

Health Research Capacity Strengthening: A UKCDS Mapping

Contents

1. Introduction.....	1
2. Methodology.....	2
3. The findings – individual, institutional and environmental levels.....	3
3.1. Individual level	3
3.2. Institutional level	6
3.3. Environmental (national/rules of the game/systems) level	8
4. Geography.....	10
5. Thematic research foci	12
6. Discussion	15
Annex: Detailed profiles of funders’ activities	20
7. Individual level.....	20
8. Institutional level.....	29
9. Environmental (national/rules of the game/systems) level.....	34
Methodological challenges	37
Acknowledgements	41

Health research capacity strengthening: a UKCDS mapping

1. Introduction

At their January 2015 meeting, MRC's Global Health Advisory Group will discuss future directions for MRC activities in Health Research Capacity Strengthening (HRCS) in Low and Middle Income Countries (LMICs). To underpin this discussion, the UKCDS Secretariat has carried out a brief mapping of what funders are doing.

The UKCDS Secretariat defines research capacity strengthening as initiatives enhancing the ability and resources of individuals, organisations and systems to undertake, communicate and use high quality research. *Health* research capacity strengthening, as used in this document, covers research capacity strengthening across the full spectrum of health sciences, from biomedical research to research on the social determinants of health. It includes both programmes that *explicitly* set out to strengthen capacity, and those in which the capacity strengthening is *embedded* within a wider research programme.

In this mapping exercise, categorising funders' activities has been challenging. They are loosely grouped into three 'levels' of the innovation system (though an investment may have effects at more than one level):

- **Individual:** involving the development of researchers and teams via training and scholarships to design and undertake research, write up and publish research findings, communicate with policy makers and engage with communities.
- **Institutional:** developing the capacity of research departments in universities, think tanks etc., to fund, manage and sustain themselves and contribute to social and economic development. Often these programmes involve funding researchers and research teams, but crucially they also include a focus on one or more of the systems (research management, leadership), incentives (e.g. pay and promotion), or infrastructure (e.g. ICT, libraries) of the organisation.
- **Environmental:** improving the 'rules of the game', including incentive structures for individuals and organisations, the political and the regulatory context for research, and the context and resource base in which research is undertaken and used.

The mapping is structured by 'level', and then by funders' main activities within that level. Following the presentation of the main findings, there is a brief discussion of the geographical focus of capacity strengthening and over-arching themes that emerged during the study period. A more detailed description of funders' activities is included as a substantial Annex.

UKCDS

UKCDS is the group which brings together UK government departments and research funders with interests in international development, including DFID, MRC, the Wellcome Trust, ESRC and the Department of Health. UKCDS runs a research capacity strengthening community of practice which brings together the relevant UK funders and project managers.

2. Methodology

The mapping involved a substantial element of desk research. We documented ongoing or recently concluded initiatives (ended in or after 2009 i.e. within the last five years) which are either solely focussed on health, or are more general in scope and thus offer potential for health research. We started by considering the larger funders within UKCDS networks (e.g. MRC, DFID, Wellcome Trust), broadening out to key stakeholders such as the Bill and Melinda Gates Foundation and IDRC, drawing on the WHO-TDR ESSENCE network. The mapping also describes some of the activities of numerous foundations, but does not attempt to be exhaustive. The focus of attention inevitably shows “selection bias” towards UK and Anglophone funders with whom UKCDS is more regularly engaged, allowing more accurate and thorough data to be obtained from, and checked by, these funders.

This helped compile a database (see Annex Section 10.3) detailing, wherever possible:

- The funders involved; the type of funder (e.g. aid agency, foundation, research funder); and whether schemes were funded individually or in partnership.
- The level of capacity strengthening (individual, institutional or environmental¹).
- Whether the programme had an exclusive health or medical focus.
- Whether the programme had an exclusive focus on capacity strengthening, or was a research programme with ancillary capacity strengthening components.
- The geographical scope of the programme (by continent, and country if possible).
- The category of health research invited by the programme, classified by MRC into one of the following categories: infections; generic HRCS²; generic RCS³; health systems; NCDs; reproductive, maternal and child health; nutrition; environment and health; mental health; and trauma.
- The career level of training offered within the programme (e.g. MSc/PhD), and the size of the cohort trained or forecast to be trained.

Data (totalling 303 programmes) was then separated by funder, and where possible sent to that organisation to check and supplement. A response rate of around 50% was achieved. The data was further refined and contextualised through semi-structured interviews conducted with key funders in early October 2014 at the Health Systems Symposium in Cape Town.

Section 10, annexed, explores the methodological challenges and caveats in more detail. The challenges stemmed from the wealth of diverse HRCS activities taking place at local, national, regional and global levels. The boundaries of capacity strengthening are difficult to define in a way that fitted the simplicity of the database, given the complex flows of funding and the lack of consensus around the exact scope and labelling of capacity strengthening as distinct from research in partnership. The sheer variety of schemes, which range from one off prizes to annual fellowships to fixed term programmes, has made it effectively impossible to rigorously quantify financial investments in HRCS. Much of the data analysis involved subjective decision making (with additional oversight provide by MRC). It is therefore anticipated that UKCDS can improve upon the data, figures and charts over time through collaboration with interested partners.

¹ See the definitions within the Introduction and relevant sections: 3.1, 3.2 and 3.3. The cross-cutting category of “embedded” was introduced for programmes where HRCS is integrated across the programme but is not defined enough to assign to one of the three core categories of individual, institutional or environmental.

² Where the call specification focuses on health, but does not narrow down any further.

³ Where the call specification includes health but is broader than health alone.

3. The findings – individual, institutional and environmental levels

3.1. Individual level

Key findings – Individual level HRCS

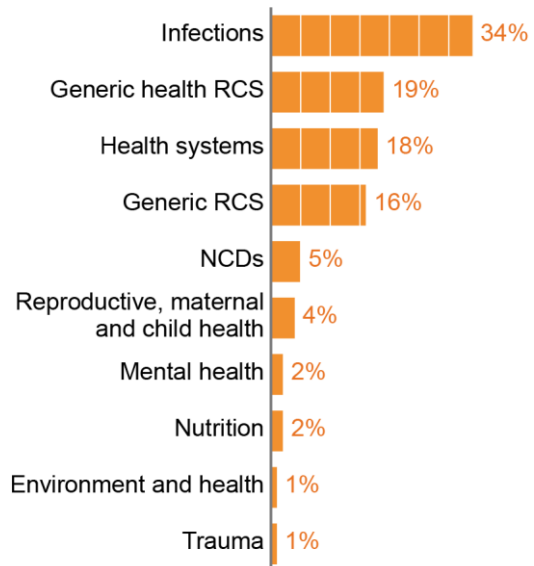
- Capacity strengthening of individuals accounted for almost half the programmes profiled. A broad variety of funders are involved at this level, with a diversity of support ranging from occasional prizes to sustained financing of large research teams.
- There is a clear focus on infections, with more individual level HRCS schemes specifically targeted at training in infectious disease research than in generic health research.
- Training at MSc and PhD level predominates, both in training offered by HRCS schemes and in the awards funded. Specific postdoctoral and early career researcher HRCS is comparatively rare.
- Major players: NIH, EDCTP, Wellcome Trust, IDRC, MRC and DFID all fund at scale.
- “Notable mention”: Private foundations, USAID, WHO-TDR, GSK, NWO-WOTRO.

In programmes UKCDS was able to classify by level, just under half (125/271) were primarily individual capacity strengthening schemes. Just over one third of programmes were primarily focused at the institutional level, with just over 1 in 10 operating at the environmental level⁴.

Individual capacity strengthening provides training and scholarships for researchers and teams to: design and undertake research; publish and communicate research findings; and/or influence policy⁵. A core aim of many individual level HRCS programmes is to create a critical mass of LMIC researchers who are supported at each stage of career progression. At the same time, there is awareness that support is required right from the production, to the uptake and use of research. As such, many funders also focus on building researchers’ “soft skills” such as proposal writing, communication and influencing skills.

Of those schemes that do target a specific thematic research area, infectious disease and health systems are most common (Figure 1). It is worth noting that the analysis records the various areas of *eligible* thematic research remit under the schemes rather than what was necessarily funded.

Figure 1: Breakdown of individual level HRCS schemes by thematic remit



⁴ These figures do not reflect secondary HRCS objectives; for example many largely individual HRCS programmes will have elements of institutional HRCS. 15 programmes, such as the Product Development Partnerships, have capacity strengthening embedded to such an extent that these were reported as “embedded” rather than under any particular HRCS level.

⁵ http://www.ukcds.org.uk/sites/default/files/content/resources/UKCDS_Capacity_Building_Report_July_2012_Exec_Sum.pdf
Page 3

Figure 2: Funding opportunities in HRCS by career levels
 Each icon represents 6 programmes

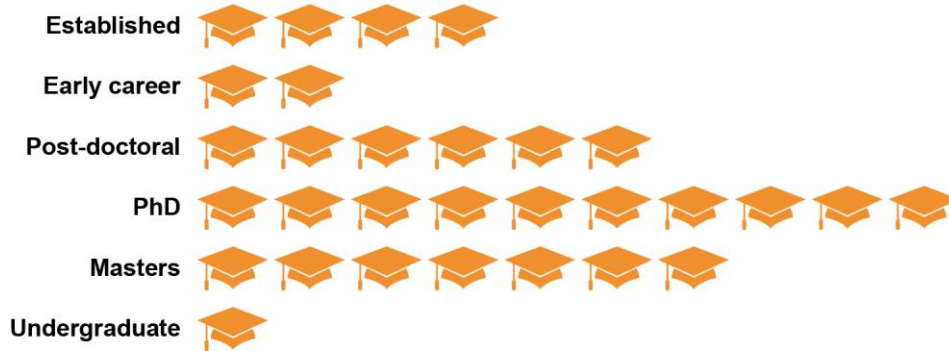


Figure 2 profiles the proportion of capacity strengthening schemes offering training at each level, with many initiatives offering support at more than one research career stage. It demonstrates that prospective PhD candidates are the most likely to be eligible for research grants under HRCS schemes, even without including the PhDs which are supported through more general research grants to LMIC institutions. Few schemes exist for which undergraduate applicants are eligible. There is a relatively large funding provision for “established researchers”, a broad category which by our definition ranges from mid-career to senior researchers. It is worth noting that the data in Figure 2 draws on funders’ own categorisations of career stages, and does not represent the aggregate numbers of people trained at each career stage, since it is not possible to compile this accurately for the majority of funders.

Overarching trends among individual level HRCS schemes are discussed below:

3.1.1 BSc

As Figure 2 illustrates, few HRCS schemes are open to applications for undergraduate level research, but the actual numbers of BSc awards made are even lower: for example only 1% of EDCTP awards have been at BSc level (Figure 8, p22). The interviews with research funders confirmed this as a broad trend. Domestic resources, as well as the education (rather than research) departments of donor organisations, likely provide far more significant support for undergraduate programmes.

3.1.2 MSc and PhD

Capacity strengthening through Master’s and doctoral training support represents the bulk of individual level HRCS, both within larger research programmes such as DFID’s Research Programme Consortia and standalone awards.

As described above, Figure 2 does not reflect the actual number of people trained, but does show that a large number of schemes are open to MSc and PhD level candidates. Indications from the data that exist for specific funders suggest that the predominance of these two levels would be even greater in real output data. The proxy of the Commonwealth Scholars data (Figure 12, p28) demonstrates the preponderance of Master’s grants, while MRC’s own data (Figure 6, p20) shows an overwhelming proportion of HRCS efforts directed towards PhD training.

3.1.3 Post-Doctoral

Dedicated post-doctoral support opportunities appear relatively limited, and anecdotally it is recognised as a challenging period for LMIC researchers. Many LMIC institutions do not have formal post-doctoral positions, and teaching demands, limited mentoring opportunities, and other barriers can make it very difficult for LMIC researchers at this level.

3.1.4 Fellowships

There appears to be greater support for established than earlier career researchers, but less support available than for MSc and PhD training. Of the individual schemes classified by career level focus, 38% of those targeted at “established researchers” included specific reference to support for early career researchers. Wellcome Trust’s Public Health and Tropical Medicine (Phatic) scheme is an exception to this trend; almost 60% of the Phatic awards since 2009 above Master’s level are supporting early-career researchers⁶. IDRC is also active in its support for the highest research career stage; for example, their African Health Economics and Policy Research Capacity Building and Dissemination programme provides training, networks and a community of practice for 75 established researchers.

⁶ See Annex 7.2 (page 21) for further information. It should be noted that the scheme is open to applications at all career stages, from Master’s to Senior Researcher level, with awards driven by demand and quality.

3.2. Institutional level

Key findings – Institutional level HRCS

- Funding schemes focussed on strengthening the research capacity of LMIC universities and research institutes constituted 37% of the initiatives profiled.
- Institutional HRCS focusses significantly on strengthening capacity in research governance, management and administration and operational/implementation research alongside more traditional health research.
- As at the individual level, there is a clear focus on HRCS in infectious disease.
- A number of contrasting funding and research approaches comprise the institutional HRCS field, ranging from bilateral long-term core support to institutions to multifunder support for the establishment of Southern-owned funding platforms.
- Major players: NWO-WOTRO, Wellcome Trust, EDCTP, SIDA, JICA, IDRC, NIH/PEPFAR.
- “Notable mention”: NORAD, MRC, DFID, Institut Pasteur, GIZ, Irish Aid, FIOCRUZ, HHMI.

Institutional level capacity strengthening can be defined as initiatives which develop the capacity of research departments in universities, institutes, think tanks and other organisations to fund, manage and sustain themselves⁷, enhancing the quality of research and its societal impacts. Often these programmes also provide funding for individual researchers and research teams. Yet crucially they also include a focus on the research systems (research management, leadership and knowledge translation), incentives (e.g. pay and promotion) and/or infrastructure (ICT, libraries) of the organisation.

Just over one-third (37%) of the initiatives profiled in the mapping represent institutional level HRCS. The Netherlands’ NWO-WOTRO NACCAP programme, working closely with EDCTP to pioneer a ‘learning by doing’ approach to poverty related diseases, has seen its major achievements at the institutional level⁸. The Wellcome Trust provides support for individuals based in 51 African institutions through their £30m African Institutions Initiative (AII). SIDA has provided long term support to universities across East Africa. JICA too is comparable in its historic and evolving support for LMIC institutions, for example in Ghana, Kenya and Bolivia, but is also particularly engaged in institutional HRCS in South East Asian countries such as Philippines, Laos and Vietnam. French research funders and institutes also play a key role at this level, through research institutes in West Africa and South East Asia co-funded by the Institut Pasteur, Inserm, the French Development Agency and Fondation Mérieux among others.

The institutional HRCS landscape is comprised of a huge range of HRCS models and activities, and it can be difficult to demarcate specific HRCS initiatives from broader donor support for LMIC research institutes. At one end of the spectrum are institutes established by funders, largely for infectious disease research, such as the MRC Gambia and Uganda units and Ghana’s Noguchi Memorial Institute for Medical Research established with JICA funding. There are then programmes of bilateral core support for institutions, such as SIDA funding for Makerere University⁹. Twinning initiatives which partner a Northern and Southern institute are still commonly used, such as in the Irish Aid Programme of Strategic

⁷ http://www.ukcds.org.uk/sites/default/files/content/resources/UKCDS_Capacity_Building_Report_July_2012.pdf Page 6

⁸ Eva Rijkers, NWO-WOTRO, Personal Communication, 14 November 2014

⁹ Akuffo, H. et al. 2014. “Doctoral Education and Institutional Research Capacity Strengthening: An Example at Makerere University in Uganda (2000–2013)”. *Higher Education Policy* 27, 195-217 (June 2014). [Online] Available at: <http://www.palgrave-journals.com/hep/journal/v27/n2/full/hep20144a.html>

Cooperation and NORAD's NORHED health programme. Concerns around the long-term sustainability and equity of such partnerships have been raised¹⁰ and there is increasing awareness of the need for LMIC partners to drive the research agenda and play a key role in project management¹¹. More complex triangular or "hub and spoke" approaches, such as the Wellcome Trust African Institutions Initiative, aim to address some of these issues. The African Institutions Initiative invests significant management of consortia grants in one lead African university which disburses grants to sub-awardees, presenting challenges but ultimately encouraging stronger local ownership of research and more genuinely collaborative partnerships.

In line with the trend to treat research governance, management and administration as a priority (see 6.2.5), a number of larger programmes are also intervening to enhance technical capacity in research laboratories and institutes as well as the skills of research faculty. For example, the \$130m PEPFAR/USAID/NIH funded MEPI initiative is aiming to train 140,000 new healthcare workers while boosting academic research capabilities¹². A number of institutional HRCS programmes, such as the Doris Duke Population Health Implementation and Training Partnerships, are also focussed on strengthening operational and implementation research capacity to support translation of basic or clinical research into improved primary healthcare outcomes.

Although a quantitative analysis of which LMIC institutions benefit most greatly from HRCS efforts is beyond the scope of this report, there are a number of key institutions which repeatedly emerge as 'donor darlings'. Makerere University, University of KwaZulu Natal, the Kenya Medical Research Institute (KEMRI), the Ifakara Health Institute and the MRC Gambia and Uganda Units can be seen as such examples of institutions funded substantially through the HRCS efforts of Anglophone and Scandinavian donors.

Infectious disease is the most significant focus of institutional HRCS programmes, representing almost half of the schemes (45/100). This might be expected given that many HRCS programmes have evolved out of developed countries' historical interests in tropical medicine research. The real share of infectious disease HRCS is likely to be greater than just under half, since many funders' investments in tropical medicine research institutes are not included within funders' HRCS portfolios, despite having secondary capacity strengthening aims. Examples include the Wellcome Trust's Major Overseas Programmes and the overseas network of Pasteur Institutes. Several HRCS infections programmes are focussed uniquely on research into emerging zoonotic infections (especially JICA) and drug resistance¹³.

A fuller catalogue of institutional HRCS schemes is presented in Annex 8, and some of the learning on best practice is discussed in Section 6.2.3.

¹⁰ Chu K. M., Jayaraman, S., Kyamanywa, P. and Ntakiyiruta G. 2014. "Building Research Capacity in Africa: Equity and Global Health Collaborations". In: *PLoS Med* 11(3): e1001612. Available at:

<http://www.plosmedicine.org/article/info%3Adoi%2F10.1371%2Fjournal.pmed.1001612#pmed.1001612-Binka1>

¹¹ Jensen, M. B., Hjortsø, C. N., Schipperijn, J., Nik, A.-R. and Nilsson, K. 2007. "Research capacity building through twinning: experiences from a Danish–Malaysian twinning project". *Public Adm. Dev.*, 27: 381–392. doi: 10.1002/pad.471 Available at: <http://onlinelibrary.wiley.com/doi/10.1002/pad.471/abstract>

¹² <http://www.pepfar.gov/partnerships/initiatives/mepi/index.htm>

¹³ For example, NWO-WOTRO's Programme for Developing an Affordable HIV Drug Resistance Test for Africa (ART-A) and NORAD's Antimicrobial Stewardship and Conservancy in Africa Programme.

3.3. Environmental (national/rules of the game/systems) level

Key findings – Environmental level HRCS

- Funding schemes focussing on strengthening the enabling environment or “ecosystem” for health research in LMICs represented 11% of all schemes profiled.
- There are three broad categories of activity in this HRCS space:
 - Large, ambitious programmes which include capacity strengthening of individual researchers and institutions but aim at system-wide transformation.
 - Supporting research funding agencies in LMICs.
 - Strengthening the research and innovation system (ethics boards, IP legislation, supporting the uptake and use of research in healthcare and policy).
- Environmental HRCS is frequently acknowledged as a complex, risky venture which may take several years to yield tangible impacts.
- Major players: EDCTP, Wellcome Trust, DFID, European Commission.
- “Notable mention”: NWO-WOTRO, Multilateral Development Banks, NEPAD.

Environmental research capacity strengthening aims to enhance the enabling environment for research. This may involve seeking to change the ‘rules of the game’ at the national and/or regional level, for example by addressing the political and regulatory context and the resource base for the undertaking and uptake of research.

Funders have, to date, used three main approaches. The first is to intervene at scale, and thereby seek to cause system-wide positive change. Examples of this include the Wellcome Trust’s India Alliance, with £80m from the Trust matched by India’s Department for Biotechnology. The Trust’s new £40m “Developing Excellence in Leadership, Training and Science” (DELTAS) Initiative has been structured with the aim of supporting programmes which address strategic areas that cut across the individual, institutional and environmental levels, with a longer-term perspective¹⁴. As noted in Section 6.1, the day to day activities of these environmental level programmes, and the outputs and outcomes envisaged, may not be radically different from individual or institutional level schemes.

The second approach is to support the establishment, or growth, of research funding agencies. Since 2008, DFID and the Wellcome Trust have supported the development of health research funding agencies in Kenya and Malawi. The Trust is also exploring the possibility of a pan-African funding platform in Nairobi.¹⁵ Often these programmes involve capacity-building-by-doing, and as such fund individuals and institutions to undertake research, further blurring the distinction between the ‘levels’ of capacity.

The third approach is to intervene in the innovation system in ways that do not directly involve research funding, but will contribute to more effective production and use of research derived knowledge and innovation. In the context of medical and health research, this often includes the establishment of ethics boards or regulatory authorities, to which NEPAD and EDCTP have significantly contributed. The latter has provided support for ethics committees, national regulatory authorities and the Pan-African Clinical Trials Registry (PACTR), with which all EDCTP trials are encouraged to register¹⁶. Other programmes focus on supporting the research to policy interface in LMICs. For example, the RIMAIS initiative in Latin America

¹⁴ Sophie Mathewson, Wellcome Trust, Personal Communication, 2 February 2015

¹⁵ Val Snewin, Wellcome Trust, Personal Communication, 29 July 2014

¹⁶ Information from old EDCTP Website, currently undergoing redesign.



Making science work for development

funded by the Spanish aid agency AECID and EU-LAC aims to strengthen Latin American health ministries' capacity to use and share health research to improve regional public health¹⁷.

Intervening at this level may be seen as a relatively risky venture, and funders' environmental capacity strengthening initiatives are often complemented by more concrete actions at the individual or institutional level. This level of capacity strengthening may also take the longest to demonstrate tangible progress, which makes shorter-term evaluations challenging and requires a more flexible approach and learning orientation. This can lead to a tension between ensuring long-term sustainable improvements in capacity and the results agenda¹⁸.

¹⁷ <http://www.isciii.es/ISCIII/es/contenidos/fd-internacional/fd-colaboracion-internacional/rimais.shtml>

¹⁸ http://www.ukcds.org.uk/sites/default/files/content/resources/UKCDS_Capacity_Building_Report_July_2012.pdf Page 41

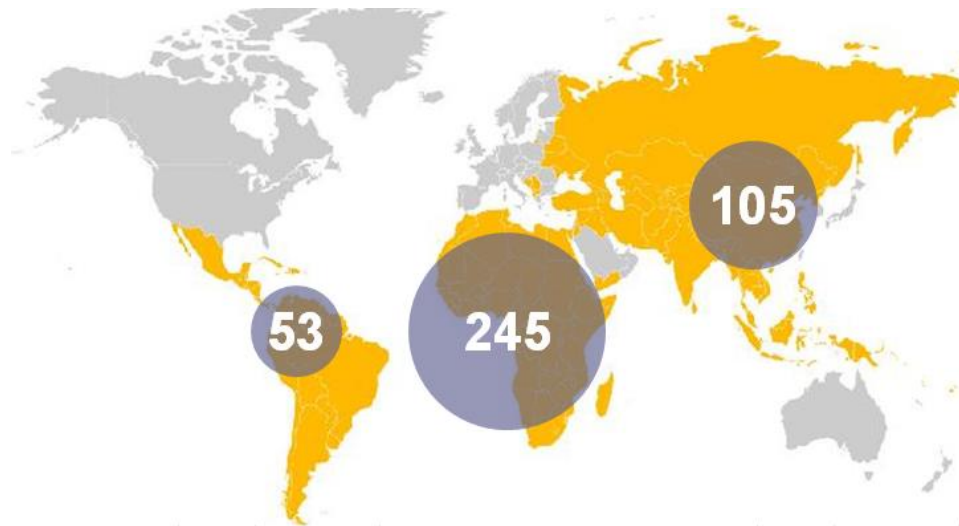
4. Geography

Key findings – Geography

- 87% of the initiatives were open to African researchers; 37% to Asian researchers; and 19% to researchers from Latin America and the Caribbean.
- The geographical foci of funders’ capacity strengthening efforts reflect general aid flows as well as broader cultural, linguistic and historical ties.

This map shows LMICs¹⁹ with the number of schemes for which applicants from the different regions are eligible. Of the 283 capacity strengthening initiatives profiled by region, 87% were targeting and/or accepting applicants from Africa.

Figure 3. A map displaying the number of HRCS schemes profiled for which researchers from Asia-Pacific, Africa and Latin America/Caribbean are eligible.



One particular hub of HRCS activity is East Africa. A mapping by Research Africa showed that Makerere University was by far the biggest institutional beneficiary for research capacity strengthening schemes, in terms of both the number of projects and funding received²⁰. Other African countries explicitly targeted by several schemes include Ghana, South Africa, Rwanda, Zambia and Nigeria. UK, US and Scandinavian funders’ efforts tend to focus on Anglophone Africa. However, French funders such as IRD and Inserm are active in Francophone West Africa, and Senegal in particular is a focus for HRCS initiatives. FIOCRUZ is active in Lusophone African countries such as Angola, Mozambique and Guinea-Bissau²¹.

In Asia, India, Bangladesh, Nepal, Vietnam, Thailand and the Philippines were included in, or targeted by many of the schemes. As well as UK funders, a number of French funders such as Institut Pasteur and Inserm are working together on the Asia Regional Research Platform. JICA is also particularly active in South-East Asia’s capacity strengthening through the SATREPS programme and direct support to institutions on infectious disease.

¹⁹ Based on the OECD DAC list, and map adapted from: http://www.finnfund.fi/yritys/en_GB/map/

²⁰ <http://www.rcbm.co.za/>

²¹ <http://www.cohred.org/wp-content/uploads/2012/11/Curi-COHRED-Bellagio-Oct-2012.pdf>



Making science work for development

In Latin America, significant French, Canadian and US funding has been provided for research capacity strengthening in Haiti. Spanish and Portuguese funders such as the Spanish Development Agency (AECID) and the Ibero-American Science and Technology for Development programme (CYTED) are active in other parts of Latin America.

Bilateral capacity strengthening funding schemes generally follow colonial ties for UK, French and Spanish funders, a tendency that has also been observed for research investments in infectious disease²². IDRC, a bilingual funder, is somewhat exceptional in running calls in both English and French which is reflected in the broad range of countries in which their schemes operate across West and East Africa.

²² Fitchett, J. R., Head, M. G. and Atun, R. 2014. "Infectious disease research investments follow colonial ties: questionable ethics". In: *Int Health* 2014 **6** Pages 74-76. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/24464047>

5. Thematic research foci

Key findings – Thematic research foci

- Over one third of programmes profiled had a clear focus on infectious disease HRCS.
- 40% of schemes were either generic research capacity schemes (open to health research) or schemes with an open health research remit.
- Research capacity strengthening in health systems constituted around 10% of programmes
- 4% of schemes were specifically focussed on NCDs, and 3% on reproductive, maternal and child health.
- RCS in nutrition; environment and health; and mental health each made up 1-2% of the programmes.

MRC assigned each initiative to one ‘best fit’ category²³, shown in the chart below (Figure 4). ‘Generic RCS’ encompasses schemes where the call specification includes, but is broader than, health. An example is Danida’s Capacity Development Support Programme. ‘Generic HRCS’ encompasses schemes where the call specification focuses on health, but does not define down within that. An example is Wellcome Trust’s new Developing Excellence in Leadership, Training and Science (DELTA) programme.

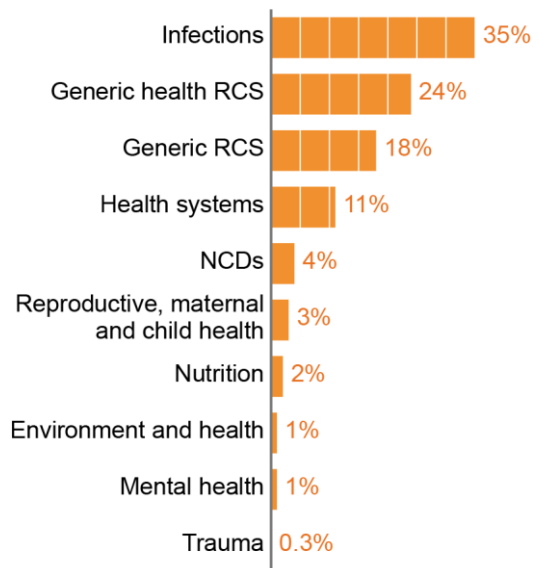
It has been challenging to accurately categorise the research fields within HRCS that receive the most and least attention. This information is often not listed (publicly) and a lack of standard categories limits comparability. As discussed in Sections 2 and 10.1, it has generally only been possible to categorise programmes by the theme(s) of research *invited*, rather than what field of research has actually funded. Moreover, while it is informative to compare the thematic balance by number of schemes, the figures do not necessarily reflect the volume of funding or scale of research training. For example, the one programme on trauma funded by NIH (Trauma and Injury Research Training Program) is providing pre- and post-doctoral support for 140 research trainees.

Schemes were most frequently classified (in 40% of cases) as Generic Health or Generic Research Capacity Strengthening. Sector specific HRCS is discussed below.

5.1. Infections

The data point to a focus on infections in all LMIC regions, with over one-third of the programmes focussed on research capacity strengthening in infectious disease.

Figure 4: Breakdown of HRCS schemes by thematic remit



²³ This categorisation was based on subjective judgement of the **eligible** health research fields within the calls for the various schemes, checked by MRC. It does not reflect the actual level of engagement with the different themes. For example, while a call may be generic in scope and welcome research into either infectious or non-communicable diseases, there may be more researchers funded and trained in one domain than the other.

There is an increasing UK interest in HRCS in zoonoses, reflected in the DFID-RCUK Zoonoses and Emerging Livestock Systems programme's LMIC studentship scheme. Other significant funders of HRCS in "One Health" include the Wellcome Trust, through the Afrique One and SACIDS African Institutions Initiative consortia, and JICA, whose partnership with the University of Zambia includes a focus on strengthening capacity in surveillance of viral zoonoses²⁴. Within infectious disease research capacity strengthening, there were more institutional than individual level activities, contrasting with the overall trend for more individual than institutional capacity strengthening schemes in the mapping.

5.2. Health systems

Around 10% of programmes focussed on strengthening capacity in health systems research, including epidemiological, social science and operational research into health policy, services and delivery. One of the main funders in this field is IDRC, who have active awards in health systems research capacity strengthening totalling over £60m²⁵. Many of these IDRC awards are geared towards students and young researchers in LMICs²⁶. The European Commission, under Framework Programme 7, has also funded significant RCS on health systems and services, as well as on social and structural determinants of health. The Alliance for Health Policy and Systems Research (AHPSR) plays a key leveraging role in health systems research. AHPSR supports networks, provides soft skills training in areas such as leadership and professional development, and supports improved systematic review capacity²⁷. 66% of health systems research capacity strengthening programmes were targeted at the individual level.

5.3. Non-Communicable Diseases (NCDs)

HRCS programmes specifically focussed on NCD HRCS are relatively rare (4% of programmes), despite the issue of the 'double burden' of infectious and non-communicable disease in LMICs rising up donors' health and development agendas. More frequently, broad HRCS schemes will be open to NCD research or NCD research will have capacity strengthening elements.

IDRC and NIH-Fogarty stand out as funders who run targeted calls in NCD HRCS, with IDRC funding one-third of the NCD HRCS schemes profiled by UKCDS through their Non-Communicable Disease Prevention programme. Additionally, in 2014 GSK launched their Africa NCD Open Lab to improve capacity for translational research in NCDs, with the long-term aim of improving understanding of NCD variations seen in Africa²⁸.

5.4. Reproductive, Maternal and Child Health

The emphasis within programmes on Reproductive, Maternal and Child Health is frequently on research and innovations which can be quickly taken to scale, and so HRCS elements are often buried within large action-oriented research initiatives. For example, IDRC's ~£20m²⁹ new research programme, "Innovating for Maternal and Child Health in Africa" twins Canadian and African research institutions, and partners each team with two African health

²⁴ http://www.jst.go.jp/global/english/kadai/h2409_zambia.html

²⁵ Converted from CA\$112,056,550 on 10 November 2014

²⁶ Rosalie Vézina. Personal Communication, 22 January 2014

²⁷ Michelle Jimenez. Personal Communication, 27 October 2014

²⁸ <http://www.gsk.com/en-gb/research/research-funding/africa-ncd-open-lab/>

²⁹ CA\$ 36,000,000

policy and research organisations to promote research uptake. At an even larger scale, the multi-donor “Saving Lives at Birth” Grand Challenge specifies that 25% of awards must go to LMIC ‘innovators’³⁰. DFID and NORAD are additional key funders of maternal and child health research capacity strengthening.

The dedicated WHO Special Programme of Research, Development and Research Training in Human Reproduction (HRP) provides a coordinating function for capacity strengthening in research in reproductive and sexual health. To date, HRP has provided long-term institutional development support to 103 institutions in 55³¹. The recently formed HRP Alliance aims to build upon and enhance these capacity strengthening activities, by fostering collaboration between regional research networks and encouraging institutions which previously benefitted from HRP support to mentor smaller centres.

5.5. Capacity strengthening follows the money

The authors believe the attention in HRCS follows wider investment decisions, both in the sense that capacity strengthening tracks wider trends, and that investment occurs later in time too. The need for research in a particular area, for example in NCDs in Africa, is often proclaimed before the need to build LMIC capacity in that research. It will be interesting to see if the Ebola crisis triggers an upswing in investment in health systems (and NTD) research capacity strengthening, alongside programmatic interventions to strengthen the health systems themselves in West African countries.

³⁰ Callie Raulfs-Wang, USAID. Personal Communication, 24 September 2014

³¹ http://www.who.int/reproductivehealth/topics/countries/HRP_Alliance/en/

6. Discussion

Key findings – Discussion

- Drawing the boundaries between global health research conducted with LMIC partners and health research capacity strengthening is challenging. Research activities not formally included in funders' HRCS portfolios may have greater capacity strengthening impacts than targeted schemes.
- Some of the largest *de facto* funders such as the Gates Foundation embed capacity strengthening to the extent that separating RCS from their research portfolio is impossible.
- "New players" from the pharmaceutical industry, private foundations and middle-income countries are entering the field, alongside more traditional funders such as aid agencies and research councils. South-South technical cooperation in health research is increasing.
- Many key funders are streamlining their HRCS schemes into larger transformative initiatives, and moving towards institutional HRCS models that allow issues of research governance, management and administration as well as scientific quality, to be addressed.
- Funders are increasingly experimenting with models that provide greater oversight to LMIC organisations for the delivery of their HRCS objectives and programmes.

6.1. Challenges of categorisation and analysis

As mentioned throughout, the categorisation of the data for this mapping has been very challenging. The data is incomplete, fragmented, and there are few fixed definitions of where research in partnership ends and capacity strengthening begins. As such, it has not been possible to fully trace funders' HRCS investments, and judgements on the scale and extent of funders' activities have been made subjectively by UKCDS with a double-check by MRC. Additionally, capacity strengthening programmes are often focussed on more than one health theme or are intervening at more than one level in the research and innovation system. However our analysis has only captured the primary feature of relevance.

Some programmes that are not labelled as capacity strengthening appear to build more capacity than many that are. For example, the Wellcome Trust has been supporting Major Overseas Programmes (MOP) in Africa and South East Asia for more than 20 years³². In Vietnam, the Centre has grown from fewer than 10 people to over 500³³. The Centre also includes a formal training programme, with 40 Vietnamese PhD students and more than 20 Master's students currently registered for degrees at Vietnamese or international universities with the focus of research on Vietnam³⁴. Nonetheless, these MOPs are not viewed as part of the Trust's core capacity building portfolio (or documented in this mapping).

In addition, there can be a disparity between how a programme is framed (for example, "Environmental", because it seeks to catalyse system-wide change) and what actually happens (research grants for individuals). The DFID-Wellcome Trust Health Research Capacity Strengthening Initiatives are indicative of this trend; the national level Kenya HRCS Initiative for example has provided grants for four Centres of Research Excellence on the institutional level as well as PhD and post-doctoral training fellowships and career development for post-doctoral and mid-career researchers. For all of these reasons, the

³² Details of all the Major Overseas Programmes, including the Vietnam MOP, can be found here:

<http://www.wellcome.ac.uk/Funding/International/Major-Overseas-Programmes/>

³³ <http://www.ft.com/cms/s/2/e6e8b13a-f2df-11e3-a3f8-00144feabdc0.html>

³⁴ <http://www.wellcome.ac.uk/Funding/International/Major-Overseas-Programmes/Vietnam/index.htm>

mapping has required a degree of subjective judgement by the UKCDS Secretariat, and all the data should be taken as indicative only.

As discussed in Section 10, it can be very difficult to draw the boundaries between research conducted in partnership with LMIC individuals, teams, institutions or governments, and research capacity strengthening, especially given the inevitable inconsistencies in terminology used by different aid agencies and research funders.

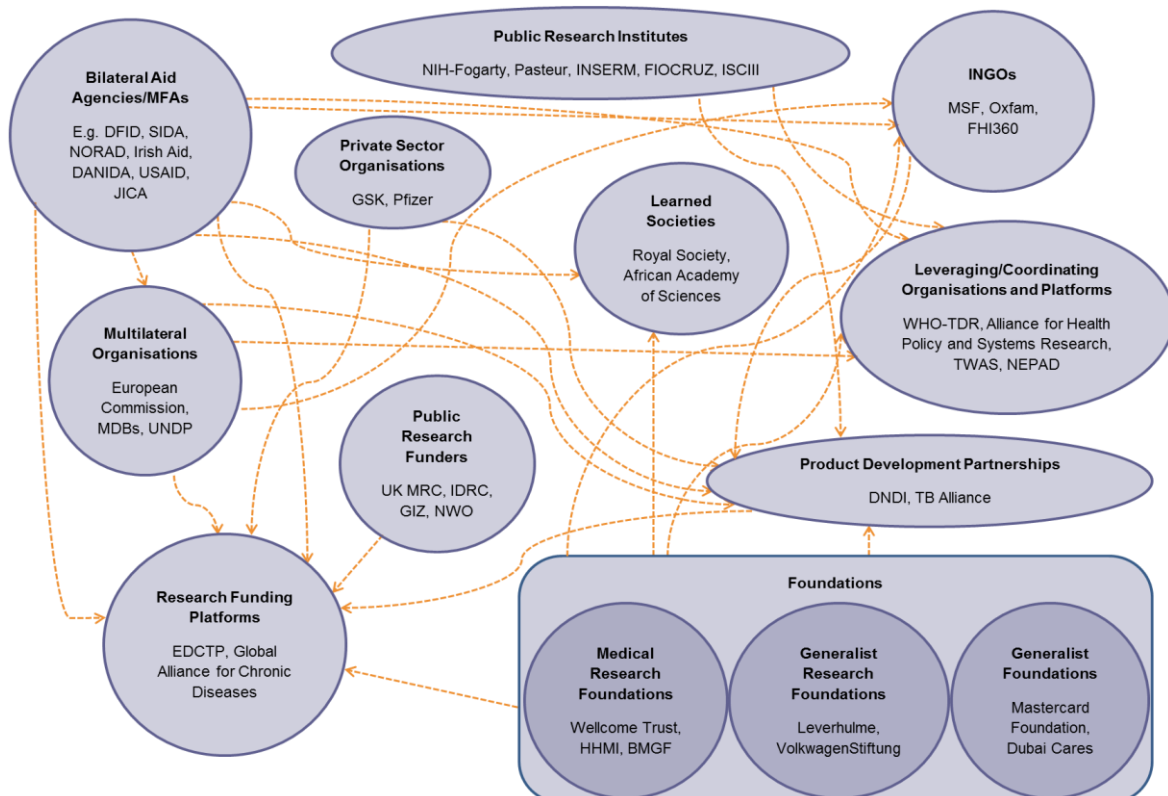
6.2. Emerging trends in how capacity strengthening is done

This section briefly outlines five trends drawn from across the mapping that may be informative for the Global Health Advisory Group’s discussion. As well as drawing on the mapping data, this section incorporates reflections and insights from UKCDS’ capacity strengthening work through the Research Capacity Strengthening Group, the Health Funders’ Forum and extensive engagement with key funders and stakeholders.

6.2.1. New players

The ESSENCE collaboration brings together many of the largest HRCS donors, as a coordinating mechanism to encourage alignment of initiatives. However a number of newer players outside this group are also investing in research capacity strengthening. These include research funders in ‘emerging’ powers, like the China CDC, who are planning investments in LMICs, and new entities, like the Kuwait Foundation for the Advancement of the Sciences or the MasterCard Foundation. These may provide new opportunities for partnership, but also an increasingly cluttered funding ‘landscape’ (Figure 5). Despite the wealth of activity, a recent survey of sub-Saharan African researchers and policymakers

Figure 5: Representation of **flows of funding** among **HRCS funders and delivery partners**



highlighted a lack of sustainable funding as the most significant barrier to improved African clinical research capacity³⁵. This survey also emphasised perceived issues in research coordination and long-term collaboration.

Related to the increasing involvement of MICs in HRCS, Northern funders are increasingly seeking to foster South-South capacity strengthening, by engaging with emerging economies and LMICs in triangular partnerships, knowledge exchange and research networks. JICA has led the way on this, for example working with the Brazilian Cooperation Agency and the UN Office for South-South Collaboration on their SSC/TrC technical cooperation programme³⁶. A comparable approach is MRC's new Joint Global Research Programme on Women's and Children's Health co-funded with DFID and India's DBT, forging partnerships between the UK, India and a low-income country. Whilst capacity building is not a primary aim of this programme, development of networks and opportunities for capacity building are embedded.

While this paper focuses on HRCS funders, it should be noted that numerous voluntary organisations are operating in the HRCS 'ecosystem' in a more decentralised fashion. Foremost among these is the Cochrane Collaboration which is increasingly focussed on strengthening capacity for LMIC decision makers to access, evaluate and use systematic reviews. While this receives some DFID support, the long-term success of Cochrane's HRCS efforts is contingent upon a mutually supportive volunteer network³⁷. New forms of e-learning such as Massive Open Online Courses (MOOCs)³⁸, freely made available by universities, may also have a role to play in an evolving HRCS landscape.

6.2.2 Towards bigger programmes

A number of funders are moving towards bigger programmes, with more transformative visions. For example, the Wellcome Trust is bringing all of its capacity building programmes under one umbrella: "Developing Excellence in Leadership, Training and Science" Initiative (DELTAS). This programme builds on Wellcome Trust's experience at the individual, institutional and environmental levels to focus on excellent research, high quality research training, support for the research environment and developing research leadership³⁹. Similarly, Danida approved its new overarching capacity strengthening programme in May 2014, the Danida Capacity Development Support Programme, "which will build on a previous Fellowship programme to better integrate Danida support into national development plans"⁴⁰⁴¹. In part this shift seems to be driven by the ambition to create significant, sustainable change, and in part by pressures around administrative transaction costs of smaller programmes.

³⁵ Cardoso, A. Breugelmans, G., Manville, C., Chataway, J., Cochrane, G., Snodgrass, J., Chataway, M. and Murali, N. 2014. *Africa Mapping: Current State of Health Research on Poverty-Related and Neglected Infectious Diseases in Sub-Saharan Africa*. EDCTP. Available at: <http://www.rand.org/randeurope/research/projects/health-research-sub-saharan-africa.html> Page 22

³⁶ http://tcdc2.undp.org/GSSDAcademy/ResourceCentre/docs/SSC_Case_Designed_Web.pdf

³⁷ Young, T., Garner, P., Kredo, T., Mbuagbaw, L., Tharyan, P. and Volmink, J. 2013. "Cochrane and Capacity Building in Low- and Middle-Income Countries: Where are we at?" [Editorial]. *Cochrane Database of Systematic Reviews* (2013) 11, Article No. ED000072. Available at: <http://www.thecochranelibrary.com/details/editorial/5428691/Cochrane-and-capacity-building-in-low-and-middle-income-countries-where-are-we-.html#R1>

³⁸ <http://blogs.worldbank.org/edutech/making-sense-of-moocs-a-reading-list>

³⁹ Val Snewin, Wellcome Trust. Personal Communication, 20 January 2015

⁴⁰ <http://dfcentre.com/main/new-danida-capacity-development-policy/>

⁴¹ Danida. 2014. *Policy for Danida Capacity Development Support Programme*. Available at: <http://bit.ly/1CcaVZd>

6.2.3 Growing awareness of the constraining power of poor institutions

A number of funders that have primarily operated at the individual level are increasing their focus on institutional strengthening, based on greater awareness of the power of poor institutions to limit national research excellence and prevent LMICs retaining a critical mass of excellent researchers. Issues highlighted include high teaching loads for academics, weak research management and/or leadership, bureaucracy, problems with research infrastructure such as ICTs, and limited access to scientific information. Northern partners' roles in providing support or guidance around these issues is acknowledged to vary greatly on a case by case basis, which can create its own tensions and challenges. The recognition of the importance of research governance, management and administration (RGMA) in low resource settings is exemplified by the Wellcome Trust's African Institutions Initiative, which required a greater spend on RGMA than initially anticipated.

6.2.4 Towards embedded capacity strengthening in research programmes

There is a live discussion regarding the most effective models to build research capacity, with two broad approaches. Either, programmes can explicitly set out to build capacity (with those outputs and outcomes central in the programme design, management and reporting), or the capacity strengthening elements can be embedded into a research programme framed around the creation of new knowledge. The Gates Foundation, for example, state that "hardly any of our programmatic funding is dedicated to research capacity building, however many of our grants include elements of capacity building needed to achieve the programmatic R&D goals."⁴²

Product development partnerships, and public-private partnerships to develop new medicines and health services, also carry out significant capacity strengthening activities to ensure the sustainability of their operations. For example, the International AIDS Vaccine initiative, funded by numerous bilateral aid agencies and private sector organisations such as GSK and Google, has developed a network of research centres at established research institutes or hospitals in five sub-Saharan African countries⁴³.

There appears to be a shift towards embedding capacity strengthening across a number of the funders consulted. DFID, for example, is developing guidance for their research teams on how best to achieve capacity strengthening outcomes within their Research Programme Consortia model.⁴⁴

6.2.5 Increasing research governance/management responsibilities invested in African institutions

A fifth trend is the shift towards supporting greater African capacity in research funding, governance and management. Since 2008, DFID and the Wellcome Trust have supported the development of health research funding agencies in Kenya and Malawi. The Trust is also supporting the development of a pan-African funding platform in Nairobi.⁴⁵ As the Trust and others have found, supporting the development of funding agencies in LMICs can be slow, challenging, and very expensive in terms of staff time. Yet it offers a tantalising prospect of

⁴² Samia Saad, BMGF. Personal Communication, 23 September 2014

⁴³ <http://www.iavi.org/what-we-do/science/capacity-building>

⁴⁴ David Fallows, DFID. Personal Communication, 7 October 2014

⁴⁵ Val Snewin, Wellcome Trust. Personal Communication, 29 July 2014



Making science work for development

long-term change in LMICs, and future research funding that is sustainable, Southern-led and more responsive to local agendas.

Weighing this up could be one focus of discussion for the Global Health Advisory Group. In addition, it is hoped that this mapping will support strategic advice that aligns global needs with MRC's remit and strengths, whilst remaining aware of others' activities and opportunities for partnership.

Annex: Detailed profiles of funders’ activities

The principal funders’ HRCS activities at the individual, institutional and environmental levels (see definitions in Section 3) are outlined below. As mentioned in Section 10, we have been better informed of some funders’ activities than others, allowing more disaggregation of activities. It is important to note that a funder profiled under only one HRCS level may have some HRCS activities at others levels too. For the brevity of the report funders have been allocated at the level where UKCDS understands most of their activities take place. It is also worth noting that MRC were most interested in individual level HRCS schemes, so this mapping places greater focus on these.

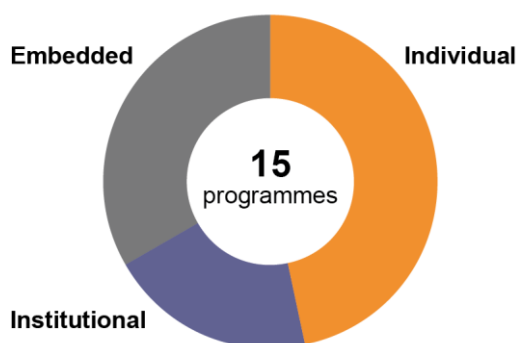
The catalogue does not aim to be exhaustive but to give a more detailed insight into funders’ activities referenced in the main body of the paper. Over time, and if there is demand from funders or other stakeholders, it may be possible to create a more comprehensive, systematic repository of HRCS funding.

7. Individual level

7.1. Medical Research Council (MRC)

MRC’s capacity strengthening activities largely focus on individual level capacity strengthening and within that, on PhD and postdoctoral/early career researchers. Their schemes operate across a broad health remit and are mostly run with other UK funders such as DFID and the Wellcome Trust, or channelled through EDCTP⁴⁶.

Figure 6: Breakdown of MRC schemes by HRCS level



Seven of the fifteen current or recently concluded programmes⁴⁷ have capacity strengthening of individual researchers as the primary objective (Figure 6). All of these schemes provide research training primarily for African scientists, with provision for broader LMIC capacity strengthening, for example through ZELS studentships⁴⁸ and opportunities for South East Asian researchers through the MRC Centre for Genomics and Global Health⁴⁹. Around three quarters of all the schemes were run by the MRC in partnership with DFID, Wellcome Trust or other funders.

⁴⁶ EDCTP capacity strengthening activities, including those funded through the MRC-DFID Concordat, are considered in section 3.1.3.

⁴⁷ Not including MRC/DFID contributions to the European and Developing Countries Clinical Trials Partnership (EDCTP).

⁴⁸ 7 of the 15 studentships will be awarded to researchers from low and middle income countries.

⁴⁹ 4 PhD studentships at the Centre have been funded in the last five years. In the future there will be 1 per annum.

Figure 7: Proportion of researchers trained at each level through MRC HRCS schemes per year (excluding researchers trained through contributions to EDCTP)



PhDs represent the vast majority (over two-thirds) of awards⁵⁰ (Figure 7), with greater support for post- than pre-doctoral researchers. Studying the funding remit at call stage indicates that the greatest scope for capacity strengthening awards has so far been in infectious disease research.

MRC’s role as a Delivery Partner for the UK Government’s Newton Fund, means that new embedded opportunities for capacity development are likely to emerge, for instance through the MRC, South African MRC and GSK new programme for collaborative research on NCDs in Africa⁵¹.

7.2 Wellcome Trust

The focus of Wellcome Trust support is on individual training and research, although frequently within the broader institutional context (e.g. the African Institutions Initiative, discussed in Section 8.2, and the Major Overseas Programmes). Around one fifth of Wellcome Trust’s current capacity strengthening portfolio specifically provides support for individuals engaged in infectious disease or public health research through strategic awards.

The Trust has five strategic awards that can be considered individual level capacity strengthening⁵²:

- Training of staff at the Indian Institutes of Public Health through 15 Master’s awards, 24 PhD awards, 27 postdoctoral fellowships and 11 research fellowships.
- (With MRC) Infection and Immunity Research and Training for Uganda (MUII) at the Uganda Virus Research Institute of Makerere University. MUII offers 80-100 graduate internships per year and Master’s project attachments. Wellcome Trust support has funded 6 MSc, 7 PhD and 7 postdoctoral fellowships.
- (With the Gates Foundation) Malaria Capacity Development Consortium. The Trust currently provides funding for 6 Master’s students and 19 PhD students.
- Developing research capacity and leadership in East Africa from the KEMRI-Wellcome Trust research programme. The Trust has funded 62 PhD studentships and supported 75 Master’s students, in addition to providing over 100 diploma level training courses for continuing professional development of technical staff⁵³.

⁵⁰ This figure is a proxy, as it does not include embedded research career opportunities at all levels offered within The Gambia and Uganda units and within the global health programmes where capacity building is embedded. Figures for numbers trained under the MRC/Wellcome “Support to Infection and Immunity Research and Training for Uganda (MUII)” could not be obtained.

⁵¹ <http://www.mrc.ac.za/Media/2014/27press2014.htm>

⁵² Sophie Mathewson, Wellcome Trust. Personal communication, 27 October 2014

⁵³ <http://www.kemri-wellcome.org/index.php/en/about>

- Clinical Infectious Disease Research Initiative. The Trust has funded 10 PhD awards. There are 11 postdoctoral fellows for the year 2014 to 2015.

Outside of Wellcome Trust's core HRCS portfolio, their programme of Public Health and Tropical Medicine fellowships⁵⁴ provides wide-ranging support across a broad range of clinical and non-clinical research at all career levels from Master's up to Senior Fellowships. Of awards made since 2009, 76 (58%) have been awarded for training at Master's level, 33 (25%) at the early career stage. 22 (17%) at mid-career stage and 1 (>1%) senior research fellowship.

Researchers from LMICs in Sub-Saharan Africa, South Asia (except India) and South-East Asia are also eligible to apply for the Wellcome Trust Investigator Awards in Biomedical Science, although limited funding seems to have been awarded to LMIC researchers through this initiative⁵⁵.

7.3 The European and Developing Countries Clinical Trials Partnership (EDCTP)

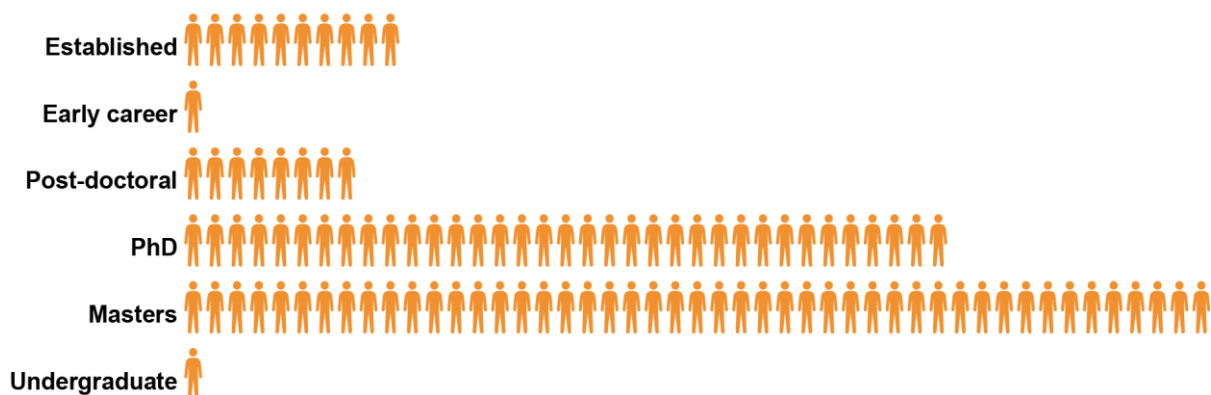
Capacity strengthening and career development in infectious disease research has been at the heart of EDCTP's objectives since its inception in 2003. EDCTP offers a broad range of capacity strengthening support but mostly focuses on training individuals.

EDCTP provides support at all levels (see Sections 8.3 and 9.2); each multi-centre trial has to have a capacity building package, typically up to 30% of the budget⁵⁶. Predominantly this will be training at Master's and PhD level. The capacity strengthening can also include short term training, project management support and infrastructure support.

As EDCTP is a jointly funded initiative, it is difficult to trace donor flows precisely, and to therefore attribute one set of grants to particular funders. For that reason it has been profiled as a separate funder in this report. Data provided by EDCTP programme managers showed that 522 researchers were trained under the programme⁵⁷. The breakdown by career level is shown in Figure 8.

Figure 8: Researchers trained at each level through EDCTP 1 HRCS schemes

Each icon represents 5 researchers



⁵⁴ <http://www.wellcome.ac.uk/Funding/Biomedical-science/Funding-schemes/Fellowships/Public-health-and-tropical-medicine/index.htm>

⁵⁵ <http://www.wellcome.ac.uk/Funding/Biomedical-science/Funding-schemes/Investigator-Awards/WTX059284.htm>

⁵⁶ Pauline Beattie, EDCTP. Personal communication, 21 January 2015

⁵⁷ This does not include researchers who undertook short-term training on the EDCTP grants.

EDCTP 2 will be broader in scope than EDCTP 1, with health systems research, pharmaco-vigilance and other NTDs included in the scope. The commitment to capacity development will remain.

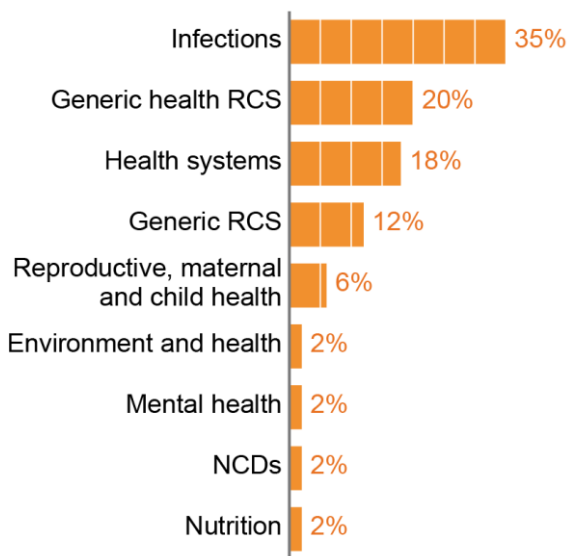
7.4 Department for International Development (DFID)

Much of DFID’s health research capacity strengthening at the individual level is embedded within larger initiatives. Either health may be included within more systemic capacity building efforts (for example to improve evidence literacy or uptake), or capacity strengthening at the individual level is embedded into the Research Programme Consortia (RPCs)⁵⁸ in health. DFID has also been one of the major contributors to the WHO’s Special Programme of Research and Training in Tropical Diseases⁵⁹ (TDR) which carries out its own suite of capacity strengthening activities (p25).

DFID’s individual capacity strengthening efforts are relatively diffuse, with 38 programmes that have some level of exclusive, significant or embedded focus on capacity strengthening. DFID capacity strengthening programmes could be categorised into three groups:

- Bespoke capacity strengthening programmes, often delivered through partners such as the Royal Society, MRC or the African Economic Research Consortium.
- RPCs which combine individual and institutional capacity strengthening by specifying that at least three of the 4-6 consortium partners be based in developing countries. Some of the RPCs such as the Resilient and Responsive Health Systems Consortium (RESYST) involve an embedded focus on maternal and child health.
- Product Development Partnerships (PDPs), public-private partnerships which aim to develop innovative new vaccines, treatments, diagnostics, microbicides and

Figure 9: Breakdown of DFID HRCS schemes by thematic remit



insecticides for HIV/AIDS, malaria and tuberculosis and NTDs⁶⁰. Partners include foundations such as Gates, Wellcome Trust and UBS Optimus Foundation, other aid agencies and research funders such as Pasteur and China’s CDC. Capacity building is an embedded though not a core activity.

The breakdown of programmes by possible research themes is shown in Figure 9, reflecting a strong DFID interest in building capacity in infections, generic health research and health systems research. The RPCs contribute significantly to the total of programmes focused on health systems, as do grants delivered through the Alliance for Health Policy and Systems Research. The nine PDPs are largely concerned with infectious disease.

⁵⁸ <http://r4d.dfid.gov.uk/PDF/Publications/RPCTermsOfReference.pdf>

⁵⁹ Sue Kinn, DFID. Personal Communication, 13 January 2015

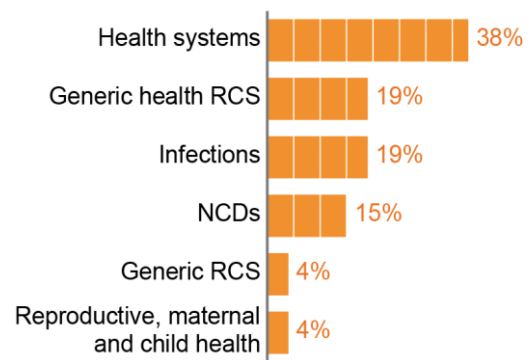
⁶⁰ <https://www.gov.uk/government/news/dfid-invests-to-save-millions-from-deadly-diseases>

7.5 International Development Research Centre (IDRC)

IDRC provides support for individual health researchers and institutional capacity strengthening in both Anglophone and Francophone Africa. IDRC’s HRCS activities at both the individual and the institutional levels include mentoring, training, networking and exchange⁶¹. A key focus of IDRC capacity strengthening programming is on health systems research.

The breakdown of different sectoral areas in health research (Figure 10) reflects IDRC’s interest in health systems research capacity strengthening. Canada’s Global Health Research Initiative⁶² funds significant HRCS efforts in infectious disease, as well as health systems and maternal and child health. Significantly, the HIV/AIDS Prevention Trials Capacity Building Grants Phase 2⁶³ program has trained over 1,600 researchers in sub-Saharan Africa at all levels, as well as decision-makers and lab technicians. Much of the capacity strengthening in NCDs research is channelled through the Non-Communicable Disease Prevention programme, building on IDRC’s earlier work on tobacco control.

Figure 10: Breakdown of IDRC HRCS schemes by thematic remit



IDRC funds a large body of awards in Francophone West Africa (as well as other parts of Africa, Asia and Latin America), in contrast to UK funders’ greater focus on East and Southern Africa. Examples include the West Africa Initiative to Strengthen Capacities through Health Systems Research and Strengthening Research for Health System Development in West Africa.

7.6 United States Agency for International Development (USAID)

The principal instrument for capacity strengthening of individuals in health research is the health stream of Partnerships for Enhanced Engagement in Research (PEER). Otherwise health is embedded as a theme within broader national or regional capacity strengthening initiatives.

7.7 GlaxoSmithKline (GSK)

GSK’s current main investment in health research capacity strengthening is their £25m R&D Open Lab for non-communicable diseases in Africa as part of broader investments in scientific and public health research in Africa⁶⁴. This will fund African researchers in-country, to study what is unique about NCDs in Africa, but may also include in-kind support where GSK’s strengths meet African needs – for example in biostatistics.⁶⁵

⁶¹ Rosalie Vézina, IDRC. Personal Communication, 22 January 2015

⁶² A partnership between IDRC, the Canadian Institutes of Health Research (CIHR) and Foreign Affairs, Trade and Development Canada (DFATD).

⁶³ http://www.idrc.ca/EN/Programs/Global_Health_Policy/Global_Health_Research_Initiative/Pages/CHVI.aspx

⁶⁴ <http://us.gsk.com/en-us/media/press-releases/2014/gsk-announces-new-strategic-investments-in-africa-to-increase-access-to-medicines-build-capacity-and-deliver-sustainable-growth/>

⁶⁵ Mike Strange, GSK. Personal Communication, 6 October 2014

GSK will concurrently support up to 25 academic chairs in African universities, in pharmaceutical and clinical sciences but also in public health, engineering and logistics. This scheme will cover a range of investments including postgraduate research, and course and programme development, as well as support for students and academics to further their studies both in country and on exchange⁶⁶.

GSK is also planning a joint call with the UK and South African Medical Research Councils under the Newton Fund, as described above.

7.8 Chinese Centre for Disease Control and Prevention (China CDC)

China, like many middle income countries, has recently transitioned from being a net receiver of aid to net donor, including substantial technical assistance and research capacity strengthening efforts. The China CDC is currently exploring the possibility of funding capacity strengthening programmes focussed on the individual level, likely to be starting in infectious diseases.⁶⁷

7.9 World Health Organisation Special Programme for Research and Training in Tropical Diseases (WHO-TDR)

WHO-TDR has supported individual and institutional HRCS for over 30 years, especially for early career researchers, providing MSc, PhD and postdoctoral fellowships as well as re-entry grants to facilitate career development when researchers return to their home country⁶⁸. WHO-TDR has just launched its first new individual training grants scheme since 2010⁶⁹, focussing largely on infectious diseases at MSc and PhD level.

TDR has four other individual HRCS initiatives:

- The Impact Grants scheme, this year supporting 20 to 30 researchers or teams to address implementation bottlenecks, identify optimal approaches for real life settings and promote the uptake of research findings for infectious disease control⁷⁰.
- Career Development Fellowships, co-funded with the Gates Foundation to improve clinical trial capacity in developing countries through one year placements in pharmaceutical companies or product development partnerships (PDPs)⁷¹. Between 2008 and 2013, 27 fellows were trained⁷². A similar initiative is now beginning with EDCTP, providing 25 fellowship placements for postgraduate researchers with clinical experience in European product development organisations⁷³.
- Support for six health research Regional Training Centres at institutions in Colombia, Indonesia, The Philippines and Kazakhstan, with two more in Africa and the Eastern Mediterranean yet to be confirmed. TDR provides funding over two years to embed skill-building courses in the universities' training programmes, and the enhanced status of the institution thanks to the centre helps leverage financial support from other donors⁷⁴.

⁶⁶ Lisa Bonadonna, GSK. Personal Communication, 24 December 2014

⁶⁷ Dr Yiming Shao, China CDC. Personal Communication, 10 July 2014

⁶⁸ <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3191138/pdf/pntd.0001351.pdf>

⁶⁹ <http://www.who.int/tdr/news/2014/training-grants-announced/en/>

⁷⁰ http://www.who.int/tdr/grants/RCS_KM_Impact_call_April032014.pdf

⁷¹ Dermot Maher, WHO-TDR. Personal Communication, 21 October 2014

⁷² <http://www.who.int/tdr/news/2014/cdf-profiled/en/>

⁷³ <http://www.who.int/tdr/news/2014/edctp/en/>

⁷⁴ <http://www.who.int/tdr/grants/calls/RTC-AFRO-call.pdf?ua=1%3C/p%3E>

- A new small grants programme with the Pan-American Health Organisation, strengthening infectious disease research capacity in Chagas, HIV, hepatitis and syphilis, in the context of improving maternal, neonatal and child health⁷⁵.

7.10 Netherlands Organisation for Scientific Research – Science for Global Development (NWO-WOTRO)

The Dutch NWO-WOTRO NACCAP (Netherlands-African Partnership for Capacity Development and Clinical Interventions Against Poverty Related Diseases) programme has been running since 2004, and focusses on HIV/AIDS, tuberculosis and malaria. It can be seen as a programme that intervenes on all three HRCS levels.

Although largely an institutional HRCS initiative, NACCAP provided training for 120 individuals⁷⁶. The programme operates a 'learning-by-doing' approach, with MSc and PhD researchers trained on the job⁷⁷ within the various research and capacity strengthening projects, discussed in Section 8.6.

Beyond NACCAP, NWO-WOTRO's Global Health Policy and Health Systems Research (GPHSR) programme in East Africa includes capacity strengthening at the individual level, with PhD opportunities in health economics and social science within the eight research partnerships⁷⁸. This is complemented by a Knowledge Translation Network which aims to support the uptake and use of research evidence generated by the GPHSR programme⁷⁹.

7.11 National Institutes of Health (NIH)

The Fogarty International Centre, the arm of the US National Institutes of Health (NIH) focussing on global health, funds individual level HRCS programmes. This includes the Global Health Programme for Fellows and Scholars, a programme with a \$6-7m annual budget to support 70 LMIC and US doctoral and postdoctoral researchers per year in global health.

Over 1000 pre- and post-doctoral students have been trained by NIH Fogarty research programmes on aspects of NCDs covering three themes: tobacco, chronic diseases across the lifespan and trauma/injuries.

Alongside this, the Global Infectious Disease Research Training Programme provides capacity strengthening through Master's and PhD training in infectious disease research⁸⁰, and has provided short term support and long-term (> 6 months) training to 1050 long-term pre- and post-doctoral trainees.

The International Research Ethics Education and Curriculum Development Award programme has helped to provide long term training to 875 pre- and post-doctoral researchers.

⁷⁵ <http://www.who.int/tdr/news/2014/tdr-paho-small-grants/en/>

⁷⁶ Data compiled through Wellcome Trust survey

⁷⁷ NACCAP 2004-2011: *Lessons Learned*. [Online] Available at: <http://www.nwo.nl/en/about-nwo/media-and-communication/publications/wotro/naccap-2004-2011-lessons-learned.html> Page 13

⁷⁸ <http://www.nwo.nl/en/research-and-results/programmes/Global+Health+Policy+and+Health+Systems>

⁷⁹ <http://ktnetafrica.net/about-ktnet-africa>

⁸⁰ <http://www.fic.nih.gov/programs/Pages/infectious-disease.aspx>

7.12 Oswaldo Cruz Foundation (FIOCRUZ)

The Brazilian Research Institute FIOCRUZ has provided significant individual level capacity strengthening support to Lusophone African researchers since 1980. The size of the cohorts trained has increased rapidly in recent years, dramatically so at the Master's level and much less significantly at the doctoral level⁸¹.

7.13 Private Foundations (e.g. Howard Hughes Medical Institute, Rockefeller, Ford, Doris Duke etc.)

Private foundations provide significant individual scholarship and fellowship opportunities for individuals, for example through mobility schemes or initiatives to train female health researchers.

The Howard Hughes Medical Institute largely provides support to individuals from both developing and developed countries, through the International Early Career Scientist and Senior International Research Scholar schemes. 13 of the 28 International Early Career Scientist grants for 2012-17 have been awarded to researchers from middle-income countries (none went to LICs), including 7 for China. Of the Senior International Research Scholar fellowships, 4 of the 13 were awarded to MICs (2 to Argentina, 1 each to Mexico and South Africa)⁸².

Several US based foundations such as Hewlett, Carnegie, Ford and Rockefeller were involved in the \$440 million Partnership for Higher Education in Africa from 2000-2010, targeting higher education in seven countries (Ghana, Kenya, Mozambique, Nigeria, South Africa, Tanzania and Uganda). Almost \$50m, 11% of the collaborative foundation investment, was spent on health research themes⁸³.

A comparable collaborative programme funded by European foundations is the European Foundation Initiative for African Research into Neglected Tropical Diseases (EFINTD). This brings together the Nuffield Foundation, the Fondation Mérieux, the Gulbenkian Foundation, the Fondazione Cariplo and the Volkswagen Foundation. Over three separate rounds, it has provided 24 grants for African researchers from the postdoctoral to senior researcher level to investigate diseases such as lymphatic filariasis, helminths, Buruli ulcer and Lassa virus⁸⁴.

Foundations such as Carnegie, MacArthur and Rockefeller fund the Organisation for Women in Science for the Developing World which has provided 107 postgraduate fellowships to women from developing countries⁸⁵. Only 7.5% of fellowships (8 of the 107) were in medicine and health.

Volkswagen Stiftung's "Knowledge for Tomorrow" programme⁸⁶ has supported young researchers at the PhD stage who then may have the opportunity for post-doctoral funding.

⁸¹ This conclusion is based on Slide 4 of this presentation: http://ecos-crisfiocruz.bvs.br/tiki-download_file.php?fileId=220

⁸² Jill Conley, Howard Hughes Medical Institute. Personal Communication, 12/11/2014

⁸³ Grant areas included in health were "health", "health and population", "HIV/AIDS" and "sexuality". Some grants in other areas e.g. "science" may be relevant to health but were not counted: <http://www.foundation-partnership.org/index.php?id=2>

⁸⁴ <http://www.ntd-africa.net/en/fellowships.html>

⁸⁵ <http://owsd.ictp.it/activities/forty-six-graduates-since-1998>

⁸⁶ <http://www.volkswagenstiftung.de/en/funding/international-focus/sub-saharan-africa.html>

7.14 Commonwealth Scholarship Commission

The DFID Commonwealth Scholarship Scheme is one example of the many scholarship schemes OECD countries provide for developing country students⁸⁷. This sits at the boundaries of capacity strengthening given that it is not developing research excellence in country. However the scheme stipulates the return of researchers to their country of origin after the award period, helping to strengthen the overall research culture.

Among Commonwealth Scholars from developing countries accepted to study or carry out health or medical research in UK universities since 2000, Figure 11 demonstrates that public health was by far the main discipline⁸⁸.

Commonwealth Scholars have overwhelmingly been accepted to study in the UK at Master’s level (Figure 12). This pattern contrasts with the emphasis on doctoral training within individual HRCS shown in Figure 2. In total, since 1960, 29% of the medical Commonwealth Scholars have been female, although since the mid-2000s the proportion of awards for female and male researchers has been similar.

Figure 11: Top ten health/medical fields for Commonwealth Scholars since 2000

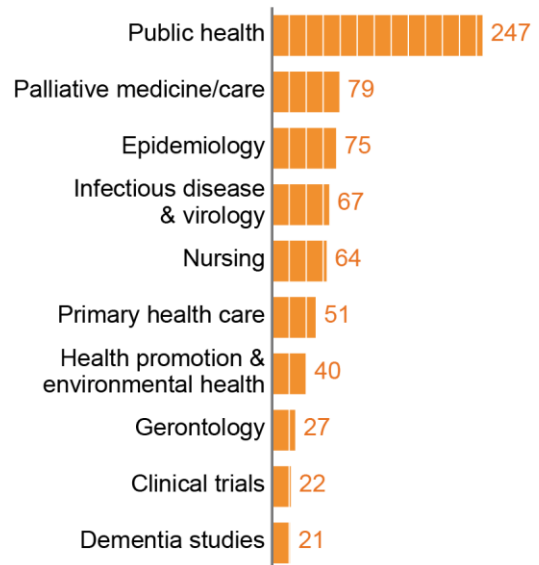


Figure 12: Researchers trained at each level by Commonwealth Scholarships

Each icon represents 20 researchers



⁸⁷ Other than the DFID Commonwealth Scholarship, these national scholarship schemes (such as the Norwegian Quota Scholarships Scheme). Many of these opportunities can be found on <http://www.scholars4dev.com/> but are too numerous to analyse to extract the health relevant elements.

⁸⁸ Caveats: “free subject text” required UKCDS to aggregate certain areas (eg Environmental Epidemiology was absorbed into Epidemiology). Some of this relied on subjective judgement – eg Infectious Disease; Virology; and research into diseases such as HIV/AIDS, malaria and tuberculosis were all listed in separate (though often overlapping) categories and were aggregated into the “Infectious Disease & Virology” category. Given that the free subject text can be quite specific (e.g. “Virus evolution & phylogenetics”), some may have been missed. Therefore the figures should only be viewed as a proxy.

8. Institutional level

8.1 MRC

Two MRC schemes provide institutional support to the units in The Gambia and Uganda, which also leverage funds from other international donors such as the Gates Foundation. In addition, MRC, under the Newton Fund, is running a programme for joint centre partnerships with India’s Department of Biotechnology.

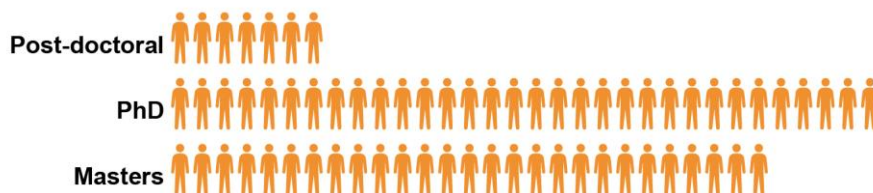
8.2 Wellcome Trust

The Wellcome Trust’s African Institutions Initiative is an ambitious £30m programme supporting individual researchers in 51 African institutes through a “hub and spoke” model. Seven thematic consortia were financed under the model, each with an African lead organisation. The model provides financial and organisational capacity building, as well as strengthening technical research expertise.

The seven consortia have provided training in the areas of public and population health, infectious disease and zoonoses research, though less on NCDs. As shown in Figure 13, a significant number of PhDs (160) and Master’s awards (134) were funded in the first four years of the programme, as well as 34 post-doctoral awards. Almost half of these MSc awards have been funded under the Southern African Centre for Infectious Disease Surveillance (SACIDS) and the Afrique One consortia, which both adopt One Health approaches.

Figure 13: Researchers trained at each level through the first four years of Wellcome Trust’s African Institutions Initiative

Each icon represents 5 researchers



Some of the Wellcome Trust funded consortia were launched afresh, such as Scientists Networked for Outcomes from Water and Sanitation (SNOWS). In contrast, others such as the Consortium for Advanced Research Training in Africa were already supported by other donors, such as SIDA and Rockefeller, and have since been able to leverage additional funding.

An independent evaluation by RAND Europe highlighted successes and challenges from the first four years of the initiative. For example, while the consortia were able to leverage an additional £80m in grants thanks to Wellcome Trust support, limitations in the research infrastructure such as robust financial systems, monitoring and evaluation frameworks and access to ICT were highlighted as areas warranting further attention⁸⁹.

⁸⁹ Full report: http://www.rand.org/content/dam/rand/pubs/research_reports/RR700/RR707/RAND_RR707.pdf Executive summary: http://www.wellcome.ac.uk/stellent/groups/corporatesite/@sf_central_grants_admin/documents/web_document/wtp057114.pdf

8.3 European and Developing Countries Clinical Trials Partnership Programme (EDCTP)

While most of EDCTP's activities have been concentrated on the individual level (7.1.3), institutional capacity strengthening is also a key focus⁹⁰. Projects in the portfolio at this level included crucial underfunded aspects of RGMA such as support for personnel and maintenance of laboratory equipment⁹¹, and purchase and installation of computer hardware and software⁹².

8.4 Japan International Cooperation Agency (JICA)

JICA primarily supports research capacity at the institutional level, mixing grant aid, technical cooperation and third-country training⁹³. Similarly to SIDA, JICA supports institutions over a long period of time, for example supporting the Noguchi Memorial Institute for Medical Research since 1977, from its construction all the way up to a recent project exploring the anti-viral and –parasitic properties of Ghanaian plants. JICA has also provided key institutional support to KEMRI, the Research Institute for Tropical Medicine (RITM) in the Philippines and to the Gastroenterological Disease Research Centres in Bolivia.

However, JICA's strategy is changing, with a move away from core support to a focus on brokering partnerships for LMIC institutions with Japanese universities⁹⁴. JICA funding generally includes infrastructure and training, but not salary costs. The health elements of the Science and Technology Research Partnership for Sustainable Development (SATREPS) programme are primarily focussed on sub-Saharan Africa and South East Asia. Projects almost exclusively focus on infectious disease,⁹⁵ including neglected tropical diseases such as dengue and trypanosomiasis, as well as HIV/AIDS and respiratory infections.

8.5 Swedish International Development Cooperation Agency (SIDA)

Like JICA, SIDA spends most of its capacity strengthening budget at the institutional level, but has been through a number of strategic shifts to reach this decision. SAREC, in 1975 had limited success promoting the Swedish Research Council model to developing countries. As a result, the strategic focus retrenched to training individuals. However this wasn't delivering systemic change, so SIDA moved to just supporting one institution per country, but broadened the support within the institution to include libraries, ICT and research management. To allow these institutions to fulfil their potential, SIDA support now includes national level issues like IP policies.⁹⁶

SIDA has recently provided direct support to universities in Bolivia, Ethiopia, Rwanda, Tanzania⁹⁷ and Uganda. Most of this support is in the area of infectious disease, with some

⁹⁰ EDCTP Website, currently undergoing redesign.

⁹¹ Career development and strengthening institutional capacity for clinical research in TB at the Faculty of Health Sciences in Brazzaville project. Page 323 of the EDCTP Project Portfolio (updated June 2014) on the old EDCTP website.

⁹² Capacity building and support for three ethics review committees in North Central and South Western geopolitical zones of Nigeria. Page 488 of the EDCTP Project Portfolio (updated June 2014) on the old EDCTP website.

⁹³ Arimi Mitsunaga, JICA, Personal Communication, 6 November 2014

⁹⁴ Ikuo Takizawa, JICA, Interview, 3 October 2014

⁹⁵ Project list: http://www.jica.go.jp/english/our_work/science/c8h0vm0000137x4-att/satreps_01.pdf

⁹⁶ Ros-Mari Bälöw, Interview, 2 October 2014.

⁹⁷ <http://www.sidaresearch.se/apply-and-report/research-training-partnership-programme.aspx>

emphasis on health systems and NCDs research. Previous projects have supported institutional capacity strengthening in health economics in Zambia⁹⁸.

SIDA institutional HRCS is remarkable for the length of time over which support is sustained. For example, SIDA has been supporting health research institutions in Mozambique, Ethiopia and Tanzania continuously for over 30 years.⁹⁹ In addition, SIDA has invested in Bolivia's Universidad Mayor de San Andrés and Universidad Mayor de San Simón since 2000 and a new phase of funding has been approved from 2017¹⁰⁰. Between 2000 and 2012, SIDA provided more support to Makerere University than any other donor and helped establish a PhD programme¹⁰¹.

8.6 NWO-WOTRO (NACCAP)

The principal achievements of NWO-WOTRO NACCAP programme have been at the institutional level¹⁰². The first phase ran from 2004 to 2012. In this phase, the NACCAP African Poverty Related Infection Oriented Research Initiative established the Kilimanjaro Clinical Research Institute in Northern Tanzania. Meanwhile the College of Medicine, Malawi-Amsterdam-Liverpool partnership for Research Capacity Development helped establish Malawi's Research Support Centre. This provides the infrastructure for institutional research at University of Malawi's College of Medicine, through collaboration with the Amsterdam Academic Medical Centre and the LSTM.

A second phase is aiming to consolidate capacity built in the first phase and is running from 2013 to 2015.

8.7 French Development Agency/Institut Pasteur

France's Pasteur Institute has an international network of 32 research institutes across Europe, West Africa, East Asia and South America¹⁰³, some of which receive support through the French Development Agency (AFD)¹⁰⁴. The Institut Pasteur in Dakar (Senegal) has been working with the Wellcome Trust and other international partners to run fast-tracked Ebola treatment trials in West Africa¹⁰⁵.

Earlier in 2014, together with Inserm and the Fondation Mérieux, Pasteur set up the Research Platform on Emerging Diseases in South-East Asia (PRR-Asie) to investigate and build regional capacity in research on vector-borne and zoonotic diseases¹⁰⁶. In September this year, Institut Pasteur, Fondation Mérieux and Inserm signed an agreement with funding provided by AFD to support laboratory capacity to respond to Ebola and other viral haemorrhagic fevers in Guinea, Mali, Mauritania, Senegal and Côte d'Ivoire.

⁹⁸ http://www.sida.se/contentassets/7b26e8378efc436690570a3d75d13535/0606-institutional-capacity-building-of-health-economics-in-zambia_2062.pdf

⁹⁹ Ros-Mari Bälöw, Interview, 2 October 2014.

¹⁰⁰ <http://www.sidaresearch.se/research-cooperation/what-we-support/bilateral-cooperation.aspx> "Bolivia"

¹⁰¹ Akuffo, H. et al. 2014. "Doctoral Education and Institutional Research Capacity Strengthening: An Example at Makerere University in Uganda (2000–2013)". *Higher Education Policy* 27, 195-217 (June 2014). [Online] Available at: <http://www.palgrave-journals.com/hep/journal/v27/n2/full/hep20144a.html>

¹⁰² Eva Rijkers, NWO-WOTRO. Personal Communication, 17 November 2014

¹⁰³ <http://www.pasteur.fr/fr/international/le-reseau-international-instituts-pasteur>

¹⁰⁴ http://www.afd.fr/home/pays/asie/geo-asie/cambodge/projets-cambodge/Secteur-sante/prevenir-les-virus-emergents_1

¹⁰⁵ <http://www.wellcome.ac.uk/News/Media-office/Press-releases/2014/WTP057419.htm>

¹⁰⁶ <http://www.cirad.fr/actualites/toutes-les-actualites/communiqués-de-presse/2014/plateforme-regionale-de-recherche-asie-du-sud-est-prr-asie>

8.8 The Institute of Research for Development (IRD)

IRD collaborates closely with other French research institutes on capacity strengthening, including the National Centre for Scientific Research (CNRS) and health research institutes like Inserm and Pasteur. IRD's individual level RCS programmes, including PhD support and exchange grants, are open to various thematic areas, including but not limited to health. One notable recent capacity strengthening programme was Integrated Support for the Strengthening of Scientific Teams in the Global South (AIRES-Sud) which provided funding to research teams in universities in Africa (especially West Africa) and the Indian Ocean region. In health, the focus was on diseases of poverty, zoonoses such as Ebola and chikungunya and neglected tropical diseases. Half of the research grant was earmarked for a combination of communication of scientific results, commercial scale-up and strengthening researchers' capacity to train others¹⁰⁷.

8.9 NIH – Fogarty

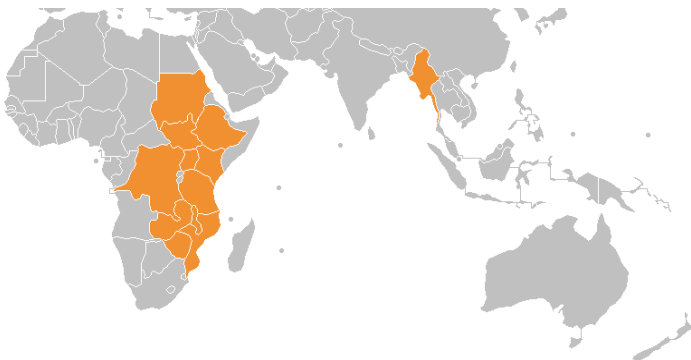
The Fogarty International Centre funds significant institutional level HRCS. The \$130m Medical Education Partnership Initiative, co-funded with the President's Emergency Plan for AIDS Relief (PEPFAR), is a significant institutional initiative which has awarded grants to African institutions in a dozen countries¹⁰⁸. This has established a network including more than 30 regional partners, country health and education ministries, and more than 20 U.S. and foreign collaborators.

On the environmental level, NIH has funded the South African Research Ethics Training Initiative (SARETI) since 2003, and has leveraged funding from EDCTP.

8.10 NORAD

The Norwegian Agency for Development Cooperation (NORAD) launched a new institutional capacity strengthening programme in 2012, the Norwegian Programme for Capacity Development in Higher Education and Research for Development (NORHED), with one of the six themes focussing on health.

Figure 14. African and Asian countries participating in the 11 NORHED health projects



Out of a total of 46 supported projects, 11 projects fall within the sub-programme of health. These projects aim to develop capacity for higher education and research within the fields of zoonoses, public health, nutrition, occupational health and injuries, antimicrobials, health informatics, maternal and child health and surgery. Figure 14 shows that the majority of institutions are in East Africa, with one project supporting the University of Public Health in Yangon, Burma¹⁰⁹.

¹⁰⁷ https://www.ird.fr/content/download/4750/41047/version/1/file/sas45_ formations.pdf

¹⁰⁸ Countries and grants here: <http://www.fic.nih.gov/Grants/Search/Pages/Awards-Program-MEPI.aspx>

¹⁰⁹ The full project list can be found here: http://www.norad.no/_public/norad.no/docs/2013-0107-NORHED-projects.pdf?_ts=141144fef88 Health projects are outlined on Pages 1-2

8.11 Irish Aid

The Irish Aid and Higher Education Authority's Programme for Strategic Cooperation has funded a number of institutional partnering and capacity strengthening initiatives between Irish and East/Southern African universities¹¹⁰ on diseases of poverty, maternal and child health¹¹¹, eye health, nutrition and health systems.

8.12 GIZ

Capacity development is an increasing priority area for BMZ/GIZ. BMZ/GIZ is a member of the European ESTHER Alliance, and supports partnerships between German and sub-Saharan institutions for improved health outcomes¹¹². The main focus is currently on joint development and implementation of research proposals on infectious disease with African institutions, although Asian partners may be eligible to participate in future¹¹³.

8.13 FIOCRUZ

FIOCRUZ has supported the establishment of public health institutes and broader infrastructures in Portuguese-speaking African countries such as Guinea Bissau¹¹⁴ and Mozambique¹¹⁵.

8.14 Private foundations

Howard Hughes Medical Institute funds the KwaZulu-Natal Research Institute for Tuberculosis and HIV (K-RITH) at South Africa's University of KwaZulu-Natal. K-RITH focusses on basic scientific research and development of tools to control tuberculosis and HIV, while aiming to engage and educate young scientists from across Africa.

The Doris Duke Charitable Foundation (DDCF) funds operational and implementation research capacity strengthening to support African health systems through the Population Health Implementation & Training (PHIT) Partnerships. DDCF is funding five teams to receive grants ranging from \$8 million to \$15 million each over five to seven years, working in Ghana, Mozambique, Rwanda, Tanzania and Zambia¹¹⁶.

¹¹⁰ <https://www.irishaid.ie/what-we-do/how-our-aid-works/research/programme-for-strategic-cooperation/>

¹¹¹ <http://cosystemnch.org/research/TDR-PAHO%20small%20grants%20programme%20on%20maternal%20and%20child%20health>

¹¹² http://health.bmz.de/topics/Partnerships-for-global-health/Hospital_partnerships_ESTHER_/Research_articles_by_German-African_university_and_hospital_partnerships/index.html

¹¹³ Brigitte Jordan-Harder, GIZ. Personal Communication, 17 November 2014

¹¹⁴ <http://www.ianphi.org/membercountries/memberinformation/guineabissau.html>

¹¹⁵ <http://www.ianphi.org/membercountries/memberinformation/mozambique.html#institute1>

¹¹⁶ <http://www.ddcf.org/Programs/African-Health-Initiative/Grant-making-Process/>

9. Environmental (national/rules of the game/systems) level

9.1 Wellcome Trust/DFID

The Wellcome Trust and DFID have been funding two large capacity strengthening initiatives at the national level – the Health Research Capacity Strengthening Initiatives in Kenya and Malawi. In Kenya this led to the establishment of a new NGO, the Consortium for National Health Research. In Malawi, this approach involved strengthening the National Commission for Science and Technology, an arm of the Malawian Government. While this approach has huge transformative potential, there are inherent challenges, linked for example to changes in government, and limitations in financial management and recruitment capacity.

In spite of the challenges, significant new cohorts of students have been trained through the programmes. 42 MSc and 16 PhD researchers have received awards under the Malawi initiative¹¹⁷, while 397 undergraduates have been awarded grants for dissertation research¹¹⁸, contrasting with the limited investment in BSc level HRCS elsewhere. The schemes have cemented further close working and partnership between DFID and Wellcome Trust.

The £80m India Alliance programme, matched by India's DBT, was "incubated" by the Wellcome Trust for about 6 months with a team of Indian staff based in the Wellcome Trust's Grant Management team, and the secondment of a Trust Grants Advisor to India. 137 awards have been made so far in the fields of biomedical science and public health for fellows ranging from early career to senior level¹¹⁹.

9.2 EDCTP

A key focus for EDCTP is supporting the enabling environment for clinical trials research in Africa. The programme has aimed to strengthen the ethics and regulatory framework in African countries, through ethics capacity development support grants, ethics training grants, support of national regulatory authorities and Pan-African Clinical Trials Registry (PACTR)¹²⁰.

EDCTP has also supported networks of excellence across Sub-Saharan Africa to encourage collaboration and good practice in clinical research, leveraging buy-in and financial support from African governments to ensure their long term sustainability and local ownership¹²¹. The four regional networks of excellence have also been supported by MRC and NWO-WOTRO's NACCAP programme¹²².

9.3 NWO-WOTRO

On the environmental level, the CoMMAL project under the NACCAP programme helped the new Research Support Centre to forge links with the Ministries of Health and Education and

¹¹⁷ Sophie Mathewson, Wellcome Trust. Personal Communication, 12 November 2014

¹¹⁸ iati.dfid.gov.uk/iati_documents/3576476.doc Page 3

¹¹⁹ <http://www.wellcomedbt.org/iafellows.html>

¹²⁰ "Ethics and regulatory" page of the old EDCTP Website, currently undergoing redesign.

¹²¹ "Networks of excellence" page of the old EDCTP Website, currently undergoing redesign.

¹²² Miiro, G. M. et al. 2013. "EDCTP regional networks of excellence: initial merits for planned clinical trials in Africa". *BMC Public Health* 2013, 13:258. Available at: <http://www.biomedcentral.com/1471-2458/13/258>

the Pharmacy, Medicines and Poisons Board in Malawi¹²³. The INTERACT project helped to strengthen clinical trial capacity in Uganda and Rwanda through a Good Clinical Practice course and PhD opportunities, while fostering research collaboration between clinical trial units in both countries.

9.4 NEPAD

NEPAD now exclusively focuses on the environmental level, supporting coordination to link up bilateral and multilateral arrangements. This represents a shift away from the approach under the Consolidated Plan of Action, which saw NEPAD take a project management role regarding centres of excellence¹²⁴.

NEPAD's Africa Biosciences Initiative has established regional networks of centres of excellence such as the Southern African Network for Biosciences (SANBio) which has conducted clinical trials on herbal remedies to treat HIV/AIDS. The Biosciences Eastern and Central Africa Network (BecANet)'s work has led to the discovery of a potential drug to treat trypanosomiasis, while the North African Biosciences Network (NABNet) has conducted research into genetic risk factors for Type II diabetes¹²⁵.

The NEPAD-administered African Medicines Regulatory Harmonisation helps African countries and Regional Economic Communities to improve access to essential medicines by building regulatory capacity and harmonising regulatory systems.

9.5 Multilateral Development Banks (MDBs)

MDB activities in research capacity strengthening are often focussed on building research structures that can contribute to economic development. Capacity strengthening is built in to large MDB development assistance investments, which has made it difficult to separate capacity strengthening from other elements of the programme.

As one example, the Islamic Development Bank works with COMSTECH, the Organisation of Islamic Cooperation's Science and Technology standing committee, to support centres of research excellence across North and West Africa, the Middle East and South Asia¹²⁶. The IDB is funding a programme to strengthen laboratory capacity in West Africa together with the French Development Agency and Fondation Mérieux, which is currently building research expertise on Ebola and other haemorrhagic fevers¹²⁷.

9.6 European Commission

Under Framework Programme 7, the European Commission has funded several projects at the environmental/systemic level. Examples include:

- Supporting the Use of Research Evidence (SURE) for Policy in African Health Systems, which aims to support the production of health research syntheses and uptake of these by appropriate policymakers¹²⁸. SURE builds on and supports the

¹²³ NACCAP 2004-2011: Lessons Learned. [Online] Available at: <http://www.nwo.nl/en/about-nwo/media-and-communication/publications/wotro/naccap-2004-2011-lessons-learned.html> Page 14

¹²⁴ Prof Aggrey Ambali and Dr Tichaona Mangwende, Interview, 2 October 2014

¹²⁵ <http://www.nepad.org/foodsecurity/africa-biosciences-initiative-abi/about>

¹²⁶ <http://www.isdb.org/irj/portal/anonymous?NavigationTarget=navurl://d14c30229d42ff18a5ba4d17e62fe8f8>

¹²⁷ <http://www.fondation-merieux.org/ebola-epidemic-fondation-merieux-strengthens-west-african-healthcare-systems-with-resaolab>

¹²⁸ <http://www.who.int/evidence/partners/SURE.pdf>

WHO Evidence-Informed Policy Network (EVIPNet) in Africa and the Region of East Africa Community Health (REACH) Policy Initiative.

- Building Sustainable Research Capacity for Health and its Social Determinants in Low- and Middle-Income Countries (SDH-Net), in African and Latin American LMICs. This programme has developed courses on theory and methods for studying the social determinants of health, as well as on research management and research communication necessary for conducting locally relevant research¹²⁹.
- ARCADE (African/Asian Regional Capacity Development) which uses innovative educational technologies to strengthen research on health systems and services across Africa and Asia¹³⁰.
- Building research capacity of blood transfusion services in Africa (T-REC)¹³¹.
- Sustaining research momentum over the coming decades: mentoring the next generation of researchers for tuberculosis¹³².

¹²⁹ Brigitte Jordan-Harder, GIZ. Personal Communication, 17 November 2014

¹³⁰ <http://www.arcade-project.org/>

¹³¹ http://cordis.europa.eu/project/rcn/98388_en.html

¹³² http://cordis.europa.eu/project/rcn/89333_en.html

10 Methodological challenges

As noted throughout, obtaining data on funders' capacity strengthening that could be neatly categorised and analysed proved very challenging. Some of the difficulties and mitigating actions are outlined in this section.

10.1. Conceptual issues

Different terminologies. There is no standardised terminology for how funders discuss capacity strengthening; some funders may prefer the term “capacity building” or “capacity development”¹³³. All these descriptions are open to accusations of paternalism¹³⁴, and alternatives such as “research partnership development”, “strategic research cooperation” or “accelerating research excellence”¹³⁵ may be preferred. These semantic difficulties extend to discussions of capacity strengthening at different levels; for example, we have used the term “environmental” level where others may talk about the “systems”, “societal” or “national” level. Similarly, funders use differing terminology for the different stages of the research career, complicating attempts to produce data which is cross-comparable. For example, some funders refer to “emerging” researchers rather than “early career researchers”. Even the term “early career researcher” has no standardised definition in the UK, let alone internationally. The corollary is that different funders have very different understandings of capacity strengthening which complicates attempts to compile defined HRCS portfolios for each funder with standardised data.

Drawing boundaries. On a related note, it is extremely difficult to draw boundaries of what counts as capacity strengthening. For example, prizes such as the Royal Society-Pfizer prize¹³⁶ states that one of its goals is to “promote science capacity building in the developing world”. We therefore included it in our database. However one could legitimately ask why this is included as capacity strengthening and yet scholarships provided by universities to developing country students are not. Similarly, the question of where any level of investment in a developing country research institute or university, which employs and/or trains local researchers, becomes “capacity strengthening” is a difficult and ultimately subjective one.

Drawing the boundaries of *health* as opposed to other fields of research has also been challenging. We have adopted a broad view of what constitutes health research, including biomedical research, epidemiology and biostatistics, health economics and policy analysis, nutrition and environmental health. As discussed in Section 2, we assigned each programme into one best-fit category on the basis of what research was welcomed in the call specification, rather than what was actually funded. Finding data on the latter is often much more difficult, buried in annual reports or inconsistently recorded.

We also included a number of generic RCS programmes (for example DFID's Programme for Enhancement of Research Information) when the objectives are cross cutting and will impact positively on the enabling environment for health research.

¹³³ Some of the different terms are discussed here: <http://www.equityhealthj.com/content/11/1/79>

¹³⁴ http://www.cohred.org/downloads/cohred_publications/Changing_Mindsets.pdf Page 170

¹³⁵ As used by Wellcome Trust: e.g.

http://www.wellcome.ac.uk/stellent/groups/corporatesite/@sf_central_grants_admin/documents/web_document/wtp057381.pdf

Slide 6

¹³⁶ <https://royalsociety.org/awards/pfizer-prize/>

However, deciding whether to include programmes that do not fit clearly into *health* RCS or the broad, multisectoral RCS initiatives which contain clear scope for health RCS has been difficult. For example, DFID's Climate Impacts Research Capacity and Leadership Enhancement (CIRCLE) programme was included because the business case referred to "health and livelihoods" as one of the programme themes. However IRD's programme of support to the African Institute of Mathematical Sciences (AIMS) was not included; it may have tangential relevance to health if researchers' mathematical skills were eventually applied, for example, to infectious disease modelling but this trajectory is not made explicit in the programme outline and aims.

We have tended to be guided by what funders themselves define as HRCS, which itself may be influenced by internal operational divisions. For example, Wellcome Trust's Human Heredity and Health programme was set up with the aim of building local African research capacity in genomics, but is not included within the Trust's formal capacity strengthening portfolio.

Selectivity. As acknowledged in the Methodology (Section 2), the attention paid to different funders is uneven. Capacity strengthening is an activity which falls under a range of different programmes and divisions, and it can be difficult to fully understand funders' activities without direct contact and relationship building. For example, UKCDS includes MRC and DFID as member organisations, meaning that the Secretariat is well connected to these funders, has a longstanding awareness of their activities and has been able to engage them in adding to and critiquing data. At the other end of the scale, the Multilateral Development Banks provide significant support to research institutions (though this may be termed "technical cooperation" rather than "capacity strengthening"). However MDBs' HRCS activities have been very challenging to capture and document as discrete programmes through desk research.

Difficulties of comparison between funders. It is very difficult to fairly compare the scale of activities across funders. Should this be by financial investment, number of schemes, number of people trained, or by other metrics? Each approach has its strengths and weaknesses. If measuring investment, how can investment in research be clearly separated from research capacity strengthening? If counting programmes, how are the varying sizes of programme captured? If the measure concerns human capital, how do you compare a PhD completed with a technician trained, or a policy-maker trained to better appraise evidence? Ultimately, therefore, our assessments of the "key players" and those who deserve a "notable mention" are subjective and open to debate.

10.2. Data recording and analysis

The spreadsheet we compiled according to the typologies presented in Section 2 (Methodology) was shared with the principal HRCS funders who provided corrections and additions. A number of issues in the spreadsheet presented challenges:

Funder. Distinguishing the ultimate source of funding of HRCS schemes among various co-funders and delivery partners was not always easy. Where a programme is funded by one organisation but administered by a different delivery partner (for example the EC-funded but WHO administered Supporting the Use of Research Evidence programme) we have aimed to record the ultimate source of programme funding. However it is very difficult to be clear about the funding source for programmes financed by large multi-donor organisations such

as EDCTP or the Global Alliance for Chronic Diseases. Given that a wide array of funders contributes to EDCTP, and that we had access to very clear aggregate EDCTP data, we chose to record EDCTP as a “funder” for analysis, rather than the constituent donors.

Granularity of data. Linked to issues outlined above under “Selectivity” is the level of detail into which we delved when recording HRCS programmes. For example, the \$130m Medical Education Partnership Initiative, co-funded by PEPFAR, NIH, USAID and others is recorded as only one row in our spreadsheet whereas the 14 different HRCS projects under Irish Aid’s Programme for Strategic Cooperation (roughly each around €1m) are each recorded. This was due to the way the programmes were presented on the funder websites and the level of detail provided by the funder, which has led to inevitable inconsistencies. The level of attention given to different donors and programmes within the mapping should not therefore be equated with the scale at which the relevant funder is operating.

10.3. Spreadsheet fields sent to funders

Below are the fields used in our HRCS spreadsheet, as sent to funders to check and return. An IDRC programme is used in the second column as an example:

Record number	1258
Checked by funder? (Y/N)	Y
Funder	IDRC
Programme	GEHS-African Population and Health Research Centre - African Doctoral Dissertation Research Fellowships
Primary CS focus	Individual
Secondary CS focus (if applicable)	
Is the scheme focussed exclusively on health?	Yes
Is the scheme specifically RCS? (rather than simply research with CS elements)?	Yes
Continental focus	Africa
Detailed regional focus	Africa (sub-Saharan)
Health category (<i>chosen by MRC</i>)	Health systems
Career level of <i>training</i> (rather than of <i>trainees</i>) and number of researchers trained	PhD (60 fellowships)
Type of funder - combined	Research funder
Type of funder 1	Research funder
Type of funder 2 (if applicable)	
Type of funder 3 (if applicable)	
Type of funder 4 (if applicable)	
UK Funding	No
Multifunder	No



Making science work for development

Start Year	2014
Estimated amount of award	CA\$ 2,086,800.00
Duration (yrs) - (NB. How long the programme runs, rather than the length of the training offered)	4
Notes (1)	http://aphrc.org/blog/african-doctoral-dissertation-research-fellowships-2014-call/
Notes (2)	Doctoral dissertation fellowships & training (IDRC note)

11. Acknowledgements

UKCDS is very grateful for the helpful input and advice provided by staff of the following organisations:

African Development Bank (AfDB)
Alliance for Health Policy and Systems Research (AHPSR)
Bill and Melinda Gates Foundation (BMGF)
China CDC
Commonwealth Scholarship Commission
Department for International Development UK (DFID)
Enhancing Support for Strengthening the Effectiveness of National Capacity Efforts (ESSENCE) on Health Research
European and Developing Countries Clinical Trials Partnership (EDCTP)
French Embassy in London and UK Embassy in Paris
German Federal Enterprise for International Cooperation (BMZ-GIZ)
GlaxoSmithKline (GSK)
Howard Hughes Medical Institute (HHMI)
International Development Research Centre (IDRC)
Institut de recherche pour le développement (IRD)
Japan International Cooperation Agency (JICA)
London School of Hygiene and Tropical Medicine (LSHTM)
Medical Research Council UK (MRC)
The New Partnership for Africa's Development (NEPAD)
[US] National Institutes of Health (NIH)
Netherlands Organisation for Scientific Research (NWO-WOTRO)
Norwegian Agency for Development Cooperation (NORAD)
Research Africa
Swedish International Development Cooperation Agency (SIDA)
United States Agency for International Development (USAID)
Wellcome Trust
WHO Special Programme for Research and Training in Tropical Diseases (WHO-TDR)

This mapping was researched and written by Jamie Enoch, with oversight from Ian Thornton. All errors or omissions are the responsibility of the authors.