

Table S1. Supplementary and detailed data for 'learning and evaluation' (from research initiatives) original research publications

Publication		Publication Characteristics			Programme Characteristics				Global = 3+regions
Author	Year	LMIC Authorship	Capacity Term	HRCs Definition	Name	Type	Focus	WHO Region	
Byrne et al	2016	Co-author	Capacity Development	Yes	Development and delivery of a Masters programme	Education	Nth-Sth	Community Systems Health Research	African
Aidam & Sombie	2016	First, last	Capacity Development	No	West African Health Organisation research development program	Health research system	Sth-Sth	Health research	African
Cole et al	2016	Co-author	Capacity Strengthening	No	Malawi's Health research Capacity Strengthening Initiative	health research system	National	Health research	African
Elmusharaf et al	2016	First. Co-author	Capacity Development	No	Connecting health research in Africa and Ireland Consortium	Education; collaborative research	Nth-Sth	Health systems strengthening	African
Kaser et al	2016	Nil	Capacity Strengthening	No	WHO/TDR Career Development Fellowship Programme	Placement	Nth-Sth	Clinical research	Global
Abawi et al	2016	Nil	Capacity Strengthening	No	E-learning for RCS	Education	Nth-Sth	Sexual and reproductive health	Global
Varshney et al	2016	First, last, co-author	Capacity Building	No	Asian Regional Capacity Development programme	Education; collaborative research	Nth-Sth	Social determinants of health	South-East Asia; Western Pacific
Thomson et al	2016	First, last, co-author	Capacity Building	No	Applied statistical training to strengthen HRC	Education	Nth-Sth	Statistical training	African
Atkins et al	2016	Co-author	Capacity Building	No	Africa/Asian Regional Capacity Development programme	Education; collaborative research	Nth-Sth	Health systems; Social determinants of health	Global
Protsiv & Atkins	2016	Co-author	Capacity Building	No	Africa/Asian Regional Capacity Development programme	Education; collaborative research	Nth-Sth	Health systems; Social determinants of health	Global
Farnman et al	2016	Co-author	Capacity Building	No	Africa/Asian Regional Capacity Development programme	Education; collaborative research	Nth-Sth	Health systems; Social determinants of health	Global
Protsiv et al	2016	Co-author	Capacity Building	No	Africa Regional Capacity Development programme	Education; collaborative research	Nth-Sth	Health systems; Social determinants of health	Global
Mahendradhata et al	2016	First, last	Capacity Building	No	Good Health Research Practice training programme	Education	Nth-Sth	Good health research practice	Global
Daniels et al	2015	Co-author	Capacity Building	No	AIDS International Training and Research Program	Education	Nth-Sth	HIV epidemiology and basic science	African
Heller et al	2015	Co-author	Capacity Building	No	People's Open Access Education Initiative, Peoples-uni	Education	Nth-Sth	Public health	Global

Agar & Zarowsky	2015	Last	Capacity Strengthening	No	Multiple HRCS initiatives (*)	NA	NA	NA	African
Dean et al	2015	Nil	Capacity Strengthening	Yes	RCS Award Scheme (un-named)	Collaborative Research	Nth-Sth	Life and physical sciences	African
Ndebele et al	2014	First, co-author	Capacity Building	No	FIC research ethics capacity building initiatives (*)	Education	Nth-Sth	Research ethics	African
Zachariah et al	2014	Co-author	Capacity Building	No	Structured Operational Research and Training Initiative	Education	Nth-Sth	Operational research	Global
Saenz et al	2014	Co-author	Capacity Building	No	FIC bioethics training	Education	Nth-Sth	Research ethics	Americas
Miuro et al	2013	First, co-author, last	Capacity Building	No	EDCTP Regional Networks of Excellence	Research collaboration	Nth-Sth	Clinical trials	African
Vian et al	2013	Nil	Capacity Building	Yes	Pfizer Global Health Fellows Program	Placement	Nth-Sth	Global health	Global
Wilson et al	2013	Nil	Capacity Building	No	Promoting Enhanced Research Capacity for Global Health	Education	Nth-Sth	Clinical research management	Global
Bennett et al	2013	Last, co-author	Capacity Development	No	FIC research training programs(*)	Education	Nth-Sth	Health research	African
Bennett et al	2013	Last, co-author	Capacity Development	No	FIC research training programs(*)	Education	Nth-Sth	Health research	African
Marjanovic et al	2013	Nil	Capacity Building	No	Africa Institutions initiative	Collaborative Research	Nth-Sth	Health research	African
Bennett et al	2012	Last, co-author	Capacity Development	Yes	Health policy analysis institutes (*)	NA	NA	NA	Global
Redman-McLaren et al	2012	Co-author	Capacity Strengthening	Yes	Introduction to Health Research Workshop	Education	Nth-Sth	Operational research	Western Pacific
Bissell et al	2012	Co-author	Capacity Building	No	Int. Union Against TB & Lung Disease & MSF OR training	Education	Nth-Sth	Operational research	Global
Mahmood et al	2011	First, co-author, last	Capacity Building	Yes	Int. Centre for Diarrhoeal Disease Research, Bangladesh	Financial management	Institutional	Research funding & perform. monitoring	South East Asia
Minja et al	2011	First	Capacity Strengthening	Yes	WHO/TDR Programmes (*)	Education; Infrastructure	Nth-Sth	Health research	Global
Goto et al	2010	Last, co-author	Capacity Development	No	Epidemiology training course for physicians	Education	National	Epidemiology research	Western Pacific
Mayhew et al	2008	Last, co-author	Capacity Strengthening	No	Health Economics & Financing Programme	Research collaboration	Nth-Sth	Health economics	African; South-East Asia
Jonsson et al	2007	Co-author	Capacity Development	No	Health systems research training programmes	Collaborative Research	Nth-Sth	Health systems	Western Pacific
Hyder et al	2003	First, co-author, last	Capacity Development	No	Doctoral trainings grants (*)	Education	Nth-Sth	Health research	Eastern Mediterranean
Jentsch & Pilley	2003	Nil	Capacity Building	No	Multinational research project	Collaborative research	Nth-Sth	Maternal and Child Health	South East Asia

Activities	Learning & Evaluation Characteristics				
	Objective	Study Design	Data Collection	Sampling	Data Analysis
Development and delivery of blended (largely web-based) Masters programme; teacher training (to support delivery)	Use of blended learning	Prospective; formative; mixed methods	Online surveys (n=17); IDIs (n=11)	Population	Thematic
Research stewardship, financing, creating or sustaining resources, prod. Or using research & dev. partnerships	Programme outputs; lessons learned	Retrospective; formative; mixed methods	Document review; IDIs (n=180); consultation	Purposive	Thematic
National priority setting, decision-making on funding, health research actor mobilisation	Lessons learned	Retrospective; formative; mixed methods; independent	Document review; IDIs (n=30)	Purposive; random	Thematic
PhD scholarship; capacity assessment; project specific capacity building and/or research activities	Lessons learned	Prospective; summative; qualitative	Reflection; document review	Convenience	Thematic
12-month placement at pharmaceutical company or PDP; administrative grant; networking	Programme outputs; outcomes; lessons learned	Retrospective; summative; mixed methods	Survey (n=33); IDIs	Population; purposive	Descriptive; thematic
Online education	Programme outputs; outcomes	Retrospective; summative; quantitative	Online survey (n=175)	Population	Descriptive
Short-term training; long-term training; joint research	Research partnerships	Prospective; formative; qualitative	IDIs (n=16)	Population	Thematic
Short-term training	Programme outcomes	Prospective; summative; quantitative	Surveys (n=14-20)	Population	Descriptive
Short-term training; long-term training; joint research	Use of blended learning	Prospective; summative; quantitative	Survey (n=82)	Population	Inferential
Short-term training; long-term training; joint research	Use of blended learning	Prospective; formative; qualitative	IDIs (n=11)	Purposive	Thematic
Short-term training; long-term training; joint research	Lessons learned	Prospective; formative; mixed methods	IDIs (n=16); document review	Population	Thematic
Short-term training; long-term training; joint research	Use of blended learning	Prospective; formative; mixed methods	Group discussion (n=3); participant observation (n=11); survey (n=18); IDIs (n=?)	Population; purposive; convenience	Descriptive; thematic
Short-term training	Lessons learned; programme outcomes	Prospective; formative; mixed methods	Course feedback (multiple methods; n=58); qualitative assessment	Population	Descriptive; thematic
Short-term training; long-term training (MS, MPH, PhD)	Transfer of a health research training programme	Retrospective; formative; qualitative	IDIs (n=10)	Purposive	Thematic
Distance learning MPH	Alumni collaboration	Retrospective; formative; mixed methods	Survey (n=68); online discussion forums	Population; convenience	Descriptive; thematic

NA	Lessons learned	Prospective; formative; qualitative	Document review; reflection; consultation (n=37)	Convenience	Thematic
Funding to support delivery of a collaborative research project	Research partnerships	Retrospective; formative; mixed methods; independent	Online surveys (n=23); IDIs/FGDs (n=42)	purposive; convenience	Descriptive; thematic
Training; mentorship; placements; web/electronic resources; public lectures, symposia; curriculum development	Lessons learned	Retrospective; formative; mixed methods	Survey (n=9); document review	Purposive	Thematic
Workshop	Programme outputs; outcomes	Retrospective; summative; quantitative	Document review; survey (n=88)	Population	Descriptive
Training (inclusive of certificate, diploma, masters) and fellowships	Programme outputs; lessons learned	Retrospective; formative; mixed methods	Document review; survey; consultation	Purposive	Thematic
Training; infrastructure development; research funding; research collaboration	Programme outputs; lessons learned	Retrospective; formative; mixed methods	Direct observation; document review	Convenience	Descriptive; thematic
Training; technical assistance	Lessons learned	Retrospective; formative; qualitative; independent	Document review; IDIs (n = 9)	Purposive	Thematic
Online continuing education course	Programme outputs; outcomes; lessons learned	Prospective; summative; quantitative	Surveys (x4, n= 21-166)	Population	Descriptive
Training (Masters and PhD) and fellowships	Mentorship	Retrospective; formative; qualitative	IDIs/FGDs (n=72)	Purposive	Thematic
Training (Masters and PhD) and fellowships	Programme outcomes	Retrospective; summative; mixed methods	IDIs/FGDs (n=52); survey, (n=29); document review	Purposive; random	Descriptive; thematic
Funding to support delivery of a collaborative research project. Funding to support advanced research training	Lessons learned	Prospective; formative; mixed methods; independent	Document review; consultation; survey (n=51)	Purposive	Thematic
NA	Lessons learned	Retrospective; formative; mixed methods; independent	IDIs (n=80); document review	Purposive	Descriptive; thematic
Workshop	Workshop participation dynamics	Retrospective; formative; qualitative	IDIs (n=5); written responses (n=5)	Purposive	Thematic
Workshop	Programme outputs; lessons learned	Retrospective; summative; quantitative	Survey (n=12); document review	Population	Descriptive
Implementation of a revised funding and performance monitoring framework	Programme outputs; outcomes	Retrospective; summative; mixed methods	KII; document review; survey	Purposive	Descriptive; thematic
Research training grants; research re-entry grants; institution strengthening grants	Programme outcomes	Retrospective; summative; mixed methods	Survey (n=92); IDIs (n=10)	Population; purposive	Descriptive; thematic
Workshop	Programme outputs; outcomes	Prospective; summative; quantitative	Surveys (x2, n = 8-70)	Population	Descriptive
Joint research, publication & funding applications; staff exchanges/training; teaching & TA; small grants	Programme outputs; lessons learned	Retrospective; formative; mixed methods	Document review; IDIs (n=25)	Purposive	Descriptive; thematic
Training; funding to support delivery of a collaborative research project	Informing policy and practice	Retrospective; formative; mixed-methods	IDIs/FGDs (n=28); survey (n=56)	Purposive	Thematic
Doctoral training	Programme outputs	Retrospective; summative; quantitative; independent	Survey (n=54)	Convenience	Descriptive
Funding to support delivery of a collaborative research project	Research partnerships	Retrospective; formative; qualitative	IDIs (n=7)	purposive; convenience	Thematic

Table S2. Supplementary and detailed data for 'Capacity Assessment' original research publications

Publication		Publication Characteristics			
Author	Year	LMIC Authorship	Capacity Term	HRCS Definition	Assessment of
Erasmus et al	2016	First, co-author, last	Capacity Strengthening	No	Postgraduate teaching capacity
Uzochukwu et al	2016	First, co-author, last	Capacity Building	No	Capacity needs for health systems policy and systems research and analysis
Motari et al	2015	First, co-author, last	Capacity Strengthening	No	Readiness of national ethics committees to respond to challenges posed by a globalised biomedical research system
Agyepong et al	2015	First, co-author, last	Capacity Strengthening	No	Capacity needs for health policy and systems research and analysis, conduct and teaching
Oliver et al	2015	Last	Capacity Strengthening	No	Capacity for conducting systematic reviews
Haafkens et al	2014	Nil	Capacity Building	No	Training needs of researchers to conduct research
Kilic et al	2014	First, co-author, last	Capacity Building	Yes	Research capacity and training needs
Kebede et al	2014	First, co-author	Capacity Development	Yes	Human capacity and staff movement

Simba et al	2014 First, co-author, last	Capacity Strengthening	Yes	Human and financial resources capacities, policies and organisational support
Ekeroma et al	2014 Nil	Capacity Building	No	Clinical research activity and audit
Kanoute et al	2014 First, co-author	Capacity Strengthening	No	Current status of oral health research
Franzen et al	2013 Co-author	Capacity Strengthening	No	Barriers and enablers to investigator-initiated trials
Mirzoev et al	2014 Last, co-author	Capacity Strengthening	Yes	Capacity for health policy and systems research and analysis
Hofman et al	2013 First, co-author	Capacity Building	No	Current status of health equity and Social Determinants of Health training
Nachege et al	2012 First, co-author, last	Capacity Building	No	Epidemiology and public health capacity
Paulus et al	2012 Co-author	Capacity Development	No	Global training priorities, unmet needs and potential cross-cohort solutions
Peykari et al	2012 First, co-author, last	Capacity Building	No	Health Systems Research – ranking of institutions
Magesa et al	2011 First, co-author, last	Capacity Building	No	Capacity building process of Tanzanian National Institute for Medical Research
Mohammadi et al	2011 First, co-author, last	Capacity Building	No	Representation of different nations in international public health journals
Nakanjaro et al	2011 First, co-author, last	Capacity Building	No	Status and nature of mentoring practices

Pepping	2010 Nil (1)	Capacity development	No	Training capacity in public health nutrition
Redman-MacLaren et al	2010 Co-author	Capacity Building	No	Public Health literature in Salomon Island
Nyika et al	2009 First, co-author, last	Capacity Building	No	Composition, training needs and independence of ethics committees
Malekafzali et al	2009 First, co-author, last	Capacity Building	No	Research activities in medical universities and their affiliated institutions
Moodley & Myer	2007 First, last (2)	Capacity Development	No	Composition, operations, and training needs of health research ethics committees
Singh	2006 First (1)	Capacity Development	No	Mental health research activities in LMICs
Cuboni et al	2004 First, co-author, last	Capacity Development	No	Participation of Fijians in health research publications

Focus	Name of programme	Region	Assessment location/level	Study Design	Data Collection	Data Analysis
Health systems policy and systems research and analysis	Consortium for Health Policy and Systems Analysis in Africa (CHEPSAA)	Africa	Multiple institutions involved in research (universities and research institutions)	Cross-sectional; mixed methods	Document review; surveys	Descriptive; thematic
Health systems policy and systems research and analysis	CHEPSAA	Africa	University	Cross-sectional; mixed methods	Document review; interviews (n=9); survey (n=123)	Thematic
Health research ethics	N.A.	Africa	Ethic committees (national level)	Cross-sectional; quantitative	Survey (n=33)	Descriptive
Health systems policy and systems research and analysis	N.A.	Africa	University	Cross-sectional; mixed methods	Document review; interview (n=1); focus group discussions (n=3); survey (n=67)	Descriptive; thematic
Systematic reviews	N.A.	Global	Multiple institutions involved in research (systematic review centres)	Rapid appraisal; mixed methods	Routine management data; document review; consultation of key informants; surveys (n=22)	Descriptive; thematic
Causes of health inequities	INDEPTH Network	Global	Multiple institutions involved in research (research network)	Qualitative	Online concept mapping (n=82)	Descriptive thematic
Non-Communicable Diseases research	RESCAP-Med	Europe	Multiple institutions involved in research	Mixed methods	Literature review; interviews (n=10); Survey (n=46)	Descriptive; thematic
National health research institutions	N.A.	Africa	Multiple institutions involved in research (health research institutions)	Quantitative	Surveys (n=847)	Descriptive

Health systems research	Higher Education Alliance for Leadership Through Health (HEALTH)	Africa	Universities	Mixed methods	Document review; self-assessment (n=123); interviews (n=73)	Descriptive; thematic
Reproductive health research	Building Reproductive health Research and Audit Capacity and Activity in the Pacific Islands (BRRACAP)	Western Pacific	Health care providers	Mixed methods	Interviews, questionnaires, focus group discussions; online survey (n=28)	Descriptive; thematic
Oral health research	N.A.	Africa	National and regional level	Mixed methods	Delphi survey (n=30); literature review	Descriptive; thematic
Informing and directing capacity strengthening initiatives	N.A.	Africa	Multiple institutions involved in research (research institute, university, NGO, hospital)	Qualitative	Interviews (n=7); focus group discussions (n=3)	Thematic
Health systems policy and systems research and analysis	CHEPSAA	Africa	Universities	Mixed methods	Document reviews; interviews; surveys	Thematic
Social Determinants of Health and health equity	INDEPTH Training and research centres of Excellence (INTREC)	Africa	Universities (Schools of Public Health)	Qualitative	Document reviews; interviews (n=30), online searches	Thematic
Training, research, funding, human resources	N.A.	Africa	Regional level	Qualitative	Interviews (n=10); literature review	Descriptive; thematic
Cohort studies	World Cohort Integration Workshop	Global	Regional level	Mixed methods	Survey (n=42); FGDs (n=1)	Descriptive; thematic
Stewardship, capacity building, knowledge production	N.A.	Eastern Mediterranean	Universities	Cross-sectional; quantitative	Survey	Descriptive
Critical mass of multidisciplinary research scientists	N.A.	Africa	Institute involved in research	Cross-sectional; mixed-methods	Document review; interviews (n=78)	Descriptive; thematic
Equity in access to health research capacity development	N.A.	Global	Regional level	Qualitative	Review of health journals (n=37)	Descriptive
Effective mentoring	N.A.	Africa	University	Qualitative	Survey (n=22)	Thematic

Public health nutrition	N.A.	Africa	Multiple institutions involved in research (research institutes and universities)	Mixed methods	Document review; survey (n=15); consultations; interviews; websites review	Descriptive; thematic
Equitable research agenda	N.A.	Western Pacific	National level	Qualitative	Literature review (n=218); focus group (n=1)	Descriptive
Capacity building programmes for effective ethic review processes	African Malaria Network Trust (AMANET)	Africa	Ethic committees (national, institutional level)	Quantitative	Survey (n=312)	Descriptive
Capacity building programmes for effective ethic review processes	N.A.	Eastern Mediterranean	Multiple institutions involved in research (universities and research institutes)	Quantitative	Bibliometric assay	Descriptive
Biomedical research	N.A.	Africa	Ethic committees (national level)	Mixed methods	Interviews; survey (n=12)	Descriptive; thematic
Publication bias	N.A.	Global	Regional level	Quantitative	Number of manuscripts submitted to 8 journals	Descriptive
Health priorities and research capacity in Fiji	N.A.	Western Pacific	Regional level	Mixed methods	Literature review (298 papers included); interviews	Descriptive; thematic

Table S3. Supplementary and detailed data for 'HRCS methods for implementation' original research publications

Publication		Publication Characteristics			Programme Characteristics		
Author	Year	LMIC Authorship	Capacity Term	HRCS Definition	Focus	Region	Study Design
Murphy et al	2015	Co-author	Capacity Development	No	Partner assessment toolkit (PAT) to discuss partnership ethics and put accountability measures in place.	Global	Qualitative
Le et al	2014	Co-author	Capacity Strengthening	No	Strengthening capacity for health policy and systems research and analysis (HPSR+A) in Universities.	Africa	Mixed Methods
Huber et al	2014	Co-author	Capacity Strengthening	Yes	Training evaluation for training related to HRCS.	Africa	Quantitative

Jessani et al	2014 Co-author	Capacity Development	No	Capacity assessment tool for schools of public health to reflect on institutional strengths and weaknesses for health systems research.	Africa	Qualitative
Bates et al	2014 Nil	Capacity Strengthening	Yes	Development of a practical approach for the design and evaluation of health capacity strengthening programmes.	Africa	Qualitative
Birch et al	2013 Co-author	Capacity Building	No	North-South clinical nursing partnership for CS.	Africa	Qualitative

Bates et al	2006 Last	Capacity Building	Yes	Evidence based tool to determine infrastructural capabilities and design and evaluation of capacity building programmes in health research.	Africa	Qualitative
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Data Collection	Data Analysis	Steps in HRCS Process	Methods Used in Process
Stakeholder workshops situated around case studies and briefing papers	Thematic	<ol style="list-style-type: none"> 1. Common understanding of PAT components developed through workshops with sub-Saharan African partners. 2. PAT modified by expert team and circulated to partners in all country contexts for comment. 3. PAT finalised and tested in existing partnership. 	<p>Qualitative joint self-assessment. Phased/developmental approach.</p> <p>Standardised</p>
FGD, IDI, Stakeholder workshop, survey, document review	Thematic and Descriptive	<ol style="list-style-type: none"> 1. Develop shared understanding of capacity and CS across consortium. 2. Map contextual environment for HPSR+A, including desk review, and key informant interviews/discussions. 3. Self-assessment against core thematic areas identified. 4. Comparative synthesis by UK partner and cross-consortium comparison. 	<p>Mixed-method self-assessment by African partners and 'external' assessment by UK partner.</p> <p>Phased/developmental approach.</p> <p>'Semi-standardised' to allow for flexibility in context.</p>
Survey	Inferential	<ol style="list-style-type: none"> 1. Domains for evaluation selected based on existing framework. 2. Development of questionnaire. 3. Testing of questionnaire. 4. Validation of questionnaire. 	<p>Quantitative self-survey.</p> <p>Fixed-point.</p> <p>Standardised</p>

Stakeholder workshop	Thematic	<ol style="list-style-type: none"> 1. Capacity assessment questions based on previous instruments but adapted for focus. 2. Meeting with capacity focal points at universities to be assessed to refine tool to context. 3. Implementation of tool. 4. Dissemination and reflection on findings to develop capacity strengthening plan in workshop. 	<p>Quantitative self-assessment.</p> <p>Qualitative institutional profiling and priority identification.</p> <p>Phased/developmental.</p> <p>'Semi-standardised' to allow for flexibility in context.</p>
Review and case studies	Thematic	<ol style="list-style-type: none"> 1. Establish goal of capacity strengthening programme 2. Describing ideal capacity to achieve goal- synthesis of relevant evidence 3. Determination of existing capacity against 'ideal' identified in step 2. 4. Devise and implement an action plan to fill gaps. 5. Learn through doing and adapt the action plan regularly. 	<p>Mixed-method joint assessment and priority identification.</p> <p>Phased/developmental.</p> <p>'Semi-standardised' to allow for flexibility in context.</p>
Review	Thematic	<ol style="list-style-type: none"> 1. Systematic literature search for partnership measures. 2. Screening of partnership measures for applicability. 3. Selection and modification of existing appropriate measure. 4. Piloting of measure. 	<p>Mixed-method self-assessment.</p> <p>Phased/developmental.</p> <p>Standardised.</p>

Review	Thematic	<ol style="list-style-type: none"> 1. Literature search for existing tools and models 2. Using best practice examples to design the evaluation programme 3. Develop and adapt an evaluation tool (links to QA cycle): define institutional systems needed to support research; enumerate existing and missing resources; address identified gaps. 	<p>Qualitative self-assessment and priority identification.</p> <p>Phased/developmental</p> <p>'Semi-standardised' to allow for flexibility in context.</p>
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Table S4. Supplementary and detailed data for 'Evidence synthesis for RCS implementation and evaluation' original research publications

Publication		Publication Characteristics			Programme Characteristics
Author	Year	LMIC Authorship	Capacity Term	HRCS Definition	Focus
Bates et al	2015	Nil	Capacity Strengthening	No	Enhance understanding in difficulties of evaluating health research capacity strengthening and make recommendations for improvement
Cole et al	2014	Nil	Capacity Strengthening	Yes	Describe the design of health research capacity strengthening evaluations, indicators, outputs and outcomes.
Boyd et al	2013	Nil	Capacity Strengthening	No	Describe and compare key characteristics of existing health research capacity strengthening evaluation frameworks
Gadsby	2011	Nil	Capacity Strengthening	Yes	Understand the way in which research capacity strengthening is understood and approached through examination of methods for monitoring and evaluation of research capacity strengthening.
Edwards et al	2009	Co-author	Capacity Building	No	Identification of factors that have influenced research capacity development amongst nurses in LMICs.

Region	Study Design	Data Collection	Data Analysis	Participants/Target Group
Global	Qualitative	Informal discussion and review	Thematic	HRCS Funders, evaluators and implementers
Global	Qualitative	Review	Thematic	LMIC Health Research Funders
Global	Mixed methods	telephone discusion, stakeholder meetings, online survey, review	Thematic	HRCS Funders, evaluators and implementers
Global	Qualitative	Review, informal discussions, semi-structured interview	Thematic	Donor Organisations and Experts in HRCS
Global	Qualitative	Review, informal interviews/discussions	Thematic	Senior Nurse Leaders (HRCS Intervention Target Group)

Table S5. Supplementary and detailed data for 'miscellaneous' publications

Publication		Publication Characteristics		
Author	Year	LMIC Authorship	Capacity Term	HRCS Definition
Cole et al	2016	Last, co-author	Capacity Strengthening	No
Parker & Kingori	2016	Nil	Capacity Building	No
Muldoon et al	2012	Co-author	Capacity Building	No
Nurse & Wight	2011	First	Capacity Strengthening	Yes

Aim	Region	Study Design	Data Collection	Data Analysis
Mixed methods examination of mentorship experiences in Global Health	Global	Mixed methods	Document review; case	Thematic
Qualitative examination of researcher's views on good and bad international research collaborations	Global	Qualitative	Interviews (n=22)	Thematic
Documenting North-South research collaborations and provide insights into ongoing benefits and challenges of engaging in the research process from the Southern perspective	Africa	Mixed methods	Surveys (n=19), Interview	Thematic
Analysing the political economy of health research commissioning among bilateral, multilateral, non-governmental and philanthropic organisations	Africa	Qualitative	Document review; interview	Thematic

Table S6. Supplementary and detailed data for 'Perspective, Opinion & Commentary' publications

Publication		Publication Characteristics		
Author	Year	LMIC Authorship	Capacity Term	HRCS Definition
Airhihenbuwa et al	2016	Nil	Capacity Building	No
Bloomfield et al	2016	Last, co-author	Capacity Building	No
Hyder et al	2016	Last, co-author	Capacity Strengthening	No
Hawkes et al	2016	Co-author	Capacity Strengthening	No
Winchester et al	2016	Co-author	Capacity Building	No
Dossou et al	2016	First, co-author	Capacity Strengthening	No
Cubaka et al	2016	First, co-author	Capacity Building	No
Davies & Mullen	2016	Nil	Capacity Building	No
Bloomfield et al	2016	Nil	Capacity Building	No
Sturke et al	2016	Nil	Capacity Building	Yes
Atkins et al	2016	Last, co-author	Capacity Building	No
Osanjo et al	2016	First, co-author, last	Capacity Building	No
Atkins et al	2016	Co-author	Capacity Building	No
O'Connor et al	2016	Co-author	Capacity Building	No
Berman et al	2015	First, co-author, last	Capacity Building	No
Cash-Gibson et al	2015	Last, co-author	Capacity Building	Yes
Koso-Thomas et al	2015	Last	Capacity Building	No
MacLaren et al	2015	Co-author	Capacity Building	No
Langlois et al	2015	Co-author	Capacity Strengthening	No
Miranda et al	2015	First, co-author, last	Capacity Building	No
Adanu et al	2015	First, co-author	Capacity Strengthening	No
Cottler et al	2015	Co-author	Capacity Building	Yes
McGregor et al	2015	Nil	Capacity Building	No
Kombe	2015	First, co-author, last	Capacity Strengthening	No
Anderson et al	2014	Last, co-author	Capacity Building	No
Hanney & Gonzalez-Block	2014	Last (2)	Capacity Building	No
Cole et al	2014	Nil	Capacity Strengthening	No
Kabiru et al	2014	First, co-author, last	Capacity Building	No
Chu et al	2014	Last, co-author	Capacity Building	No
Sweetland et al	2014	Co-author	Capacity Building	No
Adedokun et al	2014	First, co-author, last	Capacity Building	No
Harries et al	2014	Co-author	Capacity Building	No
Carothers et al	2014	Nil	Capacity Building	No
Klinkenberg et al	2014	Last, co-author	Capacity Building	No
Mandala et al	2014	First, co-author, last	Capacity Strengthening	No

Ramsay et al	2014	Co-author	Capacity Building	No
Pratt & Loff	2013	Nil	Capacity Strengthening	No
Noormahomed et al	2013	First, co-author, last	Capacity Strengthening	No
Sanchez et al	2013	Last, co-author	Capacity Strengthening	No
Sanchez et al	2013	Last, co-author	Capacity Strengthening	No
Shaji	2013	First (1)	Capacity Building	No
Ekeroma	2013	Nil	Capacity Building	No
Vasquez et al	2013	Last, co-author	Capacity Strengthening	Yes
Osei-Atweneboana et al	2012	First, co-author	Capacity Building	Yes
Ijsselmuiden et al	2012	First, co-author, last	Capacity Strengthening	Yes
Mckee et al	2012	Nil	Capacity Building	No
Nwaka et al	2012	First, co-author, last	Capacity Building	No
Kasonde & Campbell	2012	First	Capacity Building	No
Thornicroft et al	2012	Last, co-author	Capacity Building	Yes
Pratt & Loff	2012	Nil	Capacity Strengthening	No
de-graft Aikins et al	2012	First, co-author	Capacity Building	No
Greenwood et al	2012	Nil	Capacity Development	No
Airhihenbuwa et al	2011	Last, co-author	Capacity Building	Yes
Farquhar et al	2011	Last	Capacity Building	No
Forde et al	2011	Last, co-author	Capacity Development	No
Laabes et al	2011	First, co-author	Capacity Building	No
Kariuki et al	2011	First, co-author	Capacity Building	No
Pinto et al	2011	Co-author	Capacity Building	No
Wilson et al	2011	Last	Capacity Building	No
Manabe et al	2011	First, co-author, last	Capacity Building	Yes
Gezmu et al	2011	Co-author	Capacity Building	No
Brown et al	2010	First, co-author, last	Capacity Development	No
Kabiru et al	2010	First, co-author, last	Capacity Development	Yes
Ezeh et al	2010	First, co-author, last	Capacity Building	Yes
Lazarus et al	2010	Last	Capacity Development	No
Kutcher et al	2010	Last, co-author	Capacity Building	No
Maher et al	2010	First, co-author, last	Capacity Strengthening	No
Ntoumi	2010	First (1)	Capacity Building	No
Zumla et al	2010	First, co-author, last	Capacity Development	No
Kilama	2009	First (1)	Capacity Building	Yes
Kilama	2009	First (1)	Capacity Building	No
Coloma & Harris	2009	Nil	Capacity Building	No
Hussein	2008	First (1)	Capacity Building	No
Kumar et al	2008	First, co-author, last	Capacity Building	No
Malomo et al	2008	First, co-author, last	Capacity Building	No

Sheikh	2008	First (1)	Capacity Building	No
Tindana & Boateng	2008	First, last (2)	Capacity Building	No
Upshar	2008	Nil (1)	Capacity Building	No
Whitworth et al	2008	Last, co-author	Capacity Strengthening	No
Schulz-Baldes et al	2007	Nil	Capacity Building	No
Nuyens	2007	Nil	Capacity Strengthening	Yes
Stillman et al	2006	Co-author	Capacity Building	No
Goto et al	2005	First, co-author, last	Capacity Building	No
Andruchow et al	2004	Nil	Capacity Building	No
Lansang & Dennis	2004	First,last (2)	Capacity Building	Yes
Reddy et al	2002	First, last	Capacity Building	Yes
Varkevisser et al	2001	Nil	Capacity Building	No
Nchinda	2002	Nil	Capacity Strengthening	Yes

Commentary Content

HRCS Focus	Commentary Purpose	Commentary Informed By
HRCS leadership development	Recommendations	Experience
Global health centres of excellence training programme	Programme outputs; lessons learned	Experience (single programme)
Road traffic injuries research network	Programme description; programme outputs	Experience (single programme)
Capacity development for evidence uptake	Lessons learned	Experience; review
Development of a global health network	Programme description; lessons learned	Experience (single programme)
Implementing a sexual and reproductive health network in Africa	Programme description; lessons learned	Experience (single programme)
Twinning' model for PhD students	Programme description; lessons learned	Experience (single programme)
HRCS funding for Africa	Advocacy	Experience (single programme)
Capacity building in Global Health research	Lessons learned	Experience (single programme)
NIH International Tobacco and Health Research and Capacity Building Programme	Programme description; lessons learned	Experience (single programme)
Online journal clubs for student mentoring	Programme description; lessons learned	Experience (single programme)
Implementation science research training fellowship	programme description; programme outputs; lessons learned	Experience (single programme)
Africa/Asian Regional Capacity Development programme	Programme description; lessons learned	Experience (single programme)
capacity development in nursing informatics	Programme description; lessons learned	Experience (single programme)
Development of a knowledge translation platform	Lessons learned	Experience (single programme)
Sth-Nth-Sth research collaboration network	Lessons learned	Experience (single programme)
Global network for women and children's health research	Programme outputs; lessons learned	Experience (single programme)
Introduction to health research workshop	Lessons learned	Experience (single programme)
Health systems research synthesis in LMICs	Programme description	Experience (single programme)
Translational research in NCDs	Programme description	Experience (single programme)
HRCS in sexual and reproductive health in Africa	Recommendations	Workshops
HRCS for brain and nervous system disorders research	Recommendations	Experience; review
Bibliometric analysis of authorship HIV treatment/prevention publications	Analysis of LMIC authorship	Review
Field worker capacity strengthening in Africa	Recommendations	Workshops
Creating a charter of collaboration for HRCS partnerships	Process description	Experience (single programme)
Building health research systems	Situation analysis	Review
HRCS evaluation approaches	Recommendations	Review
African doctoral dissertation research fellowships	Programme outputs; lessons learned	Experience (single programme)
HRCS in Africa	Recommendations	Not stated
Mental health research capacity in Mozambique	Programme description	Experience (single programme)
Consortium for advanced research training in Africa	Programme outputs; lessons learned	Experience (single programme)
Mentorship for operational research capacity building	Lessons learned	Experience (single programme)
FIC clinical research scholars and fellows programme	Lessons learned	Experience (single programme)
Ethiopian operational research initiative	Programme outputs; lessons learned	Experience (single programme)
Southern Africa consortium for research excellence	Programme description	Experience (single programme)

Operational research training initiative	Programme outputs; lessons learned	Experience (single programme)
Contribution of product development partnerships to RCS	Programme outputs	Review
Medical education partnership	Programme outputs; lessons learned	Experience (single programme)
Multi-faceted Nth-Sth HRCS project	Programme description	Experience (single programme)
Multi-faceted Nth-Sth HRCS project	Lessons learned	Experience (single programme)
HRCS in mental health research	Recommendations	Not stated
Building reproductive health research and audit capacity in the Pacific	Programme description	Experience (single programme)
HRCS	Recommendations	Experience (single programme); review
HRCS for helminthiasis control	Recommendations	Experience
Developing human resources for health research	Recommendations	Review
HRCS in LMICs	Recommendations	Review
Identification of centres of excellence in health innovation in Africa	Programme description	Experience (single programme)
Creating a knowledge translation platform in Zambia	Lessons learned	Experience (single programme)
HRCS in global mental health research	Recommendations	Experience
Promotion of justice in global health research	Recommendations	Not stated
Nth-Sth research partnership on chronic disease	Programme outputs; lessons learned	Experience (single programme)
Gates malaria partnership	Programme outputs; lessons learned	Experience (single programme)
Nth-Sth RCS partnership	Lessons learned	Experience (single programme)
Afya-Bora consortium	Programme description	Experience (single programme)
Nth-Sth multi-faceted research collaboration	Programme outputs; lessons learned	Experience (single programme)
HRCS for biomedical research	Recommendations	Not stated
HRCS for NTD control in Africa	Recommendations	Workshops
Development of international research partnerships	Lessons learned	Experience (single programme)
NTD collaborative teaching and learning	Programme description	Experience (single programme)
PhD training in Africa	Programme description	Experience (single programme)
Strengthening biostatistics resources in Africa	Deliberations	Workshops
Public health nutrition research and training capacity in Africa	Deliberations	Workshops
African doctoral dissertation research fellowships	Lessons learned	Experience (single programme)
Consortium for advanced research training in Africa	Programme description	Experience (single programme)
HRCS in Africa	Recommendations	Experience; review
Nth-Sth clinical research development project	Programme outputs; programme outcomes; lessons learned	Experience (single programme)
ALPHA network programme of HIV epidemiology workshops	Programme outputs; lessons learned	Experience (single programme)
HRCS in Africa	Programme description(s)	Experience
Nth-Sth research collaboration	Programme outputs; lessons learned	Experience (single programme)
Research translation	Recommendations	Not stated
HRCS in Africa	Situation analysis	Review
HRCS in LMICs	Programme description	Experience (single programme)
FIC sponsored bioethics MHSc	Lessons learned	Experience (single programme)
FIC sponsored bioethics MHSc	Lessons learned	Experience (single programme)
FIC sponsored bioethics MHSc	Lessons learned	Experience (single programme)

FIC sponsored bioethics MHSc	Lessons learned	Experience (single programme)
FIC sponsored bioethics MHSc	Lessons learned	Experience (single programme)
FIC sponsored bioethics MHSc	Programme description	Experience (single programme)
HRCS in Africa	Recommendations	Not stated
Benefit sharing in international health research	Recommendations	Not stated
10 best resources for HRCS	Recommendations	Not stated
FIC tobacco HRCS programme	Lessons learned	Experience (single programme)
Reproductive health research in-service training course	Programme outputs; programme outcomes; lessons learned	Experience (single programme)
Cancer training and research collaboration	Lessons learned	Experience (single programme)
HRCS in LMICs	Recommendations	Review
Nth-Sth research collaboration	Lessons learned	Experience (single programme)
Nth-Sth joint health systems research project	Programme outputs; lessons learned	Experience (single programme)
HRCS in LMICs	Recommendations	Experience

Table S7. Supplementary and detailed data for 'systematic review' publications

Publication		Publication Characteristics			
Author	Year	LMIC Authorship	Capacity Term	HRCS Definition	Aim
Adedokun et al	2016	First	Capacity Building	No	Examine author affiliations of genomic epidemiology publications
Mugabo et al	2015	First, co-author, last	Capacity Strengthening	No	Describe different training approaches to research capacity strengthening
Huber et al	2015	Nil	Capacity Development	No	Support researchers and stakeholders in systemising future efforts in the HRDC field
Gonzalez-Block et al	2011	First, co-author	Capacity Strengthening	No	Assess the capacity of research collaborations and implementation research in strengthening networks and institutions in developing countries
San Sebastian & Hurtig	2006	Nil	Capacity Building	No	Review of health research on indigenous populations in Latin America between 1995-2004

Region	Searched databases	Search terms	Final no. of reviewed papers
Africa	Humane Genome Epidemiology (HuGE) Pub	Sub-Saharan Africa	508
Africa	PubMed	Capacity building; building capacity; capacity strengthening; strengthening capacity; capacity development; skills development; research; building research capacity; research training; operational research training; health; Africa	14
Global	PubMed; Google Scholar	Capacity development; research; health professuin fields; monitoting and evaluation; level of needs assessment, monitoring and evaluation	42
Global	PubMed; African Index Medicus; Literatura Latinoamericana y del Caribe En Ciencia de la Salud (LILACS)	Translational research; operations research; community based participatory research; process assessment; health plan implementation; government programmes; national health programmes; efficiency organisational; patient acceptance of health care; health service accessibility; reproductive health services; disease and health conditions; communicable diseases; malnutrition; malnutrition; maternal mortality	237
Americas	PubMed and LILACS	Indian; indigenous; aboriginal; native; amazon and all the different countries of Latin America	690