Antimicrobial resistance
- Health improvement
- Emergency preparedness

8.4 Networks and Population Studies

The Council for Science and Technology (CST, 2015) recently undertook a review of the landscape in population health sciences. Their report, published in 2015, provided a list of infrastructure relevant to life sciences and medical. The report included a comprehensive list of key facilities of relevance to population health sciences. A range of networks and population studies not previously referred to in this report are summarised below, reproduced from the CST's report:

8.4.1 Networks, Data and Information Resources

Farr Institute

The Farr Institute of Health Informatics Research comprises four nodes distributed across the UK at University College London, the University of Manchester, Swansea University, and the University of Dundee. The Institute aims to deliver high-quality, cutting-edge research linking electronic health data with other forms of research and routinely collected data, as well as build capacity in health informatics research.

Cohort and Longitudinal Studies Enhancement Resources (CLOSER)

CLOSER aims to maximise the use, value and impact of some of the UK's largest and longest-running longitudinal studies, both at home and abroad. Bringing together nine leading studies, the British Library and the UK Data Service, CLOSER works to stimulate interdisciplinary research, develop shared resources, provide training, and share expertise. In this way CLOSER is helping to build the body of knowledge on how life in the UK is changing – both across generations and in comparison to the rest of the world.

Administrative Data Research Network (ADRN)

The ADRN exists to make it possible to carry out academic research using administrative data. This is information collected by national and local government and other public sector organisations. The data is collected for administrative or operational reasons, but has the potential to be very valuable for social and economic research. It contains a wealth of information about our society. Social researchers can use it to analyse the impact of government policies, or find new explanations for what happens in our everyday lives.

Administrative Data Liaison Service

The ADLS is funded by the ESRC to support administrative data based research in the UK. Administrative data in the UK is extensive and has enormous potential to inform social scientific research, either directly through analysis of such data or through linkage to other datasets. The ADLS team provides expertise in the research uses of administrative data, legal and ethical research, data security, disclosure risks and data linkage.

Public Health England Data and Knowledge Gateway

The PHE data and knowledge gateway provides direct access to data and analysis tools and resources for public health professionals. The resources cover a wide range of public health areas, including: specific health conditions, lifestyle risk factors, wider determinants of health, health protection, and differences between population groups. The tools were produced by organisations that are now part of PHE.

UK Data Service

The UK Data Service is a comprehensive resource funded by the ESRC to support researchers, teachers and policymakers who depend on high-quality social and economic data. The service provides a single point of access to a wide range of secondary data (including large-scale government surveys, international macrodata, business microdata, qualitative studies and census data from 1971 to 2011) backed with extensive support, training and guidance to meet the needs of data users, owners and creators. The service promotes data sharing to encourage the reuse of data, and provides expertise in developing best practice for research data management.

UK Data Archive

The UK Data Archive is curator of the largest collection of digital data in the soc***ial*** sciences and humanities in the United Kingdom. With several thousand datasets relating to society, both historical and contemporary, the Archive is a comprehensive resource for researchers, teachers and learners.

International Bibliography of Social Sciences

The IBSS is an online resource for social science and interdisciplinary research. It supports the needs of students, researchers, lecturers, librarians and information specialists. IBSS includes over 2.5 million bibliographic records relating to the four core social science subjects of anthropology, economics, politics and sociology.

i-Sense

i-sense is a five year, £11m, EPSRC-funded programme led by University College London (UCL) and launched in October 2013, with an aim to engineer a new generation of early-warning sensing systems to identify disease outbreaks much earlier than before, using self-reported symptoms on the web and mobile phone-connected diagnostic tests. The capability to detect infections and then wirelessly connect test results to healthcare systems will help patients gain faster access to treatment, and support public health efforts to map indicators of emerging infections in real-time. It also uses the vast amounts of data from Google, Twitter and Facebook to identify indicators of disease outbreaks.

Health and Social Care Information Centre National Data Sets

NHS England is commissioning a modern data service from the Health and Social Care Information Centre (HSCIC) on behalf of the entire health and social care system. This includes care.data, a programme which will build on existing data services and expand them to provide linked data that will eventually cover all care settings, both in and outside of hospital.

8.4.2 Population Studies

The MRC (2014) has conducted a strategic review of the largest UK population cohort studies: Maximising the value of UK population cohorts. A key feature of the UK portfolio is the large number of cohorts that have been followed for a long period of time, with half of the cohorts (n=17) having been followed for at least 20 years. The age range of the UK cohort portfolio spans the whole life course from birth to over 100 years old (figure 8.2). It is estimated that 2.5 million people in the UK have been recruited to large population cohort studies and today there are over 2.2 million people, which is 3.5% of the UK population, who are still taking part.

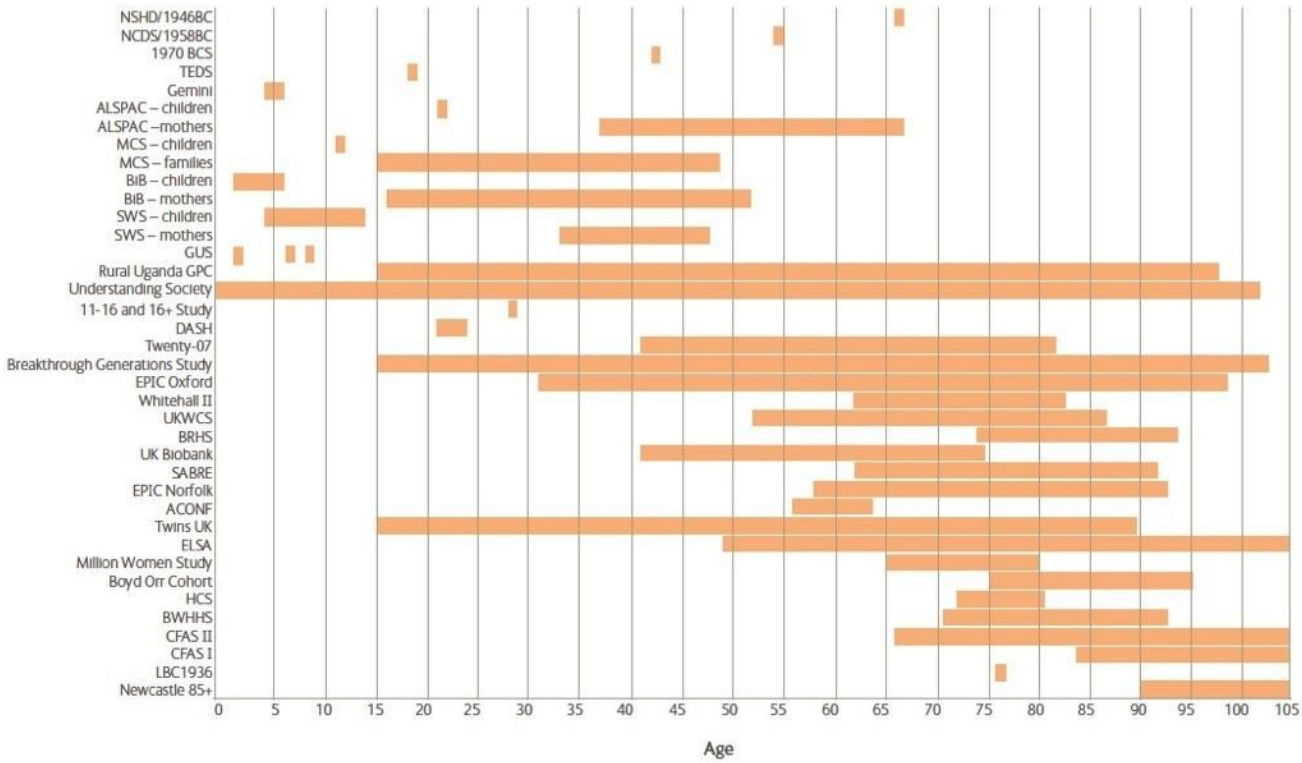

Figure 8.2 – Estimated age range of UK cohort participants in 2013; source: MRC (2014)

National Child Development Study (NCDS)

The NCDS follows the lives of 17,000 people born in England, Scotland and Wales in a single week of 1958. In the mid-fifties, when there was a great deal of concern about the number of babies who were born with abnormalities, or dying very early in life, it was decided to compare mothers and babies in Great Britain. With the help of doctors, midwives, and health authorities, all the babies born in one week in England, Scotland and Wales were studied during one week in 1958. Nearly 17,500 babies were studied in all. Since then there have been nine other major surveys, attempting to trace all those born in the week of the original 1958 survey; the in 2013. In addition, a major 'bio-medical' survey took place in 2002/3.

1970 British Cohort Study

The 1970 British Cohort Study follows the lives of more than 17,000 people born in England, Scotland and Wales in a single week of 1970. Over the course of cohort members' lives, the BCS70 has collected information on health, physical, educational and social development, and economic circumstances among other factors.

Millennium Birth Cohort Study (CLS)

The Millennium Cohort Study (MCS) is a multi-disciplinary research project following the lives of around 19,000 children born in the UK in 2000 to 2001.The study has been tracking the Millennium children through their early childhood years and plans to follow them into adulthood. It collects information on the children's siblings and parents. MCS's field of enquiry covers such diverse topics as parenting; childcare; school choice; child behaviour and cognitive development; child and parental health; parents' employment and education; income and poverty; housing, neighbourhood and residential mobility; and social capital and ethnicity.

Avon Longitudinal Study of Parents and Children (ALSPAC)

The Avon Longitudinal Study of Parents and Children (ALSPAC), also known as 'Children of the 90s', is a world-leading birth cohort study. Between April 1991 and December 1992 more than 14,000 pregnant women were recruited into the study and these women (some of whom had two pregnancies or multiple births during the recruitment period), the children arising from the pregnancy, and their partners have been followed up intensively over two decades.

Skills and Employment Survey (SES)

The Skills and Employment Survey (SES) is co-funded by the UK Commission for Employment and Skills (UKCES) and the ESRC. The study will survey approximately 3,170 respondents aged 20-65 in paid employment. The survey focuses upon the work that people do and how working life has changed over time.

Poverty and Social Exclusion in the UK (PSE)

Poverty and Social Exclusion in the United Kingdom is a major research project funded by the ESRC. Launched in May 2010, two major surveys one into the public's perceptions of necessities and one into living standards were carried out in 2012. The surveys aim to establish the best methods for measuring poverty, deprivation, social exclusion and standard of living; how the different dimensions of poverty, deprivation and social exclusion are related; the current extent and nature of poverty and how it has changed; and finally the policies that best address these problems.

Understanding Society

Understanding Society is an academic study that captures important information every year about the social and economic circumstances and attitudes of people living in 40,000 UK households. It also collects additional health information from around 20,000 of the people who take part.

Timescapes: an ESRC Qualitative Longitudinal Study

The Timescapes projects explored how personal and family relationships develop and change over time. The researchers focused on relationships with significant others: parents, grandparents, siblings, children, partners, friends and lovers with the aim of investigating how these relationships affected people's well-being and life chances, and the consequences for the long term resourcing of families. [More info:]

English Housing Survey

The English Housing Survey is a continuous national survey commissioned by the Department for Communities and Local Government (DCLG). It collects information about people's housing circumstances and the condition and energy efficiency of housing in England. It has two component surveys: a household interview, and a physical inspection of a sub-sample of the properties.

English Longitudinal Study of Ageing

The primary objective of the English Longitudinal Study of Ageing (ELSA) is to collect longitudinal multidisciplinary data from a representative sample of the English population aged 50 and older. Researchers collect both objective and subjective data relating to health and disability, biological markers of disease, economic circumstance, social participation, networks and well-being. ELSA aims to measure outcomes across a wide range of domains and to provide high-quality multidisciplinary data that can shed light on the causes and consequences of outcomes of interest.

Life Study

Life Study sought to recruit more than 80,000 babies born between 2014 and 2018 – and their families – from across the UK. Information about these babies would be collected over their early lives, childhoods and into adult life with the aim of gaining a better understanding of how early life experiences shape health and wellbeing later on. Due to the serious challenges encountered in recruiting participants, the ESRC and MRC have decided to stop funding from early 2016.

National Surveys of Sexual Attitudes and Lifestyles (Natsal)

The British National Surveys of Sexual Attitudes and Lifestyles are among the largest and most detailed scientific studies of sexual behaviour in the world. Three Natsal surveys have taken place. The first two surveys provided major sources of data informing sexual and reproductive health policy in Britain. The third survey covers an extended age range (up to 74 compared to 59 and 44 in previous surveys) allowing exploration of the interplay between aging and sexual behaviour. Through combining data from all three surveys it will be possible to conduct both period and cohort analyses, as the surveys include people born in the 1930s-1990s.

Northern Ireland Longitudinal Study

The Northern Ireland Longitudinal Study (NILS) has been formally available to researchers since the end of 2006. It comprises two major data linkage studies: the NILS and the Northern Ireland Mortality Study (NIMS). These were developed by the Northern Ireland Statistics and Research Agency (NISRA) and are maintained and managed by them as a resource for research.

The Scottish Longitudinal Study

The Scottish Longitudinal Study (SLS) is a large-scale linkage study created using data from administrative and statistical sources. These include: census data from 1991 onwards; vital events data (births, deaths, marriages); NHS Central Register data (gives information on migration into or out of Scotland); and education data (including Schools Census and SQA data).

UK Biobank

UK Biobank is a long-term study into the respective contributions of genetic predisposition and environmental exposure to the development of disease. It recruited 500,000 people aged between

40-69 and will collect health information on these individuals for the next 25 years. The study began in 2006 with initial funding of £62m.

Centre for Longitudinal Study Information and User Support

The Centre for Longitudinal Study Information and User Support (CeLSIUS) is an ESRC-funded support team for UK academic, statutory and voluntary sector users of the ONS Longitudinal Survey (LS). The ONS LS contains linked census and vital event data for one per cent of the population of England and Wales. Information from the 1971, 1981, 1991, 2001 and 2011 Censuses has been linked across censuses as well as information on events such as births, deaths and cancer registrations.

European Social Survey

The European Social Survey (ESS) is an academically driven cross-national survey that has been conducted every two years across Europe since 2001. The survey measures the attitudes, beliefs and behaviour patterns of diverse populations in more than thirty countries.

Longitudinal Study of Young People in England

The Longitudinal Study of Young People in England (LSYPE) is a large scale panel survey conducted by the Department for Education (DfE) following thousands of young people across England. Participants were first interviewed in year 9, and interviews take place each year to find out about their experiences over the past academic year, to see what they have been doing and if any of their future plans have changed.

LSYPE was set up to gather evidence about the transitions young people make from secondary to tertiary education or training to economic roles in early adulthood. The study also enhances the ability to monitor and evaluate the effects of existing policy and provide a strong information base for future policy development, as well as contextualising the implementation of new policies in terms of young people's current lives.

ESRC Time Use Survey

The Time Use Survey conducted by the Economic and Social Research Council (ESRC) sampled 9000 addresses across the UK over a 12 month period, collecting diaries for two days of the week from all individuals over 10 years of age within each of the sample households. The survey collected information on the age, sex and relationship between members, housing details, consumer durables, vehicles, help and services from outside the household and income. At the individual level, the survey collected information on activity status and employment details (or job search activities), income, education and training, voluntary work and provision of help and services outside the household, household activities, participation in leisure and sport, health and disabilities, and child care and other caring responsibilities.

Global Burden of Disease

The Global Burden of Disease study was commissioned by Public Health England (PHE) and run by the Institute for Health Metrics and Evaluation. It was the most comprehensive effort to date to measure epidemiological levels and trends around the world. The study demonstrated results in terms of disability-adjusted life years (DALYs).

Breakthrough Generations

The Breakthrough Generations Study is a large, comprehensive scientific study of the causes of breast cancer and includes over 110,000 women from the UK. It is supported by Breast Cancer Now and The Institute of Cancer Research.

Generation Scotland

Generation Scotland aims to build a major resource to support a wide range of scientific and medical research projects that will improve the prevention, diagnosis and treatment of illness and promote health throughout society. The main focus of Generation Scotland is on the inherited factors, passed on in families, that increase the chances of getting certain common conditions such as cancer, heart disease, stroke and mental illness.

9 Review of the workforce for public health practice

Public health practitioners work within a wide range of environments, such as the NHS, Public Health England, social care, local authorities and education. Practitioners' activities encompass a wide range of roles including health promotion, medicine, environmental health, urban planning and nutrition.

9.1 Mapping the core public health workforce

The Centre for Workforce Intelligence (CfWI) has gathered information on the core public health workforce in England and Scotland to support commissioners in making policy decisions relating to the future size and shape of the public health workforce. No equivalent information has yet been gathered about the workforce in Wales or Northern Ireland. Their reports include background to the public health workforce and estimates of the numbers of staff in each part of the core workforce.

The CfWI's definition of the core public health workforce is:

> 'All staff engaged in public health activities who identify public health as being the primary part of their role.'

This definition excludes several professions such as the majority of midwives, occupational health nurses, community pharmacists, GPs, trading standards officers and others in the wider workforce such as teachers or leisure centre staff, who may promote public health but only as part of their job.

Whereas public health was previously the responsibility of primary care trusts (PCTs) and strategic health authorities (SHAs) in the NHS, it has now become primarily the responsibility of Public Health England (PHE) and of local authorities, with other new organisations such as HEE playing an important role.

Many of the training routes identified are difficult for either HEE or PHE to control, either because another organisation determines who trains and/or qualifies the workforce (e.g. environmental health, the portfolio route for public health specialist training), because training roles are determined by the employer (knowledge and intelligence roles, most practitioner type roles, academic roles), or because people come in from a range of career backgrounds. While greater diversity in public health practice has been a welcome development, it has meant training pipelines have become more difficult to monitor.

The CfWI is currently conducting a review of the public health practitioner workforce across the UK. This review will document how practitioners are employed across the country, what career paths are available and what registration or other training options are open to them. The review will also develop a proposed definition of 'public health practitioner' for use in future discussions and workforce planning.

9.2 Public Health Skills and Knowledge Framework (PHSKF)

Public Health England has developed a public health skills and career framework for use across the UK. The framework is intended to be a tool for individuals working in public health at any stage of their career. It helps identify individuals' skill and knowledge

development needs, either in their current post or with future career in mind. The framework, updated by Public Health England (2015b), describes nine key areas required in roles of varying degrees of seniority.

1. Surveillance and assessment of the population's health and wellbeing
2. Assessing the evidence of effectiveness of interventions, programmes and services to improve population health and wellbeing
3. Policy and strategy development and implementation for population health and wellbeing
4. Leadership and collaborative working for population health and wellbeing
5. Health improvement
6. Health protection
7. Public health intelligence
8. Academic public health
9. Health and social care quality

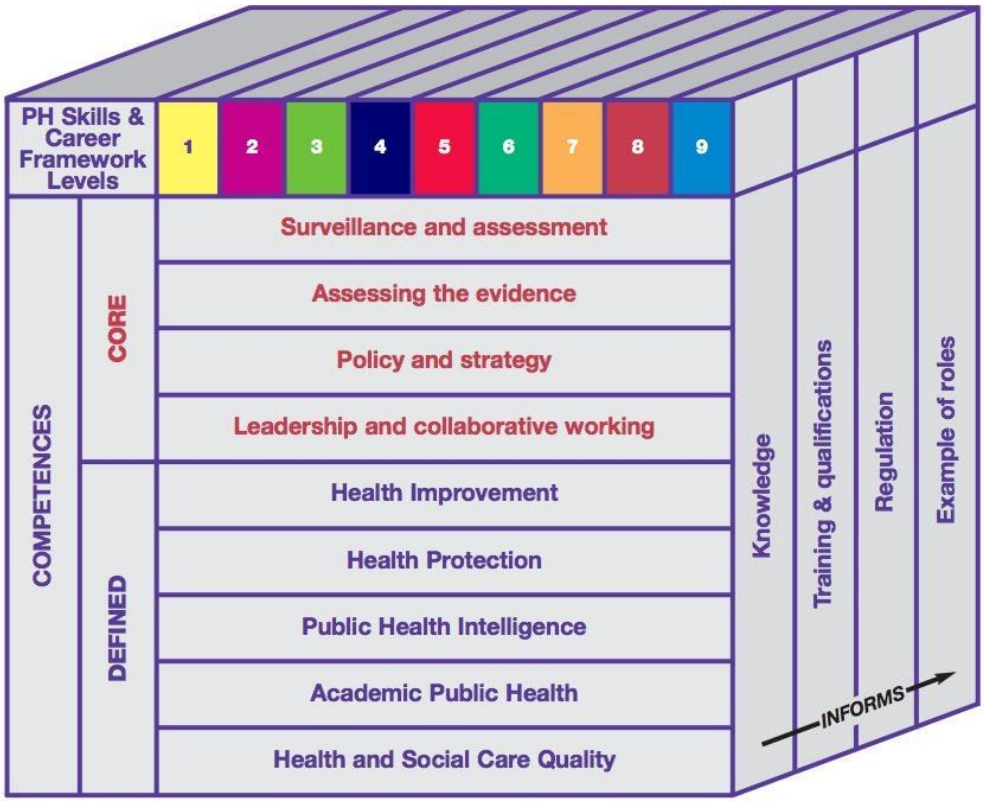

Figure 9.1 - The Public Health Skills and Career Framework cube; Source: PHRU (2009)

Public Health Online Resource for Careers, Skills and Training (PHORCaST), managed by HE East Midlands, is an online portal which aims to:

- promote public health (including health and wellbeing) as a career
- attract the most appropriate people into public health roles
- help retain the most appropriate people in public health roles
- help develop the careers of people already working in public health
- help support those with a public health aspect to their role (the wider public health workforce)

9.3 Overview of the core public health workforce

The 11 core public health roles identified by the CfWI are shown in table 9.1 and figure 9.2:

Role	Description	Estimated nos.
People working primarily at higher levels of the PHSKF (levels 8 and 9):		
Public health consultants and specialists (including registrars)	Employers: local authorities & PHE; also NHS, CCGs, NHS trusts Work at a strategic or senior management level or at senior level of scientific expertise to influence health of entire communities Must be registered with GMC, GDC or the UKPHR	1,200–1,300, plus 250–350 registrars Numbers estimated from registrations with GMC/GDC/UKPHR and 2012 data from the HSCIC
Directors of Public Health (DsPH)	Employed by local authorities Responsible for determining overall vision and objectives for public health locally Will be consultants who have qualified through specialty training Registered via GMC, GDC or UKPHR	130 Broadly one per county/unitary local authority, but some shared arrangements
Public health academics	See Table 5.1	
Public health managers	Employed primarily in local authorities Qualified staff (e.g. Masters in PH) No requirement to be registered	600–1,200 Multiple professional titles/roles and therefore difficulty in tracking numbers accurately; no data on staff in local authorities
People working across levels 5 to 9 of the PHSKF:		
Public health scientists	See Table 5.1	
Intelligence and knowledge professionals	Employed across the system, primarily within local authorities and PHE Data analysis, informatics and presentation of PH information May also have qualified as public health consultants/specialists and regulated accordingly	1,000–1,300 (up to 1,000 in PHE, including non-health professionals; estimate of at least 300 people working in local authorities but limited data available)
Public health nurses (excluding those listed below)	Employed across local authorities, PHE and NHS; most commonly in health protection teams Registered with the NMC and may be registered as specialist community public health nurses (SCPHN)	350–750 Multiple professional titles/roles and therefore difficulty in tracking numbers accurately

	or have completed other qualifications (e.g. infection prevention and control)	
People working primarily at levels 5 to 7 of the PHSKF:		
Health visitors	Commissioned by local authorities (from Oct 2015) Work as part of a primary healthcare team, assessing the health needs of individuals, families and the wider community Aim to promote good health and prevent illness, by offering practical help and advice, and in particular delivering the Government's Healthy Child Programme Registered with NMC	11,000 Number takes into account qualified health visitors working in the NHS recorded in the September 2013 census
School nurses	Mostly commissioned by local authorities from NHS and working in schools; some employed directly by independent schools and local authorities Nurses with public health function as core activity, working at practitioner level Registered with NMC	4,000 Number takes into account both qualified school nurses and nurses working in school nursing
Public health practitioners	Work across the system, including within PHE, local authorities and provider organisations, delivering public health programmes May be registered with UKPHR, Chartered Institute of Environmental Health (CIEH), allied health professionals regulated by the HCPC, or nurses/midwives regulated by NMC	Up to 10,000 Multiple professional titles/roles and therefore difficulty in tracking numbers accurately; no data on staff in local authorities; above figure estimate for the UK as a whole by the UKPHR
Environmental health professionals	Generally employed by local authorities Work in improving, monitoring and enforcing public and environmental health standards Regulated by the CIEH	5,500–8,500, including more than 4,000 in local authorities

Table 9.1 - Summary of the core public health workforce; Source: CfWI (2014)

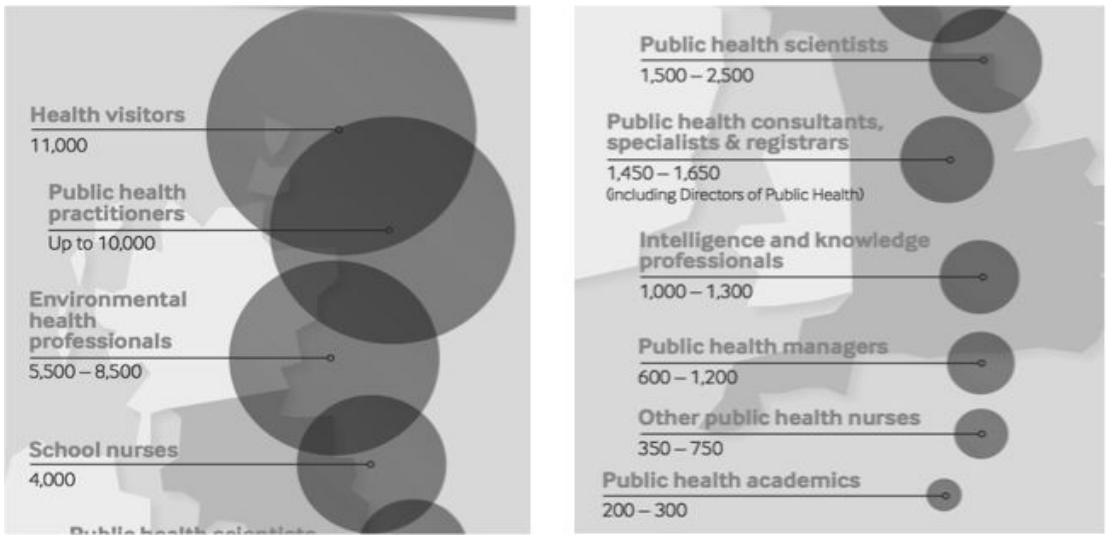

Figure 9.2 – Infographic showing the core public health workforce; Source: CfWI (2014)

9.4 Overview of the wider public health workforce

The CfWI (2015b) together with the Royal Society for Public Health (RSPH), have also looked at the wider public health workforce. Their report, Understanding the wider public health workforce (2015) found that at least 15 million people contribute to the public health agenda in England - ranging from police and fire personnel, to opticians and housing officers. The CfWI's infographic is shown below.

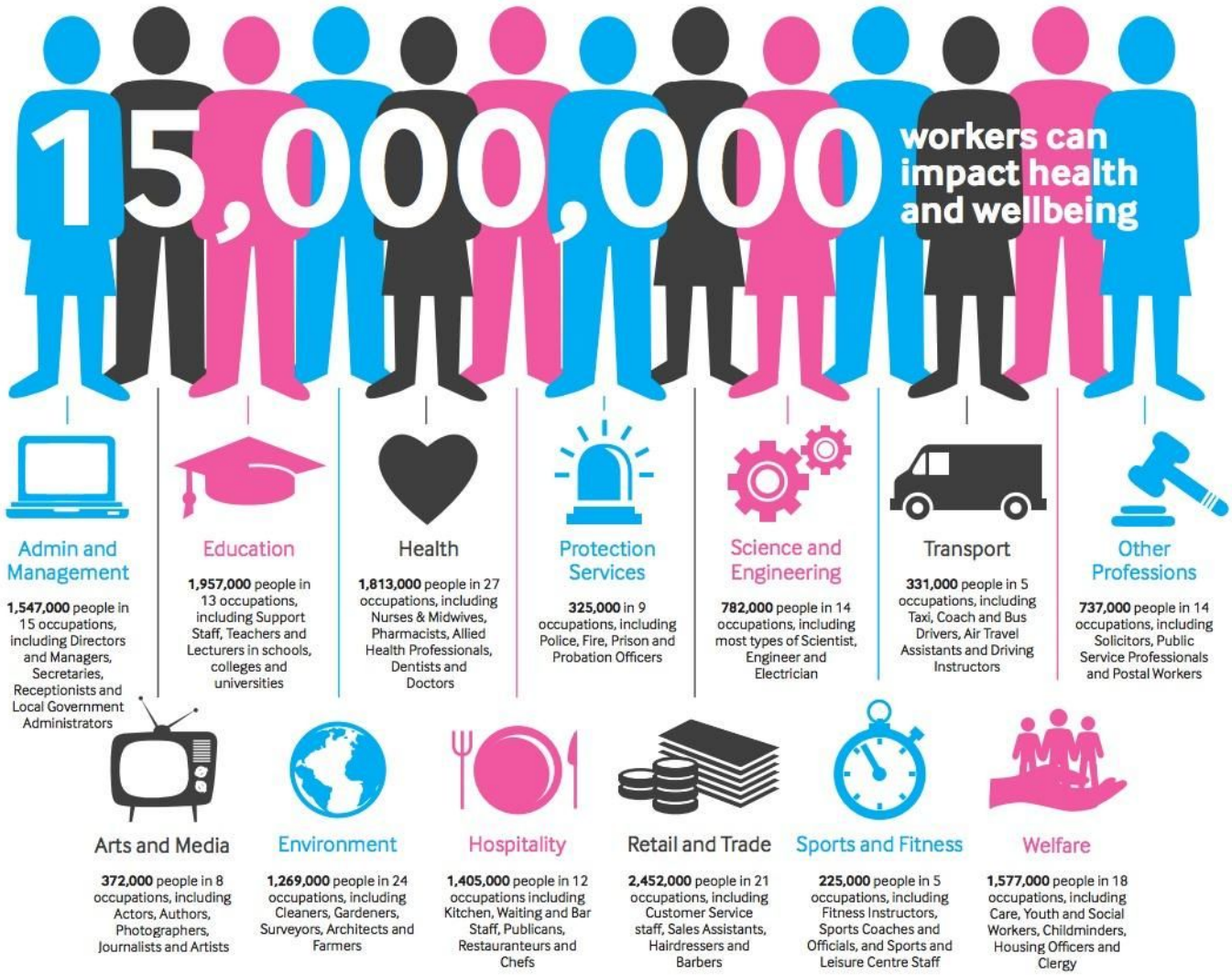

Figure 9.3 - Summary of the wider public health workforce; Source: CfWI (2015b)

In recognising the challenges we face in tackling the major public health issues and the limitations of the UK's 40,000 strong core public health workforce, the RSPH (2015) has emphasised (in its report, Rethinking the Public Health Workforce) a need to engage the wider public health workforce to effect major change and improvements.

10 Review of career pathways – from medical school onwards – for public health practitioners

As described in the previous section, there is a wide array of roles within public health practice and an equally wide range of career pathways across the sector. This section describes career pathways for public health practitioners who make up the core public health workforce (see also section 9). A range of career development cases studies is also provided (table 10.2) to highlight examples of the career development routes for selected individuals working in public health.

The main sources for information in this section are the CfWI reports on mapping the core public health workforce in England (2014) and Scotland (2015), the Skills for Health Career Framework – case studies and Career Profiles from the Faculty of Public Health (2013).

For further information, the CfWI is holding a series of workshops during late 2015 / early 2016 to enable local leaders to come together to discuss and shape national and local thinking on workforce issues that may arise in the short and long-term future.

10.1 Public Health Practitioners – career pathways (training, qualification, registration and employer)

Role	Pre-role training	Role specific qualification	Obligatory Registration	Primary Employer	Job Title(s)
Health Visitor	Qualified and registered nurse (Adult, children's, Learning disability or mental health) or midwife. Diploma or degree level. NB since 2014 all nursing programmes are degree level	Degree level or post-graduate level Specialist Community Public Health Nursing Health Visiting (SCPHN/HV) programme	NMC	Previously NHS; Local Authority (LA) Community from 2015	HV
Public Health Practitioner	None fixed but typically degree or professional qualification e.g. public health, environmental health, nursing	None. Encouraged to keep portfolio or record of evidence of training & experience. Careers progress often to masters degree	None but could register with UKPHR if area has scheme	LA Community	PH practitioner; Health Improvement (HI) principal; HI practitioner; PH strategist. Smoking cessation, health and wellbeing etc.
Environmental Health Professionals	CIEH offers Technician or Practitioner level study. Level 5 of PHSKF or Degree in Environmental health	Three stages to CIEH registration. -Accredited EH degree	EHRB CIEH	LA Community	Environmental health officer

		- Pass Portfolio of professional practice - Pass Professional exam			
School Nurses	Qualified nurse	Completion of an NMC-approved SCPHN course at a degree level.	NMC SCPHN section of the register.	NHS commissioned by LA Community	School Nurse, school matron
Public Health consultants and specialists inc. registrars	May be medically or non-medically qualified Variety of backgrounds (e.g. nursing, research, teaching, environmental health, and medicine). Applicants must have: an MBBS or equivalent medical qualification or a first degree (1st or 2:1 or equivalent grade) or a higher certificated degree (Master's or PhD)	Masters degree & speciality training or portfolio routes	General Medical Council (GMC), General Dental Council (GDC), or the UK Public Health Register (UKPHR)	LA, PHE, universities	PH manager, PH specialist, PH consultant Speciality Dr in public health medicine;
Intelligence and Knowledge Professionals	Apprenticeship available in e.g. health informatics, intelligence analysis. Graduate schemes – NHS Graduate management scheme health informatics strand. Or post-graduate training programme e.g. field epidemiology	No fixed training routes	None but could register CILIP, UKCHIP, Royal Statistical Society, UKPHR, HCPC	PHE and regional knowledge and intelligence teams (KITS)	Working within Chief Knowledge Officer's directorate PHE mostly in KITS. Or Health protection (Field epidemiological services), Health and Wellbeing Directorate (screening and social marketing)
Public health managers	PHKSF level 8 and 9. Public health managers need a qualification (a Master's degree in either Public Health or a related subject, or an equivalent qualification) or be able to demonstrable equivalent experience.	No fixed training route. However for senior roles often Masters in an area related to public health e.g. promotion or development	None but could register with UKPHR; HCPC (if registered as a healthcare scientist or allied health professional or CIEH if registered as an environmental health officer	Local government, NHS, PH, third sector	Health protection specialist; Health improvement principal; commissioning manager; public health principal
Public health nurses (family health, health	Qualified and registered nurse	No defined qualification but experience in	NMC	LA, PHE, NHS	Health promotion nurse; Health

protection public health, excluding health visitors and school nurses)		community nursing, OH, infection prevention and control, practice nursing etc. and understanding of principles of communicable disease and PH degree often required			protection nurse; TB nurse; Infection control nurse

Table 10.1 - Public Health Practitioner – career pathways; sources: Skills for Health Career Framework, National Careers Service, Health Careers (NHS) and CfWI (2014)

10.2 Public Health Practitioners – case studies

The table below describes individual career progression from training to most senior role:

Medically trained						
Gabriel Scally	Director of the WHO Collaborating Centre for Healthy Urban Environments, University of the West of England	Medical School; GP training	MSc in PH at LSHTP	Consultant in Community Medicine	Chief Administrative Medical Officer of a health board in NI	Regional Director of Public Health in England
Susy Stirling	Associate Postgraduate Dean, Training Programme Director for Public Health	Medical School	Medical jobs in UK	MSc in Maternal and Child Health (UCL)	Public health training (MPH)	Migrant Health Lead for region
Mark Strong	Clinical Senior Lecturer in Public Health and Deputy Director of Public Health Section. Honorary consultant in local NHS trust and in PHE.	Chemistry degree; Care assistant for 4 years; Medical school for 5 years	House officer 1 year, then SHO paediatrics for 2 years	Public health training NHS / University 36 months	MRC fellowship (4yrs - inc. MSc in statistics and PhD in health economics / statistics	NIHR post doc fellowship started on day of CCT

Andrew Lee	Consultant in Communicable Disease Control, PHE	Medical School; House jobs; paediatric training	Tropical medicine diploma (Liverpool)	Public Health training scheme; Completed GP training	Part time academic / lecturer in publiv health; registrar	Part time Consultant in Public Health
Kev Smith	Consultant in Public Health Specialised Commissioning, PHE	Medical School; House jobs	SHO post in Public Health Medicine	SpR in Public Health Medicine	Clinical Lecturer and Honorary SpR	Public Health Medical Advisor to SHA
Sally Pearson	Director of Clinical Strategy, Gloucestershire Hospitals NHSFT	Medical training	Public health training programme	Consultant in public health medicine	Director of Public Health	
William Welfare	Consultant in Communicable Disease Control, PHE	SHO in General Medicine	Clinical Fellow in Infectious Diseases	Public Health training with focus on Health Protection		
Peter Bradley	Director of Public Health Development, Public Health Wales	HO, GP training	MA in Healthcare Ethics	Public Health training scheme	Senor Medical Advisor / Consultant in Public Health Medicine	
Gina Radford	Centre Director, Anglia and Essex Centre, Public Health England	Medical School; GP vocational training	Public Health training scheme	Director of Public Health	Head of Public Health Unit, NHS	
Non-medically trained						
Susan Elden	Department for International Development Health adviser	Nursing	MPH	NHS - middle manager in a public health unit	DFID	
Hannah Jordan	Lecturer in Public Health	BSc Geography	Environmental Consultancy	Health services research, Faculty of Medicine	MSc in Epidemiology, LSHTM	PhD; Lecturer
Rowena Clayton	Deputy Director - Workforce	BSc in Genetics	MRC	Occupational health and safety	Health and Safety Advisor to the Ministry of Labour (Nicaragua)	NHS - HIV prevention & other public health roles

Mike Sandys	Assistant Director of Public Health - Leicestershire County Council	NHS financial management trainee	Public health (analyst/public health researcher)	Public health manager	Consultant level job in PH	
Fiona Reynolds	Consultant in Public Health, Salford City Council	BA Hons Journalism	MA Health Promotion	Senior Health Promotion Specialist	Teenage Health Coordinator	NW Public Health Training Scheme

Table 10.2 - Career Profiles – Faculty of Public Health (2013)

11 Undergraduate and postgraduate degrees available in the UK for studies in public and population health

11.1 Undergraduate degrees in public and population health

University	Course	Qualification	Duration	Study Mode
Anglia Ruskin University	Public Health	BSc (Hons)	3 years	FT
Anglia Ruskin University (London)	Business and Healthcare Management)	BSc (Hons)	3 years	FT
Birmingham City University	Public Health	BSc (Hons)	3 years	FT
Canterbury Christ Church University	Health Promotion & Public Health	FdSc	2 years	FT
Canterbury Christ Church University	Public Health	BSc (Hons)	3 years	FT
Cardiff Metropolitan University	Environmental Health	BSc (Hons)	3-4 years	FT
Cardiff Metropolitan University	Nutrition	BSc (Hons)	3-4 years	FT
Cardiff Metropolitan University	Human Nutrition and Dietetics	BSc (Hons)	3-4 years	FT
Coventry University	Public Health and Community Studies	BA (Hons)	3 years	FT
De Montfort University	Public and Community Health	BSc (Hons)	3 years	FT
Edge Hill University	Health and Social Wellbeing	BA (Hons)	3 years	FT
Glyndwr University	Health, Wellbeing and Community	BSc (Hons)	3 years	FT
Harper Adams University	Food and Public Health Nutrition	BSc (Hons)	4 years*	FT
Harper Adams University	Food Technology with Nutrition	BSc (Hons)	4 years*	FT
Leeds City College	Exercise, Health and Wellbeing	FdSc	2 years	FT
Liverpool Hope University	Biology and Health & Wellbeing	BA (Hons)	3 years	FT
Liverpool Hope University	Business Management and Health & Wellbeing	BA (Hons)	3 years	FT
Liverpool Hope University	Health & Wellbeing and Human Biology	BA (Hons)	3 years	FT
Liverpool Hope University	Health & Wellbeing and Media & Communications	BA (Hons)	3 years	FT
Liverpool Hope University	Health & Wellbeing and Nutrition	BA (Hons)	3 years	FT
London Metropolitan University	Public Health and Health Promotion (Top up)	BSc (Hons)	1 year	FT
London South Bank University	Human Nutrition	BSc (Hons)	3 years	FT
Middlesex University	Environmental and Public Health	BSc (Hons)	3 years	FT
Middlesex University	Environmental Health	BSc (Hons)	3 years	FT
Middlesex University	Environmental Health	BSc (Hons)	4 years*	FT
Middlesex University	Public Health (Top-up)	BSc (Hons)	1 year	FT
Nottingham Trent University	Exercise, Nutrition and Health	BSc (Hons)	3 years	FT
Queen Mary University of London	Global Health	BSc (Hons)	3 years	FT
Sheffield Hallam University	Food and Nutrition	BSc (Hons)	4 years*	FT
Sheffield Hallam University	Food and Nutrition	BSc (Hons)	3 years	FT
Sheffield Hallam University	Food Marketing Management	BSc (Hons)	4 years*	FT

Sheffield Hallam University	Food Marketing Management	BSc (Hons)	3 years	FT
UCL (University College London)	Population Health	BSc (Hons)	3 years	FT
University Campus Suffolk	Public Health	FdSc	2 years	FT
University Campus Suffolk	Public Health	BSc (Hons)	3 years	FT
University Centre, Croydon	Public Health and Social Care	FdA	2 years	FT
University of Brighton	Public Health	BSc (Hons)	3 years	FT
University of Chester	Public Health Nutrition	BSc (Hons)	3 years	FT
University of East London	Public Health	BSc (Hons)	3 years	FT
University of East London	Public Health and Health Promotion	BSc (Hons)	3 years	FT
University of East London	Public Health and Health Services Management	BSc (Hons)	3 years	FT
University of Exeter	Sport and Exercise Medical Sciences	BSc (Hons)	3 years	FT
University of Greenwich	Public Health	BSc (Hons)	3 years	FT
University of Greenwich	Public Health	BSc (Hons)	4 years*	FT
University of Huddersfield	Nutrition and Public Health	BSc (Hons)	4 years*	FT
University of Huddersfield	Nutrition and Public Health	BSc (Hons)	3 years	FT
University of Sunderland	Public Health	BSc (Hons)	3 years	FT
University of Sussex	Wellbeing and Social Care	BA (Hons)	3 years	FT
University of the West of England, Bristol	Public and Environmental Health	BSc (Hons)	3 years	FT
University of the West of England, Bristol	Public and Environmental Health	FdSc	2 years	FT
University of the West of Scotland	Integrated Health and Social Care	FdSc	2 years	FT
University of Wales Trinity Saint David	Promoting Public Health	BSc (Hons)	3 years	FT
University of West London	Health Promotion & Public Health	BSc (Hons)	3 years	FT
University of Wolverhampton	Public Health	BSc (Hons)	3 years	FT
University of Worcester	Health & Social Care	FdSc	2 years	FT
University of Worcester	Human Nutrition	BSc (Hons)	3 years	FT

Table 11.1 – Undergraduate degrees in public and population health; *courses includes 1 year placement (sandwich); source: www.ucas.com

11.2 Postgraduate degrees in public and population health

University	Course	Qualification	Duration	Study Mode
Anglia Ruskin University	Public Health	MSc	1yr	FT
Brunel University London	Public Health and Health Promotion	MSc	1yr	FT
Brunel University London	Specialist Community Public Health Nursing	MSc	1yr	FT
Buckinghamshire New University	Specialist Community Public Health Nursing (Health Visiting and School Nursing)	MSc	1yr	FT

Canterbury Christ Church University	Health Promotion and Public Health	MSc	18mths	FT
Canterbury Christ Church University	Public Health	MSc	1yr	FT
Canterbury Christ Church University	Allied Health Professions, Nursing and Midwifery, Public Health	MPhil	2yrs	FT
Cardiff Metropolitan University	Applied Public Health	MSc	1yr	FT
Cardiff University	Specialist Community Public Health Nursing	MSc	2-4yrs	FT
Cardiff University	Applied Clinical Research and Public Health	MPhil	1yr	FT
Cardiff University	Primary Care and Public Health	MPhil	1yr	FT
Cardiff University	Spatial Analysis	MPhil	1yr	FT
Cardiff University	Applied Clinical Research and Public Health	MScD	1yr	FT
Edge Hill University	Public Health Nutrition	MSc	1yr	FT
GCU London	Public Health	MSc	1yr	FT
Glasgow Caledonian University	Public Health	MSc	1yr	FT
Glyndŵr University	Specialist Community Public Health Nursing	MSc	1yr	FT
King's College London	Dental Public Health	MSc	1yr	FT
King's College London	Public Health	MSc	1yr	FT
Leeds Beckett University	Public Health (Health Promotion)	MSc	1yr	FT
Liverpool John Moores University	International Public Health	MSc	1yr	FT
Liverpool John Moores University	Public Health	MSc	1yr	FT
Liverpool John Moores University	Public Health	MSc	2yrs	FT
Liverpool John Moores University	Public Health (Addictions)	MSc	1yr	FT
London Metropolitan University	International Public Health Nutrition	MSc	1yr	FT
London Metropolitan University	Public Health	MSc	1yr	FT
London School of Hygiene & Tropical Medicine	Nutrition for Global Health	MSc	1yr	FT
London School of Hygiene & Tropical Medicine	Public Health	MSc	1yr	FT
London School of Hygiene & Tropical Medicine	Public Health (Environment and Health stream)	MSc	1yr	FT
London School of Hygiene & Tropical Medicine	Public Health (Health Economics Stream)	MSc	1yr	FT
London School of Hygiene & Tropical Medicine	Public Health (Health Promotion stream)	MSc	1yr	FT
London School of Hygiene & Tropical Medicine	Public Health (Public Health stream)	MSc	1yr	FT
London School of Hygiene & Tropical Medicine	Public Health for Development	MSc	1yr	FT
London School of Hygiene & Tropical Medicine	Public Health for Eye Care	MSc	1yr	FT
London South Bank University	Public Health and Health Promotion	MSc	1yr	FT

Manchester Metropolitan University	Environmental Public Health	MSc	1yr	FT
Middlesex University	Applied Public Health	MSc	1yr	FT
Newcastle University	Public Health and Health Services Research	MSc	1yr	FT
Newcastle University	Public Health, Epidemiology and Health Services Research	MPhil	1yr	FT
Nottingham Trent University	Public Health	MA	1yr	FT
Oxford Brookes University	Public Health	MSc	1yr	FT
Oxford Brookes University	Sociology and Social Policy	MPhil	2yrs	FT
Queen Margaret University	Public Health Nutrition	MSc	1yr	FT
Queen Margaret University	Public Health Practice	MSc	1yr	FT
Queen Mary, University of London	Global Public Health and Policy	MSc	1yr	FT
Queen Mary, University of London	Health Systems and Global Policy	MSc	1yr	FT
Queen Mary, University of London	International Primary Health Care	MSc	1yr	FT
Queen's University, Belfast	Public Health	MPhil	2yrs	FT
Queen's University, Belfast	Public Health	MCh	2yrs	FT
Sheffield Hallam University	Nursing (Public Health)	MSc	2yrs	FT
Sheffield Hallam University	Nutrition with Public Health Management	MSc	1yr	FT
Sheffield Hallam University	Public Health	MA	18mths	FT
Swansea University	Child Public Health	MSc	1yr	FT
Swansea University	Public Health and Health Promotion	MSc	1yr	FT
Swansea University	Public Health	MPhil	2yrs	FT
Teesside University	Health and Social Care Sciences (Public Health)	MSc	1yr	FT
Teesside University	Public Health	MSc	1yr	FT
Teesside University	Specialist Community Public Health Nursing (Health Visiting)	MSc	1yr	FT
Teesside University	Specialist Community Public Health Nursing (Occupational Health Nursing)	MSc	1yr	FT
Teesside University	Specialist Community Public Health Nursing (School Nursing)	MSc	1yr	FT
University Campus Suffolk,	Health Services Research	MPhil	1yr	FT
University College London	Clinical and Public Health Nutrition	MSc	1yr	FT
University College London	Dental Public Health	MSc	1yr	FT
University College London	Epidemiology and Public Health	MPhil	3yrs	FT
University College London	Infection and Population Health	MPhil	3yrs	FT
University College London	Primary Care and Population Health	MPhil	3yrs	FT
University of Aberdeen	Public Health Research	MSc	1yr	FT
University of Bath	Well-Being in Public Policy and International Development	MSc	1yr	FT
University of Bath	Health	MPhil	1-3yrs	FT
University of Bedfordshire	Public Health	MSc	1yr	FT
University of Birmingham	Public Health, Epidemiology and Biostatistics	MSc	1yr	FT

University of Birmingham	Public and Environmental Health Sciences	MSc	1yr	FT
University of Brighton	Public Health	MSc	1-3yrs	FT
University of Brighton	Public Health and Management	MSc	1-3yrs	FT
University of Brighton	Specialist Community Public Health Nursing	MSc	1yr	FT
University of Bristol	Nutrition, Physical Activity and Public Health	MSc	1yr	FT
University of Cambridge	Public Health	MPhil	1yr	FT
University of Central Lancashire	Applied Public Health	MSc	15mths	FT
University of Chester	Public Health	MSc	1yr	FT
University of Chester	Public Health Nutrition	MSc	1yr	FT
University of Chester	Public Health	MPhil	1-4yrs	FT
University of Derby	Specialist Community Public Health Nursing	MSc	1yr	FT
University of East London	Public Health	MSc	1yr	FT
University of Edinburgh	Global Health and Public Policy	MSc	1yr	FT
University of Edinburgh	Population Health Sciences	MSc	1yr	FT
University of Edinburgh	Public Health Policy	MSc	1yr	FT
University of Essex	Public Health	MSc	1yr	FT
University of Essex	Public Health	MPhil	2-3yrs	FT
University of Glasgow	Veterinary Public Health	MVPH	1yr	FT
University of Gloucestershire	Physical Activity, Exercise and Health Practice	MSc	1yr	FT
University of Hertfordshire	Specialist Community Public Health Nursing	MSc	1yr	FT
University of Huddersfield	Public Health Nursing Practice (Health Visiting/School Nursing)	MSc	16mths	FT
University of Liverpool	Epidemiology and Population Health	MPhil	1yr	FT
University of Liverpool	Infection and Global Health (Medical)	MPhil	1yr	FT
University of Liverpool	Public Health	MPhil	1-4yrs	FT
University of Manchester	Dental Public Health/Community Dentistry	MPhil	1yr	FT
University of Northampton	Public Health	MSc	1yr	FT
University of Northampton	Specialist Community Public Health Nursing	MSc	1yr	FT
University of Nottingham	Epidemiology and Public Health	MPhil	2yrs	FT
University of Oxford	Public Health	MSc (Res)	3yrs	FT
University of Salford	Environmental and Public Health	MSc	12-16mths	FT
University of Salford	Public Health	MSc	1yr	FT
University of Salford	Public Health, Wellness at Work and Behavioural Medicine	MSc (Res)	1yr	FT
University of Salford	Public Health, Wellness at Work and Behavioural Medicine	MPhil	1yr	FT
University of Sheffield	Dental Public Health	MClinDent	2yrs	FT
University of South Wales	Public Health	MSc	1yr	FT
University of South Wales	Specialist Community Public Health Nursing (Health Visiting)	MSc	1yr	FT
University of Southampton	Public Health	MSc	1yr	FT

University of Sunderland	Public Health	MSc	1yr	FT
University of Surrey	Public Health Practice with SCPHN (School Nursing)	MSc	1yr	FT
University of the West of England	Public Health	MSc	2yrs	FT
University of Westminster	International Public Health Nutrition	MSc	1yr	FT
University of Westminster	Public Health Nutrition	MSc	1yr	FT
University of Worcester	Public Health	MSc	1yr	FT

Table 11.2 – Postgraduate degrees in public and population health (MSc, MA and MPhil); source: www.mastersportal.eu

University	**Course**	**Qualification**	**Duration**	**Study Mode**
Birmingham City University	Specialist Community Public Health Nurse	PgDip	1yr	FT
Bournemouth University	Public Health with Professional Registration as a Specialist Community Public Health Nurse (Health Visiting)	PgDip	1yr	FT
Brunel University London	Specialist Community Public Health Nursing	PgDip	1yr	FT
Buckinghamshire New University	Specialist Community Public Health Nursing (Health Visiting and School Nursing)	PgDip	1yr	FT
Canterbury Christ Church University	Specialist Community Public Health Nursing	PgDip	1yr	FT
Cardiff Metropolitan University	Applied Public Health	PgDip	1yr	FT
Cardiff University	Specialist Community Public Health Nursing	PgDip	1yr	FT
De Montfort University	Specialist Community Public Health Nursing	PgDip	1yr	FT
Glasgow Caledonian University	Specialist Community Public Health Nursing	PgDip	1yr	FT
Glyndŵr University	Specialist Community Public Health Nursing	PgDip	1yr	FT
Leeds Beckett University	Public Health (Health Promotion)	PgDip	1yr	FT
Leeds Beckett University	Specialist Community Public Health Nursing (Health Visiting)	PgDip	1yr	FT
Liverpool John Moores University	Public Health	PgCert	1yr	FT
Liverpool John Moores University	Public Health (Addictions)	PgCert	1yr	FT
Liverpool John Moores University	International Public Health	PgDip	1yr	FT
Liverpool John Moores University	Public Health	PgDip	1yr	FT
Liverpool John Moores University	Public Health (Addictions)	PgDip	1yr	FT
London South Bank University	Public Health and Health Promotion	PgCert	1yr	FT
London South Bank University	Health Visiting (Specialist Community Public Health Nursing)	PgDip	1yr	FT

London South Bank University	Public Health and Health Promotion	PgDip	1yr	FT
Newcastle University	Public Health and Health Services Research	PgDip	9mths	FT
Oxford Brookes University	Specialist Community Public Health Nursing (Health Visiting)	PgDip	1yr	FT
Oxford Brookes University	Specialist Community Public Health Nursing (School Nursing)	PgDip	1yr	FT
Queen Margaret University	Public Health Nutrition	PgCert	6mths	FT
Queen Margaret University	Public Health Practice	PgCert	6mths	FT
Queen Margaret University	Public Health Nutrition	PgDip	9mths	FT
Queen Margaret University	Public Health Practice	PgDip	9mths	FT
Sheffield Hallam University	Public Health	PgCert	18mths	FT
Sheffield Hallam University	Nursing (Public Health)	PgDip	1yr	FT
Sheffield Hallam University	Public Health	PgDip	18mths	FT
Swansea University	Child Public Health	PgCert	1yr	FT
Swansea University	Child Public Health	PgDip	1yr	FT
Swansea University	Public Health and Health Promotion	PgDip	1yr	FT
Teesside University	Specialist Community Public Health Nursing (Health Visiting)	PgDip	1yr	FT
Teesside University	Specialist Community Public Health Nursing (Occupational Health Nursing)	PgDip	1yr	FT
Teesside University	Specialist Community Public Health Nursing (School Nursing)	PgDip	1yr	FT
Ulster University	Specialist Community Public Health Nursing (SCPHN)	PgDip	1yr	FT
University College London	Clinical and Public Health Nutrition	PgCert	6mths	FT
University College London	Clinical and Public Health Nutrition	PgDip	9mths	FT
University of Bedfordshire	Public Health	PgCert	1yr	FT
University of Bedfordshire	Public Health	PgDip	1yr	FT
University of Birmingham	Public Health (International)	PgDip	1yr	FT
University of Bolton	Specialist Community Public Health Nursing (Health Visiting)	PgDip	1yr	FT
University of Brighton	Public Health	PgCert	1-3yrs	FT
University of Brighton	Public Health and Management	PgCert	1-3yrs	FT
University of Brighton	Specialist Community Public Health Nursing	PgCert	1yr	FT
University of Brighton	Public Health	PgDip	1-3yrs	FT
University of Brighton	Public Health and Management	PgDip	1-3yrs	FT
University of Brighton	Specialist Community Public Health Nursing	PgDip	1yr	FT
University of Central Lancashire	Applied Public Health	PgDip	1yr	FT
University of Chester	Public Health	PgCert	1yr	FT
University of Chester	Public Health	PgDip	1yr	FT
University of Chester	Public Health Nutrition	PgDip	1yr	FT
University of Cumbria	Specialist Community Public Health Nursing	GradDip	1yr	FT
University of Cumbria	Specialist Community Public Health Nursing	PgDip	1yr	FT

University of Dundee	Public Health	PgDip	9mths	FT
University of Gloucestershire	Physical Activity, Exercise and Health Practice	PgCert	3mths	FT
University of Gloucestershire	Physical Activity, Exercise and Health Practice	PgDip	9mths	FT
University of Greenwich	Specialist Community Public Health Nursing (Health Visiting and School Nursing)	PgDip	1yr	FT
University of Hertfordshire	Specialist Community Public Health Nursing	PgDip	1yr	FT
University of Leeds	Public Health (International)	PgCert	3mths	FT
University of Leeds	Public Health	PgDip	1yr	FT
University of Leeds	Public Health (International)	PgDip	9mths	FT
University of Salford	Public Health	PgDip	8mths	FT
University of Sheffield	Public Health	PgCert	6mths	FT
University of Sheffield	Public Health	PgDip	1yr	FT
University of Southampton	Public Health	PgCert	1yr	FT
University of Southampton	Public Health	PgDip	1yr	FT
University of Southampton	Public Health Practice (Specialist Community Public Health Nursing)	PgDip	1yr	FT
University of the West of England	Public Health (Specialist Community Public Health)	PgDip	1yr	FT
University of the West of Scotland	Public Health Nursing	GradDip	1yr	FT
University of Wolverhampton	Specialist Community Public Health Nursing (School Nursing)	PgDip	1yr	FT

Table 11.2 – Postgraduate degrees in public and population health (PgDip, PgCert and PgGrad); source: www.mastersportal.eu

University	**Course**	**Qualification**	**Duration**	**Study Mode**
City University London	Public Health	MPH	1yr	FT
Imperial College London	Public Health	MPH	1yr	FT
King's College London	Public Health	MPH	1yr	FT
Newcastle University	Public Health	MPH	1yr	FT
Northumbria University	Public Health	MPH	1yr	FT
Queen's University, Belfast	Public Health	MPH	1yr	FT
University of Birmingham	Public Health	MPH	1yr	FT
University of Birmingham	Public Health (Health Technology Assessment)	MPH	1yr	FT
University of Birmingham	Public Health (International)	MPH	1yr	FT
University of Birmingham	Public Health (Statement of Extra Accredited Learning)	MPH	1yr	FT
University of Derby	Public Health	MPH	1yr	FT
University of Dundee	Public Health	MPH	1yr	FT
University of Edinburgh	Public Health	MPH	1yr	FT
University of Essex	Public Health	MPH	1yr	FT
University of Leeds	Public Health	MPH	1yr	FT

University of Leeds	Public Health (International)	MPH	1yr	FT
University of Liverpool	Public Health	MPH	1yr	FT
University of Liverpool	Public Health (online)	MPH	1yr	FT
University of Nottingham	Public Health	MPH	1yr	FT
University of Nottingham	Public Health (International Health)	MPH	1yr	FT
University of Sheffield	Public Health	MPH	1yr	FT
University of Sheffield	Public Health (European)	MPH	2yrs	FT
University of Warwick	Public Health	MPH	1yr	FT
University of Wolverhampton	Public Health	MPH	1yr	FT
University of York	Public Health	MPH	1yr	FT

Table 11.3 – Postgraduate degrees in public and population health (MPH); source: www.mastersportal.eu

University	**Course**	**Qualification**	**Duration**	**Study Mode**
Canterbury Christ Church University	Allied Health Professions, Nursing and Midwifery, Public Health	PhD	3yrs	FT
Cardiff University	Applied Clinical Research and Public Health	PhD	3yrs	FT
Cardiff University	Health, Well-Being and Social Care	PhD	3yrs	FT
Cardiff University	Primary Care and Public Health	PhD	3-4yrs	FT
Cardiff University	Spatial Analysis	PhD	3yrs	FT
Newcastle University	Public Health and Health Services Research	PhD	3yrs	FT
Oxford Brookes University	Sociology and Social Policy	PhD	3yrs	FT
Queen's University, Belfast	Public Health	PhD	3yrs	FT
Queen's University, Belfast	Public Health	MD	2yrs	FT
Swansea University	Public Health	PhD	3yrs	FT
University Campus Suffolk,	Health Services Research	PhD	3yrs	FT
University College London	Epidemiology and Public Health	PhD	3yrs	FT
University College London	Infection and Population Health	PhD	3yrs	FT
University College London	Primary Care and Population Health	PhD	3yrs	FT
University of Bath	Health	PhD	2-4yrs	FT
University of Birmingham	Public Health, Epidemiology and Biostatistics	PhD	3yrs	FT
University of Cambridge	Public Health	PhD	3yrs	FT
University of Chester	Public Health	PhD	2-4yrs	FT
University of Edinburgh	Population Health Sciences	PhD	3yrs	FT
University of Edinburgh	International Public Health Policy	PhD	3yrs	FT
University of Essex	Public Health	PhD	3yrs	FT
University of Leeds	Nutrition and Public Health	PhD	4yrs	FT
University of Liverpool	Epidemiology and Population Health	PhD	3yrs	FT
University of Liverpool	Infection and Global Health (Medical)	PhD	30mths	FT
University of Liverpool	Public Health	PhD	2-4yrs	FT
University of Liverpool	Epidemiology and Population Health	MD	5yrs	FT
University of Liverpool	Infection and Global Health (Medical)	MD	5yrs	FT

University of Liverpool	Public Health	MD	2-6yrs	FT
University of Manchester	Dental Public Health/Community Dentistry	PhD	3-4yrs	FT
University of Nottingham	Epidemiology and Public Health	PhD	3-5yrs	FT
University of Nottingham	Maternal, Child and Public Health	PhD	3yrs	FT
University of Nottingham	Epidemiology and Public Health	DM	3-5yrs	FT
University of Oxford	Public Health	DPhil	4yrs	FT
University of Salford	Public Health, Wellness at Work and Behavioural Medicine	PhD	3yrs	FT

Table 11.4 – Postgraduate degrees in public and population health (PhD, DPhil, MD, DM); source: www.mastersportal.eu

Appendix 1 – UKCRC Health Research Analysis System

Summary of Health Research Classification System codes

Health Categories:

Blood
Cancer
Cardiovascular
Congenital Disorders
Ear
Eye
Infection
Inflammatory and Immune System
Injuries and Accidents
Mental Health
Metabolic and Endocrine
Musculoskeletal
Neurological
Oral and Gastrointestinal
Renal and Urogenital
Reproductive Health and Childbirth
Respiratory
Skin
Stroke
Generic Health Relevance
Other

Research Activity Codes:

1 Underpinning Research
1.1 Normal biological development and functioning
1.2 Psychological and socioeconomic processes
1.3 Chemical and physical sciences
1.4 Methodologies and measurements
1.5 Resources and infrastructure (underpinning)

2 Aetiology
2.1 Biological and endogenous factors
2.2 Factors relating to physical environment:
Environmental or external factors associated with the cause, risk or development of disease, conditions or ill health including:
- physical agents, occupational hazards, environmental surroundings, radiation and pollution
- chemicals and nutrients
- infection by pathogens and studies of infectious agents

2.3 Psychological, social and economic factors:
Research into psychological conditions, or research into the cause, risk or development of disease, conditions or ill health associated with social, psychological and economic factors including:
- individual or group behaviours and lifestyle
- cultural or religious beliefs or practices
- ethnicity, age and gender differences
- socioeconomic factors

2.4 Surveillance and distribution:

Observational studies, surveys, registries, and studies that track incidence, prevalence, morbidity, co-morbidity and mortality including ongoing monitoring of large scale cohorts

2.5 Research design and methodologies (aetiology)

2.6 Resources and infrastructure (aetiology)

3 Prevention of Disease and Conditions, and Promotion of Well-Being

3.1 Primary prevention interventions to modify behaviours or promote well-being

3.2 Interventions to alter physical and biological environmental risks

3.3 Nutrition and chemoprevention

3.4 Vaccines

3.5 Resources and infrastructure (prevention)

4 Detection, Screening and Diagnosis

4.1 Discovery and preclinical testing of markers and technologies

4.2 Evaluation of markers and technologies

4.3 Influences and impact

Studies investigating impact of screening and factors affecting uptake including:

- attitudes and beliefs including cultural and religious practices
- issues relating to gender, age and ethnicity
- genetic counselling and decision making
- psychological, social and economic factors
- development, implementation and evaluation of interventions to promote screening including policy, education and communication

4.4 Population screening

Studies investigating population screening programmes including

- feasibility studies, pilot studies and trials
- evaluation of effectiveness, benefits and economic evaluation
- impact on health services and policy issues
- models of population surveillance

4.5 Resources and infrastructure (detection)

5 Development of Treatments and Therapeutic Interventions

5.1 Pharmaceuticals

5.2 Cellular and gene therapies

5.3 Medical devices

5.4 Surgery

5.5 Radiotherapy

5.6 Psychological and behavioural

5.7 Physical

5.8 Complementary

5.9 Resources and infrastructure (development of treatments)

6 Evaluation of Treatments and Therapeutic Interventions

6.1 Pharmaceuticals

6.2 Cellular and gene therapies

6.3 Medical devices

6.4 Surgery
6.5 Radiotherapy
6.6 Psychological and behavioural
6.7 Physical
6.8 Complementary
6.9 Resources and infrastructure (evaluation of treatments)

7 Management of Diseases and Conditions
7.1 Individual care needs
7.2 End of life care
7.3 Management and decision making
7.4 Resources and infrastructure (disease management)

8 Health and Social Care Services Research
8.1 Organisation and delivery of services
8.2 Health and welfare economics
8.3 Policy, ethics and research governance
8.4 Research design and methodologies
8.5 Resources and infrastructure (health services)

Appendix 2 – Methodology for the Health Research Analysis

All data was obtained from analysis reports and data sets published by the UKCRC's Health Research Analysis (HRA). This analysis includes data on research spend from all the major public and non-profit organisations that support health research in the UK.

This latest analysis, published in 2015, described research spend during 2014 (calendar year). The previous two analyses looked at research spend in financial years 2004-05 and 2009-10. In the 2014 analysis, over 17,000 projects were included, supported by 64 funding organisations, corresponding to £3bn of spend in (£2bn directly on research projects and £1bn on infrastructure). The analysis described hear covers direct spend on research projects only since the spend on infrastructure is not publicly available.

Health research data is classified into 8 Research Activity Codes (RACs):

1. Underpinning Research
2. **Aetiology**
3. **Prevention of Disease and Conditions, and Promotion of Well-Being**
4. Detection, Screening and Diagnosis
5. Development of Treatments and Therapeutic Interventions
6. Evaluation of Treatments and Therapeutic Interventions
7. Management of Diseases and Conditions
8. Health and Social Care Services Research

The RACs are further classified as described in Appendix 1.

For the purposes of this report, research data relating to two RACs were analysed: '**Aetiology'** and **'Prevention of Disease and Conditions, and Promotion of Well-Being'**. Whilst the remaining research RACs contain research of relevance to population and public health research, the majority of relevant research spend is contained in the two codes selected. Indeed, in the portfolio analysis conducted by the Wellcome Trust, 62% of the charity's spend on population and public health research was within these two RACs. The analysis also describes spend by Health Category (HC), e.g. cancer, cardiovascular etc. These categories are also listed at Appendix 1. Further information about the data, classification system and caveats in using and interpreting health research data are described on the HRA's website[4].

The HRA team have adjusted figures from 2004/05 and 2009/10 to generate real terms values (at 2014 prices) to enable comparison. The conversion factors used in the 2014 analysis were derived from the HM Treasury GDP deflator figures for December 2014: 1.2377 for 2004/05, 1.0831 for 2009/10.

The first two analyses included only data from the 12 largest funders of health research (Health Research Analysis Forum, HRAF). The most recent analysis included spend from additional funders, mainly members of the Association of Medical Research Charities (AMRC) who had not been included in the previous analyses (figure M1). Therefore, for comparisons looking at spend over the last ten years, HRAF data is used.

[4] http://www.hrcsonline.net/pages/data

A closer look at trends in research spend at universities was not possible due to a high level of incomplete data for these fields in 2004/5 and 2009/10.

Overall spend by the 12 largest funders (HRAF) during the last ten years has increased from £1.19bn to £1.90bn (figure M1), a real terms increase of almost 60%. The increase was much more modest during the last five years (7.3%).

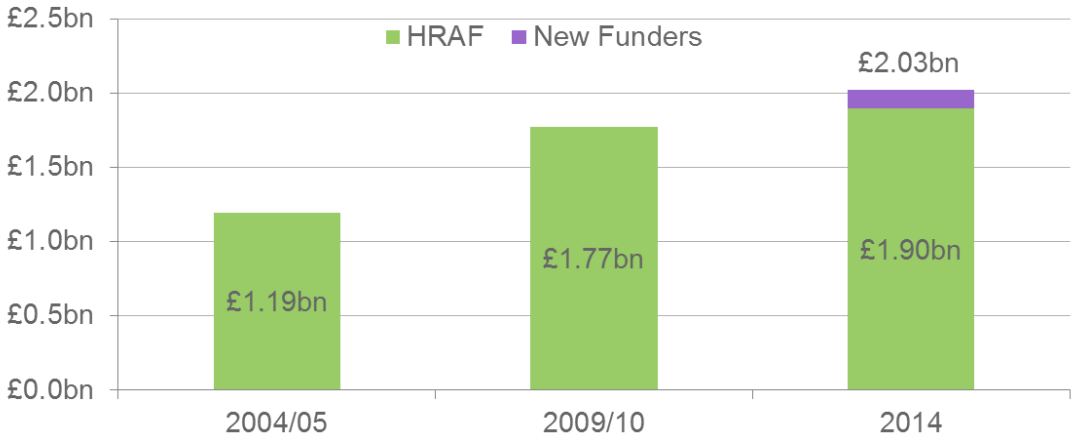

Figure M1 - Direct spend totals for health research analyses in 2004/05, 2009/10 and 2014. HRAF[5] data and New Funder data (52 funders) are shown together.

[5] Health Research Analysis Forum (top 12 funders)

Appendix 3 – Methodology for measuring the numbers of clinical and non-clinical academics at Higher Education Institutes (HESA Data)

Data was extracted by the Higher Education Statistics Agency (HESA) using the following parameters to identify numbers of academic staff:

Search Parameters	*Description and notes*
Specified cost centres	(101) Clinical medicine (102) Clinical dentistry (103) Nursing & allied health professions (104) Psychology & behavioural sciences (105) Health & community studies (106) Anatomy & physiology (107) Pharmacy & pharmacology
Year	2012/13 and 2013/14 The current academic discipline field (see below) is only available from 2012/13 onwards. Prior to this, information is not available to describe staff teaching / research subjects
Data extraction categories	
Current academic discipline 1	4 Digit JACS Subject Codes[6]
Current academic discipline 2	4 Digit JACS Subject Codes[1]
Contract level	D and E - Head of Schools/Senior Function head F1 - Professor F2 - Function head I0 - Non-Academic section manager, Senior/principal lecturer, Reader, Principal Research fellow J0 - Team Leader (Professional, Technical, Administrative), Lecturer, Senior Lecturer, Senior Research Fellow K0 - Senior Professional (Technical), Lecturer, Research fellow, Researcher (senior research assistant), Teaching fellow L0 - Senior Administrative staff (Professional/technical), Research assistant, Teaching assistant M0 - Assistant professional staff, Administrative staff N0 - Junior Administrative Staff, Clerical Staff, Technician/Craftsmen, Operative O0 - Routine task provider
Academic employment function	Research only; Teaching only; Research and Teaching
Higher Education provider	
Source of basic salary	
Highest qualification held	

6 www.hesa.ac.uk/component/content/article/44-statistics/information-provision/102-bespoke-data-service---other-information?limit=1&start=8

Table M1 – Description of data search and extraction parameters

Current academic disciplines selected for analysis

To refine the data for analysis, filters were applied to select staff working within the current academic disciplines listed below. These were selected as being disciplines of most relevance to population health. A full list of codes and disciplines is provided on the HESA website[1].

(B400) Nutrition
(B410) Dietetics
(B490) Nutrition not elsewhere classified
(B712) Health visiting
(B910) Environmental health
(B920) Occupational health
(C111) Parasitology
(C120) Behavioural biology
(C142) Reproductive biology
(C150) Environmental biology
(C170) Population biology
(C186) Population ecology
(C187) Ecotoxicology
(C470) Population genetics & evolution
(C500) Microbiology
(C510) Applied microbiology
(C521) Medical microbiology
(C530) Bacteriology
(C540) Virology
(C600) Sport & exercise science
(C800) Psychology
(C810) Applied psychology
(C811) Occupational psychology
(C822) The psychology of ageing
(C840) Psychology in health & medicine
(C841) Health psychology
(C848) Psychology of mental health
(C880) Social Psychology
(D620) Food hygiene
(H123) Public health engineering
(K400) Planning (urban, rural & regional)
(L100) Economics
(L110) Applied economics
(L431) Health policy
(L432) Welfare policy
(L434) Transport policy
(L510) Health & welfare
(L700) Human & social geography
(L728) Human Demography

Table M2 – 'Population Health Research' academic disciplines – search criteria used to identify academic staff working in relevant disciplines

For 2013/14, a total of 27,861 staff were identified working within the seven cost centres described in table M1. Of these, 7,487 staff were linked to the current academic disciplines identified above. This cohort was used for the subsequent analyses.

Caveats

The HESA data does not include a specific category for population health research. Therefore, a range of academic disciplines has been selected, as described above (table M2), which are of most relevance to population health research. Elements of population health research may be recorded within other academic discipline codes. This analysis included data from the cost centres described above. Elements of population health research may also be recorded within other cost centres, such as economics, law, sociology, social work and social policy.

Note about HESA data: Neither the Higher Education Statistics Agency (HESA) Limited nor HESA Services Limited can accept responsibility for any inferences or conclusions derived by third parties from data or other information supplied by HESA Services.

Appendix 4 – Bibliography

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