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Review of the Health Systems Research Initiative

Final Report (Appendices)

Anoushka Davé, Maike Rentel, Eva Wölbert, Robert King, Rebecca Babb, Kalle Nielsen, Peter Varnai

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Appendix A HSRI portfolio and Researchfish® analysis

A.1. HSRI Portfolio summary

A.1.1. Applications

The HSRI received a total of 1087 applications across 6 calls (2014-2019), including 101 for full grants (at an average of 17 applications per call) and 500 for foundation grants (at an average of 83 applications per call) (Table 1).

More full grant applications (101) were received compared to the number of successful outline applications (94). One explanation for this is that occasionally organisations whose applications were unsuccessful in previous calls have been asked to resubmit a full grant application.

Application status	All applications	Foundation grant	Outline	Full grant
Successful	186	57	94	35
Rejected	901	443	392	66
Total	1087	500	486	101

Table 1 Number of applications to HSRI (2014-2019)

Source: Technopolis analysis of HSRI applications data

The number of applications has varied over the duration of the programme, showing an overall decrease after Call 3 (Figure 1). This is largely due to a decrease in the number of outline applications, even though the number of foundation applications has increased. Applications for full grants have remained relatively constant, at between 12 and 21 applications.



Figure 1 Number of applications per call

Source: Technopolis analysis of HSRI applications data

The success rate for outline proposals was between 15% to 27% and for full grants between 24% and 41% for Calls 1 - 6. For foundation grants, the success rate ranged from 8% to 16% (Figure 2).

•



Figure 2 Success rate of applications per call

Source: Technopolis analysis of HSRI applications data

Of the applications for which the country of the lead applicant was specified, over half (58%) of all applications were made by institutions located in LMICs (632 of 1087, including outline proposals)¹ (Table 2). Applications from LMICs accounted for 62% (301 of 486) of outline applications, 47% (47 of 101) of full grant applications and 57% (284 of 500) of foundation grant applications. However, application success rates were much lower for LMICs, particularly for foundation grants where the LMIC success rate (4.9%) was about a fourth of the high income country (HIC) success rate (19.9%). Thus, quality rather than application rates appears to be the barrier to greater LMIC participation in the programme.

Grant type	Number of LMIC applications	Number of HIC applications	Number of successful LMIC applications	Number of successful HIC applications	LMIC success rate (%)	HIC success rate (%)
Foundation	284	216	14	43	4.9%	19.9%
Outline	301	185	39	55	13.0%	29.7%
Full	47	54	13	22	27.7%	40.7%
Total	632	455	66	120	10.4%	26.3%

Table 2 Normber of applications and soccess rate by country typ	Table 2 Number (of applications	and success i	rate by	country	type
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Source: Technopolis analysis of HSRI applications data

Less than a third (29%) of successful applications came from LMICs (27 of 92), accounting for 37% of full grants (13 of 35) and 25% of foundation grants (14 of 57) (Table 2).

¹ LMICs classified according to Wellcome Trust

Tigure 3 LMIC and HIC success rates by call and application type



Source: Technopolis analysis of HSRI applications data.

Success rates of LMIC applications have consistently been lower than those for HIC applications across almost all calls and grant types (Figure 3). This is despite the fact that for each call, full and foundation application numbers were usually similar for LMICs and HICs, and outline LMIC applications outnumbered HIC outline applications. The only exception is Call 2 where LMIC applications for full grants had a greater success rate, but it must be noted that full grant applications would have already gone through the outline application stage.

Applications (including outline applications) were received from a total of 72 countries of which 7 were high income countries (HICs). Nine applications were received from HICs other than the UK. These were usually cases where an LMIC-led application did not pass due diligence and hence, if successful the funding would be directed via their closest partner organisation, often in an HIC, that does pass due diligence. Successful full and foundation grant applications came from 16 different countries, including 2 HICs, the UK and Sweden (1 grant).

The top three countries by number of outline² and foundation applications were the UK, Bangladesh and India (Figure 4), while the top three countries by number of successful full and foundation grant applications were the UK, South Africa and Kenya.

UK applications had an overall success rate of 16% (Figure 4). Most LMICs achieved a lower success rate (\leq 16%) with the exception of Ethiopia (17%, 1 of 6), Colombia (17%, 1 of 6), Lebanon (22%, 2 of 9) and Georgia (40%, 2 of 5).

² As the first application stage for full grant applications



Figure 4 Number of full and foundation grant applications by country (with overall success rate)

Source: Technopolis analysis of HSRI applications data. Only countries with 15 or more outline and foundation grant applications (combined) are included. The overall success rate represents the total number of full and foundation grants awarded out of the total number of outline and foundation grant applications received.

We also analysed the MeSH terms³ applied to applications to get a view of which keywords appeared most commonly in applications (Table 3) and in successful versus rejected proposals (Table 4). Among the top 10 most common MeSH terms in terms of topics, evaluation studies as topic, primary health care and income had the highest likelihood (about 24%) of being included in successful proposals. In terms of countries that the research focused on, proposals related to South Africa, Ghana and Kenya had the most likelihood of success (34% to 50%) (Table 3). Among successful applications, Primary Health Care was the most commonly found MeSH term, with just over a fifth (19 of 92, 20.7%) of applications relating to this field.

MeSH term (topic)	Number of applications (% of total, n=1087)	Success rate (%)	MeSH term (country of focus)	Number of applications (% of total, n=1087)	Success rate (%)
Delivery of Health Care	131 (12.1%)	13.0%	India	39 (3.6%)	15.4%
Primary Health Care	80 (7.4%)	23.8%	Kenya	38 (3.5%)	34.2%
Income	72 (6.6%)	23.6%	Uganda	38 (3.5%)	15.8%
HIV	65 (6.0%)	18.5%	Bangladesh	36 (3.6%)	5.6%
Health Services	53 (4.9%)	18.9%	China	30 (2.8%)	16.7%
Child	52 (4.8%)	11.5%	South Africa	22 (2.0%)	50.0%

Table 3 To	n 10 MeSH t	erms (topics	and countries) in HSRI	applications
		CITIS TOPICS	and coonnes		applications

³ When MeSH terms are assigned to a grant, they are given a value of how relevant the match is (1 being a fully relevant and 0 being no relevance, any anywhere in-between). As some grants can have many MeSH terms, some with very little relevance, we have only analysed MeSH terms where the relevance value is above 0.5.

Therapeutics	51 (4.7%)	19.6%	Tanzania	20 (1.8%)	25.0%
Evaluation Studies as Topic	46 (4.2%)	23.9%	Ghana	19 (1.7%)	47.4%
Communicable Diseases	43 (4.0%)	9.3%	Nepal	13 (1.2%)	23.1%
Hospitals	43 (4.0%)	14.0%	Nigeria	12 (1.1%)	25.0%

Table 4 Top 5 MeSH terms (topics and countries) in successful and unsuccessful HSRI applications

Successful applications		Unsuccessful applications	
MeSH term (topic)	Number of applications (% of successful, n=92)	MeSH term (topic)	Number of applications (% of unsuccessful, n=995)
Primary Health Care	19 (20.7%)	Delivery of Health Care	114 (11.5%)
Income	17 (18.5%)	Primary Health Care	61 (6.1%)
Delivery of Health Care	17 (18.5%)	Income	55 (5.5%)
HIV	12 (13.0%)	HIV	53 (5.3%)
Evaluation Studies as Topic	11 (12.0%)	Child	45 (4.5%)
MeSH term (country of focus)	Number of applications (% of successful, n=92)	MeSH term (country of focus)	Number of applications (% of unsuccessful, n=995)
Kenya	13 (14.1%)	Bangladesh	34 (3.4%)
South Africa	11 (12.0%)	India	33 (3.3%)
Ghana	9 (9.8%)	Uganda	32 (3.2%)
Uganda	6 (6.5%)	Kenya	25 (2.5%)
India	6 (6.5%)	China	25 (2.5%)

A.1.2. Awards

A total of 92⁴ grants were made as part of Calls 1 – 6 of the HSRI, representing an investment of \pounds 31.8m. 35 of these awards were for full grants, with a budget of \pounds 23.3m, and 57 were foundation grants, with a budget of \pounds 8.6m. 9 full grants were listed as closed, with 22 remaining active. Of the foundation grants, 31 had closed and 19 remained active. 4 full and 7 foundation grants were listed as 'In Progress'⁵ (Table 5).

Table 5 Number of HSRI grants (Call 1 - 6), by status								
	Grant status	All grants	Full grants	Foundation grants				

⁴ Three grants have two grant numbers but are counted as one in the analysis because the duplicate grant numbers are due to a Principal investigator (PI) changing institute, the PI institution changing its name and inability to transfer funds from the UK to PI location.

⁵ Indicating that the grant is in the process of being awarded. It has been successful at Panel but is not yet fully set up to receive funding

Active	41	22	19
Closed	40	9	31
In progress	11	4	7
Total	92	35	57

The number of awards(n=17) was highest for Calls 2 and 6 (10 foundation and 7 full, each), and lowest in Call 3 (n=12, 5 foundation, 7 full) (Figure 5). The highest number of full grants were awarded in Calls 2, 3 and 6 at 7 grants each, and the lowest in Call 5 at 4 grants. The highest number of foundation grants were awarded in Calls 4 and 5 (11 grants each) and the lowest in Call 3 (5 grants).





Source: Technopolis analysis of HSRI portfolio. Labels indicate numbers of grants

The total amount of funding awarded per call ranged from £4.6m in Call 3 to £6.6m in Call 6. The lowest amount awarded for full grants was £3m in Call 5 and the highest was £4.8m in Call 6. While the lowest amount awarded for foundation grants was £593k in Call 3 and the highest was £2.2m awarded in Call 5 (Figure 6).

Figure 6 Total amount awarded (in £ million), per call and grant type £6.6 7 £5.5 6 £5.2 £5.1 £4.8 £4.6 5 4 £4.8 (million) £4.2 £4.1 3 £3.8 £3.5 2 £3.C ч £2.2 £2.0 £1.8 £1.0 £1.0 0 £0.6 Call 3 Call 2 Call 1 Call 4 Call 5 Call 6 -Foundation --Full ---- Total

Source: Technopolis analysis of HSRI portfolio. Labels indicate sum of grants

The average grant size for full grants was $\pounds 667k$, and $\pounds 152k$ for foundation grants. For full grants the lowest average grant size was in Call 3, at approx. $\pounds 587k$, and the highest average in Call 5, at $\pounds 740k$. For foundation grants the lowest average grant size was in Call 1, at approx. $\pounds 97k$, and the highest average in Call 5, at $\pounds 203k$ (Figure 7).



Figure 7 Average grant size per call and grant type

Source: Technopolis analysis of HSRI portfolio

A.1.3. Pls and institutes

Seventy-nine PIs were listed in the HSRI portfolio. Twelve PIs (15%), none of whom were affiliated with an LMIC institution⁶, received multiple grants. One PI had three grants – one foundation and two full grants. The remaining 11 PIs had two grants each, of whom four PIs had two foundation grants, one had two full grants and six had one foundation and full grant each. Based on grant titles and dates, it appears that four PIs with foundation grants successfully applied for full grants. Of the 79 PIs, 43 (54%) were women, leading 54 of the 92 HSRI grants (59%).

⁶ The London School of Hygiene and Tropical Medicine was counted as a UK-based institution regardless of where the PI or their unit are based.

The London School of Hygiene and Tropical Medicine received more grants than any other organisation (27%, 25 of 92 grants). The remaining grants were more evenly distributed with six institutions receiving 3 grants, 13 receiving 2 and 23 receiving one grant. In total, 43 different institutions received grants.

Twenty LMIC institutions were awarded grants, of which seven received 2 or more grants. Strathmore University (Kenya), the University of Cape Town (South Africa) and the African Research Collaboration for Health-KEMRI Wellcome Trust Research Programme (ARCH-KWTRP, Kenya) won 3 grants each.





Source: Technopolis analysis of HSRI portfolio. Note: LMIC institutions are highlighted in yellow.

A.1.4. HRCS Health and Research Activity codes⁷

The largest share of grants was classified as 'Generic Health Relevance' (69%, 52 of 75), followed by 'Infection' (17%, 13) and 'Reproductive Health and Childbirth' (16%, 12). The predominance of the 'Generic Health Relevance' code may indicate that the research being undertaken by HSRI grantees is largely disease-agnostic or also applicable to contexts other than those involving the specific health problem being researched. The classification of HSRI

⁷ HRCS coding was not available for grants awarded during Call 6 (10 Foundation and 7 Full). Values include double counting for grants with more than one HRCS code.

grants to HRCS health codes was overall similar (based on share of total grants) between full and foundation grants (Figure 9). 12 grants (16%, n=75) were classified to more than one HRCS health code, of which 11 were assigned 2 codes and one to 4 codes.

Figure 9 Share of HRCS health code classification, by grant type



Source: Technopolis analysis of HSRI portfolio



Figure 10 Share of HRCS research activity code classification, by grant type

Source: Technopolis analysis of HSRI portfolio

The most common research activity codes were 8.1 Organisation and delivery of services (75%, 56 of 75 grants), followed by 8.3 Policy ethics and research governance (27%, 20) and 8.2 Health and welfare economics (13%, 10).

HRCS research activity code classification was more diverse among foundation grants compared to full grants (9 codes represented across all foundation grants, compared to 4 across full grants). The majority of both full and foundation grants were classified as 8.1 Organisation and delivery of services (92%, 24 of 26 grants and 65%, 32 of 49 grants respectively). However, a greater proportion of full grants were classified as 8.2 Health and welfare economics (27%, 7 of 26) compared to foundation grants and a greater share of foundation grants were classified as 8.3 Policy ethics and research governance (33%, 16) compared to full grants (Figure 10).

In total, 23 grants (31%, n=75) were classified to more than one HRCS research activity code, of which 20 were assigned 2 codes and three were assigned 3 codes. The most common combinations were 8.1 and 8.3 (13 grants) followed by 8.1 and 8.2 (8 grants).

A.2. HSRI Researchfish® Analysis

The analysis presented here represents the 75 awards for which Researchfish® data were reported. The analysis distinguishes between full and foundation awards as well as closed and active awards. Foundation awards make up the majority of awards for which Researchfish® data were available (47 compared to 28 full awards, see Table 6). Currently 40 closed awards are represented in the data, including both foundation and full awards, with the remainder (35) being active.

Call name	Total Number of awards	Foundation closed	Foundation active	Full closed	Full active
Call 1 2014	15	10	0	4	1
Call 2 2015	17	10	0	4	3
Call 3 2016	12	5	0	1	6
Call 4 2017	16	6	5	0	5
Call 5 2018	15	0	11	0	4
Total	75	31	16	9	19

Table 6 Number of awards by HSRI call

Source: Technopolis analysis of Researchfish® data

It should be noted that this data was self-reported and consequently there are inherent limitations – the various reporting fields are interpreted and completed inconsistently by researchers. Results should hence be interpreted with caution.

A.2.1. Publications

Data reported in the 'publications' category in Researchfish® were cleaned to exclude any publications published prior to the award start date. A total of 8 entries were removed on this basis.

From our experience, we also know that researchers often include publications unrelated to the relevant award in their Researchfish® submissions. On scanning through the data available, this also appears to be the case with some HSRI awards. However, it was not possible to reliably clean the publications data considering the volume of publications involved and without indepth knowledge of the grant. Reporting of funding support and grant numbers is not available for publication types other than journal articles and even within journal articles, it can be inconsistent. It was also not possible to verify attribution for all the awards with the researchers

themselves. Hence, it should be noted that the number of publications resulting from HSRI awards may be an over-estimation.

A total of 46 awards reported 283 publications. Ten awards reported 10 or more publications, with the top 3 awards in terms of the highest number of publications reporting 36, 32 and 21 publications respectively. Thirty-three awards reported having 5 or fewer publications. Journal articles were by far the most common type of publication (accounting for 78% of all publications), followed by conference abstracts (13%) and technical reports (4%). For grants reporting publications (n=46), means of 6.2 publications per grant and 4.8 journal articles per grant were reported (Table 7). However, across all grants reported in Researchfish® (n=75), the mean drops down to 3.8 publications per grant.

Type of publication	Total (n=46)	Foundation closed (n=21)	Foundation active (n=4)	Full closed (n=8)	Full active (n=13)
Journal Article	222	78	5	66	73
Conference Abstract	36	14	0	9	13
Technical Report	10	6	0	0	4
Policy briefing report	4	2	0	0	2
Other	4	1	0	1	2
Thesis	3	0	0	2	1
Book Chapter	2	1	0	0	1
Working Paper	1	1	0	0	0
Manual / Guide	1	0	0	0	1
Total	283	103	5	78	97
Mean publications per award	6.2	4.9	1.3	9.8	7.5
Mean journal articles per award	4.8	3.7	1.3	8.3	5.6

Source: Technopolis analysis of Researchfish® data

The top 10 journals where HSRI-funded research has been published are shown in Table 8. BMJ Global Health (25 publications), BMJ Open (18), and Health Policy and Planning (13) published the most HSRI research. The majority (80%) of the top 10 journals had an open access model. Only Health Policy and Planning and The Lancet used alternative hybrid publication models. Thus, grantees seem to prefer publishing in open access journals, which is likely because of the HSRI funders' open access policy for the research they fund.⁸

⁸ https://www.ukri.org/wp-content/uploads/2020/10/UKRI-020920-OpenAccessPolicy.pdf; https://wellcome.org/grant-funding/guidance/open-access-guidance/open-access-policy

Call name	Open access?	Number of publications
BMJ Global health	Yes	25
BMJ Open	Yes	18
Health Policy and Planning	Hybrid	13
PloS one	Yes	10
BMC Health Services Research	Yes	9
The Lancet	Hybrid/delayed	6
Journal of the International AIDS Society	Yes	5
Malaria Journal	Yes	4
BMC Medicine	Yes	4
Wellcome Open Research	Yes	4

Table 8 Top 10 journals with the most publications

Source: Technopolis analysis of Researchfish® data

A.2.2. Collaborations⁹

A total of 44 awards reported 189 different collaborations, giving a mean of 4.3 collaborations per award. The Higher Education (academic/university) sector had the most collaborations with HSRI awards (Table 9). A significant number of collaborations (56) included the broader public sector, indicative of the policy maker and health systems partnerships required in the HSRI. Interestingly, collaboration with hospitals was low, with only 9 instances. A similarly low number of collaborations (4) occurred with the private sector.

Sector where collaboration took place	Total (n=44)	Foundation closed (n=20)	Foundation active (n=5)	Full closed (n=8)	Full active (n=11)
Academic/University	76	29	2	19	26
Public	56	36	1	11	8
Charity/Non-Profit	23	15	1	3	4
Hospitals	9	8	0	1	0
Private	4	4	0	0	0
Other	22	7	3	11	1
Total	189	98	7	45	39

Table 9 Collaborations by sector, grant type and status

Source: Technopolis analysis of Researchfish® data

Collaborations occurred with 157 different partner organisations in 35 different countries. Thirteen countries were involved in only one collaboration whilst three countries were involved

⁹ 14 duplicate IDs and 15 instances of the collaboration date occurring before the date of the grant were removed.

in more than 10 collaborations. The UK was the most common collaborating country with 36 reported instances, followed by South Africa (21 collaborations) and the United States (17 collaborations). The majority of the partner organisations (85%) were only involved in one collaboration. The top collaborating organisation was the Western Cape Government with 6 separate instances. The Pan American Health Organisation, London School of Economics and Political Science, Harvard University, and University of Cape Town all had 3 collaborations each. A further 19 organisations were involved in 2 collaborations each with HSRI grantees.

A.2.3. Engagement¹⁰

A total of 411 engagement events were reported across 62 awards. The primary audience for almost half of the engagement events (n=193, 47%) was professional practitioners (e.g. academics, NGO professionals, schoolteachers, and funders), or health professionals (Table 10). The main mechanism for engagement was talks or presentations, accounting for over a third of the engagement activities (n=158, 38%). This was also the predominant engagement type for most audiences. Participation in an activity, workshop or similar was also a commonly used mechanism (n=118, 29%), especially for engaging with professional practitioners and policy makers.

Notably, the geographical reach of activities targeting the media, other audiences, postgraduate students, professional practitioners, the public, and third sector organisations was predominantly international. For policymakers, it was predominantly national. Audience size varied across target audiences, although 11-50 was the most commonly reported range (38% of all events).

¹⁰ 23 duplicate IDs and 13 instances of the engagement activity occurring before the date of the grant were removed.

Primary audience				Type of Enga	igement				Red	ach	Total events	No. of HSRI awards
	Broadcast	Formal working group, expert panel or dialogue	Magazine, newsletter or online publication	Press release, press conference, response to a media enquiry/ interview	Talk or present- ation	website, blog or social media channel	Participation in an activity, workshop or similar	Participation in an open day or visit at my research institution	Chief geogra- phical reach (% events)	Most common audience size per event (% events)		
Industry/Business	0	0	0	0	1	0	2	0	Local (67%)	1-10, 11- 50, 51-100 (33% each)	3	3
Media (as a channel to the public)	0	0	0	4	1	2	0	0	Internatio nal (71%)	>500 (71%)	7	6
Other audiences	0	1	0	0	18	1	2	0	Internatio nal (77%)	101-500, 51-100 (32% each)	22	8
Patients, carers and/or patient groups	0	1	0	0	2	0	1	0	National/ regional (50%)	1-10 (75%)	4	2
Policymakers/ politicians	0	50	1	1	22	0	34	1	National (51%)	11-50 (46%)	109	45
Postgraduate students	0	1	0	0	19	1	7	1	Internatio nal (38%)	11-50 (66%)	29	20
Professional Practitioners	0	45	4	0	85	2	55	2	Internatio nal (49%)	11-50 (35%)	193	46
Public/other audiences	2	0	0	4	0	8	7	0	Internatio nal (62%)	101-500, >500 (33% each)	21	11
Study participants or study members	0	0	0	0	2	0	6	0	Local (63%)	11-50 (38%)	8	7

Table 10 Engagement by primary audience, type, geographical and audience reach

1												
Supporters	0	0	0	0	2	0	1	0	Regional/ national/i nternatio nal (33% each)	1-10 (67%)	3	2
Third sector organisations	0	1	1	0	4	0	1	1	Internatio nal (75%)	11-50 (50%)	8	7
Undergraduate students	0	0	0	0	2	0	2	0	Local (50%)	11-50 (50%)	4	4
Total	2	99	6	9	158	14	118	5	Internatio nal (42%)	11-50 (38%)	411	161

Source: Technopolis analysis of Researchfish® data

A.2.4. Further funding

After inspection of the data, 10 further funding entries were removed as they were dated prior to the start date of the award. In order to facilitate analysis, funding reported in currency other than GBP was converted using relevant historical conversion rates¹¹. Overall, 78 further grants were reported for 32 HSRI awards. However, only 28 of these grants were for amounts greater than £10,000. Table 11 shows that over half (56.4%) of the grants were for research, a fifth (20.5%) were for travel or small personal grants and over a tenth (12.8%) were for studentships. Closed full grants leveraged more further grants on average (3.1) than closed foundation (2.1) grants.

Type of grant	Number of further grants (n=32)	Foundation closed (n=14)	Foundation active (n=4)	Full closed (n=6)	Full active (n=8)
Capital/infrastructure (including equipment)	3	2	0	1	0
Fellowship	5	0	2	3	0
Research grant (including intramural programme)	44	18	0	17	9
Studentship	10	2	0	7	1
Travel/small personal	16	10	2	0	4
Total	78	32	4	28	14
Mean additional grants per award	2.4	2.3	1	4.7	1.8

Table 11 Number of further funding grants by type and status of HSRI award

Source: Technopolis analysis of Researchfish® data

Overall, HSRI awards led to $\pounds 21.4$ million in further funding, with a mean grant size of $\pounds 274,145$. Table 12 shows the organisations that have funded 2 or more grants to HSRI grantees. A further 34 separate organisations provided 1 grant. The MRC provided the highest number of further grants (14) followed by the University of Aberdeen (6). The ESRC and GCRF Internal Pump Priming Fund (IPPF) awarded 4 grants each, but the total funding via ESRC grants was almost forty-fold higher than that awarded by the IPPF. In terms of total funding awarded, the MRC again came top with £5.2 million, followed by the ESRC with $\pounds 1.3$ million.

Table 12 Organisations that provided additional funding to HSRI awards

Funder organisation	Number of additional grants awarded	Total amount awarded
Medical Research Council (MRC)	14	£5,168,899
University of Aberdeen	6	£40,880
Economic and Social Research Council	4	£1,308,751
GCRF Internal Pump Priming Fund (IPPF)	4	£34,000

¹¹ Conversion rates obtained from <u>https://www.xe.com/currencytables/?from=ZAR&date=2020-10-21</u>

Funder organisation	Number of additional grants awarded	Total amount awarded
King's College London	2	£51,500
China Medical Board	2	£508,653
Newton Fund	2	£633,522
Save the Children	2	£46,918
Robert Wood Johnson Foundation	2	£131,200
General Electric	2	£46,044
Government of Scotland	2	£19,880
University of Birmingham	2	£101,500

Source: Technopolis analysis of Researchfish® data

A.2.5. Skills Shortage

Problems with skills shortages were only reported for 8 awards, indicating that on the whole skills needs are well served across the HSRI awards. Of those that did report skills shortages, 6 projects had problems recruiting people with competent skill sets. This was reported for both quantitative and qualitative positions. Another 2 awards reported having problems with retainment; these were due to only part-time support being available and difficulty in retaining senior research staff in local research institutes that face funding issues.

A.2.6. Policy influence

Three policy impact entries were removed as they were dated prior to the date of the award. A total of 110 instances of policy influence were reported across 36 HSRI awards, meaning on average each of these HSRI awards had 3 instances of policy influence. 'Influenced training of practitioners or researchers' was the most often reported type, accounting for 40% of all reported types of policy influence (Table 13). The geographic reach of these awards was roughly equally distributed across different scales, from local (9 awards) to multi-continental/international (12). 'Participation in an advisory committee' and 'Gave evidence to a government review' each accounted for roughly 15% of reported policy influences. The geographical reach of these awards was mainly centred around the national level, perhaps to be expected given advisory committees and government reviews are usually convened at the national level.

Policy influence type	Geographical reach	Count of policy influence type	Total count of policy influence
	Africa	9	
	Asia	1	
	Europe	1	
	South America	2	
Influenced training of practitioners or researchers	Multiple continents/international	12	
	National	10	44

Table 13 Count of policy influence by type and geographical reach

Policy influence type	Geographical reach	Count of policy influence type	Total count of policy influence
	Local/Municipal/Regional	9	
	Africa	3	
	North America	1	
	Multiple continents/international	2	
Participation in an advisory	National	8	
	Local/Municipal/Regional	4	18
	Africa	1	
	Multiple continents/international	3	
Gave evidence to a	National	12	
	Local/Municipal/Regional	1	17
	Africa	2	
Participation in a national	National	10	
consultation	Local/Municipal/Regional	1	13
Implementation	Multiple continents/international	3	
circular/rapid advice/letter	National	5	
	Local/Municipal/Regional	3	11
	Africa	1	
Momborphin of a quideline	Multiple continents/international	2	
committee	National	3	6
Citation in systematic reviews	Multiple continents/international	1	1

Source: Technopolis analysis of Researchfish® data

In terms of impact, 61 (55%) of the reported policy influences had either no policy impact or the researchers did not know if a policy impact had been achieved. For those that did report policy impacts, the most often reported policy impact type was 'improved educational and skill level of workforce', which was reported as occurring 25 times. Other most reported types of policy impact were improved regulatory environment (10 times) and changed public attitudes (8 times).

A.2.7. Tools¹²

For the purpose of this study, we have considered submissions to the tools, databases and software categories of Researchfish®, broadly as tools. As such, the analysis presented here is an aggregate analysis of those three reporting fields.

¹² 5 entries deleted from the Tools and Database datasets as the dates attributed were prior to the award date.

Databases/data collections were the most reported type of tool (see Table 14). These often involved linkage of datasets generated during the HSRI award to other existing datasets, for example, linking routinely collected patient data from heath facilities with HIV cohort data. Other examples include the creation of database architecture that can be updated and maintained, such as the National Archive for Ebola-related data in Sierra Leone. Improvements to research infrastructure were the second most reported type of tool (31 times). Examples include training courses for health advocates, development of a training manual for a survey instrument, and a paper-based tool for evaluating structural components of staffing infrastructure and equipment. Physiological assessment or outcome measure examples include a tool to measure patient satisfaction and a tool to collect community-level data on attitudes towards and use of maternal health services among women.

Type of tool	Number of tools (n=40)	Foundation closed (n=15)	Foundation active (n=5)	Full closed (n=7)	Full active (n=13)
Database/Collection of data	50	14	1	20	15
Improvements to research infrastructure	31	12	2	12	5
Model of mechanisms or symptoms - human	14	8	0	2	4
Physiological assessment or outcome measure	19	5	1	5	8
Technology assay or reagent	2	0	2	0	0
Computer model/algorithm	7	1	0	0	6
Data analysis technique	1	0	0	0	1
Software	2	1	0	1	0
Webtool/Application	4	3	0	1	0
Total	130	44	6	41	39

Table 14 Tools developed in HSRI projects by type of award

Source: Technopolis analysis of Researchfish® data

A.2.8. Products

The analysis here combines the intervention products, artistic/creative products and intellectual property (IP) reporting fields of Researchfish®. A total of 14 intervention products, 16 creative products, and 2 cases of IP were reported (Table 15). Health and social care service products accounted for just under half of the intervention products. Of these, half were still under development, so were yet to make an impact. Impact cited for health and social care service intervention products mainly concerned increasing awareness in key stakeholders. Other examples of impact included a pilot test of a therapeutic intervention that revealed significant reductions in alcohol use and symptoms of depression and psychological distress. Films, videos, or animations were the most commonly reported artistic/creative products (8 times). These covered webinars, documentaries and informative animations. Impacts from artistic/creative products were noted to be largely in terms of creating awareness and successfully engaging with audiences.

IP was not a common output of HSRI awards. The only examples of IP were firstly, a licensed innovation that extracts digital information from paper-based records and secondly, an application that standardises flow of village doctor follow-up visits in China.

Type of product	Total products (n=18)	Foundation closed (n=10)	Foundation active (n=2)	Full closed (n=3)	Full active (n=3)			
Products (n=14)								
Health and Social Care Services	6	4	1	0	1			
Management of Diseases and Conditions	3	2	0	0	1			
Preventative Intervention - Behavioural risk modification	1	0	0	1	0			
Products with applications outside of medicine	1	1	0	0	0			
Support Tool - For Medical Intervention	1	1	0	0	0			
Therapeutic Intervention - Psychological/Behavioural	2	0	0	2	0			
Artistic/creative (n=16)								
Artistic/Creative Exhibition	2	0	1	0	1			
Artwork	2	0	0	0	2			
Composition/Score	1	0	0	0	1			
Creative Writing	1	0	0	1	0			
Film/Video/Animation	8	6	0	1	1			
Image	1	0	0	1	0			
Performance (Music, Dance, Drama, etc)	1	1	0	0	0			
Intellectual property (n=2)								
Intellectual property	2	1	0	1	0			

Table 15 Products developed in HSRI projects by type of award

Source: Technopolis analysis of Researchfish® data

Appendix B Survey analysis

B.1. PI survey

B.1.1. Overview

Responses were received from 77% (10 of 13) of PIs of full grants (1 closed, 9 active) and 46% (17 of 37) of PIs of development/foundation awards (6 closed, 11 active).

• Location of respondents (by country)

Just over half (59%, 16 of 27) of the respondents were from UK institutions across both full grants (6 of 10) and development/foundation awards (10 of 17). For full grants, one respondent each was from Brazil, Lebanon, South Africa, and Tanzania. For development/foundation awards, three respondents were located in Kenya and one each in Georgia, Nigeria, Tanzania, and Uganda.

	Full			Development / Foundation			Total			
	Call 2	Call 3	Call 4	Call 5	Call 6	Call 1	Call 4	Call 5	Call 6	
Brazil					1					1
Georgia									1	1
Kenya							1		2	3
Lebanon				1						1
Nigeria									1	1
South Africa					1					1
Uganda								1		1
UK	1	2	1	1	1	2	2	5	1	16
Tanzania					1			1		2
Total	1	2	1	2	4	2	3	7	5	27

Table 16 Respondents to the PI survey, by country and call

• Project sites

The reported number of project sites varied from 1 to 22 (full award; mode=1) and 1 to 200 (development/foundation award; mode=2). Overall, 88% of awards had between 1 and 4 project sites.

Across all awards, project sites were located in 25 different countries. The largest number of awards involved sites in Kenya (5 awards) followed by Tanzania and Uganda (4 each, 25%). 30% (3 of 10) of full and 18% (3 of 17) of development/foundation grants were multi-country, while 20% of full (2 of 10) and 6% (1 of 17) of development/foundation grants were multi-continent (between Africa and Asia) studies. Overall, a larger proportion of the studies were Africa-based (44%, 12 of 27), followed by Asia (33%, 9 of 27) and Latin America (11%, 3 of 27; all full awards).

Project research areas

Just over two-thirds of the respondents were focussing on research questions related to service delivery and/or general health relevance (70% and 67% respectively, Figure 11). Based on the latter finding, it appears that HSRI-funded projects are tackling wider systemic questions rather than concentrating on individual diseases or conditions. However, it should be noted that the categorisations are not mutually exclusive, and projects may be covering multiple HPSR are and/or health categories simultaneously.

The other category for HPSR areas included quality of care, community health systems and private market regulation among others, while the other health categories included areas such as nutrition.



Figure 11 Research focus of HSRI awards, by health policy and systems research area (a) and health categories (b); n=27

• Pilot studies

19% (5 of 27) respondents had undertaken a pilot study to inform the project prior to application to the HSRI. In the remaining cases, either respondents felt no need to conduct a pilot study (41%) or the pilot study was a part of the HSRI grant (33%).

B.1.2. Project team

Change to project team

A majority of the PIs (56%, 15 of 27) reported that the project team did not change from the team set out in the Case for Support (Figure 12). Where changes were made, reasons given included replacements triggered by original team members leaving and additional junior researchers recruited to provide project support.



Figure 12 Reported change to project team (n=27)

• Project team expertise

The expertise involved in each project as reported by the PIs is shown in Figure 13. Health policy (96%, 26 of 27) and health systems (93%, 25 of 27) expertise was most commonly included. Conversely, expertise in operational research (19%, 5) and data management (27%, 11) and patient recruitment (22%, 6) was the least frequently reported. The other category included epidemiological, participatory research, microbiological and health informatics expertise.

Pls of full awards usually reported on average six different skills, whereas Pls of development/foundation awards reported seven different skills (data not shown). Along with health policy and health systems expertise, most awards typically also included social science expertise (78%, 21), with full awards often including health economics expertise (8 of 10 full awards).





B.1.3. Stakeholder engagement

Pls reported engaging with different types of stakeholders ranging from policy makers to health care organisations, practitioners and communities. Engagement in the design phase was overall to a lesser extent compared to engagement during the implementation phase (Figure

14). During project design, PIs most frequently engaged with national government policy makers (67%, 18 of 27). During implementation, stakeholder engagement included national as well as local government policy makers (77% and 73% of projects respectively), LMIC health care organisations (62%) and community organisations or representatives (54%). The types of stakeholders involved were broadly similar for full and development/foundation grants with the exception of community organisations or representatives who were much more frequently associated with development/foundation grants.





The mode of engagement was typically a direct approach or interactive workshops/feedback sessions (Figure 15). Stakeholders are often represented in project advisory boards with engagement happening through regular meetings, for example, every six months. Eight Pls reported using this mechanism.





B.1.4. Challenges encountered

When asked about what challenges they encountered during project implementation, the majority of Pls (61%, 14 of 23, Figure 16) cited 'other' reasons, which were elaborated as being COVID-19 pandemic-related issues and delays (11 projects). Since most projects represented

in the survey are active, this finding was somewhat expected. The next most commonly reported challenges were administrative or technical (26%, 6 of 23). Administrative challenges concerned contracting, collaboration agreements and payments.



Over half of the respondents (56%, 15 of 27) reported making major adjustments to the project plan due to unforeseen circumstances/challenges. The vast majority of these adjustments were study timeline changes (81%, 13 of 16) followed by changes to the data collection methods (38%, 6) and training for project staff (25%, 4) (Figure 17). These were largely owing to the COVID-19 pandemic and involved extending timelines to accommodate delays in field work, and shift to online/remote data collection methods and engagement where possible (e.g. for interviews, focus groups, advisory board meetings, dissemination events etc.).





B.1.5. Lessons learned

48% of PIs (13 of 27) indicated they would approach the project's design or implementation differently, wherein 41% (11 of 27) would make minor changes and 7% (2 of 27) would make substantial changes. Changes they would opt for included adjustments to the study timeline (Figure 18) and other changes such as including a set of preliminary studies, costing a more skilled research fellow in the project for data analysis and budgeting for more face-to-face

team meetings in the analysis and write-up phase (project was pre-covid). When asked to provide further detail, the study timeline changes were mostly in light of the COVID-19 pandemic, but other potential changes involved including more consultation and involvement of local communities in the research and being less ambitious with the study plan so that it is commensurate with the budget and time available.





B.1.6. Project outputs, outcomes and impacts

Almost three-quarters (74%) of the projects represented in the survey are still active and hence, outputs, outcomes and impacts may not yet have accrued. We would expect the outputs, outcomes and impacts to increase as projects progress.

Outputs and scientific outcomes

As expected, PIs were unable to report outputs or scientific outcomes as most projects are still ongoing and have been delayed by the pandemic. Nonetheless, the desired outputs and scientific outcomes were reported to some extent (Table 17).

For instance, findings reported so far cover several different areas such as governance, standards (e.g. SafeCare intervention), health system strengthening (looking at the potential of using wearables for this), and linking from primary to secondary health care in LMICs. Most projects with findings have already published some of these and/or are in the process of drafting further peer-reviewed publications. Publications include literature reviews, frameworks and protocols as well as qualitative and cross-sectional studies.

Tools developed are largely data collection tools and guides e.g. survey questionnaires, systematic review protocols and a participatory policy analysis workshop guide. One project reported adapting / refining existing tools for assessing compliance with infection prevention and control for health workers and standardised patients. Some of the tools were associated with novel or improved methodologies. Other projects reported having adopted novel statistical approaches and remote qualitative data collection methods, including Whatsapp interviews and Zoom focus groups. Databases reported included a linked database for primary health care and a merged databased based on several administrative databases.

Six Pls (23%, n=26) reported that their findings or outputs have been taken up by other researchers. Examples include the use of the OPERA framework by project partners and at least two NGOs, use of newly developed household survey tools by other research groups, and the use of a tool to monitor the progress of infants by a researcher in Kenya who is using it in a rural context.

Outputs and scientific outcomes	Full (n=10)	Development/ Foundation (n=16)	Total (n=26)						
Findings									
Not yet, as project is still ongoing	6 (60%)	6 (38%)	12 (46%)						
Yes	4 (40%)	10 (63%)	14 (54%)						
No	0 (0%)	0 (0%)	0 (0%)						
Publications									
Not yet, as project is still ongoing	6 (60%)	8 (50%)	14 (54%)						
Yes	4 (40%)	7 (44%)	11 (42%)						
No, but planning to do so	0 (0%)	1 (6%)	1 (4%)						
New research tools or databases									
Not yet, as project is still ongoing	5 (50%)	6 (38%)	11 (42%)						
Yes	5 (50%)	4 (25%)	9 (35%)						
No	0 (0%)	6 (38%)	6 (23%)						
Development and/or use of new or i	mproved met	hodologies							
Not yet, as project is still ongoing	7 (70%)	8 (50%)	15 (58%)						
Yes	3 (30%)	3 (19%)	6 (23%)						
No	0 (0%)	5 (31%)	5 (19%)						
New or improved pathway to impact									
Not yet, as project is still ongoing	8 (80%)	11(67%)	19 (73%)						
Yes	0 (0%)	2 (13%)	2 (8%)						
No	2 (20%)	3 (19%)	5 (19%)						

Table 17 Outputs and scientific outcomes

Capacity building

Formal training of staff and stakeholders occurred in about half of the projects (48%, n=25) and just over a tenth of the projects (12%, n=25) respectively (Figure 19). Among project staff, training in data collection methods was most common, with junior staff, students and early career researchers benefitting from courses. On the other hand, both staff and stakeholders could also avail of informal training, for example, through participatory workshops.



Figure 19 Formal training for staff and stakeholders (n=25)

Other capacity building activities included mentoring of LMIC PIs and researchers by HIC partners, and mentoring of junior researchers by senior researchers.

Figure 20 Capacity building for LMIC (a) and HIC (b) researchers and institutions (a)



(b)



HSRI-funded projects have also led to capacity building for LMIC and HIC researchers and institutions (Figure 20) as well as LMIC decision makers, practitioners and community representatives (Figure 21). PIs reported that improved knowledge and technical skills was the most significant capacity building outcome in both LMICs and HICs (Figure 20). Other capacity building outcomes were reported to have occurred at a larger extent for LMIC researchers and

institutions than for their HIC counterparts. These included improved research leadership, research management and administrative skills, community engagement and knowledge transfer skills and organisational / institutional capacity. This outcome was expected as the research, particularly the data collection, was embedded in LMICs.

Pls also reported capacity building for LMIC decision makers, practitioners and community representatives had mostly occurred to some extent (Figure 21).





Follow-on funding

Since most projects are still active, 81% (21 of 26) of PIs had not yet applied for further funding. Three PIs had already acquired funding (12%) which included one GCRF/Newton Fund COVID-19 grant (PI at University of Warwick), two PhD studentships (one funded by the MRC and one funded by the University of Birmingham Global Research Fund), and a Wellcome Trust Intermediate Fellowship (PI at KEMRI-Wellcome).

Three PIs (of 6 PIs with closed development/foundation awards) had applied for a full HSRI grant, of whom two were not successful and one grant proposal is still under review. Two PIs applied for funding elsewhere. In one case this was because Digital Innovation for Development in Africa funding and COVID-related funding became available.

Collaborations, networks and partnerships

The majority of respondents reported working with new partners in their HSRI funded project (70% [7 of 10] of full grants and 75% [12 of 16] of development/foundation grants) (Figure 22). New partners located in LMICs accounted for the largest proportion (around 40% for both grant types). 10% of full awards and 25% of development/foundation awards included new partners located in HICs. In contrast, full awards had more new HIC as well as LMIC partners compared to development/foundation awards (20% vs 13%). This would be expected as full awards are longer and larger projects, possibly requiring a larger variety of technical and country expertise.

69% (18 of 26) of PIs reported that they have collaborated or are collaborating with the new partners outside of the HSRI project. Thus, the HSRI is facilitating new partnerships and networks. Collaborative activities outside the remit of the HSRI project included regular knowledge exchange and interactions and joint development and submission of proposals (Figure 23).




Figure 23 Collaborative activity beyond the HSRI project (n=21)



New stakeholder collaborations were also facilitated within HSRI projects, predominantly with LMIC stakeholders (Figure 24).



48% (12 of 25) of PIs are engaging with these new stakeholder partners in the context of other projects while 44% (11 of 25) PIs are planning to do so in the future. In several cases, PIs included the stakeholders in other grant proposals, although not all of them have been successful.

Impacts

Policy or health system influence or changes were reported for four (of 26, 15%) projects in the PI survey. The examples reported were as follows

- Data from an ongoing foundation award from Call 5 suggests that the project has helped create a pressure group that is encouraging the Ugandan government to push forward a health insurance bill in parliament
- The results from a Call 2 full award are contributing to a body of knowledge about interventions to improve quality in private health facilities in Tanzania. This is changing the nature of the debate and is likely to influence the design of and funding for such strategies in future
- The team working on a Call 3 full grant has been invited twice to present at parliamentary enquiries on the future of the Indonesian national health insurance scheme (the JKN) to demonstrate the level of financial protection achieved under the JKN. The role of private health care financing in Indonesia is a very topical issue at the moment
- Findings from a Call 1 Development grant have influenced India's Kerala State Government's health system developments for clinical information exchange between providers

In most cases (85%, 22 of 26) HSRI projects have not yet led to any policy or health systems impact. This is mainly due to projects that are not yet completed (77%, 20 of 26). Two PIs stated that their projects are unlikely to result in policy or health systems changes because they were development awards and it would be the follow-on studies that would lead to impact.

Further impacts that were not directly related to the research question were also reported (Figure 25). Examples included a higher profile for health systems research in Colombia; expanded stakeholder networks; creation of an international network of researchers with an interest in improving regulation of health professionals; a new research and education stream on digital health at St Francis College of Health and Allied Sciences, Tanzania has developed; and requests for health informatics expertise from the Ugandan Ministry of health to support transformation of health services using digital health.



Figure 25 Wider impacts of HSRI awards

B.1.7. HSRI and the funding landscape

Global health funding landscape

All PIs who responded to the survey agreed that the HSRI fills a gap in the global health funding landscape.

67% of respondents (16 of 24) also felt that critical gaps remain in the HPSR funding landscape and act as a barrier to impact. Eleven of the 16 Pls who provided further comments pointed to the lack of sufficient funding for HPSR as the major barrier to capacity development and impact. While the HSRI has made an important contribution in addressing an important gap, the need for such research and research funding is much more than is currently available through the HSRI. A related problem is the lack of funding from local national institutions, including governments, in most LMICs, which makes it difficult for researchers to build and sustain HPSR research capacity in LMIC institutions. Other identified gaps include lack of support for follow-on impact and engagement activities with policy makers and users, and lesser focus on research related to implementation, quality of care, and efficiency improvements.

Strengths and weaknesses of the HSRI

The main strength of the HSRI according to survey respondents is that it is one of the only funding programmes which is designed around health systems research – a crucial area which often falls between other funding programmes (Table 18). Moreover, now that it is a fairly established scheme, HPSR researchers can prepare for proposals in much advance e.g. identifying and building relationships with new partners and jointly developing ideas for proposals. The main weakness however is that the overall amount of funding available for the scheme is relatively small resulting in high competition and many high-quality proposals not getting funded.

Strengths (n)	Weaknesses (n)		
Funding specifically allocated to health systems research (10)	Relatively small funds (6)		
Focus on LMICs, including allowing LMIC researchers to be PIs on projects, funding in challenging contexts such as Syria, promoting equitable partnership with institutions in LMICs (5)	High competition, resulting in many high-quality fundable projects not awarded funding (4)		
An all-inclusive approach, that is open to innovation, social science research and multi-/inter-disciplinarity (6)	Criteria for selection seem to require a methodologically novel, policy-relevant proposal with a prominent theoretical element, creating some tension (1)		
Focus on policy-relevant and impactful research, including encouraging knowledge and skill exchange between and among researchers and stakeholders (4)	No feedback for unsuccessful applications makes it difficult to improve (1)		
Strengthens research capacity in LMICs (also HICs) (2)	Low success rate of proposals led by LMIC-based researchers (1)		
Low burden monitoring requirements, excellent application guidelines with detailed/comprehensive information (1)	Scope could be wider (1)		
Significant funding for projects (1)			
Decisions made by committees that understand health systems research (1)			

Table 18 Strengths and weaknesses of the HSRI

• HSRI design and requirements

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77% of PIs (20 of 26) who responded to the survey were satisfied with the scheme's design and requirements. Individual critical comments were made concerning some aspects as follows

- The application form is somewhat repetitive, especially in areas concerning impact. While this has improved in recent calls, the problem has not been solved completely.
- There is a tension between the amount of funding that can be requested and the level of ambition expected in the proposal. In one particular instance, this meant that less post-doctoral time and travel budget was costed in the proposal than required
- Feedback for unsuccessful applications could be improved, particularly to help LMIC researchers improve their future grant applications
- The JeS system does not allow teams to demonstrate equal partnerships between the HIC and LMIC partners e.g. joint PIs. This is important in the context of the need to decolonise global health research

The HSRI's design and requirements are largely seen as conducive to attracting relevant highquality proposals (75%, 18 of 24 Pls). Five Pls (21%) felt that there are certain aspects that function as a barrier for LMIC researchers, while one Pl (4%) felt that some aspects are a barrier for HIC researchers. The latter highlighted that Pls affiliated with UK institutions but based overseas should be able to apply as Pl. LMIC researchers pointed to barriers such as difficulty in finding HIC partners, low success rate even for high quality proposals which may discourage researchers from applying again, and reviewers unable to link one service improvement to system change.

Almost all the respondents (95%, 25 of 26) felt that the calls for proposals and other HSRI information are communicated through the right channels. One PI was unsure about the communication reach in LMICs.

Suggestions for additional activities that the HSRI could support included funding and training for dissemination and knowledge translation to stakeholders (e.g. policy makers and other users), support for creating networks with other researchers and stakeholders such as high-level policy makers and health managers, short courses in health systems research, PhD support in LMICs (under the project grant), and small "catalyst" grants to develop partnerships and shape ideas into proposals (Figure 26). One PI suggested convening a series of workshops that take research evidence from HSRI projects and develop policy options grounded in a good understanding of the political economy (at national and regional levels).



Figure 26 Suggested additional activities that HSRI could support (n=25)

B.2. Co-investigator survey

B.2.1. Overview

The survey invitation was sent to 351 co-investigators (Co-Is). Of these, responses were received from 100 Co-ls (28%).

Responses were received from Co-Is representing 55 of the HSRI funded projects (22 full, 33 foundation) with a median of 1 response per project. The most responses for a single project was 6. A total of 57 Co-Is (57%) who responded were involved with foundation grants and 43 respondents (43%) were involved with full grants.

Respondent country was reported by 100% (100 out of 100) of respondents with 29 countries represented. The United Kingdom represented the greatest proportion of responses (20%, 20 of 100) followed by Ghana (10%, 10), Bangladesh (7%, 7), Kenya (7%, 7) and Tanzania (6%, 6).

The country of the Co-I institution was further defined using the Wellcome Trust list of LMIC countries.¹³ The majority (73%) of Co-I institutes were from LMICs (Figure 27) with 27% coming from HICs. The proportion was similar across full and foundation grants (74% and 72% LMIC Co-Is respectively).



Figure 27 Percentage of Co-I respondents by type of institution (LMIC, HIC)

B.2.2. Role of co-investigator

The most common areas of expertise reported by Co-Is were health systems (65%, 65 of 100) and health policy (local policy context) (42%, 42), whilst implementation science and social science were each reported by 34% (34) of respondents (Figure 28). Three out of the four lowest reported skills were quantitative in nature: data management (21%, 21), statistics (14%, 14) and health economics (13%, 13).

¹³ https://wellcome.org/grant-funding/guidance/low-and-middle-income-countries

Figure 28 Co-investigator skills (n=100)



Health systems expertise was the most frequently reported expertise for both full and foundation grants (Figure 29). Some differences in expertise were observed between the full grants and the foundation grants: A greater proportion of Co-Is in full grants reported having expertise in health policy (in local contexts), evaluation/impact, operational research, knowledge brokerage, statistics, and health economics than Co-Is in foundation grants. Conversely, a greater proportion of foundation award Co-Is reported expertise in social science and implementation science.



Figure 29 Co-investigator skills, by grant type (full, n=43 and Development/Foundation, n=57)

When asked about their level of involvement in the design of the project, most co-investigators reported being either very involved (53%, 53 of 100) or having made a substantial contribution

(25%, 25) to the design of the project (Figure 30). Two respondents did not state their level of involvement with the design of the project.



Involvement varied somewhat between Co-Is from LMICs and HICs. While a large proportion of Co-Is from both LMICs and HICs reported that they were very involved in all aspects (LMIC 56%, 39 of 70; HIC 48%, 13 of 27; Figure 31), about a fourth of LMIC-based Co-Is (28%) reported making substantial contributions to several aspects of the project (as opposed to 19% of HIC Co-Is) and a fourth of HIC-based Co-Is (26%) stated that they had some input to specific aspects of the project (compared to 7% of LMIC Co-Is).

Figure 31 Level of involvement of Co-I in design of project by Co-I institution location (LMIC, n=70; HIC,



A large majority of Co-Is felt that their role in the project did not differ from what was written in the funding application (73%, 73 of 100) (Figure 32). A small number of Co-Is suggested that their level of involvement differed in scale, either being more involved than was planned (10%, 10/100) or less involved than was planned (9%, 9 of 100). Responses were largely similar between Co-Is across LMIC and HIC institutes (Figure 33).



Figure 32 Changes to role or scale of involvement in project compared to funding application (n=100)

Figure 33 Changes to role or scale of involvement in project compared to funding application by Co-I institution (LMIC n = 73, HIC n = 27)



B.2.3. Project design and implementation

The majority of Co-Is indicated that, in hindsight, they would not make any changes to the design or implementation of the project (62%, 62 of 100) (Figure 34). Of those that indicated they would make minor changes, the most commonly stated change was to modify the study timeline (42%, 13 of 31), followed by recruitment of additional experts to the team and training for project staff (both 26%, 8 of 31). Only 5% of the 100 respondents indicated that they would make substantial changes to the project design in hindsight, which primarily included engagement with additional stakeholders/stakeholder groups (57%, 4 out of 7). None of the respondents indicated that they would change the scope of the study. Seven individuals indicated they would improve communication across the research team in the free text comments.

Several Co-Is (44) provided reasons for the change, such as the challenges and unpredictability of working in an LMIC environment (23%, 10 of 44).



Figure 34 Changes that would be made to the project in hindsight (n=100)

Figure 35 Minor and substantial changes that would be made to the project in hindsight by category (n = 100)



B.2.4. Outcomes and impacts for co-investigators

• Impact on co-investigators and their institutions

Co-investigators were asked how the HSRI funded project has impacted them and their institution across seven areas: the institutions capability to conduct health systems research, the institutes awareness of health systems research, extended the Co-I's network of collaborators, provided the Co-I with important new contacts for future work, informed the direction of research, improved community engagement and knowledge transfer and lastly, improvement of research management/administration skills.

A total of 54% (53 out of 98) of Co-Is agreed to a large extent that the HSRI project extended their network of collaborators and 49% (46 out of 94) agreed to a large extent that the project had provided them with contacts they have used in further work.

Co-Is also reported that their HSRI project had raised their institutions' capabilities to conduct health systems research (54%, 51 out of 95), improved skills related to community engagement and knowledge transfer (51%, 48 out of 94), and informed further direction of research (49%, 46 out of 94) to some extent.

Twelve respondents also provided other responses as to how they think the HSRI project has had an impact. Examples of these were providing an opportunity to mentor LMIC researchers early in their careers and improving policy maker engagement skills.

Raised my institution's capabilities to conduct health systems research Raised my institution's awareness of health systems research Extended my network of collaborators Provided me with important new contacts I have used in my further work Informed my further direction of research Improved skills related to community engagement and knowledge transfer Improved my research management / admin skills 60 90 100 0 10 20 30 40 50 70 80

Figure 36 Impacts of HSRI project on the work of co-investigators and their research institutes (n=98)

• Follow-on funding

Over half of the respondents (51%, 51 out of 100) said that their project had not yet led to followon funding because the project was still ongoing. One fifth (20%, 20 out of 100) of the respondents had received follow-on funding. Of the 20 respondents who reported that they had received follow-on funding, 11 were from LMIC institutions and 9 were from HIC institutions. These numbers suggest a much lower proportion of LMIC Co-Is are receiving follow-on funding (15%, 11 out of 73) compared to HIC Co-Is (33%, 9 out of 27).

To a large extent

% of respondents

To some extent





Don't know

Not at all



Figure 38 Follow-on funding captured by co-investigator, by location of institution

A total of 12 different sources of follow-on funding were named (Figure 39), including GCRF (4 times) and Wellcome Trust (2 times). In total, 16 grants were reported. Two grants were jointly funded: one by the MRC, NIHR and FCDO; and one by UKRI, GCRF and Newton Fund.



Figure 39 Sources of follow-on funding, by number of grants (n=26)

Impacts on LMIC practitioners, decision makers and community representatives

Most Co-Is felt the HSRI projects had had an impact to a large extent or to some extent on stakeholders in terms of policy makers and practitioners increasingly seeking evidence from researchers to inform policy making, stakeholders feeling more informed of the nature and value of health systems research, and policy makers and practitioners increasingly considering research evidence available when making policy decisions (Figure 40).





• Wider impacts

In terms of wider impacts, 42% (42 out of 100) respondents agreed that local research networks had been built or expanded (Figure 42). However, a sizeable percentage (41%, 41/100) thought that their project had either no additional impact or insufficient time to accumulate impact other than that related to the original research question and their research group. Roughly one fifth of respondents agreed that the project had helped to build or expand a local network of policy makers (18%, 18 out of 100). The same percentage thought that the project had helped make health systems research a higher research priority in LMICs.

Figure 41 Impacts not directly related to the project research question and beyond Co-I's research group



B.2.5. HSRI and the funding landscape

HSRI in the global health research funding landscape

There is clear consensus amongst Co-Is that the HSRI is filing a gap in the global health research funding landscape (Figure 42). A total of 84% (84 out of 100) of respondents agreed whilst only 1% (1 out of 100) disagreed and the remaining 15% did not have a view.



Figure 42 Percentage of Co-Is who believe the HSRI is funding a gap in the global health research funding landscape



Figure 43 Other funding gaps in the global health policy and systems research landscape according to Co-Is (n=41)

When asked what funding gaps exist in the global health policy and systems research landscape (that function as a barrier to health impact), the most common answer from Co-ls was a lack of funding/funders (34%, 14 out of 41). These gaps referred to both the amount of funding available and a lack of different organisations that offered funding. The next most common funding gaps were the type of research funded and human resource issues (15% each, 6 out of 41). Specific examples given were the concentration on COVID related research, lack of implementation research, a lack of non-academic-led research, a lack of personnel skills in quantitative methods, and high financial costs of human resources in LMICs.

HSRI aspects for improvement

The majority of Co-Is were satisfied with the scheme's design and requirements and felt that nothing needed to be improved (87%, 82 out of 94) (Figure 44). However, 13% (12 out of 94) of respondents felt that certain aspects could be improved. The two most frequently cited aspects for improvement were to overcome the English language barrier and to provide more feedback to unsuccessful applications (mentioned twice each). Other suggestions (reported once each) were improving efficiency for dispensing funds and increasing funding for capacity building.

69% of Co-Is (63 of 91) felt that the HSRI calls and information are communicated well and reach the relevant researchers. 31% (28 of 91) felt that some aspects could be improved.

Figure 44 Co-investigators' views on the scheme's design and requirements (n = 94)

• No, I did not consider any aspects or requirements of the scheme problematic

87%

• Yes, there were aspects that were problematic and could be improved

HSRI Strengths and Weaknesses

When asked about the main strengths of the HSRI, one third (33%, 20 of 61) of respondents felt that the greatest strength was that it provides funding/covers funding gaps for health systems research (Figure 45). The second most reported strength was that the HSRI allows multidisciplinary collaboration between LMICs and HICs (25%, 15 out of 61). Other strengths, each reported by 7% (4 out of 61) of respondents, were that the HSRI informs policy, meets the needs of LMICs, and generates important knowledge. Thirty-nine respondents did not state any strengths or felt they were not best informed to comment.



Figure 45 Strengths of the HSRI according to co-investigators (n = 61)



Figure 46 Weaknesses of the HSRI according to co-investigators (n = 22)

A total of 78 out of 100 respondents either did not state any weaknesses or felt they were not well informed enough to point out weaknesses. Of weaknesses identified by Co-Is, the most common was limitations associated with funding (27%, 6 out of 22), including that the grant size was too small, not enough grants were awarded compared to the number of applications, and the duration of grants was not long enough. The next most commonly reported weakness was that HSRI focuses on research rather than translation or implementation of research (14%, 3 out of 22). Other weaknesses reported by two or more respondents included insufficient feedback on applications, lack of follow-on funding, limited scope of the research focus, and not allowing PhD/MSc students to be funded from the grant.

• Support from HSRI to improve impact

Suggestions for additional activities the HSRI could support included dissemination and knowledge exchange (28%, 25 out of 88) followed by network building (20%, 18 of 88) and support for other types of research (17%, 15 out of 88) (Figure 47).

Figure 47 Additional activities the HSRI could support that you think would make the research more effective and increase the potential for impact (n = 88)



Support for training was a larger priority for HIC institution Co-Is (24%, 5 out of 21) than LMIC institution co-Is (12%, 8 out of 67).





B.3. Survey of unsuccessful applicants

B.3.1. Overview

130 unsuccessful applicants were invited to participate. Of these, 39 took part in the survey, giving a response rate of 30%. Respondents were from 12 countries and based at 30 institutions

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at the time of the application (Table 19 and Table 20). Most respondents were from the United Kingdom of Great Britain and Northern Ireland (51%) and based at the London School of Hygiene and Tropical Medicine (11%), followed by King's College London (8%).

Table 19 Number of respondents per country at the time of application (n=39)

Location of country	Number of respondents
United Kingdom of Great Britain and Northern Ireland	20
Africa	5
India	4
Peru	2
Austria, China, Gambia, Germany, Jamaica, Mexico, State of Palestine, Thailand	1 each

Source: Technopolis analysis of survey data

Table 20 Number of respondents per institution at the time of application (n=37)

Location of research institution	Number of respondents
London School of Hygiene & Tropical Medicine	4
King's College London	3
Public Health Foundation of India, University of Liverpool	2 each
Aga Khan University, Caribbean Institute for Health Research, Centro de iNvestigacao e saude da Manhica, Duke Kunshan University, East Central and Southern Africa Health Community, Health Intervention and Technology Assessment Program, Imperial College London, Birzeit University, Instituto de Investigacion Nutricional, Liverpool School of Tropical Medicine, Macha Research Trust, MRC Unit The Gambia, National Institute of Public health, South African Medical Research Council, SRM Institutes for Medical Science, George Institute for Global health, The Open University, University of East Anglia, University of Leeds, University of Oxford, University of Portsmouth, University of Stirling, University of Strathclyde, University of the West of England Bristol, University of Warwick, University of York	1 each

Source: Technopolis analysis of survey data

Most respondents (68%) reported making one application to the HSRI and over a third of respondents (32%) reported applying multiple times (Figure 49 A). When asked about the type of grant applied for, there was a roughly even distribution with 39% of respondents reporting applying for a development/foundation grant, 37% reporting applying for a full grant and 24% reporting applying for an outline application (Figure 49 B). The majority of applications were made to Call 6 (45%), followed by Call 5 (16%) (Figure 50).



Figure 49 (A) Number of applications made to the HSRI (n= 38) and (B) types of grants applied for (n=39)







Source: Technopolis analysis of survey data

B.3.2. Project research area

Respondents indicated their proposed project related to 1-5 area(s) of health policy and system research, with most (72%) reporting the project related to one area (Figure 51). The most common category areas selected were service delivery (68%), followed by leadership and governance (24%). Over a fifth of respondents (21%) provided information on other areas their project related to; 13% indicated the proposal related to other areas in addition to the specified categories (such as data readiness, impact assessment and difficult to reach populations) and 8% reported the proposal did not relate to any of the specified category areas, but instead related to health technology assessment, health policy or mental health and addiction.



Figure 51 Breakdown of health policy and systems research areas in proposed projects (n=38)



All respondents (100%) indicated their proposed project related to 1 or 2 health area(s) (Figure 52). The most common areas reported were general health (34%), followed by reproductive health and childbirth (21%) (Figure 52). No respondents reported that their proposed project related to stroke or metabolic and endocrine categories. Of the 10 respondents (29%) that specified other areas, two reported child development and two reported emergency care/service.



Source: Technopolis analysis of survey data

Proposed projects planned to take place across 1-8 research site(s). In most cases, projects were based at one site (46%,15 of 36) or two sites (28%, 10 of 36). Where mentioned, sites were in a single country and were mostly located in South Africa.

When asked about the range of expertise involved in the proposed project, respondents indicated 1-11 area(s) of expertise (Figure 53). In most cases (63%), projects included 4-6 area(s) of expertise. The most common areas of expertise cited were health systems (74%) and health policy – local policy context (74%). Of the nine respondents (23%) that indicated other areas of expertise, three cited epidemiology.





Source: Technopolis analysis of survey data

B.3.3. Experience with HSRI

Opinions about the scheme design and requirements were mixed; 51% (18 of 35) of respondents felt there were aspects that were problematic and could be improved and 49% (17 of 35) of respondents did not consider any aspects or requirements problematic. Of the respondents that felt there were problematic aspects, five respondents reported the guidance on remit and criteria could be clearer and three reported the application requirements could be simplified e.g. there were duplications around describing pathways to impact and it took too much time to complete the additional material required. Two respondents reported it was difficult to secure letters of support during the COVID-19 pandemic.

When asked if a pilot study was carried out to inform the project prior to the application, most respondents (43%, 15 of 35) reported they did not carry out a pilot. Of these respondents, nine (26%) reported there was no need to pilot the study as the project locations(s), context, methodology was well understood, whereas six (17%) reported they would have liked to carry out a pilot study, provided they had funding. Around a quarter of respondents (26%) reported conducting a pilot study in the context of the project location(s). Three respondents provided more information to indicate that their project was either a pilot, built on previous work, or that the proposed methods were not amenable for a pilot.

The majority of respondents (94%) reported involving stakeholders at the application stage. Most respondents (74%) involved between 2-5 categories of stakeholders, most commonly policy makers from national government (63%), implementing organisations (46%) and LMIC healthcare organisations (46%) (Figure 54). Three respondents (9%) reported other categories of stakeholders: LMIC academics with policy roles, specialists in the area from another country, and the United Nations Relief Agency.



Figure 54 Breakdown of stakeholder involvement at the application stage (n=35)



When asked whether in hindsight they would approach aspects of the application differently, the majority of respondents (73%) indicated they would make changes. Of these respondents, 48% indicated they would make minor changes and 26% indicated they would make substantial changes in 1-5 area(s) of the application. The most commonly cited changes included changing the scope of the study (46%), recruitment of additional experts to the team (43%), and engagement with additional stakeholders/stakeholder groups (36%) (Figure 55). Over a quarter of respondents (26%) indicated that they would not make any changes. A third of respondents (32%) provided information on other changes they would make such as reducing the budget, allocating more budget to LMIC partners, or including a pilot study. Explanations for making the changes included revising the study design based on feedback to strengthen the application (6) and including stakeholder expertise earlier in the study design process (2).



Figure 55 Breakdown of the areas in the application that would be changed in hindsight (n=28)

Most of the respondents (65%) reported receiving feedback on their application, whereas 35% reported they did not receive feedback. Most respondents (38%) felt that the feedback was somewhat helpful (Figure 56). Those that felt that the feedback provided was somewhat or not helpful discussed that they received contradictory feedback (e.g. respondents felt they had responded to the feedback, however the application was still declined, 3 cases), there were no actionable changes, or feedback was too generic.



Figure 56 Opinions on the feedback provided by HSRI (n=26)



B.3.4. Further research activity and progress

About a quarter of respondents reported continuing working on the research idea (26%, 9 of 35) or some aspect of the research idea after their application to HSRI was unsuccessful. Over a third of respondents reported they did not pursue the research idea further (37%, 13). The remaining 26% indicated the research idea, as far as they are aware, had not been pursued elsewhere, whereas 11% reported that others had pursued the research idea.

Most respondents (69%, 24 of 35) reported they did not apply for funding elsewhere. However, about a third of respondents (31%, 11) reported they did submit a grant to another funding programme. Of these respondents, six reported the grant application was successful. A summary of the funding programmes applied for is presented in Table 21.

Successful applications to another funding programme	WHO Thailand, International Health Policy Program, Thai Health Promotion Foundation, UK-India Education and Research Initiative
Unsuccessful applications to another funding programme	EU Horizon 2020, MRC applied global health research board, NIHR Health Policy and Systems Research, MRC- International Master's Fellowships, GCRF capacity building initiative

Table 21 Other funding programmes unsuccessful applicants applied for

Source: Technopolis analysis of survey data

All of the respondents who successfully secured funding reported they are/were involving or engaging with stakeholders in the funded project (Figure 57). Most of the respondents (66%) reported that the research project had not yet resulted in any findings, as the project is still ongoing. However, 67% of these respondents reported the project has contributed to some form of capacity building (Figure 57).

Figure 57 Capacity building in projects funded by other sources after unsuccessful HSRI application(n=6)



Source: Technopolis analysis of survey data

One respondent reported they had published findings from the study and one respondent is planning to publish findings. One respondent has developed a National Burns Registry which is being piloted in India. Another respondent has developed a model for adolescent health check-ups which is being piloted by the Government of Belize. None of the projects have led to any changes in policy or health systems yet, as the projects are still ongoing.

B.3.5. Global landscape

The majority of respondents (80%, 25 of 31) felt that the calls for proposals and other information on the HSRI are communicated through the right channels and reach the relevant research community in the UK and LMICs. Most respondents (59%) reported the HSRI is filling a gap in the global health research funding landscape (Figure 58).







The majority of respondents (84%) felt that there are critical gaps in the health policy and systems landscape that act as barriers to health impact. The main strengths and weaknesses of HSRI were described by 27 respondents. Some of the respondents felt there are critical gaps and provided further information that there is a need for grants to provide a long enough timeframe for capacity building (2) and for grants to explore implementation research in LMICs in mental health (2).

Strengths included the specific focus on health systems (10) and multidisciplinary research (2). Weaknesses included the length of the application, which could be shorter (2) and feedback, which could be improved (3). Two respondents mentioned it was difficult to balance budgets to allow for sufficient budgets for a UK researcher and LMIC partners. Suggestions for additional activities that the HSRI could support included providing training for junior research staff working in health systems research, funding longer term projects (up to 10 years), and running capacity building events for the health systems research community.

Appendix C Literature review

C.1. Definition of health systems research

Health systems research, health services research, as well as the related fields of implementation research and operational research, have been defined in multiple ways, often resulting in considerable overlap between definitions [(Remme *et al.*, 2010; Mills, 2012) and references within]. This is at least in part due to the range disciplines involved, which led to inconsistent use of terminology to describe the research, as well as to the relatively recent shift in focus towards this field of research (see below).

The Alliance for Health Policy and Systems Research (AHPSR), a partnership hosted by the World Health Organisation (WHO), employs the term 'Health Policy and Systems Research' (HPSR). It defines HPSR's goal as "the purposeful generation of knowledge that enables societies to organise themselves to improve health outcomes and health services" (WHO, 2009). HPSR thus provides "crucial evidence to inform health-related policy and support the efficient and successful implementation of health interventions", including an understanding of "how different actors interact in the policy and implementation processes to contribute to policy outcomes"¹⁴. Policy was included by the AHPSR's to include the goal of influencing policy explicitly within the remit of health systems research.

To more clearly outline the scope and intended scale of influence, it is helpful to consider how some of the research domains under the umbrella of 'research to improve health systems' relate to each other (Remme *et al.*, 2010) (Figure 59).

- **Operational research** aims to develop solutions to current operational problems of specific health programmes or specific service delivery components of the health system, such as a health district or a hospital. Problems addressed are those encountered during the execution of routine processes which require practical solutions to allow more operations to proceed more effectively. Users of operational research outputs are predominantly local health care providers. As operational research is relatively context-specific, it tends to be less amenable to adaptation and use in other locations (local utility).
- Implementation research aims to develop strategies to improve access to, and the use of, health interventions by populations in need. It starts with the availability of an intervention or intervention package proven efficacious in prior research, but for which major questions remain in terms of scale-up and effective integration within the health system. Research outputs are mainly used by programme managers of scale-up of the intervention. Studies are often conducted at multiple centres and in several countries to clarify which findings are location-specific and which are more generalisable. Findings can thus be useful for, and adaptable to, other contexts.
- Health systems research addresses questions that are not disease-specific but affect some or all of the building blocks of a health system. It is thus concerned with systems problems that have repercussions on the performance of the health system as a whole. The findings of health systems research are mostly used by those who manage or make policy for the health system. While health systems issues are often highly context-specific, health systems research can be designed to also generate lessons that are amenable to adaptation and adoption in other settings. This is particularly true when a systems perspective is used,

¹⁴ <u>https://healthsystemsglobal.org/improving-health-systems/what-is-hpsr/</u>

considering all the positive and negative effects of a particular system-level intervention (broad utility).

Figure 59 Research to improve health systems



Source: Reproduced from (Remme et al., 2010)

Health systems are complex systems. The WHO describes health systems in terms of six core components or "building blocks": 1) service delivery, 2) health workforce, 3) health information systems, 4) access to essential medicines, 5) financing, and 6) leadership/governance (Figure 60) (World Health Organization, 2010). These blocks contribute to the strengthening of health systems in different ways: Some are cross-cutting components, such as leadership/governance and health information systems, on which the overall policy and regulation of all the other health system blocks are based. Others refer to key inputs to the health system, such as financing and the health workforce. HPSR can address any or several of these six building blocks. Given the broad range of (inter-related) components that 'build health systems', and the variety of actors within, HPSR is inherently multi- and interdisciplinary, drawing upon a range of disciplines, particularly social sciences including economics, sociology, anthropology, political science, psychology, management science, geography and history, as well as epidemiology (Alliance for Health Policy and Systems Research, 2007).

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Figure 60 The six building blocks of health systems



Source: Reproduced from (World Health Organization, 2010)

Table 22 illustrates the types of areas and research topics addressed by HPSR within each of the six building blocks (Adam *et al.*, 2011).

Tab	le 22	Areas	add	ressed	within	health	systems	building	blocks

	Building block	Areas / research topics				
1	Service delivery	Access, integrated care, continuum of care and modes of delivery Non-state sector (e.g. contracting, private sector) Quality of care and performance				
2	Health workforce	Distribution and retention Training (pre-service and in-service) Migration				
3	Health information systems	Medical and drug records; computerised records Management information systems				
4	Medicines	Monitoring (e.g. adverse reactions) Selection (e.g. in essential drug lists) Regulation and Quality Assurance Intellectual Property Access Policy/Reform (e.g. national drug policies)	Insurance and Financing Medicine supply (e.g. forecasting) Prescribing and utilisation Information (e.g. for education and advocacy) Marketing (e.g. drug promotion)			
5	Health financing	Payment mechanisms Health insurance Resource allocation				
6	Governance and leadership	Government regulation and legislation Licensing and accreditation Professional authority and roles (e.g. scope, content and location of practice) Audit Consumer involvement				

Source: Reproduced from (Adam et al., 2011)

C.2. Development of the field of health systems research

Over the past 15-20 years, global health organisations have increased their focus on HPSR. While the bulk of attention centred on disease-specific ventures from the mid-1990s to mid-2000s, including the establishment of the Global Alliance for Vaccines and Immunizations (GAVI, established in 2000), the Global Fund (2002) and the US President's Emergency Plan for AIDS Relief (PEPFAR, established in 2003), health systems emerged as a key component in the successful implementation of these programmes (Hafner and Shiffman, 2013; Bennett, Frenk and Mills, 2018). This led to a growing recognition that the targets set by the Millennium Development Goals (MDGs) would not be achieved without better health systems. Similarly, a 2005 evaluation of the WHO's and UNICEF's Integrated Management of Childhood Illness (ICMI) strategy concluded the anticipated improvements in child health had not been achieved mainly due to weak health systems: "The full weight of health system limitations on IMCI implementation was not appreciated at the outset, and only now is it clear that solutions to larger problems in political commitment, human resources, financing, integrated or at least coordinated programme management, and effective decentralization are essential underpinnings of successful efforts to reduce child mortality." (Bryce et al., 2005) More recently, the Ebola epidemic highlighted again the importance of health systems and health systems strengthening.

As a result, the global health agenda started to shift from an emphasis on disease-specific approaches to a focus on strengthening of health systems, including in discussions at a range of high-level policy fora (e.g. 2008 G8 summit in Japan) (Reich and Takemi, 2009; Hafner and Shiffman, 2013; Yao *et al.*, 2014), and through the launch of major health systems strengthening efforts ('horizontal') as part of disease-focussed 'vertical' programmes (e.g. GAVI, Global Fund) – albeit not without controversy (Storeng, 2014; Tsai, Lee and Fan, 2016). This was accompanied by a shift from disease or service-specific ways of viewing health services in LMICs towards a more integrated and systems-focused perspective, with universal health coverage (UHC) becoming a focal point for action (Bennett, Frenk and Mills, 2018). Thus, while the MDGs targeted specific health outcomes, the 2015 Sustainable Development Goals (SDGs) included UHC as a commitment (Rajan *et al.*, 2020).

The increased focus on health systems also led to a growing recognition of the role of research in improving health systems and health care delivery (Remme *et al.*, 2010; Bennett, Frenk and Mills, 2018). The establishment of the AHPSR in 1999, as a partnership hosted by the WHO, marked an important milestone. The potential role of HPSR was magnified by the SDG's shift to a more cross-sectoral approach, given HPSR's application of systems thinking to health, its focus on health equity, and the strength of its multi-disciplinary approaches (Peters, 2018). In addition, determinants of health are embedded within targets of most SDGs, with a health systems associated target exemplified under each of the 17 goals in the Annex (Byskov *et al.*, 2019).

In line with these developments, funding of HPSR-related activities has increased since 2000 (Grépin *et al.*, 2017). Applying the AHPSR's definition for HPSR, an analysis of the OECD's Creditor Reporting System, which aggregates annual transaction-level data on official development assistance (ODA) projects supported by bilateral aid agencies, multilateral donors, and private sources such as charities estimated that the total commitment to HPSR-related activities amounted to USD4 billion between 2000 and 2014. Commitments increased from 2000 to 2011 from below USD100 million to a peak of USD 540 million in 2010, and held at around USD400 million from 2011 to 2014. The majority of funding, 93%, originated with ten donors, with countries in the sub-Saharan African region the major recipients of HPSR funding.

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Figure 61 Donors of health policy and systems research funding >USD100 million (2000-2014), in USD million



Source: Adapted from (Grépin et al., 2017)







It should be noted that quantification of financial resources for HPSR and 'related' research is challenging. Research activities address a broad set of areas, which are not captured within a single research field code, and 'research' is often a component of larger projects rather than being funded through a stand-alone grant (Grépin *et al.*, 2017; Witter *et al.*, 2019). Few donors break down funding for specific research activities in their financial statements, making it difficult to single out resources allocated specifically for HPSR. Furthermore, there are no clear-cut criteria for distinguishing between research and evaluation. While the former is more often (but not exclusively) associated with academic experts producing generalisable findings published in scientific journals, the latter is often commissioned work, may or may not enter the public domain, and focusses on effectiveness of a specific program or model to inform future actions or decisions (Patton, 2014; Cohen, Manion and Morrison, 2018).

A number of bibliometric studies confirm a rise in HPSR publication output, mirroring the rise in investment. For example, an analysis of HSR publications from 1981-2012 showed that the number publications increased from a very low level in the early 1990s, followed by a more rapid rise after 2000 (Yao *et al.*, 2014). Research mainly addressed the areas of 'public,

environmental and occupational health' and 'health care sciences and services' (around 20% of publications, each), as well as 'general and internal medicine' (13%). Other studies looked at HPSR publications focussing on issues relevant to an LMIC. One analysis found that the number of publications increased slowly and steadily over the 1990 – 2015 period, with the relative share of HPSR papers was rising - indicating a continuing shift towards this area of research (English and Pourbohloul, 2017b). HPSR publications published between 2003 and 2009 focussed predominantly on the areas 'Service delivery' (29.3%), 'Human resources' (27.9%) and 'Governance' (22.4%), with 'Health financing' (13.1%), 'Health information systems' (5.3%) and 'Medicines' (1.8%) trailing behind (Adam *et al.*, 2011).

C.3. The case for Health Policy and Systems Research

Inadequacies in health systems limit health outcomes for populations in LMICs, demonstrating a continued need for HPSR. An estimated 15.6 million excess deaths occurred in LMICs in 2016, with around 7 million deaths preventable through public health intervention and 8.6 million deaths due to a lack of access to high-quality care, across a broad range of conditions. The latter includes around 3.6 million people who did not access the health system (non-utilisation), and 5.0 million who did but received poor-quality care (Figure 63) (Kruk, Gage, Joseph, *et al.*, 2018).



Figure 63 Deaths from conditions due to poor-quality care and non-utilisation in 137 LMICs

Source: Reproduced from (Kruk, Gage, Arsenault, *et al.*, 2018). Estimates were based on a comparison of mortality for conditions amenable to health care between countries with well performing health systems and LMICs.

A study undertaken in 2003 for the Bellagio Conference on Child Survival found that most of the 10 million deaths per year of children under five occurred in low income countries (Jones *et al.*, 2003). The Bellagio Conference concluded that about two thirds of these deaths could have been prevented by existing interventions that could have been implemented in these countries at the time.

The discrepancy in mortality rates is not simply a result of limited resources available to LMIC health systems. When countries were grouped by income to reduce the influence of social and

economic determinants, disparities persisted; for example, in countries with similar, high coverage of skilled attendants during birth (80–90% of births), the ratio of worst to best performing country for maternal mortality was 2.1 in low-income, 12.2 in lower-middle-income, and 5.7 in upper-middle-income countries (Kruk, Gage, Arsenault, *et al.*, 2018). Countries with similar levels of economic development can hence have substantially different levels of health. Evidence (and action) to inform improvements in the overall effectiveness of health policies and systems is required to address this imbalance.



Figure 64 Maternal mortality rates in LMICs

Source: Reproduced from (Kruk, Gage, Arsenault, et al., 2018)

There is evidence that changes to health systems can lead to improvements in population health. A USAID review of systematic literature reviews that assessed the effects of health systems strengthening interventions in LMICs concluded that "health systems strengthening interventions produce substantial positive effects on health status and health system outcomes" (Hatt *et al.*, 2015). These effects spanned across different types of outcomes, including reductions in mortality and morbidity, and improved service utilisation, financial protection and quality service provision. Interventions included in the analysis were innovations and reforms in the health system, e.g. in how and where health services are delivered, how they are organised and financed, and who delivers them. The review findings "demonstrate clearly that improvements to these systems components can improve the health of populations in LMICs".

Despite these findings, research on how to strengthen health systems received lower support than research directed biomedical discovery and development research. A review of research grants directed at childhood mortality that were funded by the US National Institutes of Health (NIH) and the BMGF between 2000-2004 concluded that the vast majority of grants supported pre-delivery research (Leroy *et al.*, 2007). No more than 3% of NIH grants and 23% of BMGF grants were relevant to research on delivery and utilisation. In 2014, the NIH invested close to USD30 billion in medical research, an amount close to 70 times the estimated for all donor HPSR funding in that same year (Grépin *et al.*, 2017).

Arguments for a shift of research funding (at least to some degree) from the development of new interventions towards research on the delivery and use of health technologies include:

- Effective technologies often exist, but do not meet their full potential in improving health outcomes. Issues are often rooted in 'non-medical' areas, such as logistics, deployment of personnel, and integration of interventions into existing health services (Leroy et al., 2007). Furthermore, new technologies are likely to encounter the same barriers that prevented current ones from achieving their potential.
- There is evidence that countries with similar levels of economic development have substantially different levels of health (see above). Health outcomes are affected by issues and bottlenecks within the health system; these can involve one or more components of the system (see Figure 60).
- Health systems strengthening interventions produce substantial positive effects on health status and health system outcomes (Hatt *et al.*, 2015). Research on health systems can thus provide insights and guidance underpinning interventions.

C.4. Factors affecting HPSR implementation and impact

C.4.1.Communicating and embedding HPSR to enhance use of research evidence

A key step on the path to impact is uptake and use of research evidence in policy-making and practice. Research evidence can be communicated through a variety of approaches. A study of how HPSR researchers engaged with policy makers in Nigeria observed four strategies (Uzochukwu, Onwujekwe, *et al.*, 2016):

- 1) Policymakers and stakeholders seek evidence from researchers
- 2) Researchers involve stakeholders in designing research objectives and engage throughout the research period
- 3) Research findings are actively disseminated to relevant stakeholders and policymakers
- 4) Activities to identify options for effective engagement between policymakers and researchers. This strategy is concerned with building the structures and environment to enable use of research evidence more broadly ('research on engagement')

There is evidence that policy makers are open to, and looking for, HPSR evidence (Bennett *et al.*, 2020). A recent study, including consultation with policy makers from LMICs across global regions, found that there was demand HPSR for a range of issues, including health financing, human resources for health, and service delivery. Key areas of interest highlighted included how best to strengthen primary health care and community-based systems, political factors affecting the adoption of accountability measures, as well as health worker reactions to such measures. Some modes of communication are more accessible and attractive for decision makers than others. In a study of HPSR uptake in two Nigerian states, more than 80% of evidence users consulted (46) indicated that policymaker workshops and partners' meetings were important channels for communicating research evidence (Onwujekwe *et al.*, 2019). Around 73% of cited short courses and conferences, and 65% policy briefs. There were no mentions of media or journal publications, latter being the preferred dissemination route of researchers consulted.

For research evidence to be used, it needs to correspond to decision-makers' needs and priorities. A systematic literature review to identify facilitators to and barriers of use of research

evidence by policymakers¹⁵ found that the most frequently reported facilitators were collaborations with researchers and relationship- and skills-building with policymakers (Oliver *et al.*, 2014). Barriers were poor access to good quality relevant research, and lack of timely research output. A survey of Ministries of Health yielded comparable findings; barriers identified were "a lack of locally relevant evidence, poor presentation of research findings and low institutional prioritisation of evidence use as significant constraints to evidence uptake" (Shroff *et al.*, 2017). Improved communication between researchers and decision-makers and increased availability of relevant evidence were identified as facilitators of evidence uptake.

To ensure that research is relevant to local needs and aligned with policy priorities, HPSR should thus actively involve decision-makers in the research process, e.g. through collaborative research models, a key enabler of success. For example, programmes aimed at increasing policymakers' capacity for using research evidence were more successful when partners 'accompanied' government partners through a flexible, tailored, collaborative approach that promoted ownership (Vogel and Punton, 2018). In the area of health research, a review of the Joint Global Health Trials Initiative highlighted collaboration and/or active engagement with policymakers and the policy process a key enabler of research use (Technopolis, 2019). Examples include embedding of a research project within a local health programme, researchers taking on advisory functions such as membership of guideline or national strategy committees, and local decision makers holding advisory functions related to the research projects. Similarly, a study of 30 project funded by the Ghanaian-Dutch Health Research for Development Programme, which aimed at increasing the use of research by ensuring it was locally relevant and led, found that 20 had contributed to action within a year (Kok et al., 2016). Research was most likely to be used when it was initiated and conducted by individuals who were in a position to use the results in their own work. In addition, involving potential key users in formulating proposals and developing recommendations was found to have contributed to the use of research.

Community engagement also plays an important role in enabling implementation. A recent evidence review on 'What works for health systems strengthening" concluded that "there is increasing evidence that governance-specific interventions, including civil participation and engaging community members with health service structures and processes, can lead to tangible improvements in health as well as better service uptake and quality of care" (Witter *et al.*, 2019). Similarly, research projects need to 'fit' the local context, including cultural and social components.

A recently developed conceptual framework for embedded implementation research sets out a model consisting of three stages: 1) Co-production of evidence, including problem identification and framing of data collection and analyses, 2) Engagement with evidence, including communication to the broader stakeholder universe and collaborative problemsolving based on research evidence, and 3) Enactment of programme changes, including negotiation, resource allocation, approval, and implementation (Figure 65) (Varallyay *et al.*, 2020).

¹⁵ The review focussed primarily on the health field, but was not specific to HPSR or LMICs.



Figure 65 Conceptual model for embedded implementation research

Source: Reproduced from (Varallyay et al., 2020)

An example of a programme of embedded research is the "Improving Programme Implementation through Embedded Research (iPIER)" initiative, which was implemented in 2014–2015 in Latin America and the Caribbean (Langlois *et al.*, 2019). iPIER implementation research projects engaged policymakers and implementers as leaders of the research and their involvement in all phases of the projects. An analysis of ten of these projects found that all of the studies produced improvement strategies informed by the research findings, including implementation strategies, operationalisation improvements and action plans. These were used to optimise the implementation and scale-up of health interventions. The main facilitating factors for uptake of research were actionability of findings and relevance of research questions to decision-makers. The main barriers were found to be the timeframe of policy implementation (extending beyond the duration of the research projects) coupled with the complexity of political processes.

Pathways to uptake of evidence are subject to organisational arrangements. For example, HPSR may be conducted by HPSR divisions or expert committees within the local Ministry of Health, by publicly-funded external organisations, or by privately-financed external institutions (Koon *et al.*, 2013). Decision-makers may also convene a task force of researchers before undertaking a major policy process (such as formulating a national policy). A review of how HPSR enters into the decision-making sphere found that the level of 'embeddedness' of the organisation generating HPSR evidence is a key factor in facilitating this step (Koon *et al.*, 2013). This is influenced by four qualities of the organisation: a reputation for producing quality outputs, capacity to conduct HPSR in areas where evidence is needed, as well as the quality and quantity of its connections to decision-makers. Leadership by, or substantial involvement of such embedded research organisations is hence an important enabler of HPSR.
Similarly, a study by researchers at a Nigerian university engaging with local policy makers on HPSR explored critical factors for supporting effective policy engagement and uptake of evidence (Uzochukwu, Onwujekwe, *et al.*, 2016). These included:

- Capacity and willingness of policymakers to seek and use research findings (even if these
 go against their expectations or against current policy). This is confirmed in a further study
 in the Nigerian context, which found that policymakers were either not aware of the
 availability of research findings that could inform the policies, or did not prioritise the time
 and effort required to read 'extensive research reports' (Uzochukwu, Mbachu, et al., 2016).
 The finding also indicates that researchers need to improve communications and tailor the
 outputs of their research to their target audience.
- Credibility of both the research findings and the researchers
- Relationship and trust between the researchers and policymakers
- Established policy networks and fora for discussion and information exchange
- International agendas driving national policy change

The study also identified four 'misunderstandings' between researchers and policy-makers:

- Researchers and policy makers consider each other's activity as generating products instead of engaging in processes
- Research aims to formulate research questions for which a clear and crisp answer can be provided, while policy making involves a broad range of variables such as interests, ideology, values, or opinions
- Researchers' and decision-makers' incentives are not aligned. Researchers prioritise attracting grant money and publishing in peer-reviewed journals; policymakers need evidence to inform policy decisions as they arise, in a timely manner. In support of this finding, findings from a survey of research institutions identified the lack of definitional clarity and academic incentive structures for HPSR as significant a constraint (Shroff *et al.*, 2017).
- Policy makers rarely convey clear messages about the policy challenges they face to allow for timely and appropriate research agendas. Researchers rarely take into account the audience for their research to tailor it accordingly.

A systematic review of capacity building for policymakers and planners relevant to mental health systems in LMICs found that few interventions to enhance capacity of this stakeholder group were described (Keynejad et al., 2016). Where implemented, capacity building mostly combined brief training with longer term mentorship, dialogue and/or the establishment of networks of support. However, the effectiveness of these capacity building activities was rarely assessed. One capacity building initiative that was evaluated was DFID's Building Capacity to Use Research Evidence (BCURE) programme which aimed to "increase the ability of xc in the South to use research evidence for decision making". The evaluation found that while BCURE was initially framed as a technical rather than political intervention, experiences in implementing the programme highlighted "the essential importance of understanding and responding effectively to political economy opportunities and constraints when attempting to promote evidence use. This chimes with recent insights from the broader literature, which emphasises the messy, political nature of evidence use in policymaking, and the importance of moving away from 'rational' understandings of policy processes towards a deeper understanding of the political and power dynamics that affect the extent to which evidence is used." (Vogel and Punton, 2018)

However, even where policymakers are aware and willing to use research evidence, broader external factors and the policy environment strongly influences uptake. For example, a study of HPSR uptake into policy in two Nigerian states found that while policymakers' level of awareness of evidence to inform policy was high, this did not translate to significant actual use, including due to a lack of autonomy in decision making (Onwujekwe *et al.*, 2019). Other external factors that enable (or challenge) use of HPSR evidence include the presence (or absence) of legislation governing the use of HPSR, historical precedence of relying on evidence to inform policy, research background of key decision-makers, an active civil society, networks or fora bringing decision-makers in contact with evidence generators, established communication channels between actors (e.g. policy-briefs, updates, emails), responsive channels for quickly sourcing evidence, and open access to centrally-located HPSR (Behague *et al.*, 2009; Koon *et al.*, 2013).

A recent review of a research funding programme – the Joint Global Health Trials Initiative examined enablers of and barriers to policy influence, implementation, and scale-up encountered (Technopolis, 2019). The study showed that engagement of decision makers with research projects had helped to raise awareness of and interest in research evidence. A model of conditions enabling policy and health outcomes based on the review findings was developed (Figure 66). This model separates enablers into two categories:

- Enablers driven by utility of data and external conditions, dictating whether research evidence 'can' (in principle) be used and implemented
- Enablers driven by human factors (awareness, understanding, and buy-in), dictating whether individuals involved in the process 'want to' respond to the change warranted by the research evidence

	Policy	Implementation	Scale-up	
	"Can use"	"Can implement"	"Can scale up"	
Utility of research evidence	 Research evidence: Demonstrates conclusive option for uptake into policy Is not in conflict with existing evidence OR Is of sufficient strength to demonstrate superior policy option, over conflicting evidence To avoid delay in uptake: Is reported at the right point in the policy cycle 	 Implementing organisation: Can afford the change/ intervention (if cost implication) All necessary conditions to implement the change are in place, incl.: community acceptance necessary infrastructure healthcare worker skills communication channels and organisational change capacity secure conditions, e.g. no war, environmental disasters 	Research evidence: • Is relevant to and can be applied to other contexts; 'generalisable'	
20	"Want to use"	"Want to implement/adopt"	"Want to scale up"	
Stakeholde knowledge	 Policy makers: Are aware of / involved in research and understand options for take up into policy 	 Implementing organisation: Can overcome potential resistance to change within the system 	Policy makers and implementing organisations outside the study context:	

Figure 66 Model of conditions enabling policy and health outcomes

 Are aware of the health systems need the research addresses 	 Has bought into the policy change; feels a level of ownership 	 Are aware and interested in intervention
Have prioritised the policy addressed in research		 Can overcome potential resistance
 Feel a level of ownership over research and policy option (buy-in) 		present in other contexts

Source: Adapted from (Technopolis, 2019)

C.4.2.LMIC research leadership and participation

Involvement of LMIC researchers in HPSR – as leaders or co-Pls - is considered an important enabler of HPSR with the potential to lead to impact (see C.4.1). LMIC researchers can draw on their extensive knowledge of the local context and circumstances, established relationships with key stakeholders in the system, and local language proficiency (Hasnida *et al.*, 2017). This increases the validity of results, e.g. their suitability for local implementation and acceptance, as well as the likelihood that results are actually used. Local leadership also ensures that incountry research capacity and connectivity between researchers and policy makers is bolstered, thus supporting sustainability of impact.

However, the level to which research is led by researchers from LMICs in HPSR trails that of HICled research. A bibliometric analysis of HPSR publications between 2003 and 2009 focussed on LMICs found that only 4% of the studies were led by authors from low-income countries (LICs) (Adam *et al.*, 2011). This was mirrored in a survey of LIC institutions which concluded that the level of experience of their researchers had seen only minimal change, despite improvements in infrastructure. LMIC researchers may not be full participants in HPSR networks: An analysis of countries of origin of participants and presenters at five global symposia on health systems research that while 96% of the primary data were collected in LMICs, 56% of first authors were based in HICs, compared to only 8% in low-income countries (Hasnida *et al.*, 2017).

The situation has improved, at least for a subset of LMICs: More recent figures show that while HICs provided lead authorship in the 1990s, lead authorship from upper middle income countries was on par with that of HICs over the 1990-2015 period (English and Pourbohloul, 2017a). In addition, the analysis showed that research networks had evolved, from a situation in the 1990s where research groups operated mainly independently, to more than half of the authors being part of a co-authorship network by 2015. Within this network, a strongly connected cluster influenced by Upper Middle Income Countries emerged, mainly Brazil, China, South Africa, Iran and Thailand, acting as a hub to connect authors from all economic regions. The Lower Middle Income Countries participating in the research network are predominantly India, Pakistan, Kenya and Nigeria.

An analysis of 152 HPSR training courses available in 2014 showed that most were embedded in a master's degree programme offered in English (Tancred *et al.*, 2016). Few courses were available in central and eastern Europe, the Middle East, North Africa or Latin America, and many institutions lacked the critical mass of trained individuals needed to support doctoral and postdoctoral students. In addition, there was little between institutions in definitions of the competencies required for HPSR. To supporting further building of HPSR capacity, in LMICs and globally, the study concludes that efforts to define and develop the field and strengthen the training and mentorship capacity of global networks, institutions and individuals need to continue.

C.4.3. Challenges for HPSR

This literature review identified number of (often interrelated) challenges to planning, implementing and evaluating HPSR projects. These include:

Assessing effectiveness in complex health systems, including the broad range of actors and long timeframes involved: Implementing interventions can be challenging, as this may involve complex changes in clinical routines in collaborative patterns among different healthcare providers and disciplines; in the behaviour of providers, patients or other stakeholders; or in the organisation of care (Pantoja et al., 2017). In addition, health systems operate in broader contexts that are strongly influenced by individuals, as well as broader social, political, and economic settings (Sheikh, George and Gilson, 2014). These complex and changing environments make it difficult or impossible to robustly assess effectiveness of an intervention and to find suitable comparison areas (Hatt et al., 2015). In addition, linking health systems strengthening interventions to health outcomes is hampered by the longer time horizon for effects of some systems-level interventions to be observed, and measured, and by potential interaction with other interventions implemented within this timeframe. For example, an evaluation of a programme supporting primary health care delivery systems concluded that "variety and inclusiveness of concerned key players are necessary to address complex health system issues at all levels" and that "five to seven years is the minimum time frame necessary to effectively implement complex health system strengthening interventions and generate the evidence base needed to advocate for sustainable change" (Rwabukwisi et al., 2017).

It has been argued that the challenge of measuring systems-level outcomes has not been adequately addressed, and that current programme evaluation fail to address donor needs: to demonstrate value for money for investments in health systems in a way that recognises and reflects the complexity of the health system and avoids reductionism, and to test system strengthening strategies 'in the lab' in order to understand them and optimise design (Borghi and Chalabi, 2017). Rather than applying a systems-thinking perspective, evaluation methods employed tend to isolate, quantify and compare population-level effects of strategies aimed at strengthening <u>a particular part</u> of the system (e.g., financing vs governance) – thus treating the health system as static, one-dimensional and linear. The authors argue for increased use of complexity science methods to rectify this issue.

Context-specificity of research findings and recommended interventions: It can be difficult to draw generalisable conclusions from HPSR studies conducted in one country, at a specific point in time; what works in one setting and time might not work elsewhere (Alliance for Health Policy and Systems Research, 2007). In addition to existing 'external' conditions, contextual influences also affect the daily practice of health systems through the experiences, mindsets, and values that shape the behaviours of the actors within it (Sheikh, George and Gilson, 2014). To address these issues and disentangle the effects of context, comparative studies in multiple locations are needed. However, knowledge is unlikely to be broadly generalisable; interventions need to be adapted to different contexts, requiring monitoring and iteration. Thus, countries need their own analytical capacity to trace health system changes and adapt interventions as needed (again highlighting the need for training and local leadership, see C.4.2) (Bennett, Frenk and Mills, 2018). Supporting this point, an evaluation of a programme aimed at strengthening primary health care delivery systems concluded that a critical factor for success is "a learning culture that promotes evidence creation and ability to efficiently adapt were key in order to meet changing contextual needs" (Rwabukwisi *et al.*, 2017).

Gaps in HPSR activity: A study examining the characteristics of 791 implementation research in LMICs over the 1998 to 2016 period found that less than 5% of the less than 5% of studies addressed problems of scale-up and sustainability of interventions, highlighting a gap in

research activity (Alonge *et al.*, 2019). This highlights a disconnect between supply and demand: Whereas most studies centred on evaluation of an intervention, key implementation questions in most settings are concerned with how to scale up or sustain an intervention within a practice area or population. In addition, the analysis found that most studies had <u>not</u> been conducted under routine conditions for management and financing. This limits the extent to which learning can be applied to commonly found conditions and reduces the level to which findings can 'flow' into the health system and/or routine practice. A bibliometric analysis of HPSR publications published between 2003 and 2009 showed that a small share of studies had addressed the areas 'Medicines' (1.8%) and 'Health information systems' (5.3%) (Adam *et al.*, 2011). An evidence review of 'What works for health systems strengthening' found that there is a substantial body of evidence on service delivery and financing, but very little on health information and supply chain management (Witter *et al.*, 2019).

Given the complexity of health systems, with many interrelated components, unresolved issues in some areas can limit progress of an intervention and the system as a whole. Thus, a study exploring barriers that impeded scale-up of interventions identified a range of factors, including the complexity of the intervention and lack of technical consensus, as well as limited human resource, leadership, management, and health systems capacity (Yamey, 2012).

A lack of data for LMICs in areas contributing to HPSR: The current evidence base and/or routine data gathered which informs HPSR in HIC is not available for many LMICs. For example, little is known about the quality of care for a range of indications, such as respiratory diseases, cancer, mental health, injuries, and surgery, and some patient groups, such as care of adolescents and elderly people (Kruk, Gage, Arsenault, et al., 2018). To fill these gaps requires better routine health information systems for monitoring as well as research on system-wide improvement strategies, evaluating the effects and costs of improvement approaches on health, patient experience, and financial protection. Other knowledge gaps with respect to low-income country contexts include the area of social values, with a limited level of empirical work focussing on this area (Whyle and Olivier, 2020).

Perceived lack of rigour of HPSR: Health scientists and physicians schooled in discovery science are less comfortable with methods used in HPSR, which employ a range of social science approaches in order to probe questions dealing with the complexity of health systems as well as contextual factors (Alliance for Health Policy and Systems Research, 2007). This can affect trust in HPSR and motivations to participate and/or act on findings. The ESSENCE (Enhancing Support for Strengthening the Effectiveness of National Capacity Efforts) initiative sets out a number of trade-offs that may be necessary given that research needs to take account of existing structures and processes as well as deal with the complexity of health systems (ESSENCE on Health Research, 2020):

- Weighing up the thoroughness of the process versus the urgency of the required information of behaviour change
- Staying faithful to or adapting existing implementation protocols
- Choosing locally embedded versus externally identified and verified approaches
- Seeking generalisable knowledge or solving context-specific problems
- Designing implementation research and related administrative processes in ways that encourage and support researchers and their institutions, rather than focussing primarily on meeting funders' requirements

Tight projects budgets may also affect the level of rigor and 'generalisability' of HPSR, e.g. with study budget only stretching to accommodate single case studies (Alliance for Health Policy and Systems Research, 2007).

Lack of funding for HPSR: To date, HPSR has received a relatively low level of support compared to other types of health research. In 2014, the NIH invested close to USD30 billion in medical research, an amount close to 70 times the estimated for all donor HPSR funding in that same year (Grépin *et al.*, 2017) (see section C.3). Research institutions and stakeholders highlight limited research funding as a key challenge to HPSR (Uzochukwu, Mbachu, *et al.*, 2016; Uzochukwu, Onwujekwe, *et al.*, 2016; Shroff *et al.*, 2017). An increase in funding for demand-driven and LMIC-led research has been proposed to address this issue and enhance translation of research into action, coupled with channelling this funding through nationally embedded programmes (Hasnida *et al.*, 2017). This shift would also support building HPSR communities beyond English-speaking countries and reducing the dependency on Northern scholars with limited language abilities beyond English.

Reviewing 'good practice' in funding implementation research, a recent report by the ESSENCE initiative highlights seven overarching approaches for funding organisations to consider when investing in implementation research to enable impact (ESSENCE on Health Research, 2020):

- Include all stakeholders from the inception of the research process. Funders are in a
 position to mandate and facilitate partnerships between researchers and end-users,
 but must remain alert to process issues and be willing to work iteratively and/or offer
 supplementary training for various stakeholders. This can also include funding new
 platforms that link funders and researchers with practitioners and policymakers.
- 2. Embrace the diversity of being involved in implementation research. Funders investments tend to be guided by their organisations' strategic plans; however, implementation research may require a longer timeline and the ability to fund a broader range of organisational types. In the short term, a more ad hoc approach to funding implementation research can produce results; in the long-term, organisations may need to shift strategic thinking and planning to fully embrace this type of research.
- 3. Expect and enable implementation research practices to evolve. As new methodologies and frameworks for implementation research are emerging, funders and research institutions need to remain alert and responsive to the challenges and opportunities these offer.
- 4. International partnerships are important; join one or form one. By pooling expertise and resources, funders increase the likelihood that interventions will make an impact beyond discovery research, and create sustainable health improvements.
- 5. Integrate training, mentoring and fellowships into implementation research programmes. There is a need for capacity building linked to implementation research, at the level of funders, researcher, health practitioners and policymakers.
- 6. Communicate funding criteria clearly. With many definitions and frameworks in use, it is crucial to clearly state the specifications and review criteria, and enable LMIC researchers to compete, in the absence of formal training or mentorship in proposal writing.
- 7. Embed implementation research into health systems. Outcomes of research projects must be envisioned and designed to become an integral part of health systems.

Appendix D HPSR funding – organisations and programmes

D.1. Funding organisations supporting activities relevant to HPSR

This section provides a brief introduction to some of the primary funding organisations of HPSR, followed by a description of individual funding activities and programmes relevant to HPSR (section D.2). Funders of HPSR include different types of organisations, such as government research funding bodies (e.g. NWO, NIHR), aid agencies (e.g. USAID, Norad, Sida), as well as charitable foundations (e.g. Doris Duke Foundation, Bill & Melinda Gates Foundation).

D.1.1. NWO-WOTRO Science for Global Development

The NWO is the Dutch Research Council, and the country's largest research funder with an annual budget of about €1 billion. NWO-WOTRO Science for Global Development is a domain-overarching initiative within the NWO, spanning the organisation's four main domains.¹⁶

WOTRO funds research for inclusive global development and aims to provide knowledge and skills that contribute to sustainable solutions for social and ecological problems in LMICs. WOTRO has a particular focus on collaboration with local partners and on ensuring the sharing and use of research results.

WOTRO is governed by an autonomous steering committee responsible for policy and strategy, and it is managed by a dedicated WOTRO office within NWO.¹⁷

D.1.2. National Institute of Health Research (NIHR)

The UK's National Institute of Health Research (NIHR) was established in 2006 aim to improve the health and wealth of the UK through research. Since 2016, the NIHR has also funded applied global health research and training to the benefit of LMICs using Official Development Assistance (ODA) funding.

The Global Health portfolio now accounts for about 10% of NIHR's total spend and includes programmes such as the Global Health Research Groups, the NIHR Research and Innovation for Global Health Transformation (RIGHT) as well as the Global Health Policy and Systems Research (HPSR) programme.¹⁸

D.1.3. United States Agency for International Development (USAID)

The United States Agency for International Development (USAID) administers foreign aid and development assistance, thus "promoting broad-scale human progress".¹⁹ At the same time, USAID "expands stable, free societies, creates markets and trade partners for the United States, and fosters good will abroad". The United States provided a total of USD34.6 billion in ODA in 2019.

USAID's Health System Strengthening (HSS) activities deploy resources specifically to improve one or more of the core functions of health systems in a sustainable fashion. The agency aims

¹⁶ "Connecting Science and Society: NWO Strategy 2019-2022", Netherlands Organisation for Scientific Research, 2018, available at: <u>https://www.nwo.nl/en/strategy-nwo-2019-2022</u>

¹⁷ https://www.nwo.nl/en/wotro-science-global-development

¹⁸ Annual Report 2018/2019, NIHR, March 2020.

¹⁹ https://www.usaid.gov/who-we-are

to "help countries, their people and institutions, improve health outcomes over the long term"²⁰. To this end, USAID works in partnership with the public and private sectors. Support for HSS contributes to progress towards USAID's priority global health goals of Preventing Child and Maternal Deaths, Controlling the HIV/AIDS epidemic, and Combating Infectious Disease.

The US also supports global health security work through its Global Health Security (GHS) Agenda, an interagency initiative by USAID and the US' Centers for Disease Control and Prevention (CDC), which aims to drive progress on preventing, detecting, and responding to infectious disease threats.

D.1.4. Norwegian Agency for Development Cooperation (Norad)

Norad is a directorate within the Norwegian Ministry of Foreign Affairs responsible for Norwegian development aid. The agency has an annual budget of more than £2 billion. Among its tasks are quality assurance, monitoring, and evaluation of Norwegian aid measures, and managing grant programmes.²¹

'Global Health' is an important thematic area in Norwegian aid policy, and includes the following priorities:

- Women, children and adolescents' health
- Sexual and reproductive health and rights
- Epidemics of HIV, TB, malaria, hepatitis, neglected tropical and other communicable diseases
- Global Health Security and enhanced capacity to detect and respond to epidemics and health emergencies
- Building cross sectoral collaborations and stronger health systems

Norwegian health aid has quadrupled from approx. £100m in 2000 to more than £400m in 2016. A large proportion, about 80% in 2016, is implemented through multinational organisations and global funds. Among other things, Norad contributes to initiatives relevant to health systems research such as the Alliance for Health Policy and Systems Research (AHPSR) and Global Vaccine Alliance (GAVI), both described below.²²

D.1.5. Swedish international Cooperation Agency (Sida)

Sida is Sweden's government agency for development cooperation, reporting to the Ministry for Foreign Affairs. Its main assignments include supporting policy and strategy development in the area of international development cooperation, implementing strategies and managing interventions monitoring and evaluation. Sida is responsible for about half of Sweden's overseas aid budget, about £3.7bn in 2019.²³

Sida's support for HSS focusses on support for nationally owned plans and strategies. Funding is often aligned with broader support actions, and provided through pooled funds managed by government or international organisations such as the UN or the World Bank.²⁴ For example,

²⁰ <u>https://www.usaid.gov/global-health/health-systems-innovation/health-systems-strengthening</u> Accessed 23 Nov 2020

²¹ <u>https://www.norad.no/en/front/about-norad/</u>

²² https://www.norad.no/en/front/thematic-areas/global-health/how-norway-works-with-global-health/

²³ <u>https://www.sida.se/English/About-us/About-Sida/</u>

²⁴ "Health Systems Strengthening", Sida Health Brief, February 2016

Sida supports the United Nations Population Fund (UNFPA)²⁵ and is one of the core sponsors of the AHPSR (see below).

D.1.6. Bill and Melinda Gates Foundation (BMGF)

The Bill and Melinda Gates Foundation (BMGF) is the largest charitable foundation in the USA, with an endowment of USD54.8bn and direct grant support of USD5.1bn in 2019.²⁶

The BMGF takes a proactive approach to project funding: Programme officers identify ideas for activity in consultation with stakeholders including researchers and policy makers.²⁷ Ideas are further developed into research proposals through direct solicitation and discussion with one or more organisations, which may subsequently be invited to submit a proposal. The foundation thus typically collaborates with grantee and partner organisations to develop activities that align with its strategic priorities.

Activities funded through the BMGF's Global Delivery Programs, part of the Global Development Division, aim "to improve the delivery of health products and services and promote health system innovations so countries can significantly reduce maternal and child mortality, improve disease control, and advance health equity".²⁸ To achieve this, the BMGF focusses on "helping health systems significantly improve their performance and expand the reach and impact of products". Funded research seeks to identify new approaches to improving the efficiency and effectiveness of health systems and primary care delivery. Among the BMGF's priorities are vaccine coverage and health system reforms (including integration with the private sector), expanding coverage of basic services, building the health care workforce, and ensuring the quality and availability of services and products.

BMGF sponsors several initiatives relevant to health systems strengthening, including the Alliance for Health Policy and Systems Research (AHPSR), e.g. the PRIMASYS case study project, and the GAVI vaccine alliance (both described below).

D.1.7. Doris Duke Charitable Foundation

The Doris Duke Charitable Foundation (DDCF) was established in 1996 with the mission to improve the quality of people's lives through grants, as well as through preservation of the legacy of Doris Duke's properties. Headquartered in New York City, the foundation has an endowment of USD1.9bn (2019) and has given out grants of a total value of USD1.7bn to date. DDCF grants typically range in value from USD100k to USD1m and run over several years. ²⁹

The DDCF has four main programme areas – Arts, Environment, Medical Research, and Child Well-Being. The Medical Research Program supports clinical research through two main funding streams:

- 'Encourage and Develop Clinical Research Careers' in support of US scientists
- 'Advance Biomedical Research and Innovation' in targeted disease areas.³⁰

²⁵ <u>https://www.sida.se/English/press/current-topics-archive/2020/strong-health-systems-are-crucial-in-the-fight-against-pandemics/</u>

²⁶ https://www.gatesfoundation.org/Who-We-Are/General-Information/Foundation-Factsheet Accessed 23 Nov 2020

²⁷ BMGF. How we work. https://www.gatesfoundation.org/How-We-Work Accessed 23 Nov 2020

²⁸ <u>https://www.gatesfoundation.org/What-We-Do/Global-Development/Global-Delivery-Programs</u> Accessed 23 Nov 2020

²⁹ <u>https://www.ddcf.org/about-us/mission-and-history/</u>

³⁰ https://www.ddcf.org/what-we-fund/medical-research/goals-and-strategies/?id=1544

Although the DDCF has provided some grant funding for research into AIDS treatment and care in Africa, the Medical Research Program primarily supports clinical research in the US.³¹

In addition to the established programme areas, new grant initiatives are launched based on internal research to establish new needs and gaps in the current provision. This included the African Health Initiative (AHI), which was launched in 2007 with the aim to support the development of health care systems in South-Saharan Africa to tackle broader health challenges beyond specific disease areas.³²

D.2. Funding programmes relevant to HPSR

D.2.1. Introduction

Health systems research addresses questions that affect some or all of the building blocks of a health system ('horizontal' approach), rather than focussing on how a specific disease is addressed in a given health system ('vertical'). However, delivery partnerships, such as the Global Fund and the GAVI Alliance (see below) and research programmes focussed on specific disease interventions or technologies, such as the Global Alliance for Chronic Diseases³³, and the Norwegian Research Council's Globvac programme³⁴, often include research relevant to the implementation of interventions and to health systems.

Support for this type of research is often complex and perhaps as a consequence, often undertaken by partnerships and alliances rather than by individual funding bodies on their own, and with a strong emphasis on local stakeholder engagement and take-up.

The following section provides an overview of four programmes with a focus on HPSR, as well as one 'vertical' partnership (the GAVI Alliance). This is not an exhaustive list - other funders, including those supporting the HSRI - also support HPSR as part of other initiatives. For example, DFID (now FCDO) has funded a number of consortia focussed on health systems in the past, including the Future Health Systems consortium (2005-2018)³⁵, the ReBUILD consortium (2011-2019)³⁶, and the RESYST consortium (2010-2018) which was preceded by Consortium for Research on Equitable Health Systems from 2005 to 2010³⁷.

D.2.2. Doris Duke - African Health Initiative

The African Health Initiative (AHI) was launched in 2007 with the overall aim to "catalyse significant advances in strengthening health systems by supporting partnerships that will design, implement and evaluate large-scale models of care that link implementation research and workforce training directly to the delivery of integrated primary healthcare in sub-Saharan Africa."³⁸

In **Phase 1** (2009 to 2015), the AHI supported five teams from US universities to implement proofof-concept projects called 'Population Health Implementation & Training (PHIT) Partnerships' in

³² https://www.ddcf.org/what-we-fund/african-health-initiative/why-put-health-systems-first/

³¹ Bassett et al. From the ground up: Strengthening health systems at district level. BMC Health Services Research, 13(SUPPL.2), S2, 2013

³³ <u>https://www.gacd.org</u> Accessed 23 Nov 2020

³⁴ <u>https://www.forskningsradet.no/siteassets/publikasjoner/1254031414810.pdf</u> Accessed 23 Nov 2020

³⁵ <u>http://www.futurehealthsystems.org</u> Accessed 23 Nov 2020

³⁶ https://rebuildconsortium.com/about/about-the-rebuild-consortium/ Accessed 23 Nov 2020

³⁷ https://resyst.lshtm.ac.uk/about Accessed 23 Nov 2020

³⁸ <u>https://www.ddcf.org/what-we-fund/african-health-initiative/</u>

a geographical area of Sub-Saharan Africa with a population of at least 250,000 people. Each project was supported by a grant of \$8-15m for a period of five to seven years. The projects tested a variety of interventions to strengthen local health systems and trained local staff in implementation research. The projects aimed to 1) Significantly and measurably improve health, 2) Strengthen the health systems in the region, and 3) Increase the knowledge for evidence-based health delivery and health systems planning by conducting implementation research.³⁹

In **Phase 2** (from 2016), the AHI supports three large-scale health system strengthening partnerships to build on Phase 1 projects in order to 1) replicate, evaluate and scale up interventions that achieve measurable, significant health improvements, and 2) develop national, regional and/or district-level platforms – incl. ministries, universities, and funders – that use existing health and implementation research to enable the entire health system to become more responsive to the population's changing contexts and needs.⁴⁰

D.2.3. Netherlands Global Health Policy and Health Systems Research (GHPHSR) programme

The GHPHSR was launched in 2009 by the Dutch Ministry of Foreign Affairs and the Ministry of Health to support research and bilateral cooperation between the Netherlands and low-income countries (LICs). The it had three overall aims: ⁴¹

- Contribute to better health by funding research aimed at strengthening health systems in LICs with a particular focus on Africa.
- Strengthen research capacity in LMICs.
- Strengthen collaboration in the Dutch research and knowledge community to enhance the use of Dutch research capacity to tackle health issues in LICs.

The programme was seen to be relevant to the UN's Millenium Development Goals (MDG) 4, 5, and 6 – and subsequently to Sustainable Development Goal 3 (SDG 3): "Ensure healthy lives and promote well-being for all at all ages".⁴²

The programme was developed and managed by the Dutch Research Council (NWO) through their Science for Global Development division, NWO-WOTRO. It was implemented through three calls for proposals supporting multidisciplinary research with focus on stakeholder engagement.

The programme's two first rounds of calls funded eight projects, which were subsequently divided into three thematic clusters:⁴³

- Antenatal and maternal health (4 projects)
- Health financing (2 projects)
- Community empowerment (2 projects)

To complement the projects, the third call for proposal funded a Knowledge Translation Network (KTNet) to help researchers from the eight projects to translate and disseminate

³⁹ <u>https://www.ddcf.org/what-we-fund/african-health-initiative/phase-1/</u>

⁴⁰ <u>https://www.ddcf.org/what-we-fund/african-health-initiative/phase-2/</u>

⁴¹ <u>https://www.nwo.nl/en/researchprogrammes/global-health-policy-and-health-systems-research</u>

⁴² "Netherlands Global Health Policy and Health Systems Research (GHPHSR) programme: Final evaluation", Technopolis Group, 12 February 2018.

⁴³ "Global Health Policy and Health Systems Research Programme: Impact and lessons learned", Netherlands Organisation for Scientific Research, 2016, p. 31.

findings across African countries. The third call for proposals was implemented in 2012 and the last projects concluded in 2017.

D.2.4. NIHR Global Health Policy and Systems Research (HPSR)

Global HPSR was introduced as a priority for the NIHR in 2018-19. Following a range of stakeholder engagement activities, Health Services Research UK (HSRUK) were commissioned to undertake and independent scoping study, which formed the basis for the recommendations to establish the Global HPSR programme.

The HPSR supports applied health services and systems research that can strengthen and improve health systems in LMICs at all levels, including the micro-level (patients and practitioners), meso-level (organisation and delivery of healthcare), and the macro-level (health policies and systems).

Three types of awards are used to implement the programme:

- Development awards, aimed to develop partnerships and research planning in preparation of a future funding bid (up to $\pm 100,000$ for 9 months)
- Commissioned Awards to support consortia of 3-5 institutions, aiming to build equitable partnerships and create new knowledge to tackle priorities for health systems in LMICs (up to £4m for 4 years).

Research plans are required to build on established partnerships between two joint lead applicants - one from an LMIC and one from a UK institution, and can include further collaborators. Proposals need to draw on LMIC-led needs analyses, which refine research questions and priorities through engagement with policy makers, evidence users and/or local communities. The selection criteria also require an assessment of training and capability needs and how to best address them, particularly in low resourced settings.

A call was launched in 2019 focussing on the following four themes:44

- Integrating health services
- Quality of care
- Health workforce management and planning
- Improved data quality and use
- A 'Researcher-led call' is expected to be launched in 2021⁴⁵

D.2.5. Alliance for Health Policy and Systems Research (AHPSR)

The AHPSR is an international partnership under the aegis of the World Health Organization (WHO). It was established in 1999 to improve health in LMICs through support for the creation and use of evidence that strengthens health systems.

The partnership's most recent strategic plan defines four strategic objectives:46

• Provide a unique forum for the health policy and systems research community

⁴⁴ <u>https://www.nihr.ac.uk/documents/nihr-global-health-policy-and-systems-research-global-hpsr-programme-remit-and-guidance-for-the-commissioned-awards-call/22165</u>

⁴⁵ "NIHR Global Health Research", Presentation by Dr Nicola Commander, 30th September 2020.

⁴⁶ "Strategic Plan 2016-2020: Investing in Knowledge for resilient health systems", WHO and the Alliance for Health Policy and Systems Research, 2016.

- Support institutional capacity for the conduct and uptake of health policy and systems research
- Stimulate the generation of knowledge and innovations to nurture learning and resilience in health systems
- Increase the demand for and use of knowledge for strengthening health systems

The AHPSR has supported over 326 projects in 73 countries since 1999,⁴⁷ and currently has 16 ongoing projects with 111 grants in 42 countries.⁴⁸ This includes a great variety of different types of activities, for example:

- The Learning Engaging and Advocating for Policy and Systems Research (LEAP) Forum working to coordinate efforts across global actors working in health policy and systems research, share knowledge and promote research that is embedded in health systems⁴⁹
- Systematic Review Centres to produce systematic reviews addressing questions of how to improve the performance of health systems⁵⁰
- Primary Health Care Systems (PRIMASYS) supporting the development of 20 case studies focussed on primary health care systems in LMICS (supported by the Bill & Melinda Gates Foundation)⁵¹

The AHPSR has an annual cost of about \$7-10m. It receives core financial support from the Norwegian agency for Development Cooperation (Norad), the Swedish International Development Cooperation Agency (Sida) and the UK Department for International Development (DFID). Other donors include the Bill & Melinda Gates Foundation, the Doris Duke Charitable Foundation, GAVI, and USAID among others.⁵²

D.2.6. Global Alliance for Vaccines and Immunisation (GAVI)

GAVI was established in 2000 with the aim of increasing immunisation rates by pooling demand for vaccines from the poorest countries and encouraging manufacturers to lower prices in exchange for a stable high-volume demand.⁵³ GAVI's four founding partners are the World Health Organization, UNICEF, the World Bank and the Bill & Melinda Gates Foundation. In addition, GAVI also works with a variety of doners from national governments and private organisations.

GAVI has supported Health System Strengthening, in the context of its overall aims, since 2006, with investments gradually increasing to USD331m in 2019.⁵⁴ Its current strategy for the period 2020-2025, includes health systems strengthening under the 'equity goal', which defines three main objectives for strengthening health systems:⁵⁵

• Help countries extend immunisation services to regularly reach under-immunised and zerodose children to build a stronger primary health care platform

⁴⁷ <u>https://www.who.int/alliance-hpsr/projects/en/</u>

⁴⁸ Alliance for Health Policy and Systems Research. (2020). 2019 Annual Report. World Health Organization (WHO).

⁴⁹ <u>https://www.who.int/alliance-hpsr/leap/en/</u>

⁵⁰ <u>https://www.who.int/alliance-hpsr/projects/systematic_reviews/en/</u>

⁵¹ <u>https://www.who.int/alliance-hpsr/projects/primasys/en/</u>

⁵² "Alliance for Health Policy and Systems Research: 2018 Annual report", p. 19.

⁵³ https://www.gavi.org/our-alliance/about

⁵⁴ GAVI Annual Progress Report 2019, p. 24

⁵⁵ <u>https://www.gavi.org/our-alliance/strategy/phase-5-2021-2025/equity-goal</u>

- Support countries to ensure immunisation services are well-managed, sustainable, harness innovation and meet the needs of caregivers
- Work with countries and communities to build resilient demand, and to identify and address gender related barriers to immunisation

Support for health systems is set out in the 2016 Health System and Immunisation Strengthening (HSIS) Support Framework. The main instrument is the Health System Strengthening (HSS) grants which are given to address health system bottlenecks to equity in immunisation coverage. Funding ceilings for each country are calculated using the HSS Resource Allocation Formula for a 5-year GAVI strategic period. In addition, GAVI offers a number of complementary allocations, including performance payments and vaccination introduction grants (VIG) among others.⁵⁶

D.3. Impact indicator frameworks and monitoring processes employed for HPSR

Measuring impact on complex systems, such as health systems, is challenging given the many actors, contextual factors and external influences, and long timeframes involved.

A review of indicators frameworks and metrics of HPSR research funding programmes found that monitoring processes employed 'traditional' indicators, i.e. those related to activities undertaken and research publications. Where additional evaluation was available, these tended to be conducted externally, at one or more points during programme implementation.

On the other hand, two programmes – the Doris Duke AHI and GAVI – employed a detailed set of health indicators. These are specific to health issues and patient populations targeted by the initiatives, rather than measuring impacts on the health system as a whole.

The following section provides a brief overview of approaches to monitoring and evaluation of five programmes.

D.3.1. Netherlands Global Health Policy and Health Systems Research (GHPHSR) programme

The programme initially adopted a 'light touch' approach to monitoring and evaluation, requiring applicants to set out their own plans in their proposals. It was foreseen that projects would be monitored after two years, for a mid-term programme review, and again for a final programme evaluation. Subsequently, following an intervention by the programme steering committee, a stronger framework was put in place whereby the programme secretariat would be responsible for monitoring progress and annual progress reporting.⁵⁷

For the mid-term review, research teams were required to submit self-assessment progress reports, and site visits were carried out with participation of external reviewers. For the final evaluation, interviews and an online questionnaire were carried out, covering programme participants and stakeholders.⁵⁸ However, an external evaluation of the GHPHSR concluded that no measurable indicators had been formulated to trace the programme's impact on health systems, policies and practice.

⁵⁶ "Gavi, the Vaccine Alliance - Health System and Immunisation Strengthening (HSIS) Support Framework", 2016, retrieved from: <u>https://www.gavi.org/programmes-impact/programmatic-policies/hsis-support-framework</u>

⁵⁷ Technopolis Group (2018) GHPHSR final evaluation, op. cit, p. 20.

⁵⁸ lbid., p. 12

D.3.2. NIHR Global Health Policy and Systems Research (HPSR)

The programme was launched in 2019, and many projects have yet to start. No evaluations have been undertaken to date, and It is therefore too early to report on results.

As part of their bids, applicants are required to specify the expected 'pathway to impact' for draft theory of change detailing expected impacts. They should also demonstrate Value for Money and describe any plans for evaluation and impact tracking.⁵⁹ Researchers funded by the NIHR are required to report annually to the Researchfish® database, including for the five years following the conclusion of the research award.

D.3.3. Alliance for Health Policy and Systems research (AHPSR)

The main sources of evaluation and monitoring data for the AHPSR are external reviews conducted in 2010 and 2014, as well as their annual reports. In addition, external evaluation has been commissioned in 2020.

Among the main conclusions from the 2014 review were:

- The programme is delivering its agreed workplan
- The programme is recognised for its leadership, raising the profile of HPSR, defining the field, and being an advocate for investment.
- Priority-setting was found to not always be systematic or transparent, and there was a perception that choices influenced by agendas of donors and individual researchers
- Stakeholder engagement with the research community was good, but communication and collaboration with users, primarily policymakers in target countries, was found to be less systematic

Specifically on impact monitoring, the external review noted that despite the fact that a number of monitoring documents had been produced, there was a "lack of a rigorous results framework". It recommended a stronger focus on metrics relating to outcomes and impacts (p. 38), as opposed to activities and outputs.⁶⁰

The table below summarises indicators, broadly aligned with the programme objectives, extracted from the most recent annual report:

Section	Indicator	Number
Working	UN General Assembly side event with LEAP Forum partners	1
together	Networks supported by the alliance	3
	Instances of collaboration across all three levels of the WHO	49
Empowering leaders	Articles published by mentees as part of the Early-career women researchers mentorship scheme	4
	Change-maker scholars supported to attend a Pre-World Health Assembly workshop	3
	Countries where the programme worked to strengthen institutional capacity for HPSR	9
	Written outputs supported	69

Table 23 Indicators of AHPSR results

⁵⁹ <u>https://www.nihr.ac.uk/documents/nihr-global-health-policy-and-systems-research-global-hpsr-programme-remit-and-guidance-for-the-commissioned-awards-call/22165</u>

⁶⁰ Ollier, L., & Gerhardt, C. (2014). Alliance for Health Policy and Systems Research: External Review 2014. World Health Organization.

Section	Indicator	Number
Advancing	Journal supplements funded	2
knowledge	Stand-alone publications	2
Commentary pieces		9
	Publications made available in online database	600+
Informing policy	(qualitative)	n/a

Source: AHPSR Annual report 2019 (WHO, 2020)

D.3.4. Doris Duke - African Health Initiative

All phase 1 projects were required to collect, and make publicly available, data demonstrating whether or not the intervention had resulted in measurable impacts on population health. In addition, an important objective of the project was cross-site learning between the five project partnerships.

For this purpose, a 'common evaluation framework' was developed setting out four main elements^{61 62}:

- A conceptual model, or programme logic model
- A set of metrics including 'core' metrics that all projects would report on, and 'common' metrics relevant to a subset of projects
- Guidelines for supporting documentation on the implementation of partnership activities
- Procedures for developing and maintaining the Collaborative databases containing these data

An overview of the conceptual model, and core and common metrics are shown in Figure 67 and Figure 68.





Adapted from the CHeSS framework.

⁶¹ Bryce et al., "A common evaluation framework for the African Health Initiative", BMC Health Serv Res. 2013; 3(Suppl 2): \$10

⁶² "Concept Paper and Scope of Work", the Population Health Implementation and Training Data Collaborative, 2011

Source: (Bryce et al., 2013)

Figure 68 Doris Duke AHI Common evaluation framework: Core and common metrics

Inputs & Processes Outputs		Outcomes	Impact	
Governance and leadership:	 Service access, readiness & quality: Quality of child health care by providers 	Coverage of services: Contraceptive prevalence rate Antenatal care (1+ visits)	Mortality and undernutrition: Under 5 mortality rate Cause of death distribution	
Financing: • Total costs in intervention areas	 Service utilization 	 Intermittent preventive treatment for malaria in pregnancy (IPTp) Skilled attendant at birth C-section prevalence rate (urban, 	 for under-fives in intervention areas Child undernutrition (height for age and weight 	
Health Information systems: Recent HMIS report available at facility		rural) Exclusive breastfeeding Childhood immunizations 	for height)Adult mortality rateNeonatal mortality rate	
 Human resources: Health workers per capita (physicians, nurses/midwives, pharmacy staff) 		 Reported treatment of priority childhood illnesses Vitamin A supplementation (2 doses) 	Morbidity:	
Medicines, Equipment, Commodities: Continuous stocks of essential commodities		 Insecticide-treated net use TB treatment (DOTS) success rate Antenatal care (4+ visits) 	Fertility:	
(Tracer equipment and commodities at health center level; Tracer medicines for all health facilities; Tracer medicines for health facilities providing specific services)		ART coverage Post-natal care for mother HIV testing for pregnant women Stillbirth ratio: fresh/macerated Unmet need for family planning	Total Ferbility Rate Equity: Core impact metrics reported by wealth quintile	
		Equity: • Core coverage metrics reported by wealth quintile	4	

Source: (Bryce et al., 2013)

D.3.5. Global Alliance for Vaccines and Immunisation (GAVI)

The performance of Gavi's Health System Strengthening (HSS) investment is monitored an evaluated in several ways:

First, each of Gavi's strategic goals have set of indicators associated with it. The **health systems** goal indicators, also reported in Gavi's annual performance reports,⁶³ were:⁶⁴

- Supply chain performance: The average score achieved by Gavi-supported countries that have completed WHO's effective vaccine management (EVM) assessment
- Data quality: Proportion of Gavi-supported countries with a less than 10 percentage point difference between different estimates of immunisation coverage
- Coverage with a first dose of pentavalent vaccine and the drop-out rate between the first and third dose in countries we support
- Integrated health service delivery: Percentage of Gavi-supported countries meeting benchmark for integrated delivery of antenatal care and immunisation services
- Civil society engagement: Percentage of Gavi-supported countries that meet benchmarks for civil society engagement in national immunisation programmes to improve coverage and equity

Secondly, **grant performance frameworks (GPF)** are agreed between Gavi and implementing countries specifying key metrics used to monitor and report on grant progress. GPF were first introduced in 2015 – and later updated in 2019 – with three main elements:⁶⁵

⁶³ <u>https://www.gavi.org/news/document-library/gavi-progress-report-2019</u>

⁶⁴ https://www.gavi.org/our-impact/measuring-our-performance/2016-2020-indicators/health-systems-goal

⁶⁵ <u>https://www.gavi.org/our-support/grant-performance-frameworks</u>

- A results chain (Theory of Change) for the grant.
- Core indictors related to Gavi's overall mission. These include cross-cutting as well as grantspecific indicators, incl. five indicators relevant to HSS (see below)
- Tailored indicators related to country-specific objectives. HSS grant recipients are required to choose 10-20 such metrics in addition to core indicators. At minimum, each HSS objective should have at least one activity/process metric and one linked intermediate result metric being tracked for monitoring and accountability purposes. A catalogue of suggested indicator is available to support this selection.

Figure 69 sets out grant-specific core indicators, including those required for HSS support grants.⁶⁶ Results of the GPFs are used for routine monitoring as well as in the grant renewal process for HSS.

igure of GAVI Grann renormance namework, grann-specific core indicators					
	NVS	Campaigns	HSS	CCEOP	
National Penta3 coverage rate					
National measles containing vaccine 1 st dose coverage rate					
Penta3 coverage in HSS targeted zones or populations					
Number of surviving infants in HSS targeted areas and/or					
population who received the 3rd recommended dose of					
pentavalent vaccine					
Percent utilisation of Gavi HSS funds			-		
Post-campaign coverage for any vaccination campaign					
Number of children in the target population who received a dose					
of a given antigen during the last campaign					
Cold chain equipment replacement in existing equipped sites					
Cold chain equipment extension in unequipped existing and/or					
new sites					
Cold chain equipment expansion in existing equipped sites					
Freeze-free to non-freeze-free carrier ratio					
Maintenance of cold chain equipment (to be defined by the					
country)					

Figure 69 GAVI Grant Performance Framework: grant-specific core indicators

Source: GAVI Guidance for Gavi Grant Performance Frameworks – 2019, p. 4

Finally, a series of **externally commissioned evaluations** have reviewed country-programmes as well as the Gavi's overall HSS support.⁶⁷ The most recent evaluation, published in 2019, found that a (small) positive association between HSS support and vaccine coverage. They also noted several challenges:⁶⁸

- The quality of evidence available: For example, the evaluators noted a lack of streamlined data collection which would allow comparison between grants, and that the Grant performance Framework lacked tailored indicators to monitor progress towards grant objectives at the process and intermediate level.
- Complexity involved in evaluating the effect of HSS support on the system as a whole, given multitude of other programmes and influences.

⁶⁶ Ibid.

⁶⁷ https://www.gavi.org/our-impact/evaluation-studies/health-system-strengthening-evaluations

⁶⁸ "Review of Health Systems Strengthening (HSS) Support", Swiss Tropical and Public Health Institute, 2019

D.4. Funding for health systems research in LMICs 2014-2020 (Dimensions analysis)

Grants data allows us to understand the broader funding landscape for health systems research in LMICs. The following analysis uses the Dimensions database, a global research funding database that holds data on over 5 million grants from over 500 funders. Dimensions automatically assigns codes from the Health Research Classification System (HRCS) to grants, based on project titles and abstracts.

A two-step procedure was used to identify grants relevant to health systems research in LMIC. In a first step, all grants on Dimensions categorised as HRCS Research Activity Code "8 – Health and social care services research" were retrieved and downloaded.

These grants were subsequently filtered for their relevance to LMICs using a keyword search. This identified any grant mentioning either an LMIC country name or keyword in any of the following fields: "Country of Research organisation", "Title translated" and "Abstract translated". Additional steps served to limit the number of false positives (due to e.g. Georgia or New Mexico as in the US states) and disambiguate ambiguous country names (e.g. Niger vs. Niger State in Nigeria). Finally, a manual screening was performed to remove additional false positives.

It is important to note that this approach relies on the assumption that if grants mention one of the country names or an LMIC keyword, they are relevant to LMICs. Although this assumption will not always be correct, manual screening suggests the resulting dataset is sufficiently specific to give an informative overview of the landscape.

Out of the analysed 10,571 grants, 1378 (13%) grants were identified as relevant to LMICs. Of these, 1018 (74%) included information on the funding amount, with a total funding volume of \pounds 395m.

Table 24 shows the top funders of health systems research with relevance to LMICs. Most of these are based in HICs, most notably the European Union, the UK and the United States. Major funders from MICs include the National Natural Science Foundation of China, the National Council for Scientific and Technological Development (Brazil), and São Paulo Research Foundation (Brazil).

Name	Country	Grants	Funding amount (aggregated)
European Commission	European Union	21	£56,048,851
Medical Research Council	United Kingdom	124	£49,668,865
National Institute of Mental Health	United States	44	£42,050,713
Economic and Social Research Council	United Kingdom	61	£38,007,831
United States Department of Defense	United States	17	£32,207,374
United States Department of the Navy	United States	9	£26,214,732
Wellcome Trust	United Kingdom	101	£23,007,176
Fogarty International Center	United States	26	£14,914,106

Table 24 Top funders in HRCS RAC 8: Health and social care services research

National Natural Science Foundation of China	China	265	£14,458,633
National Institute on Drug Abuse	United States	9	£12,258,773
Canadian Institutes of Health Research	Canada	64	£7,106,401
University Grants Committee	China	43	£2,174,456
Japan Society for the Promotion of Science	Japan	44	£1,362,443
National Council for Scientific and Technological Development	Brazil	158	-
São Paulo Research Foundation	Brazil	131	-

Note. The table includes funders with a total funding amount above £10 Million, or 40 grants or more.

Table 25 shows which countries are the likely focus of the research, based on the location of the research organisation, or the country being mentioned in the project description. Where projects are relevant to a number of countries, the associated funding amount is split evenly across the different countries. The top 10 countries jointly receive over 62% of the total funding. Although this may in part reflect the fact that funders from LMICs are less likely to be represented on the Dimensions database, it suggests that large parts of research funding from HICs are focussed on a small number of (predominantly anglophone) LMIC countries.

Name	Grants	Funding amount (aggregated)	Percentage of total	
South Africa	129	£41,309,286	10.5%	
Zambia	31	£34,709,756	8.8%	
China	362	£33,323,949	8.4%	
Uganda	63	£26,868,992	6.8%	
India	100	£24,407,109	6.2%	
Kenya	64	£24,316,136	6.2%	
Tanzania	48	£17,597,007	4.5%	
Mozambique	18	£16,329,097	4.1%	
Malawi	36	£15,965,645	4.0%	
Brazil	326	£11,266,624	2.9%	

Table 25 Top countries in HRCS RAC 8: Health and social care services research

Note. The table includes countries with a total funding amount above $\pounds 10$ Million, or 40 grants or more. Grants may count towards more than one country.

Table 26 shows the distribution of funding across HRCS Health Categories. As with countries, it is possible that grants have been assigned multiple Health Categories and funding is split evenly in this case. The lion share of the funding goes towards the category Infection, followed by Generic Health Relevance. The third and fourth largest categories are Mental Health and

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Reproductive Health and Childbirth, respectively. HRCS Health Category codes were missing for 400 grants, accounting for 13.2% of the total funding amount.

HRCS HC Categories	Number of Grants	Funding Amount (aggregated)	Percentage of total
Cancer	32	£1,749,910	0.4%
Cardiovascular	50	£9,922,251	2.5%
Eye	1	£133,310	0.0%
Generic Health Relevance	595	£118,578,419	30.0%
Infection	217	£126,215,447	31.9%
Inflammatory and Immune System	1	-	0.0%
Injuries and Accidents	8	£2,754,495	0.7%
Mental Health	126	£48,576,764	12.3%
Metabolic and Endocrine	22	£3,571,693	0.9%
Musculoskeletal	4	£1,350,803	0.3%
Neurological	10	£3,749,496	0.9%
Oral and Gastrointestinal	4	-	0.0%
Other	3	£524,306	0.1%
Renal and Urogenital	3	-	0.0%
Reproductive Health and Childbirth	116	£23,525,331	6.0%
Respiratory	7	£634,642	0.2%
Skin	2	-	0.0%
Stroke	22	£1,727,839	0.4%
HRCS HC missing	400	£52,092,611	13.2%

Table 26 Distribution of funding across HRCS Health Categories

Note. Grants may count towards more than one HRCS Health Category code.

Appendix E Data collection tools

E.1. Principal investigator and co-investigator interviews

E.1.1. Project background (pre-implementation)

E.1.1.1 Project aim

- Can you briefly describe the primary aim of the project, at its outset, and what you hoped to achieve?
- What was the health systems problem the project sought to address?
- How did this relate to your previous work? (e.g. continuation of research programme, or 'new' to HPSR / to projects in LMICs)
- Who were the expected main users of the research (e.g. hospital administrators, Ministry of Health or specific department within)?
- Who were the expected ultimate beneficiaries of the research (e.g. women, rural populations currently without access, general population)?
- What outcomes and impacts did you hope to achieve? Were there any specific policies or practices you sought to improve? How did you plan to influence them? What was the potential for impact on health policy and systems as a result of the project?
- What other projects have addressed / are addressing this issue? What is the broader research landscape, who conducts and funds other research in this area?
- Did the project involve any novel methodological approaches? If yes, please elaborate.
- What did you find particularly challenging in the preparation phase?

E.1.1.2 Project team

• How was the project/team organised?

Please describe the project team: name **all** institutions involved (**including their locations**). Had you worked with this team before?

- Where was the research being conducted (location, country)? Had you worked in this location before?
- What were the roles of collaborators in the delivery of the project? What skills, infrastructure or capabilities did they contribute to the project?
- Were any <u>new</u> partners brought in to support the delivery of the project? Why was this done? How did you identify these partners?
- For UK-led projects: How were LMIC researchers involved in the design of the project? How were LMIC researchers involved in the implementation of the project, and in reporting of research findings?

E.1.1.3 Project design

- What preparations were most important in designing the project?
- Did you involve stakeholders in the design phase of the project (i.e. before submitting the application)?

Who were these stakeholders? E.g. policy makers, practitioners, NGOs, community representatives. Please give details of their organisations and locations.

What aspects were they involved in e.g. design of pathway to impact?

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How did you engage? E.g. interactive workshops, online fora, targeted meetings etc. Had you worked with these stakeholders before? If no, how did you identify individuals? If yes, how long had you worked with them for?

E.1.2. Project experience

E.1.2.1 Adjustments and challenges

- Was the project plan adjusted after the start of the project? If yes, why?
 Did the actual project team differ from the team described in the project application? If yes, why?
- Did you encounter any challenges during project implementation? If yes, what were they? E.g. collaboration and communication with research team members; local engagement (if yes, with which stakeholders?); infrastructure; administrative issues; capacity issues Were any of these unexpected?

E.1.2.2 Learning from design and implementation phase

• <u>In hindsight</u>, is there anything you would change about how the project was designed and conducted?

E.1.2.3 Stakeholder engagement

- Did you continue engagement with stakeholders during the project (beyond those directly involved in the research)? If yes, who did you engage with and how?
 Did you have policy makers, practitioners and/or community representatives in your project steering committee or other evidence structure?
- Which engagement activity do you think was most critical to the project's progress, outcomes, and impacts?

E.1.3. HSRI award outputs and scientific outcomes

E.1.3.1 Research findings

- Did the HSRI-funded project answer the research question(s) it originally set out to address? Could you summarise the key findings?
 - If the project did **not** answer the original research question, why not? What happened?
- Has the project yielded any additional findings (incl. not anticipated at the outset of the project)?
- Are you aware if others in the research community have taken up the project's findings?

E.1.3.2 Project outputs

• *Publications* - Did you publish the findings of the HSRI-funded research project? How many publications stemmed from the project? Which of these do you consider the key outputs? including peer-reviewed publications, policy briefs, training materials, guidelines, implementation guides, other media coverage

If published, could you point me to the reference for the main project results?

• Tools and databases - Were any new research tools or databases developed as part of the HSRI-funded project? Do you know if these continue to be used?

• Methodology - Did the project advance the development and/or use of new or improved HPSR methodologies?

Are you aware if others have **taken up** the findings from your HSRI-funded project, or any tools/methodologies developed?

• Pathways to impact – Did the project map / test a pathway to impact? If yes, can it be implemented elsewhere, either in a similar or different context?

Are you aware if others have **taken up** the findings from your pathway to impact?

- [If not yet covered:] How have you disseminated project findings? Have you actively shared insights and results? If yes, how? Did you continue to disseminate findings beyond the duration of the HSRI award?
- Capacity building
 - i) Researchers and research institutions: Do you think the award contributed to capacity building for the researchers and institutions involved? What were the main skills or capabilities developed in LMIC locations? e.g.
 - a. knowledge and technical skills to undertake HPSR (e.g. learning of new research methods)
 - b. LMIC researchers' research leadership capabilities (e.g. confidence, negotiation and communication skills, team building skills)
 - c. LMIC researchers' research management / admin skills
 - d. skills related to community engagement and knowledge transfer
 - e. LMIC institutions' research governance structures

Can you describe the scale of this benefit? [incl. number of staff and students trained or participated]

Did the award involve any formal training for project staff?

- ii) Policy makers, practitioners and community representatives: Do you think the HSRI project has contributed to capacity development among practitioners', decision makers' and community representatives in LMICs? For instance,
 - a. Is there evidence that LMIC policy makers, practitioners and communities are more aware and informed of the nature and value of HPSR?
 - b. Is there evidence of LMIC policy makers and practitioners seeking evidence from researchers to inform policy making?
 - c. Is there evidence of LMIC policy makers and practitioners considering research evidence available when taking policy decisions?

Can you describe the scale of this benefit? [incl. number of stakeholders trained or participated]

Did the award involve any formal training for stakeholders?

- Collaboration
 - iii) Research collaboration: Have you collaborated, or are you collaborating, with team members of the project research team beyond the HSRI project? What has been the effect of the HSRI project on collaborations with individuals not in the project team?

If joint funding has been secured for a collaboration that originated with the HSRI-funded project, please specify: Name of collaboration partner(s), Source and amount of funding, and Project title

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[For Development/Foundation awards only] Did you apply for a full grant after you foundation award? If so, what was the outcome? In your view, what was the reason for this outcome?

• Other stakeholders: Have you continued contact with stakeholders you started working with as part of the HSRI award? Has this benefitted your research, and its impact, beyond the HSRI-funded activity?

E.1.4. HSRI award outcomes and impact

E.1.4.1 Potential for impact

 Do the findings of the HSRI-funded project have the <u>potential</u> for impact on the health and well-being of people living in LMICs?

Please explain

If no, why not? E.g. findings disproved the research hypothesis; More evidence is needed to inform and bring about a change in policy

In hindsight, what could have increased the HSRI-funded project's potential for impact? [may have been covered in 'hindsight' questions above]

SKIP to 1.4.5

If yes (the findings have potential for impact) - carry on:

E.1.4.2 Take up by policy makers

• Have the project's findings been taken up into policy and/or had an impact on health?

If yes: Who are the policy makers involved (organisation, country, name) and what was the change? What is the scale of take-up, e.g. at local, national, multi-country or international level?

We would like to also consult with stakeholders (involved in policy making) as part of this study. **Who do you recommend we get in touch with?** How might we be able to engage with them? Would it be possible for you to make an introduction?

If no: Why not? (e.g. the findings were relevant but there was no interest/l'm not involved in supporting take-up; there are other factors preventing a change in policy)

In hindsight, what do you think could have increased take up by policy makers?

E.1.4.3 Implementation and health systems or health impact

• Have the findings of the HSRI-funded project led to, or contributed to, any **changes in health** systems? Have they been implemented?

If no: Why did relevant findings of the HSRI-funded project not contribute to a change in health systems?

In hindsight, what do you think could have been done additionally to assist in the implementation of the project's findings? E.g. Change in project design; additional project activities; additional support from funders

[SKIP TO 1.4.4]

If yes:

- Could you describe the change, how the findings contributed to it, and who is implementing the change (organisation, country, name)?
- What is the **scale of implementation**, e.g. at local, national, multi-country or international level?
- Were there elements of the HSRI project design or the project activities you consider were essential for this change/implementation?
- In hindsight, what do you think could have been done additionally to further assist in the implementation of the project's findings / a change in practice? E.g. Change in project design; additional project activities; additional support from funders

Again, we would like to also consult with stakeholders (involved in the implementation) as part of this study. **Who do you recommend we get in touch with**? How might we be able to engage with them? Would it be possible for you to make an introduction?

• Have the findings of the HSRI-funded project led to any **health benefits** in the target population (beyond research participants)?

If yes

- Can you describe the benefit to the health system and those who use it? **What has changed as a result of the research**? E.g. access (e.g. wait times), coverage (no. of people accessing a health service), quality/effectiveness, efficiency, equity of health practices
- What is the scale of the benefit? e.g. how many people/patients have benefitted? How have different sub-groups benefited? What is the level of cost savings to the health system or to patients?

Could you **share** or point me to sources of evidence for this impact, e.g. published studies, statistics?

• In hindsight, what do you think could have been done additionally to achieve and maximise health impacts?

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- Why not? Is the implementation too recent, or are there other challenges that have emerged? Is there future potential for health impact, and if yes, what might this look like?
- In hindsight, what do you think could have been done additionally to achieve health impacts?

E.1.4.4 Scale-up

• Is there potential for further scale-up of the impact of the HSRI project's findings?

lf yes

- Could you outline the potential for scale up? Is this being pursued, and if yes, how?
- Were there elements of the HSRI project design or the project activities you consider were essential for scale up?
- In hindsight, what could have increased the HSRI-funded project's potential for scale up further?

lf no

• Why can the findings not be scaled? (e.g. HSRI-project specific to the local context; key decision makers or practitioners beyond the local context not aware of the project's findings)

 In hindsight, what could have increased the HSRI-funded project's potential for scale up further?

E.1.4.5 Other impacts

- Were there any other unanticipated impacts, both positive and negative, the HSRI project may have achieved (including impacts not directly related to the research question, and/or beyond your research group)?
- To what extent have the project's research findings informed wider decision-making, e.g. in countries not involved in the original HSRI project?

Again, we would like to also consult with stakeholders and partners as part of this study. **Who do you recommend we get in touch with**? How might we be able to engage with them? Would it be possible for you to make an introduction?

[FOR INTERVIEWEES INVOLVED IN MORE THAN ONE HSRI AWARD]

E.1.5. Other HSRI awards

- If you were, or still are, involved in other HSRI awards:
 - Have any of these led to changes in policy and practice?
 - Have there been any impacts on health?
 - Within the scientific domain, have there been any main advances now used by others?

E.1.6. Global Health Systems Research funding landscape

- Is the HSRI filling a gap in the global health research funding landscape?
- To what extent has the programme led to increased capacity and demand for health policy and systems research among both decision makers and researchers?
- What sources of funding for HPSR are you aware of (other than the HSRI)? What are sources of follow-on funding, after HSRI? What would be the situation without HSRI funding?
- What do you consider the main strengths of the HSRI, setting it apart from other similar funding programmes?

What are the advantages of other similar funding programmes over the HSRI? What aspects in other similar funding programmes have been particularly effective in achieving impact?

• Are there currently any gaps in the research funding landscape relevant to HPSR that you think function as a barrier to health impact? If yes, what are the main gaps?

E.g. Gap in the type of research funded; in geographical coverage / research location; for certain specific health problems; for stakeholder engagement and dissemination of research findings; relevant research capacity; for training

E.1.7. HSRI design

• Thinking back to when you applied for an HSRI award, were there any aspects of the scheme's design and requirements you feel were problematic and could be improved?

Have you had any unsuccessful HSRI applications? If yes, why do you think your application was unsuccessful? Were you able to fund the proposed project through other means? If yes, what was the funding source/scheme and has it led to any impact?

- Are there aspects of the scheme's current design and requirements that are a barrier to attracting relevant high-quality proposals, both from high income countries and low-income countries?
- How do the HSRI's application process and requirements compare with those of similar funding programmes?
- What additional activities could the HSRI support to achieve the desired impacts?

Do similar funding programmes provide support for additional activities not covered by the HSRI that you consider particularly effective to achieve outcomes (e.g. change in policy) and health impacts (e.g. implementation, scale-up)?

• Do you think calls for proposals and other information on the HSRI are communicated through the right channels, reaching the relevant research community in the UK and in LMICs?

E.1.8. Final comments and close

Do you have any other comments about the HSRI or any suggestions to the funders?

E.2. Funding committee members, academic experts and senior management and programme staff interviews

E.2.1. Interviewee background

- Could I confirm your current role(s): You are currently [...] at [...]
- Could you briefly describe your involvement with and expertise in relation to global health research and health policy and systems research (HPSR)? Which area of research or policy making are you mainly involved in?
- Could you outline how you have been involved with the HSRI?

E.2.2. HSRI design

- What are your overall impressions of the design of the HSRI scheme? Are there any aspects that stand out, both positive and negative?
- What do you consider the main strengths of the HSRI, setting it apart from other similar funding programmes?
 - What are the advantages of other similar funding programmes over the HSRI? What aspects in other similar funding programmes have been particularly effective in achieving impact?
- To what extent does the HSRI's design contribute to research results that are implementable and scalable? Do you think the scheme's design enables health outcomes and impacts to be achieved?
- What do you think of the two-step approach to funding grants foundation grants for initial studies, with potential for a full grant?
- How could the HSRI enhance its impact and lead to implementable and scalable results? What further activities could support impact?

E.2.3. Application processes [for funding committee members only]

• To what extent is the HSRI application process appropriate? Are there any issues with the process, e.g. promotion of call, application form, timelines? What could be improved?

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• To what extent are the HSRI review process and criteria appropriate for driving the desired impacts? What could be improved?

Does the review appropriately cover considerations of LMIC health system needs and priorities, innovative approaches, involvement of community and decision makers, potential for implementability and scalability?

Does the review involve experts of the specific HPSR area, including experts from the affected geographical area?

• What is the current experience of funding foundation grants?

Does it change the way full grants are prioritised and funded?

What do you see as the main benefits of foundation grants?

• What is the level of relevance and quality of applications received? Has this changed over the lifetime of the HSRI? If yes, why do you think this might be?

To what extent has the programme been successful in attracting high-quality applications from LMICs?

Are the social sciences adequately embedded in the proposals?

Are policy makers, practitioners, or other relevant stakeholders, and affected communities adequately involved in the design and delivery of projects?

Do researchers adequately plan to disseminate/promote their research results to policy makers and other relevant stakeholders?

Are there any other key issues with proposals you have identified?

• What factors do you think lead to differences in the quality of applications? E.g. lead organisation, location of lead PI, career stage of lead PI

Are there changes that could be made if the funders wished to achieve a more balanced spread?

• Can you identify any trends in the applications received?

e.g. level of funding requested, type of trial, type and scale of intervention tested, methodologies used, location of trial, location of PI, co-funding from other sources

How have the changes in the call specifications led to changes in the types of research fields, methodologies, breadth of disciplines, geographical reach and location of the lead investigator in the grants being funded?

• What aspects of scheme management work well or work less well for committee members?

E.2.4. Governance and management processes [for key academic experts and senior management and programme staff with knowledge of these]

• To what extent are the operational, management and governance frameworks effective for delivering programme objectives?

Is it resourced adequately e.g. in terms of people and time?

What are the pros and cons of this model? What could be improved?

- Have there been any key successes or challenges related to programme implementation, e.g. contracting, grant administration, post-award support?
- To what extent are current monitoring processes and indicators appropriate for the monitoring and evaluation of outputs, outcomes and impacts from HSRI-funded projects and the programme as a whole?

Is Researchfish® capturing the right information from grantees to demonstrate impact? What additional data should be collected and how?

What measurement indicators can be used by the funders to evaluate the programme on a periodic basis?

E.2.5. Added value of joint working between funders

• What is the added value of running HSRI through a partnership of funders? (including value for money)

What kinds of efficiencies are being realised, e.g. operationally?

Have lessons from joint working in the HSRI partnership of funders informed other schemes? Were any learnings from the JGHTI adopted into the HSRI?

• What in your view are the advantages and challenges in supporting HPSR through a partnership of funders?

Does joint working between funders affect cohesion and coordination of research funding?

• Does the joint working between HSRI funders contribute to the UK's reputation and international leadership in producing high quality research of relevance to developing societies? How?

E.2.6. HSRI-funded research and outcomes

- What are your overall impressions of the **research funded by the HSRI scheme**, in terms of:
 - The types and scale of grants funded
 - The quality of research conducted
 - PIs / teams / institutions involved

Has this changed over time?

- How relevant are the <u>research questions and designs being funded</u> to the needs of people living in LMICs? Are HSRI projects asking the 'right' questions? Could this be improved through changes in the HSRI's design and implementation?
- What is your overall impression of the outcomes and impact of the HSRI?

Do you have specific examples of HSRI-funded projects you could share with us? What are their outcomes and impact e.g. in terms of scientific progress, new methodologies, health/policy practice, health outcomes, capacity building, level of engagement of policy makers and communities, value for money for health systems?

- How relevant is the <u>evidence being produced</u> to the needs of people living in LMICs? Are HSRI projects producing the 'right' evidence? How do outcomes from individual studies fit into the global, regional and national evidence base on health systems and health systems strengthening?
- Do you think the HSRI funds global health research activities that can lead to international development impact?

How is the research contributing to the UK's efforts to achieve the health-related Sustainable Development Goals?

• Do you think the scheme is contributing to or has the potential to contribute to value for money of international development funds?

What impact if any do you think increased UK funding through ODA had on the HSRI scheme and the wider field of HPSR?

• Has the scheme in your view increased demand from the HPSR community to conduct research in this area? Has the scheme in your view increased demand from policy makers for research evidence to support their work?

E.2.7. Global HPSR funding landscape

- Is the HSRI filling a gap in the global health research funding landscape?
- What are the alternative sources of funding? What are sources of follow-on funding after HSRI for both foundation and full grant awardees? What would be the situation without HSRI funding?
- What opportunities and gaps remain for delivering impact through HPSR? Are there currently any gaps in the research funding landscape relevant to HPSR that you think function as a barrier to health systems impact? If yes, what are the main gaps?
- How could a global health research funding programme, such as the HSRI, further address gaps between disease or technology-focussed and systems level research?

E.2.8. Final comments and close

• Do you have any other comments about the HSRI or any suggestions to the funders?

E.3. Survey for Principal Investigators

E.3.1. Introduction

The funders of the **Health Systems Research Initiative (HSRI)** – the UK Medical Research Council, the Wellcome Trust, the UK Department for International Development, and the UK ESRC - have commissioned a review to **understand the current and potential impact of the HSRI**, which would also inform the design of future funding schemes.

As part of this review, Technopolis Ltd is consulting with researchers and other stakeholders involved in the HSRI. Your participation in the survey will help gather evidence on the outcomes and impacts achieved by the HSRI and provide you with the opportunity to inform discussions on the future design of the scheme.

The survey contains roughly 40 questions. All responses and associated personal information will be treated in the strictest confidence, in line with legislation on data protection. Information will only be reported in an aggregate or anonymised form to the funders of the HSRI.

Thank you for taking the time to complete the survey – your participation is extremely important to inform the study.

Before you begin, please make sure that your browser is maximised. It's easy to navigate through the questionnaire: just click on the answer or answers that apply for each question. You may need to use the scroll bar to see the next question. To continue, click on the next button at the bottom of each page. While your browser is open you can go backward and forward in the survey, but you will not be able to return to your survey once the browser has been closed or you submitted the survey.

Please click 'next' to enter the survey.

- 1. About you
- Last name

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- First Name
- Institution (at time of HSRI grant)
- Country [drop-down menu]
- Grant number and title (as stated in email)
- Type of grant and your role [drop-down menu]
 - PI of full grant
 - PI of development/foundation grant
 - Coinvestigator [these will be routed to section 3]
- Grant closing date (month/year) [drop-down menu]

2. HSRI award activity

- i) Project description
- Which area of health policy and systems research does your project relate to? (please select all that apply) [drop-down menu]
 - service delivery
 - health workforce
 - health information systems
 - access to essential medicines
 - financing
 - leadership/governance
 - Other please specify
- Which health area does your project target? (please select all that apply) [drop-down menu]
 - General health relevance
 - Infectious diseases
 - Reproductive health and child birth
 - Cardiovascular diseases
 - Stroke
 - Mental health
 - Metabolic and endocrine
 - Other please specify
- Prior to your application to the HSRI, had you or others carried out pilot studies to inform the project? [drop-down menu]
 - No there was no need for a pilot study, we knew the project location(s), context, and project methodology well
 - No but we would have liked to carry out a pilot study, provided we had funding
 - Yes we conducted a pilot study in the context of the project location(s)
 - Not applicable the pilot study was part of the HSRI grant
 - Other please specify
 - ii) Project team

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- Does the current project team differ from the team described in the proposal? (select all that apply) [drop-down menu]
 - The project team was/is as described in the proposal
 - The current project team includes additional members compared to the team described in the proposal please explain
 - The current project team does not include all team members described in the proposal - please explain
- Where is the project taking place?

Number of research site(s) [drop-down menu]

Location of research site(s) (country) [drop-down menu] - choose all that apply

- We would like to understand the range of expertise involved in the project. Does the study team include experts in the following areas (select all that apply): [drop-down menu]
 - Health policy local policy context
 - Health systems
 - Health care, e.g. doctor/nurse/pharmacist/CHW
 - Implementation science
 - Operational research
 - Social science
 - Data management
 - Statistics
 - Health economics
 - Knowledge brokerage (stakeholder engagement, network building)
 - Evaluation/impact
 - Other please specify
- Did you involve stakeholders in the <u>design phase</u> of the project (i.e. before submitting the application)? (please select all that apply) [drop-down menu]
 - No
 - Yes policy makers from national government(s)
 - Yes policy makers from local government(s)
 - Yes policy makers from international agencies
 - Yes LMIC health care practitioners
 - Yes LMIC health care organisations
 - Yes implementing organisations/NGOs
 - Yes community organisations/representatives
 - Yes other (please explain)
- If yes, how were you engaging with these stakeholders during the design phase? (select all that apply) [drop-down menu]
 - Direct approach
 - Presentations/seminars
 - Interactive workshops/feedback sessions

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 - Policy briefs
 - Social media
 - Online forum
 - Other please specify
- Are you involving or engaging with stakeholders in the project (beyond those directly involved in the research)? (please select all that apply) [drop-down menu]
 - No
 - Yes policy makers from national government(s)
 - Yes policy makers from local government(s)
 - Yes policy makers from international agencies
 - Yes LMIC health care practitioners
 - Yes LMIC health care organisations
 - Yes implementing organisations/NGOs
 - Yes community organisations/representatives
 - Yes other (please explain)

Please summarise any stakeholder involvement / engagement as part of the project, including the frequency and nature of input, mechanism for engagement (e.g. inclusion in project steering committee), etc. and indicate which aspects you consider the most critical.

- iii) Challenges encountered and adjustments to project plan
- What are the main challenges you have encountered in the implementation of the research project? (please select all that apply)
 - Technical / research-related challenges please specify
 - Collaboration challenges please specify
 - Administrative issues please specify
 - Capacity issues / shortage of trained staff please specify
 - Other please specify
- Did you have to make a major adjustment to the project plan after the start of the project due to unforeseen circumstances/challenges encountered? (select all that apply) [drop-down menu]
 - No, the project aligns closely with the proposal.
 - Yes, the project plan had to be adjusted, in terms of:
 - Scope of study
 - Study timeline
 - Type of data collected
 - Site of data collection
 - Method of data collection
 - Recruitment of additional experts to team
 - Training for project staff
 - Engagement with additional stakeholders / stakeholder groups

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- Level / frequency of stakeholder engagement
- Other please specify

If yes, please describe/explain major changes made and how these have helped to address challenges encountered.

- In hindsight, are there aspects of the project's **design or implementation** you would approach differently? [drop-down menu]
 - No, I would not make any changes to the project's design and implementation
 - Yes, knowing what I know now, I would make substantial changes to the project's design and implementation
 - Yes, knowing what I know now, I would make minor changes to the project's design and implementation

If yes, I would make changes relating to: [drop-down menu]

- Scope of study
- Study timeline
- Type of data collected
- Site of data collection
- Method of data collection
- Recruitment of additional experts to team
- Training for project staff
- Engagement with additional stakeholders / stakeholder groups
- Level / frequency of stakeholder engagement
- Other please specify

Please outline the main changes you would make and why. (If already covered in the previous question on major adjustment to project plan, please insert 'see previous question'.)

- iv) Capacity building
- Does the award include training of staff? (please select all that apply) [Multiple choice]
 - No formal training project staff learn informally from other team members / on the job
 - Project staff have attended formal training as part of the HSRI grant please specify
 - Project staff have attended another formal training course please specify
- Does the award include training of stakeholders? (please select all that apply) [Multiple choice]
 - No formal training stakeholders learn informally from participating in the project
 - Stakeholders have attended formal training as part of the HSRI grant please specify
 - Stakeholders have attended another formal training course please specify

3. HSRI award outputs and scientific outcomes

Questions in this section may not apply to you if your award is still active, and the research project has not yet completed. However, your active project may already have resulted in

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some outputs and outcomes. If this is the case, please select the relevant option, or indicate "Not yet, as the project is still ongoing".

- i) Research findings
- Has the research project resulted in any findings to date?
 - Not yet, as the project is still ongoing
 - Yes
 - No, the project has completed, but did not result in findings

If yes, please provide a brief summary of key findings. If no, please explain why not.

- ii) Publications
- Have you published any findings of the HSRI-funded project?
 - Not yet, as the project is still ongoing
 - Yes, findings of the HSRI-funded research project have been published.
 - No, findings have not yet been published but we are planning to do so
 - No, the project's findings are not suitable for publication

If yes, please provide reference(s) for publication(s) reporting key results of the project.

iii) Tools

- Have any new research tools or databases been developed as part of the HSRI-funded project?
 - Not yet, as the project is still ongoing
 - Yes please describe
 - No
 - iv) Methodology
- Has the HSRI-funded project advanced the development and/or use of new or improved methodologies?
 - Not yet, as the project is still ongoing
 - Yes please describe
 - No
 - v) Pathways to impact
- Has a new or improved pathway to impact been established as a result of the HSRI award?
 - Not yet, as the project is still ongoing
 - Yes please describe
 - No
 - vi) Capacity building
- To what extent has the HSRI grant contributed to the following for <u>LMIC researchers and</u> <u>institutions</u>?

	To a large extent	To some extent	Not at all
Improved knowledge and technical skills to undertake health systems research			
Improved research leadership capabilities			
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Improved research management / admin skills			
Improved skills related to community engagement and knowledge transfer			
Organisational and institutional capacity			
Other – please specify			

• To what extent has the HSRI grant contributed to the following for <u>HIC researchers and</u> <u>institutions</u>?

	To a large extent	To some extent	Not at all
Improved knowledge and technical skills to undertake health systems research			
Improved research leadership capabilities			
Improved research management / admin skills			
Improved skills related to community engagement and knowledge transfer			
Organisational and institutional capacity			
Other – please specify			

• To what extent has the HSRI grant led to the following for <u>LMIC practitioners, decision makers</u> and community representatives?

	To a large extent	To some extent	Not at all
Stakeholders feel more informed of the nature and value of health systems research			
Policy makers and practitioners increasingly seek evidence from researchers to inform policy making			
Policy makers and practitioners increasingly consider research evidence available when taking policy decisions			

vii) Uptake of project findings by research community

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- Has the HSRI-funded project led to follow-on funding for further research?
 - Not yet, as the project is still ongoing
 - No I don't know
 - Yes the HSRI-funded project led to follow-on funding

If yes, please specify the funding amount, source of funding and project title.

- Are you aware if other researchers have taken up project findings, or are using new tools, databases, training materials, implementation pathways or methodologies developed as part of the HSRI-funded project?[drop-down menu]
 - Not yet, as the project is still ongoing
 - No I don't know
 - Yes other researchers have taken up knowledge generated by the HSRI-funded project.

If yes, please describe what project findings or outputs have been taken up, by whom and for what purpose as far as you are aware.

4. Collaboration networks

- i) Research collaboration
- Does the HSRI project involve research collaboration partners you had not worked with previously? (select all that apply) [drop-down menu]
 - No, I had already worked with this project team
 - Yes, new partners from institutions in HICs
 - Yes, new partners from institutions in LMICs
 - Yes, new partners from institutions in HICs and LMICs

If yes, please describe the new collaborations (name of institution; country)

- Are you collaborating with these research partners beyond the HSRI-funded project? [dropdown menu]
 - No, I have not collaborated with these partners beyond the HSRI-funded project, and I am not planning to collaborate in the future
 - No, I have not (yet) collaborated with these partners beyond the HSRI-funded project, but am planning to / may collaborate in the future
 - Yes, I have collaborated / am collaborating on other projects
- If you are collaborating, please select the options which describe your ongoing collaboration (select all that apply) [Multiple choice]
 - Regular information exchange and advice
 - Developing joint proposal
 - Submitted joint proposal
 - Secured joint funding
 - Collaboration extended to other research groups at my institution/at the HSRI-funded collaboration partners' institutions

- Collaboration extended to other research groups beyond my / the HSRI collaboration partners' institutions
- Other please specify
- ii) Other stakeholders
- Does the HSRI project involve **policy maker**, **practitioner**, **community or implementation** partners you had not been in contact with previously? (select all that apply) [Multiple choice]
 - No, I had already worked with these partners
 - Yes, new partners from LMICs
 - Yes, new partners from HICs
 - Yes, new partners from both LMICs and HICs

If yes, please describe the new partners (type; name; country).

- Are you in contact with these policy maker, practitioner, community or implementation partners beyond the HSRI-funded project? [drop-down menu]
 - No, I have not been in contact with these partners beyond the HSRI-funded project, and I am unlikely to be in contact in the future
 - No, I have not been in contact with these partners beyond the HSRI-funded project, but am planning to continue interactions in the future
 - Yes, I am in contact in the context of other projects please specify

If you are <u>not</u> in contact with these partners and are <u>unlikely to be in contact in the future</u>, please explain why this is the case.

5. HSRI award outcomes and impact

- i) Impact on policy and health systems
- Has the project already led to any changes in policy or health systems? (We are aware that the project may still be ongoing, and hence outcomes or impacts may not have been achieved at this stage.) [Multiple choice]
 - Not yet, the project is still ongoing
 - Yes, project findings have informed or led to changes in policy and practice
 - No, the project has completed but has not led to any changes and is unlikely to do so I the future

If yes, please explain the nature of these changes and the number of people likely to benefit.

If no, please explain why the project will not lead to any changes.

- ii) Other impacts
- Has the HSRI-funded project achieved other impacts, not directly related to the research question it addresses / beyond your research group? (select all that apply) [Multiple choice]
 - No / not yet
 - Yes it has given a higher priority to health systems research at LMIC institution(s)
 - Yes it has built up or expanded a local network of researchers with associated benefits
 - Yes it has built up or expanded a local network of policy makers with associated benefits

- Yes it has informed wider decision-making, e.g. in countries not involved in the original HSRI project
- Yes other (please specify)

Please give a short description of the impact(s) indicated above and provide any supporting evidence / contacts.

• If you were/are involved in other HSRI-funded awards: Please provide a brief summary of outcomes and impacts achieved, stating the award title and number

6. Global health systems research funding landscape

- Is the HSRI filling a gap in the global health research funding landscape?
 - Yes
 - No
 - Don't know / can't say
- What do you consider the main strengths and weaknesses of the HSRI? Please explain.
- Are there currently any gaps in the health policy and systems research funding landscape that you think function as a **barrier** to health impact? [drop-down menu]
 - No, there are currently no gaps in funding relevant to researchers that function as a barrier
 - Yes, there are critical gaps in the research funding landscape

If yes, please describe the critical gaps.

7. Design of the HSRI

- i) Application
- Thinking back to when you applied for a HSRI award, were there any aspects of the scheme's design and requirements you feel were problematic and could be improved? [multiple choice]
 - Yes, there were aspects that were problematic and could be improved
 - No, I did not consider any aspects or requirements of the scheme problematic

If yes, please specify what could be improved?

- Are there aspects of the scheme's current design and requirements that are a barrier to attracting relevant high-quality proposals? [multiple choice]
 - No, I think the scheme's design and requirements enable it to attract relevant highquality proposals
 - Yes, I think there are aspects that limit the scheme's attractiveness and accessibility for researchers from HIC institutions
 - Yes, I think there are aspects that limit the scheme's attractiveness and accessibility for researchers from LMIC institutions

If yes, please specify the problem and possible ways of improvement.

ii) Support for additional activities

- Are there additional activities the HSRI could support that you think would make the research more effective and increase the potential for impact? (select your top choice) [Multiple choice]
 - a. Support for other types of research
 - b. Stakeholder engagement
 - c. Dissemination and knowledge exchange
 - d. Network building
 - e. Training
 - f. Other please specify

Please elaborate on your selected activity

- iii) Promotion
- Do you think calls for proposals and other information on the HSRI are communicated through the right channels, reaching the relevant research community in the UK and as well as in LMICs? [multiple choice]
 - Yes, I think relevant researchers are aware of the HSRI
 - No, I think communication about the HSRI could be improved please explain

8. Final remarks

Thank you for your response. We appreciate your input so far. If you are willing to be contacted for further information or a short follow-up interview (by telephone or teleconference) with the study team, **please provide your contact details below**.

Please be assured that your contact details will not be shared outside the study team, and will be deleted on completion of the study. Full details on how the study team will handle your data are available at <u>http://www.technopolis-group.com/privacy-policy/</u>.

Name	
Email address	
Comments	

E.4. Survey for Co-Investigators

E.4.1. Introduction

The funders of the **Health Systems Research Initiative (HSRI)** – the UK Medical Research Council, the Wellcome Trust, the UK Department for International Development, and the UK ESRC - have commissioned a review to **understand the current and potential impact of the HSRI**, which would also inform the design of future funding schemes.

As part of this review, Technopolis Ltd is consulting with researchers and other stakeholders involved in the HSRI. Your participation in the survey will help gather evidence on the outcomes and impacts achieved by the HSRI and provide you with the opportunity to inform discussions on the future design of the scheme.

The survey contains roughly 20 questions. All responses and associated personal information will be treated in the strictest confidence, in line with legislation on data protection. Information will only be reported in an aggregate or anonymised form to the funders of the HSRI.

Thank you for taking the time to complete the survey – your participation is extremely important to inform the study.

Before you begin, please make sure that your browser is maximised. It's easy to navigate through the questionnaire: just click on the answer or answers that apply for each question. You may need to use the scroll bar to see the next question. To continue, click on the next button at the bottom of each page. While your browser is open you can go backward and forward in the survey, but you will not be able to return to your survey once the browser has been closed or you submitted the survey.

Please click 'next' to enter the survey.

- 1. About you
- Last name
- First Name
- Institution (at time of HSRI grant)
- Country [drop-down menu]
- Grant number and title (as stated in email)
- Type of grant and your role [drop-down menu]
 - PI of full grant
 - PI of development/foundation grant
 - Coinvestigator [these will be routed to section 3]
- Grant closing date (month/year) [drop-down menu]

2. HSRI Award activity

We are also consulting with the PIs of the HSRI awards; in answering the survey questions, please focus on aspects <u>specific to your research</u>.

- Please indicate your area(s) of expertise you were / are bringing to the HSRI -funded project (select all that apply) [drop-down menu]
 - Health policy local policy context
 - Health systems
 - Health care, e.g. doctor/nurse/pharmacist/CHW
 - Implementation science
 - Operational research
 - Social science
 - Data management
 - Statistics
 - Health economics
 - Knowledge brokerage (stakeholder engagement, network building)
 - Evaluation/impact
 - Other please specify

- What was your level of involvement in the design of the project? [drop-down menu]
 - Very involved across all aspects of the design; member of the core research team
 - Substantial contributions to several aspects of the project design
 - Some input to specific aspects of the project design
 - Provided feedback / advice on the project plan
 - Limited input
 - Other please specify
- Did your actual role or scale of involvement in the project differ from the planned involvement (e.g. as set out in the application)? (select all that apply) [drop-down menu]
 - No, my involvement was/is as planned
 - Yes, my involvement differed in scale I was / I am more involved than planned
 - Yes, my involvement differed in scale I was / I am less involved than planned
 - Yes, my involvement differed in nature but not in scale
 - Yes, my involvement differed in nature and scale

If yes, please outline any differences.

- In hindsight, are there aspects of the project's **design or implementation** you would approach differently? [drop-down menu]
 - No, I would not make any changes to the project's design and implementation
 - Yes, knowing what I know now, I would make substantial changes to the project's design and implementation
 - Yes, knowing what I know now, I would make minor changes to the project's design and implementation

If yes, I would make changes relating to: [drop-down menu]

- Scope of study
- Study timeline
- Type of data collected
- Site of data collection
- Method of data collection
- Recruitment of additional experts to team
- Training for project staff
- Engagement with additional stakeholders / stakeholder groups
- Level / frequency of stakeholder engagement
- Other please specify

Please outline the main changes you would make and why.

3. Outputs of the HSRI-funded project

• To what extent has the HSRI-funded project led to the following impact for you and your research group/institution:

	To a large extent	To some extent	Not at all	
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Improved my knowledge and technical skills to undertake health systems research		
Improved my research leadership capabilities		
Improved my research management / admin skills		
Improved skills related to community engagement and knowledge transfer		
Informed my further direction of research		
Provided me with important new contacts I have used in my further work		
Extended my network of collaborators		
Raised my institution's awareness of health systems research		
Raised my institution's capabilities to conduct health systems research		
Other – please specify		

- Has the HSRI-funded project led to follow-on funding for your further research?
 - Not yet, as the project is still ongoing
 - No
 - Yes I have secured follow-on research funding as a result of the HSRI project

If yes, please specify the funding amount, source of funding and project title.

• To what extent has the HSRI grant led to the following for LMIC practitioners, decision makers and community representatives?

	To a large extent	To some extent	Not at all
Stakeholders feel more informed of the nature and value of health systems research			
Policy makers and practitioners increasingly seek evidence from researchers to inform policy making			
Policy makers and practitioners increasingly consider research evidence available when taking policy decisions			

4. HSRI award outcomes and impact

- i) Impact on policy and health systems
- Has the project already led to any changes in policy or health systems? (We are aware that the project may still be ongoing, and hence outcomes or impacts may not have been achieved at this stage.) [Multiple choice]
 - Not yet, the project is still ongoing
 - Yes, project findings have informed or led to changes in policy and practice
 - No, the project has completed but has not led to any changes and is unlikely to do so I the future

If yes, please explain the nature of these changes and the number of people likely to benefit. If no, please explain why the project will not lead to any changes.

- ii) Other impacts
- Has the HSRI-funded project achieved other impacts, not directly related to the research question it addresses / beyond your research group? (select all that apply) [Multiple choice]
 - No / not yet
 - Yes it has given a higher priority to health systems research at LMIC institution(s)
 - Yes it has built up or expanded a local network of researchers with associated benefits
 - Yes it has built up or expanded a local network of policy makers with associated benefits
 - Yes it has informed wider decision-making, e.g. in countries not involved in the original HSRI project
 - Yes other (please specify)

Please give a short description of the impact(s) indicated above and provide any supporting evidence / contacts.

• If you were/are involved in other HSRI-funded awards: Please provide a brief summary of outcomes and impacts achieved, stating the award title and number

5. Global health systems research funding landscape

- Is the HSRI filling a gap in the global health research funding landscape?
 - Yes
 - No
 - Don't know / can't say
- What do you consider the main strengths and weaknesses of the HSRI? Please explain.
- Are there currently any gaps in the health policy and systems research funding landscape that you think function as a **barrier** to health impact? [drop-down menu]
 - No, there are currently no gaps in funding relevant to researchers that function as a barrier
 - Yes, there are critical gaps in the research funding landscape

If yes, please describe the critical gaps.

6. Design of the HSRI

- i) Application
- Thinking back to when you applied for a HSRI award, were there any aspects of the scheme's design and requirements you feel were problematic and could be improved? [multiple choice]
 - Yes, there were aspects that were problematic and could be improved
 - No, I did not consider any aspects or requirements of the scheme problematic

If yes, please specify what could be improved?

- Are there aspects of the scheme's current design and requirements that are a barrier to attracting relevant high-quality proposals? [multiple choice]
 - No, I think the scheme's design and requirements enable it to attract relevant highquality proposals
 - Yes, I think there are aspects that limit the scheme's attractiveness and accessibility for researchers from HIC institutions
 - Yes, I think there are aspects that limit the scheme's attractiveness and accessibility for researchers from LMIC institutions

If yes, please specify the problem and possible ways of improvement.

- ii) Support for additional activities
- Are there additional activities the HSRI could support that you think would make the research more effective and increase the potential for impact? (select your top choice) [Multiple choice]
 - a. Support for other types of research
 - b. Stakeholder engagement
 - c. Dissemination and knowledge exchange
 - d. Network building
 - e. Training
 - f. Other please specify

Please elaborate on your selected activity

- iii) Promotion
- Do you think calls for proposals and other information on the HSRI are communicated through the right channels, reaching the relevant research community in the UK and as well as in LMICs? [multiple choice]
 - Yes, I think relevant researchers are aware of the HSRI
 - No, I think communication about the HSRI could be improved please explain

7. Final remarks

Thank you for your response. We appreciate your input so far. If you are willing to be contacted for further information or a short follow-up interview (by telephone or teleconference) with the study team, **please provide your contact details below**.

Please be assured that your contact details will not be shared outside the study team, and will be deleted on completion of the study. Full details on how the study team will handle your data are available at <u>http://www.technopolis-group.com/privacy-policy/</u>.

Name	
Email address	
Comments	

E.5. Survey for unsuccessful applicants

E.5.1. Introduction

The funders of the **Health Systems Research Initiative (HSRI)** – the UK Medical Research Council, the Wellcome Trust, the UK Department for International Development, and the UK ESRC - have commissioned a review to **understand the current and potential impact of the HSRI**, which would also inform the design of future funding schemes.

As part of this review, Technopolis Ltd is consulting with researchers and other stakeholders involved in the HSRI, including applicants. Your participation in the survey will help gather evidence on the HSRI scheme and its processes and provide you with the opportunity to inform discussions on the future design of the scheme.

The survey contains roughly 30 questions. All responses and associated personal information will be treated in the strictest confidence, in line with legislation on data protection. Information will only be reported in an aggregate or anonymised form to the funders of the HSRI.

Thank you for taking the time to complete the survey – your participation is extremely important to inform the study.

Before you begin, please make sure that your browser is maximised. It's easy to navigate through the questionnaire: just click on the answer or answers that apply for each question. You may need to use the scroll bar to see the next question. To continue, click on the next button at the bottom of each page. While your browser is open you can go backward and forward in the survey, but you will not be able to return to your survey once the browser has been closed or you submitted the survey.

Please click 'next' to enter the survey.

- 1. About you
- Country [drop-down menu]
- Institution (at time of HSRI application)
- How many times have you applied to the HSRI? [drop-down menu]

If you have applied multiple times to HSRI, please select one unsuccessful proposal for the purpose of this survey for which you have the most information available.

- Type of application [drop-down menu]
 - Outline application
 - Application for full grant
 - Application for development/foundation grant
- Call applied for [drop-down menu]

- 2. Project description
- Which area of health policy and systems research did the proposed project relate to? (please select all that apply) [drop-down menu]
 - service delivery
 - health workforce
 - health information systems
 - access to essential medicines
 - financing
 - leadership/governance
 - Other please specify
- Which health area did the proposed project target? (please select all that apply) [dropdown menu]
 - General health relevance
 - Infectious diseases
 - Reproductive health and child birth
 - Cardiovascular diseases
 - Stroke
 - Mental health
 - Metabolic and endocrine
 - Other please specify
- Where was the project taking place?

Number of research site(s) [drop-down menu]

Location of research site(s) (country) [drop-down menu] - choose all that apply

- We would like to understand the range of expertise involved in the proposed project. Did the proposed study team include experts in the following areas (select all that apply): [drop-down menu]
 - Health policy local policy context
 - Health systems
 - Health care e.g. doctor/nurse/pharmacist/community health worker
 - Implementation science
 - Operational research
 - Social science
 - Data management
 - Statistics
 - Health economics
 - Knowledge brokerage (stakeholder engagement, network building)
 - Evaluation/impact
 - Other please specify

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- 3. Application stage
- Thinking back to when you applied for an HSRI award, were there any aspects of the scheme's design and requirements you feel were problematic and could be improved? [multiple choice]
 - Yes, there were aspects that were problematic and could be improved
 - No, I did not consider any aspects or requirements of the scheme problematic

If yes, please specify what could be improved?

- Prior to your application to the HSRI, had you or others carried out pilot studies to inform the project? [drop-down menu]
 - No there was no need for a pilot study, we knew the project location(s), context, and project methodology well
 - No but we would have liked to carry out a pilot study, provided we had funding
 - Yes we conducted a pilot study in the context of the project location(s)
 - Not applicable the pilot study was part of the HSRI grant application
 - Other please specify
- Did you involve stakeholders at the application stage? (please select all that apply) [dropdown menu]
 - No
 - Yes policy makers from national government(s)
 - Yes policy makers from local government(s)
 - Yes policy makers from international agencies
 - Yes LMIC health care practitioners
 - Yes LMIC health care organisations
 - Yes implementing organisations/NGOs
 - Yes community organisations/representatives/patients
 - Yes other (please explain)
- In hindsight, are there aspects of the application you would approach differently? [dropdown menu]
 - No, I would not make any changes to the application
 - Yes, knowing what I know now, I would make substantial changes to the application
 - Yes, knowing what I know now, I would make minor changes to the application

If yes, which of the following would you change: [drop-down menu]

- Scope of study
- Study timeline
- Type of data collected
- Site of data collection
- Method of data collection
- Recruitment of additional experts to team
- Training for project staff
- Engagement with additional stakeholders / stakeholder groups

- Level / frequency of stakeholder engagement
- Other please specify

Please outline the main changes you would make and why.

- Did you receive feedback on your application? [drop-down menu]
 - Yes
 - No
 - Can't say

If yes, was this feedback helpful? [drop-down menu]

- Yes, the feedback provided was very helpful
- Somewhat, the feedback provided could have been more helpful
- No, the feedback provided was not helpful
- I do not recall whether the feedback provided was helpful

Please provide further detail.

- 4. Your further research activity
- Did you continue working on the specific research idea after your application to HSRI was unsuccessful? [drop-down menu]
 - Yes, I continued working on the research idea
 - Yes, I continued working on some aspects of the research idea
 - No, I did not pursue this research idea further, but I am aware that others have
 - No, I did not pursue this research idea further, and as far as I know, it has not been pursued elsewhere
 - Other (please specify)
- Did you apply for other sources of funding for the same research idea after your application to HSRI was unsuccessful? [drop-down menu]
 - Yes, I submitted a grant application to another funding programme, and was successful
 - Yes, I submitted a grant application to another funding programme, but was not successful
 - No, I did not apply for funding elsewhere

If yes, please provide details as to which funding programme/s you applied for, the level of funding requested, and whether the original research idea or team was modified.

[Survey routed to section 6 for those who have not found alternative funding]

- 5. Research progress and outcomes
 - i) Project implementation
- Are/were you involving or engaging with stakeholders in the funded project? (please select all that apply) [drop-down menu]
 - No
 - Yes policy makers from national government(s)

- Yes policy makers from local government(s)
- Yes policy makers from international agencies
- Yes LMIC health care practitione
- Yes LMIC health care organisations
- Yes implementing organisations/NGOs
- Yes community organisations/representatives
- Yes other (please explain)

Please summarise any stakeholder involvement / engagement as part of the project, including the frequency and nature of input, mechanism for engagement (e.g. inclusion in project steering committee), etc. and indicate which aspects you consider the most critical.

- ii) Research findings
- Has the research project resulted in any findings to date?
 - Not yet, as the project is still ongoing
 - Yes

If yes, please provide a brief summary of key findings. If no, please explain why not.

- Have you published any findings from the project?
 - Not yet, as the project is still ongoing
 - Yes, findings of the research project have been published.
 - No, findings have not yet been published but we are planning to do so
 - No, the project's findings are not suitable for publication
 - iii) Other outputs
- Have any new research tools, databases, methodologies or pathways to impact been developed as part of the project?
 - Not yet, as the project is still ongoing
 - Yes please describe
 - No
 - iv) Capacity building
- Has the project contributed to capacity building?
 - Not yet, as the project is still ongoing
 - Yes institutional and organisational capacity built in HIC
 - Yes institutional and organisational capacity built in LMIC
 - Yes health systems research capacity built in HIC
 - Yes health systems research capacity built in LMIC
 - Yes improved research management and administrative skills in LMIC
 - Yes improved research leadership in LMIC
 - No
 - v) Uptake of project findings
- Are you aware if others have taken up project findings, or are using new tools, databases, training materials, implementation pathways or methodologies developed?[drop-down menu]

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- Not yet, as the project is still ongoing
- No I don't know
- Yes

If yes, please describe what project findings or outputs have been taken up, by whom and for what purpose, if you can.

- vi) Impact on policy and health systems
- Has the project already led to any changes in policy or health systems? (We are aware that the project may still be ongoing, and hence outcomes or impacts may not have been achieved at this stage.) [Multiple choice]
 - Not yet, the project is still ongoing
 - Yes, project findings have informed or led to changes in policy and practice

If yes, please explain the nature of these changes and the number of people likely to benefit.

- 6. Global health systems research funding landscape
 - i) Position of HSRI in the landscape
- Is the HSRI filling a gap in the global health research funding landscape?
 - Yes
 - No
 - Don't know / can't say
- What do you consider the main strengths and weaknesses of the HSRI? Please explain.
 - ii) Gaps
- Are there currently any gaps in the health policy and systems research funding landscape that you think function as a **barrier** to health impact? [drop-down menu]
 - No, there are currently no gaps in funding relevant to researchers that function as a barrier
 - Yes, there are critical gaps in the research funding landscape

If yes, please describe the critical gaps.

- iii) Support for additional activities
- What additional activities could HSRI support to achieve its desired impacts strengthened health systems, improved access to health services and improved health in LMICs?
 - iv) Promotion
- Do you think calls for proposals and other information on the HSRI are communicated through the right channels, reaching the relevant research community in the UK and as well as in LMICs? [multiple choice]
 - Yes, I think relevant researchers are aware of the HSRI
 - No, I think communication about the HSRI could be improved please explain
- 7. Final remarks

Thank you for your response. We appreciate your input. If you are willing to be contacted for further information or clarifications, **please provide your contact details below**.

Please be assured that your contact details will not be shared outside the study team, and will be deleted on completion of the study. Full details on how the study team will handle your data are available at <u>http://www.technopolis-group.com/privacy-policy/</u>.

Name	
Email address	
Comments	

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Appendix F Impact case studies

F.1. Optimizing health systems to improve delivery of decentralised care for patients with drug resistant tuberculosis

F.1.1. Background

Drug-resistant tuberculosis (DR-TB) presents a major burden for fragile health systems in sub-Saharan Africa, which are further encumbered by a high prevalence of HIV. South Africa counts for 6% of the total global burden of DR-TB (defined as resistance to at least rifampicin and including multi- and extensively DR-TB) with 13,005 laboratory-confirmed cases in 2019.⁶⁹

To tackle this burden effectively, South Africa opted for a national policy to decentralise DR-TB services in 2011.⁷⁰ The reasons for this were manifold.⁷¹ Firstly, DR-TB regimens are arduous and associated with significant adverse events. Hence, patients are monitored monthly with laboratory tests to identify drug toxicities and determine treatment response. Secondly, hospital-based treatment (centralised services) is burdensome for patients, their families and providers, since patients are isolated in a hospital ward for lengthy periods of time. Thirdly, decentralised care reportedly leads to similar or better outcomes while being more acceptable to patients and reducing provider costs.

The South African National Department of Health provided a very generic guideline document for decentralised services. This was intentional to give different provinces and districts the freedom to implement the guideline based on what would work in their context. Thus, while the guideline document was helpful in the sense that it sanctioned decentralisation, it did not provide enough practical guidance for implementation. As a result, provinces implemented the policy based on their own understanding and experience, availability of resources, and the health system and strategies in place locally. This context offers an excellent opportunity to learn lessons, both positive and negative, from the decentralisation experience which will assist not only South Africa, but also other countries, to strengthen their health systems and increase access to and quality of DR-TB care.

There is already some evidence from a previous study that a successful programme of decentralised care at the district level can enable successful and rapid linkage of patients with DR-TB to care.⁷¹ The study results confirmed that the interpretation and manner of implementation of decentralised care varies substantially across different districts and provinces.

F.1.2. The award

The "Optimizing health systems to improve delivery of decentralized care for patients with drug resistant tuberculosis" (MR/N015924/1, £578,055) was a full grant funded through Call 2 of the HSRI from February 2016 to December 2020. The project aimed to identify how decentralisation had taken place and evolved in the 5 to 7 years after the launch of the national document including what the patients' travel and referral pathways were.

⁶⁹ World Health Organization. Global tuberculosis report 2020. Geneva, Switzerland: WHO, 2020.

⁷⁰ National Department of Health South Africa. Management of drug-resistant tuberculosis: policy guidelines. Pretoria, South Africa: Department of Health, South Africa, 2011.

⁷¹ Oga-Omenka C, Tseja-Akinrin A, Sen P, et al. Factors influencing diagnosis and treatment initiation for multidrugresistant/rifampicin-resistant tuberculosis in six sub-Saharan African countries: a mixed- methods systematic review. BMJ Global Health 2020;5:e002280.

The study was conducted in three South African provinces – Eastern Cape, Western Cape and KwaZulu Natal – by a multidisciplinary team of experts led by Mark Nicol (University of Western Australia, previously University of Cape Town). Key co-investigators included Lindy Dickson-Hall and Helen Cox (both University of Cape Town), Mosa Moshabela (University of KwaZulu-Natal), Marian Loveday (South African Medical Research Council), Alison Grant (London School of Hygiene and Tropical Medicine), Karina Kielmann (Queen Margaret University Edinburgh), and John Black (South African Government, Eastern Cape). The South African researchers were drawn from across the 3 provinces and brought a wealth of experience in DR-TB diagnosis, treatment, programme design and health care financing. The researchers from the UK brought skills and expertise in health systems evaluation, qualitative and realist methodologies.

The project approach involved the following:

1. **Policy Analysis** to characterise relevant health systems features pertaining to the decentralised care policy in South Africa

2. **Situational Analysis** to describe the key features of the model of decentralised care adopted in each of the selected districts

3. **Theory of Change** to study how specific features of decentralized service delivery (e.g., management organisation of services, financing, health workforce) influence the success/failure of DR-TB programmes

4. **Realist study** of existing DR-TB service delivery practices at the selected districts to determine the health systems features and mechanisms that influence how decentralised care impacts patient pathways and treatment outcomes

5. Action Learning to identify strategies, innovations and action items to support optimal decentralised DR-TB care in the relevant health districts and facilities

A novel aspect of the project was the use of patients as tracers to understand the way health systems are structured rather than relying on policy makers or implementers to provide the relevant information. It involved using a combination of laboratory records, folder review, facility interviews (to verify the laboratory data) and geographic-information systems to track patients through the health system.⁷² This approach provided rich information on the actual pattern of decentralised DR-TB care at the district level, i.e. at a more granular level, which was then translated to generic models. The patient tracer method could be used in other contexts to understand patient movements through the health system to identify and interrogate underlying models of care, and hence is a valuable addition to the health systems toolbox.

The project team did not face many major challenges. The challenges they experienced included delays in getting approvals at the district level, a longer time to verify data in the field, and in 2020 the secondment of health policy makers and practitioners to working for the COVID-19 response. In addition, some senior co-investigators were unable to participate as actively as initially hoped because of new academic responsibilities and/or involvement with the COVID-19 response.

Six-monthly or yearly in-person team meetings were a key enabler for collaborative working allowing the study team to discuss and critique the data, exchange ideas and develop models to understand and articulate what was being observed on the ground. The meetings also helped the team to decide on the next steps for the project.

⁷² Hill JS, Dickson-Hall L, Grant AD, et al. Drug-resistant tuberculosis patient care journeys in South Africa: A pilot study using routine laboratory data. The International Journal of Tuberculosis and Lung Disease. 2019;24(1):83-91.

External stakeholders (national and provincial health policy makers and practitioners, patients and their family members) were engaged during the implementation of the project primarily through workshops and interviews. Dr Dickson-Hall and Professor Moshabela have built strong relationships with policy makers in the Department of Health, in particular with the National Director for DR-TB. In addition, the team twice presented at and facilitated stakeholder meetings where representatives from the various provinces discussed decentralisation efforts and plans to optimise DR-TB care in South Africa. This provided the study team with opportunities not only to disseminate their findings to provinces not involved in the research project, but also to exchange learnings and ideas to further operationalise or improve their provincial and district decentralisation strategies going forward.

F.1.3. Findings (Outputs, outcomes, impacts)

Manuscripts describing the main outcomes of the study are currently in preparation or under review, with 15 manuscripts (published and as yet unpublished) already attributed to the project according to Researchfish[®].⁷³ The main findings of the project are

There are tensions between actors favouring centralised, specialised DR-TB approaches and control of patient treatment and resources which are perceived to protect quality of care, and actors favouring decentralised, patient-centred care which is seen to be better for human rights and access to DR-TB treatment⁷⁴

The patient tracer method allowed characterisation of patient movement patterns during DR-TB treatment and multiple different models of care emerged. In addition, the complex social, economic, and psychological needs of DR-TB patients became apparent. Patients experienced complex medical (e.g. advanced HIV co-infection and chronic illness) and social challenges (e.g. mental illness, incarceration, substance abuse) which affected their physical, social, economic, psychological, and emotional well-being far beyond the period when treatment is being administered.^{75,76} Therefore, it became clear that even within a decentralised model, there is no 'one size fits all' model of care. So, policy makers should offer differentiated models of decentralised care to better address the needs of individual patients having considered what models work for specific patient groups in specific situations

The use of ancillary staff as clinical health care "champions" can help drive DR-TB policy implementation and overcome barriers in resource-constrained environments.⁷⁷ Hence, they should be supported by their organisational networks, so that they may help cover gaps in the healthcare system

The realist evaluation part of the project contributed to a theory of decentralisation termed the 'sweet spot' theory. The 'sweet spot' was developed to understand the ideal point of care delivery for an individual / group within a particular healthcare setting and how best to

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https://gtr.ukri.org/projects?ref=MR%2fN015924%2f1&pn=0&fetchSize=10&selectedSortableField=firstAuthorName&selectedSortOrder=ASC

⁷⁴ Moshabela M, Cox H, Jassat et al. "We were caught sleeping": Tensions between 'control-based' and 'accessbased' approaches in the formulation of a national policy to decentralise management of drug-resistant tuberculosis in South Africa. Manuscript under review, BMJ Global Health. 2020.

⁷⁵ Furin J, Loveday M, Hlangu S. *et al.* "A very humiliating illness": a qualitative study of patient-centered Care for Rifampicin-Resistant Tuberculosis in South Africa. BMC Public Health. 2020;20: 76.

⁷⁶ Mitrani L, Dickson-Hall L, Le Roux S et al. Diversity of clinical and social circumstances of drug-resistant TB patients in South Africa: a retrospective cohort study. Public Health Action. Under review.

⁷⁷ Le Roux S. The role of clinical healthcare champions in driving implementation of policy on drug-resistant tuberculosis in South Africa (in preparation)

organise decentralised DR-TB care. This 'sweet spot' is as close as possible to a patient's home with the right level of capacity to provide personalised clinically appropriate DR-TB care. The spot is further determined by a delicate balance of clinical, system, personal and social factors, presented as different controlled hours on a 'dial'. This work is currently being brought together in a manuscript and has been presented and favourably received by South Africa's National Department of Health for incorporation into current decentralisation efforts

The study also looked at mapping patients' trajectories through the health system using geospatial information system data.⁷⁸ This mapping exercise helped provincial and district policy makers and practitioners to understand and appreciate the distance, frequency and access challenges patients face during the course of their treatment as well as the costs they occur, which can be a significant portion of the household income. It brought new understanding about why patients may not be completing their treatment course and why decentralised, patient-centred DR-TB care may be more helpful from the patient's and their family's perspective

Involvement in the study, helped improve Professor Mark Nicol's knowledge of and track record in health systems research and Professor Mosa Moshabela's understanding of DR-TB and health systems research among others, creating a small critical mass of people in this area. Junior team members also developed skills and knowledge in health systems research. Two researchers will achieve doctoral degrees and one student has completed a master's degree through nested work and support from the project. Sixteen undergraduate medical students were involved in short research projects on focus areas of the study. Several students working with Professor Moshabela are trying to learn from the study methodology and use a similar approach in their own research. Further, the engagement with policy makers helped develop their understanding and appreciation for health systems research through seeing the tangible benefits that they can gain from this kind of work.

The National Director for DR-TB is adopting outputs of the work to implement health systems strengthening components in the South African DR-TB programme. He has also commenced a PhD in this area of research under the supervision of Dr Mosa Moshabela, one of the lead investigators in this project.

F.1.4. Next steps

The engagement with the Department of Health in the provinces is helping these stakeholders understand their options for implementation and the ways they could organise care, which is expected to translate into changes in decentralised DR-TB care delivery. Further, there are plans to present the findings at upcoming national and international meetings in the fields of health systems research broadly and tuberculosis specifically.

The patient tracer method could help health services to understand the models of care operational in their setting through individual patient pathway pattern analysis, enabling them to plan implementation of decentralised and patient-centred care for other illnesses, including chronic diseases. This is also of continued relevance to tackling the DR-TB burden, since patient-centred care is one of the three pillars of the WHO End TB strategy.⁷⁹

⁷⁸ Dickson-Hall L. Care pathways for drug-resistant TB patients in South Africa: An observational study of geospatial and temporal patterns (in preparation)

⁷⁹ World Health Organization. The End TB Strategy. Available at http://www.who.int/tuberculosis/strategy/end-tuberculosis/en/.

The study has the potential to deliver economic benefits for patients by demonstrating different models for delivery of care and helping rational decision making on implementation of the most appropriate models according to the health systems and patient factors present in a particular context. This might mean less travel and costs for patients resulting in savings. There would be benefits for the transport systems and the health system as well, not only in terms of transmission of illness, but also in terms of the burden associated with building and maintaining specialised facilities and infrastructure unnecessarily. Lessons could also be learnt from the study with regard to other infections such as COVID-19 and HIV as well as mental illness which have similar patterns in terms of the stigma, the risk for the community and health system, presence of vulnerable individuals, and treatment adherence.

The study team was able to investigate a very important topic which has major implications for the delivery of DR-TB care and patient outcomes as well as the South African health system (local, regional, and national) and this would not have been possible without the HSRI grant. In the words of Dr Lindy Dickson-Hall: "I can certainly say that as a clinician and as a public health care worker, I find the work that has been done to be tremendously useful and helpful. And if it wasn't funded by this initiative, it wouldn't have been conducted. And I think it's probably one of the most beneficial studies that I know that's taken place in a number of years with patients in this country."

F.2. Determinants of effectiveness of a novel community health workers programme in improving maternal and child health in Nigeria

F.2.1. Background

Maternal and child health (MCH) remains a health priority in Nigeria. While maternal mortality was cut in half between 2003 and 2013, it still affected 0.55% of births in 2013.⁸⁰ Similarly, neonatal mortality had decreased by nearly a quarter, but remained high at 3.7% - just under 250,000 new-borns each year. Access to and use of quality MCH services tends to be particularly low in rural areas among vulnerable groups in Nigeria.

Research evidence, from Nigeria and elsewhere, suggested that access to health services and the health of mothers and children can be effectively improved through Community Health Worker (CHW) schemes.⁸¹ CHWs are individuals who provide health services within their community.⁸² They do not have professional training and are usually volunteers or receive a stipend for their work. Addressing MCH, CHWs can provide continuity of care from the antenatal through to the postnatal period, giving women advice on pregnancy, childbirth and postnatal care and strengthening linkages between communities and formal health services.⁸³

CHW schemes are complex interventions which combine elements at different levels of the system, from provision of training and support for individuals, to strengthening links with the formal health system, to enabling adequate resourcing and political support for CHW

⁸⁰ Federal Ministry of Health (2013) Country Implementation Plan for Prioritized Life-Saving Commodities for Women and Children. Abuja: Federal Ministry of Health; Federal Ministry of Health (2011) Saving newborn lives in Nigeria: Newborn health in the context of the Integrated Maternal, Newborn and Child Health Strategy

⁸¹ Blanchard, AK, Prost, A & Houweling, TAJ (2019) Effects of community health worker interventions on socioeconomic inequities in maternal and newborn health in low-income and middle-income countries: a mixed-methods systematic review. BMJ Glob Health 4(3):e001308

⁸² Olaniran A, Smith H, Unkels R, Bar-Zeev S, van den Broek N. (2017) Who is a community health worker? - a systematic review of definitions. Glob Health Action 10(1):1272223.

⁸³ Wilford, A, Phakathi, S, Haskins, L et al. (2018) Exploring the care provided to mothers and children by community health workers in South Africa: missed opportunities to provide comprehensive care. BMC Public Health 18: 171

programmes. There is no 'one size fits all' approach; CHW schemes need to take account of diverse country contexts, and potential synergies (or interference) with other interventions, e.g. financing schemes such as conditional cash transfers (CCTs). CCTs aim to incentivise mothers by providing them with payments each time they access health services, e.g. for antenatal and postnatal care visits and for delivery at a health facility.

Given this complexity, a sound understanding of what makes CHW programmes successful, under what circumstances, is required to inform further implementation. This also includes the factors that enable progress achieved to be sustained beyond the duration of an intervention.

In 2012, the Federal Government of Nigeria established the Subsidy Reinvestment and Empowerment Programme (SURE-P), which invested revenue from a fuel subsidy reduction into a social security programme to improve the lives of the most vulnerable populations. One component of SURE-P focussed on maternal and child health (SURE-P/MCH). This programme combined recruitment and training of CHWs with infrastructure development and increased availability of supplies and medicines to improve access to quality health services - and ultimately MCH. From December 2012, incentive payments to pregnant mothers (CCTs) were added at selected sites.

F.2.2. The award

The "Determinants of effectiveness of a novel community health workers programme in improving maternal and child health in Nigeria" (REVAMP; MR/M01472X/1, £939,292⁸⁴) was a full grant funded through Call 1 of the HSRI from June 2015 to February 2021. The project aimed to assess the effectiveness of the CHW component of the SURE-P/MCH programme with and without CCT in promoting equitable access to quality services. It also sought to conduct an indepth analysis of key contextual facilitators and barriers that affect achievement of outcomes. Insights from REVAMP were to inform policy decisions of the Nigerian Ministry of Health (MoH) at federal and regional levels on further integration of CHW and CCT programmes into primary health care, and on health system strengthening in Nigeria more generally. A deeper understanding of contextual facilitators and barriers in Nigeria can also help to shape CHW interventions in other settings.

REVAMP was led by Prof Tolib Mirzoev, University of Leeds, and included a multi-disciplinary team from the Nuffield Centre for International Health and Development at the University of Leeds, and The College of Medicine University of Nigeria Enugu Campus (COMUNEC). Prof Mirzoev and the COMUNEC team had a well-established collaboration, having worked together on several preceding health policy and systems research projects and research capacity strengthening initiatives. In addition, Prof Benjamin Ugochukwu, COMUNEC, had led a baseline evaluation of SURE-P/MCH in 2012. He and colleagues were fully familiar with the intervention and context, and had connections to the MoH and other local stakeholders.

REVAMP was implemented in Anambra State in the South of Nigeria. It took a realist evaluation approach, combining health economics, sociology and statistical analysis, and gathered evidence through surveys, interviews, focus groups and analysis of health facility records. In this way, REVAMP brought together perspectives from across stakeholder groups, including facility managers, CHWs, primary healthcare staff, service users (pregnant women) and their families.

REVAMP's methodological approach, realist evaluation, was relatively novel for global health policy and systems research: Large-scale government programmes tend to be evaluated through economic, impact or process evaluations, while REVAMP focussed on explaining

⁸⁴ The award was originally for £794,948; the budget was increased based on indexation

factors behind the causality, for example through 'reasoning', i.e. the motivations and feelings of individuals that impact on the effectiveness of an intervention. The idea for REVAMP originated from conversations between COMUNEC team members and their contacts at the MoH, who expressed an interest in evidence on SURE-P/MCH's effectiveness. The proposal to HSRI was then designed in consultation with the MoHs at federal and state levels.

In line with realist evaluation methodology, new lines of enquiry were continuously identified over the course of the study based on interim findings. While REVAMP had originally focussed on CHWs, its scope was later broadened to include other closely interlinking components. For example, the project explored the roles of facility security and patient-provider trust, neither of which were explicitly included in the original project design but emerged as important aspects from data gathered early in the study.⁸⁵ These are novel insights into factors that affect access to MCH services. As the study team reported: "During our feedback workshop in January 2020, Nigerian policymakers reflected that, since security is such a mundane and routinely evident issue, they had never linked it with provision or uptake of health care."

• Facilitators of project implementation

The study team engaged with key stakeholders throughout the project, starting with a set of informational workshops and presentations at the MoH as REVAMP was launched, through to regular meetings and updates on emerging findings for the duration of the project. This engagement is a crucial element in realist evaluation as it allows the study team to tease out the (non-documented) logic behind the programme, understand the connections and assumptions that were made in its implementation, identify other important stakeholders to consult, and test findings as they emerge. In this way, the programme theory is continuously refined, and new insights and lines of investigation identified. Prof Mirzoev explained: "While they were not on the grant, the teams at the Ministry of Health were almost fully fledged partners in the project".

This close engagement was also critical when project plans had to be adjusted: In late 2015, six months into REVAMP, a newly elected Nigerian government withdrew funding from the SURE-P programme. In consultation with staff at the State and Federal MoHs and the HSRI funders, this new situation was identified as an opportunity to evaluate the legacy and sustainability of changes achieved by the programme, and REVAMP adjusted its research questions accordingly. As Prof Mirzoev explained: "Research projects rarely look at the longer-term effect, beyond the duration of a government programme. So that was a really unique feature of our project." Other than this major project adjustment, REVAMP did not meet any unexpected challenges.

The existing strong collaboration and previous track record of working together in earlier projects and programmes, was a critical success factor for project implementation: "REVAMP was a fairly stark reminder that for these complex projects, we need to have a high level of trust and confidence in each other. That is something that I'm really happy that we had; there was that really high amount of confidence that each side will deliver."

F.2.3. Findings (outputs, outcomes, impacts)

REVAMP assessed the sustainability of changes achieved by the SURE-P/MCH programme and provided insights into the role of contextual factors, some of which were newly identified over the course of the research. REVAMP found that both provision and uptake of maternal health

⁸⁵ Mirzoev T, Etiaba E, Ebenso B, et al. (2020) Tracing theories in realist evaluations of large-scale health programmes in low- and middle-income countries: experience from Nigeria. *Health Policy Plan*. 2020;35(9):1244-1253

care services were increased in areas where SURE-P/MCH had been implemented, even after funding had ceased, and CCTs incentivised women to give birth in public health facilities⁸⁶. After SURE-P/MCH was defunded, several factors contributed to sustaining the changes the programme had achieved:

- Improvements in the working environment, e.g. through infrastructure investments, led staff to be more motivated to deliver quality care. Other motivating factors included feeling supported, feeling valued, morale and confidence to perform tasks and companionship.⁸⁷
- While withdrawal of SURE-P/MCH led to distrust in the health system and reduced utilisation of MCH services, some women retained increased trust and confidence in the health system as a result of SURE-P/MCH and continued to use the facilities after the programme.⁸⁸
- Increased security at the health facility, e.g. security guards, perimeter fencing, lighting and staff accommodation, provided a boost in staff motivation and people's confidence in the system, which contributed to improved provision and uptake of health care.⁸⁹

The project found that on-going advocacy and lobbying efforts at national and sub-national levels can be instrumental for maintaining the political prioritisation of MCH. Effective advocacy mechanisms involved alliance brokering to increase influence, media support, and the use of champions and influencers.⁹⁰

These insights provide some important considerations for future interventions: REVAMP showed that a large-scale comprehensive intervention such as SURE-P/MCH can improve both provision and uptake of health services, and lead to 'residual trust' in the system. This legacy effect may not be achievable through smaller programmes that focus on individual components of the system.

To date, REVAMP has reported its findings in seven publications in the academic literature.⁹¹ In addition, the study team prepared policy briefs, summarising key insights on the role and state of advocacy, trust, security, data quality, and health worker motivation in MCH services in Nigeria. REVAMP's results have been presented to audiences of policy makers, health professionals, non-governmental organisations (NGOs) and researchers at national, regional and global conferences including the biannual Global Symposia on Health Systems Research, the African Health Economics Association and others. The study team also organised multiple dissemination workshops with federal and state decision-makers. For example, a workshop was organised in January 2020 to feed back the study's findings to national-level stakeholders in Abuja, Nigeria. The workshop was attended by more than 50 representatives from organisations such as the Nigerian Federal MoH, National Primary Health Care Development Agency,

⁸⁶ Onwujekwe, O, Ensor, T, Ogbozor, P, et al (2020) Was the Maternal Health Cash Transfer Programme in Nigeria Sustainable and Cost-Effective? Front. Public Health 8:582072

⁸⁷ Ebenso B, Mbachu C, Etiaba E, et al. (2020) Which mechanisms explain motivation the of primary health workers? Insights from the realist evaluation of a maternal and child health programme in Nigeria. BMJ Global Health 5(8)

⁸⁸ Ezumah, N, Ezenwaka, U, Obi, U et al (2019) Role of trust in sustaining maternal and child health services: Evidence from a SUREP-MCH Program in Anambra State, Nigeria. Policy Brief. REVAMP project. Enugu, Nigeria. University of Nigeria Enugu Campus. <u>https://medicinehealth.leeds.ac.uk/downloads/download/166/revamp_downloads</u> (Accessed 18 March 2021)

⁸⁹ Etiaba, E., Manzano, A., Agbawodikeizu, U. *et al.* (2020) "If you are on duty, you may be afraid to come out to attend to a person": fear of crime and security challenges in maternal acute care in Nigeria from a realist perspective. *BMC Health Serv Res* 20: 903

⁹⁰ Uzochukwu, B., Onyedinma, C., Okeke, C. *et al.* (2020) What makes advocacy work? Stakeholders' voices and insights from prioritisation of maternal and child health programme in Nigeria. *BMC Health Serv Res* 20: 884

⁹¹ <u>https://medicinehealth.leeds.ac.uk/directories0/dir-record/research-projects/962/revamp</u> (Accessed 18 Mar 2021)

Federal Governor's Forum, and NGOs such as the UNFPA and UNICEF.⁹² Key stakeholders are hence aware of the evidence and have access to the policy briefs developed as part of REVAMP, which they can draw on to inform the design of future programmes. All project outputs are also freely available on the REVAMP project website.⁹³

The complexity of stakeholder landscape and the context of SURE-P/MCH required close collaboration between multiple disciplines. During the implementation of REVAMP, a series of teleconferences, webinars, face-to-face capacity-building sessions followed by capacitybuilding workshops were held, enabling each team member to bring in their perspective and arrive at a shared understanding. This close interaction allowed the REVAMP study team to effectively combine expertise and learn from each other: "We [in Leeds] had to really get our heads around the contexts, the mechanisms and the outcomes of the SURE-P/MCH. And similarly, colleagues from Nigeria had to really understand how realist evaluation methodology works. All of that demanded continuous interaction and engagement between the two teams." REVAMP thus highlighted that collaborative realist evaluations require adequate resources and appropriate processes to ensure rigorous analytical engagements across organisations. Other insights and key lessons learned in implementing a realist evaluation have been published in the academic literature, presented at meetings, and made available online, including how REVAMP's logic model and initial programme theories were developed⁹⁴, and how its programme theories were tested, consolidated and refined throughout the study^{95,96}. Dissemination of these experiences can now inform the implementation of other realist evaluations of large-scale health programmes in LMICs.

F.2.4. Next steps

The groups at the University of Leeds and University of Nigeria Enugu continue to collaborate on issues of access to MCH health services. Alongside other collaborators in Bangladesh, Nepal and Ghana, the groups were recently awarded £7.9m in funding for CHORUS, a 6-year research programme consortium focused on urban health systems with funding from the UK Foreign, Commonwealth and Development Office.⁹⁷ REVAMP and CHORUS will enable triangulation of findings with evidence from other settings to improve our understanding of 'what works, in what context, and under what conditions' to enhance access to MCH services.

F.3. Implementing comprehensive, integrated, community-based health care for underserved, vulnerable communities in South Africa

F.3.1. Background

Vulnerable communities face many barriers to care, including financial barriers (e.g. time off from work, transport costs), social barriers (e.g. navigating the health system) and emotional

⁹² https://gtr.ukri.org/project/ED2EF405-12BA-426E-8478-3502343BC9D7 (Accessed 18 March 2021)

⁹³ http://bit.ly/REVAMPproject (Accessed 26 March 2021)

⁹⁴ Ebenso B, Manzano A, Uzochukwu B, et al. (2019) Dealing with context in logic model development: Reflections from a realist evaluation of a community health worker programme in Nigeria. *Eval Program Plann*.;73:97-110

⁹⁵ Mirzoev T, Etiaba E, Ebenso B, et al. (2020) Tracing theories in realist evaluations of large-scale health programmes in low- and middle-income countries: experience from Nigeria. *Health Policy Plan.* 2020;35(9):1244-1253

⁹⁶ Tracing realist theories in the context of large-scale programmes: Experience from Nigeria. Presentation at 2021 International Conference for Realist Research, Evaluation and Synthesis: https://www.youtube.com/watch?v=T6dr0R6W6ec (Accessed 26 March 2021)

⁹⁷ https://medicinehealth.leeds.ac.uk/directory_record/1350/community-led-responsive-and-effective-urban-healthsystems-chorus (Accessed 18 March 2021)

barriers (e.g. dealing with disagreeable staff suffering from burnout). As a result, many vulnerable people do not access care, miss appointments, or fail to adhere to treatment schedules. One element in improving access to affordable high-quality health services is a sufficient number of appropriately trained, motivated health workers who can provide comprehensive primary health care. Against the backdrop of a continuing global health worker shortage, there has been a renewed focus on community health workers (CHWs) as a way to extend services to hard-to-reach populations in remote areas.⁹⁸

CHWs are lay workers with minimal training who provide health services within their community, such as advice and follow-up to encourage adherence to treatment plans, and can take on simple medical procedures.^{99,100} This reduces the workload of higher-level medical providers (e.g. nurses and doctors) - so-called 'task shifting'. CHWs can also strengthen linkages between communities and formal health services by helping people from vulnerable communities negotiate access to facility-based care.¹⁰¹

At the time of the HSRI award, research evidence on a number of health outcomes indicated that CHWs can provide effective community-based care, e.g. in reducing child mortality and mortality caused by malaria.¹⁰² However, there was little evidence on the effectiveness of CHW programmes in improving non-communicable disease outcomes, such as diabetes and hypertension, which represent a growing disease burden for middle income countries. In addition, existing CHW programmes tended focus on individual diseases ('vertical' services), and were facing challenges in achieving scale-up beyond localised implementation and in ensuring sustainability.^{103,104}

In 2011, the South African Government launched a policy to "re-engineer primary health care". The programme included plans for a shift from multiple NGO-led, donor-funded CHW programmes with a disease-specific vertical focus to a scaled-up national CHW programme providing comprehensive, integrated, community-based care.¹⁰⁵ As such, CHWs who had been trained and paid by NGOs to provide support for specific groups, e.g. people living with HIV or tuberculosis, shifted to work within a government programme. As part of this new role, they had to deal with a much broader range of tasks, including services related to non-communicable diseases.

⁹⁸ Ballard M, Montgomery P (2017) Systematic review of interventions for improving the performance of community health workers in low-income and middle-income countries BMJ Open 2017;7:e014216

⁹⁹ Olaniran A, Smith H, Unkels R, et al. (2017) Who is a community health worker? - a systematic review of definitions. Glob Health Action 10(1):1272223.

¹⁰⁰ Blanchard, AK, Prost, A & Houweling, TAJ (2019) Effects of community health worker interventions on socioeconomic inequities in maternal and newborn health in low-income and middle-income countries: a mixedmethods systematic review. BMJ Glob Health 4(3):e001308

¹⁰¹ Wilford, A, Phakathi, S, Haskins, L et al. (2018) Exploring the care provided to mothers and children by community health workers in South Africa: missed opportunities to provide comprehensive care. BMC Public Health 18: 171

¹⁰² Viswanathan, M, Kraschnewski, JL, Nishikawa, B,*et al.* (2010) Outcomes and Costs of Community Health Worker Interventions A Systematic Review. Medical Care 48(9): p. 792-808.

¹⁰³ Tulenko, K, Møgedal, S, Afzal et al. (2013) Community health workers for universal health-care coverage: from fragmentation to synergy. Bulletin of the World Health Organization 91(11): p. 847-852

¹⁰⁴ Pallas, SW, Minhas, D, Pérez-Escamilla, R et al. (2013) Community Health Workers in Low- and Middle-Income Countries: What Do We Know About Scaling Up and Sustainability? American Journal of Public Health. 103(7): p. E74-E82

¹⁰⁵ South Africa Department of Health 2018/19-2022/23. Policy Framework and Strategy for Ward-based Primary Healthcare Outreach Teams. https://rhap.org.za/wp-content/uploads/2018/04/Policy-WBPHCOT-4-April-2018-1.pdf (Accessed 23 March 2021)

In the Sedibeng District, a region near Johannesburg with a population of around 800,000, different models of CHW programmes were being implemented across its 39 CHW teams. These teams differed in their arrangements for how CHWs were supervised, e.g. some teams were led by senior nurses with experience in supervision and a high standing within the formal health systems, while others were supervised by junior nurses with little or no prior experience; some teams were based at primary health clinics, while others were based at health posts (temporary structures of 3-6 rooms managed by one or two senior nurses), and some CHWs were responsible for 100 households while others were responsible for 300. In addition, CHW programmes require engagement with a more complex set of players than other sub-systems of the health sector, extending from the formal health service into communities at household level. Evidence on the effectiveness of different CHW programme models and how they operate within different contexts was needed to inform further implementation.¹⁰⁶

F.3.2. The award

The "Implementing comprehensive, integrated, community-based health care for underserved, vulnerable communities in South Africa: A practical, evidence-informed model" study (MR/N015908/1, £669,626) was a full grant funded under Call 2 (2015) of the HSRI. The project was funded from July 2016 to February 2020. It aimed to develop an effective service model that was practical, evidence-informed, sensitive to the South African context and in line with the existing South African CHW policy. Evidence of how CHW service models can be improved can inform policy and service implementation stakeholders at multiple levels, including policy makers at the Department of Health, health service managers, and practitioners at facility, district, provincial and national level in South Africa. Insights can also provide practical lessons for implementing CHW programmes at scale, elsewhere in South Africa as well as in other LMICs. Ultimately, this leads to benefits for individuals living in vulnerable communities who struggle to access care.

The research project consisted of two stages: First, the team conducted an observational study to describe, cost and compare differently structured CHW programmes that were already being implemented at six sites in the Sedibeng Health District of South Africa. This included data collection through household surveys, interviews, and focus group discussions with local stakeholders. In the second stage, evidence from the observational study was combined with findings from literature reviews to develop an improved CHW service model. The model was subsequently implemented in two pilot sites and evaluated in terms of cost, effect, and acceptability to the community using a before-and-after study design with realist evaluation.

The project team was led by PI Professor Jane Goudge, University of the Witwatersrand, South Africa, and co-PI Professor Frances Griffiths, University of Warwick, UK. This combined the researchers' expertise in the social sciences and health systems and policy research in an LMIC context (Prof Goudge) with clinical expertise and experience in healthcare service evaluation (Prof Griffiths). Study team members from Witwatersrand, Warwick, the South Africa Medical Research Council, and the University of the Western Cape spanned additional disciplines, including statistics, health economics, anthropology, public health, and epidemiology.

Prof Goudge existing relationship at the local government level were very well established, as she had worked with the Head of the Sedibeng Health District on a previous research project. Consequently, the PI was already familiar with how community health services and the CHW programme were implemented in the district. Prof Goudge continued to engage with the

¹⁰⁶ Schneider, H & Nxumalo, N (2017) Leadership and governance of community health worker programmes at scale: a cross case analysis of provincial implementation in South Africa. International Journal for Equity in Health 16:72

district office after the project completed to keep track of further developments. The idea for the HSRI-funded project originated through these discussions and the district officer was a project partner for the study.

Throughout the research project, the study team consulted with a local advisory committee composed of government health officers at district, subdistrict and provincial levels as well as practitioners such as family physicians. Research progress and findings were communicated through regular presentation sessions. These formal meetings also allowed a broader set of stakeholders to be brought in, including officials from neighbouring districts, to communicate the aims and findings of the research. Moreover, the meetings facilitated discussion and joint decision making relating to the project, generating buy-in and a sense of ownership among the participants. For example, members of the local committee were involved in the recruitment of project staff, ensuring the hire would fit within the local organisational culture. In addition to the formal meetings, the study team also stayed in contact with a core stakeholder group through regular informal 'chats', described as "just as important in terms of bringing people along".

F.3.3. Findings (Outputs, outcomes, impacts)

The first stage of the project - the observational study - investigated how different configurations of CHW supervisors affected coverage (proportion of households visited by a CHW in the past year and month), quality of care provided by CHWs, and costs of the service. This assessment highlighted that coverage of households was low; an average of only 10-20% of households had been visited within the preceding year across all six study sites.¹⁰⁷ The study team found that CHWs tended to revisit households they already knew, driven by requests by the clinic to deliver medication or trace patients who had stopped attending the clinic, rather than taking on the more difficult task of approaching an unknown household. The level of supervision, support and resources was insufficient, creating resentment among CHWs.

There were however differences between the CHW supervision models: CHWs' motivation and performance were improved when they were supervised by experienced nurses.¹⁰⁸ Further benefits were achieved when the supervising these senior nurses were based at the local health clinic. This strengthened the relationship with the formal health services and led to the effective integration of CHWs into the health system. On the other hand, supervision by junior nurses did not lead to integration of CHWs. Junior staff did not have the standing within the clinic team to facilitate effective working relationships with CHWs. As a result, CHWs in these teams were less able to ensure necessary care for patients, resulting in lower levels of trust from clients. At the same time, junior nurses did not have perceived as a threat to their own positions).

CHW teams based at health posts had more difficulties building relationships with the clinics, due to the geographical distance and clinic staff's inability to witness CHWs' work first-hand. Especially when managed through junior nurses, CHW teams at health posts lacked adequate training and supervision, and consequently their performance was minimal. The observational

¹⁰⁷ Goudge J, de Kadt J, Babalola O, et al (2020) Household coverage, quality and costs of care provided by community health worker teams and the determining factors: findings from a mixed methods study in South Africa. BMJ Open 2020;10:e035578

¹⁰⁸ Tseng Y, Griffiths F, de Kadt J, *et a.I* (2019) Integrating community health workers into the formal health system to improve performance: a qualitative study on the role of on-site supervision in the South African programme. BMJ Open 2019;9:e022186

study thus showed that dedicated, experienced supervision and co-location with the formal health service improve household coverage or quality of care.

The team then designed a CHW programme model which takes into account the findings of the observational study as well as the availability of resources and cost implications. As South Africa has a limited number of health professionals available to oversee the CHW activities, the model involves 'roving nurse mentors' who operate at multiple sites. These senior nurses can build the capacity of both, CHWs and junior nurse supervisors, and support relationship building with the local health system and community structures.¹⁰⁹ To test this model, a nurse mentor was hired from August 2017 to November 2018, with a 4-year nursing degree and 15 years' experience in nursing including in supervisory roles in other CHW programmes. This senior nurse rotated between two facilities to provide mentoring, working alongside CHWs and supervisors and liaising with senior health clinic staff. The 'interim periods' allowed junior supervisors to take charge of the CHWs in their own and test their capability to manage the teams.

The 'roving nurse' model led to an increase in households that received a visit, from 20% preintervention to a sustained 30% six months after the intervention had completed. Observations during household visits showed that CHWs were now delivering a much broader range of more complex tasks, including registering new households, checking on immunisations of young children, arranging access to antenatal care for pregnant mothers, and monitoring the wellbeing of elderly household members. The study also highlighted an underlying mechanism for the improvement in the quality of care provided CHWs: an increase in confidence and skill gained by working alongside an experienced practitioner over an extended period of time. Previously, the time-limited training courses provided to CHWs had been insufficient to build their confidence in delivering care, especially when faced with a wide range of conditions and tasks. This lack of confidence had led CHWs to limit their engagement during home visits, e.g. CHWs tended to avoid asking questions which could have uncovered new health issues or missed opportunities to promote prevention and screening services available to the household. Working alongside the 'nurse mentor' for extended periods of time allowed CHWs – many of whom had not completed school - to increase their skills and confidence. As Prof Goudge explained: "This increase in skills and confidence helped CHWs to gain more respect and therefore households engaged with them differently. And so we had sort of generated a virtuous circle."

As part of the study, the team also developed a tool to assess the quality of care provided by CHWs when delivering comprehensive care at home visits, as no standard method was available.¹¹⁰ The tool enables data capture by non-clinical fieldworkers shadowing CHWs on their household visits. It collects data to score performance in two areas: "messages and actions" and "quality of communication". It is now available for use not only for performance assessment but also to support training and management of CHW teams.

The study's findings have been reported in three peer-reviewed publications, with a fourth under review and a further paper in preparation. The study has added knowledge and understanding to the body of evidence that can inform and underpin health policy decisions. There are signs that policy makers are taking note: Health officials from a district neighbouring

¹⁰⁹ Malatji, H, Goudge, J, Griffiths, F (under review) Piloting a roving nurse mentor into community- based health programmes to capacitate community health workers: Findings from a realist evaluation in South Africa. https://www.researchsquare.com/article/rs-279480/v1 (Accessed 24 March 2021)

¹¹⁰ Griffiths F, Babalola O, Brown C, et al. (2019) Development of a tool for assessing quality of comprehensive care provided by community health workers in a community-based care programme in South Africa. BMJ Open 2019;9:e030677.

Sedibeng have expressed an interest in implementing the 'nurse mentor' model in their area. However, implementation is hampered by budget constraints and a challenging environment within the South African Health Department. For example, retaining buy-in from key decision makers is hampered by extremely high staff turnover, and a hierarchical organisational culture limits take up and follow through of new approaches.

The study team is continuing to build the evidence base on the design and implementation of effective CHW programmes. Prof Goudge is currently writing a proposal for a research grant on this topic. She also continues to collaborate with the co-PI, Prof Griffiths, who started a 5-year research chair appointment at the Centre for Health Policy, South Africa, in early 2020.^{111,112} In addition, a master's student who worked on the HSRI-funded project is now involved in a secondary analysis of the collected data.

F.3.4. Next steps

The study showed that nurse mentors are effective in improving the performance of CHWs. This model could now be scaled up, within Sedibeng and surrounding districts as well as further afield.

F.4. Stakeholder monitoring to improve quality of Maternal Neonatal care in public and private sector facilities

F.4.1. Background

Maternal and neonatal health (MNH) is at the forefront of national and global health policy agendas. WHO's Sustainable Development Goal 3.1 aims to "reduce the global maternal mortality ratio to less than 70 per 100,000 live births" by 2030.¹¹³ MNH has improved markedly in Bangladesh in recent decades. Between 1990 and 2011, under 5-year-old mortality decreased from 151/1000 to 53/1000 live births, whilst in the same period maternal mortality decreased from 574/100,000 births to 194/100,000.¹¹⁴ Although there have been clear improvements, there is still progress to be made, underlining the importance of delivering high quality of care for mothers and neonates in Bangladesh and worldwide.

At the same time, private health care providers are becoming increasingly important in Bangladesh, but how they fit into the health system with respect to MNH and the quality of care available is not completely understood.

F.4.2. The award

The "Stakeholder monitoring to improve quality of Maternal Neonatal care in public and private sector facilities following a district health systems approach" (MR/M001717/1, £98,132) was a foundation grant funded under Call 1 of the HSRI from March 2015 until March 2017. The principal research question of the project was "to develop and test a stakeholders' monitoring tool to improve the quality of care in public and private sector emergency obstetric care (EmOC) facilities in a district in Bangladesh". Other objectives for the study were to estimate

^{111 &}lt;u>http://www.chp.ac.za/Research</u> (Accessed 24 March 2021)

¹¹² The chair is funded through the South African Research Chairs Initiative (SARChI) of the South African Department of Science and Technology and the National Research Foundation, which aims to strengthen and improve research capacity at South African public universities. <u>https://www.nrf.ac.za/division/rcce/instruments/research-chairs</u> (Accessed 24 March 2021)

¹¹³ SDG 3: https://www.who.int/topics/sustainable-development-goals/targets/en/

¹¹⁴ "Success factors for women's and children's health: Bangladesh" Ministry of Health and Family Welfare: https://www.who.int/pmnch/knowledge/publications/bangladesh.pdf

the cost of implementing the tool, identification of health system factors that enable/constrain implementation, and to develop the next steps to facilitate nationwide scale-up.

The team, based in Bangladesh, was led by Dr ATM Iqbal Anwar, an expert in Maternal Health and Health Systems, with support from experts at the International Centre for Diarrhoeal Disease Research, Bangladesh (icddr,b¹¹⁵), and the Directorate General of Health Services in Bangladesh. The team was multidisciplinary including a social scientist, a health economist, a statistician, an anthropologist, a health systems manager, and an Obstetrician/public health expert.

The project's methodological approach followed a mixed-method, pre-test – post-test research design of the intervention (without any control group). The intervention was a comprehensive stakeholders' monitoring tool for periodic audit of and providing feedback on public and private sector MNH facilities in a district. Stakeholder mapping was conducted to identify the relevant stakeholders such as service providers, programme managers, professional bodies, local government representatives, journalists, and community stakeholders. In order to implement the tool, a district quality assurance team was formed involving these key MNH stakeholders.

In order to enable smoother implementation, a memorandum of understanding was signed by the icddr,b and the Ministry of Health and Family Welfare. Mr Amod Kumar, a Director at the Ministry of Health and Family Welfare, whose responsibility within the Ministry is ensuring delivery of quality care, contributed his expertise to the project. Mr Kumar's two key responsibilities in the project were firstly to support development of the appropriate tools, protocol, and guidelines for monitoring and supervision of the private health care facilities, and secondly to facilitate development of the tools and guidelines for improvements in the selected facilities.

Process documentation was a key method: key informant interviews were conducted throughout the implementation phase to collect information on the barriers, facilitators, feasibility, and sustainability of the tool's use. Data collected via the tool were analysed and disseminated through periodic quality monitoring reports and dissemination workshops.

The study faced a number of challenges although these largely occurred at the early stages. The primary challenge before project implementation was objection by stakeholders, including the Bangladesh Ministry of Health, to include public facilities along with private facilities given that the government has its own mechanisms to deal with public facilities. The concern was that public facilities may compare unfavourably to private ones for various reasons and hence it would be unfair to consider them in the same study. Consequently, it was decided that the original proposal would be amended such that private facilities would be the main focus.

Dealing with private sector facilities posed its own challenges during implementation. At the outset, the private sector facility owners were sceptical of the authority of the investigators, leading to difficulties in establishing initial engagement. These problems were compounded by a lack of human resources at the facilities and the current legislation governing private care facilities being outdated. Critical to overcoming the challenge of engaging with the private sector recognised that the government was affiliated with the study team, working relationships became more manageable.

¹¹⁵ Icddr,b: https://www.icddrb.org/

F.4.3. Findings (Outputs, outcomes, impacts)

Use of the stakeholder monitoring tool resulted in improvement in certain quality of care indicators such as cleanliness of facilities and hospital waste management. One of the key problems faced in demonstrating improvement of quality was that quality of care is multifaceted. Therefore, quantitative analysis needed to make use of multivariate regression. However, no improvements were observed in the structural elements, such as human resources, of the private care facilities.

After private facilities learned that the tool was not a regulatory tool, but was there to improve quality of care, they became more willing to use it. Furthermore, the tool enabled better quality of care through competition between care providers. This was a result of care providers being able to view how they were scoring in comparison to other providers.

The findings from the study were presented at different international forums. Firstly, baseline findings were presented at the Global Health Systems Symposium in 2016, followed by a panel presentation at the same Symposium in 2018. Findings were also presented at the European Public Health Conference. The study team has published conference abstracts in the European Journal of Public Health and one publication in BMJ Open. Two more transcripts are currently being drafted.

One of the key impacts was improved capacity for leadership and communication skills, particularly within hospitals, among health care facility managers and key clinicians. The findings have been translated into national policy through their inclusion in the Ministry of Health and Families National Strategy document. The results were used as evidence for the need for good communication and motivation, crucial aspects of health system responsiveness.

F.4.4. Next steps

Prior to dissemination of the findings of the study, the government in Bangladesh paid minimal attention to the role of private facilities in the quality of care provided to mothers and neonates. Although the stakeholder monitoring tool is still not in widespread use, the feasibility and value of such an intervention was demonstrated through the grant. The findings have been presented to national level stakeholders despite the study being conducted at a district level. Changing policy on a national level is difficult in this area but the findings have so far contributed to national level discussions on the important part that private facilities play in improving quality of care.

The grant has also leveraged further funding for Dr ATM Iqbal Anwar from the European Union for evidence-based health policy making.

F.5. Understanding the Impact of Innovations in the Regulation of Kenya's health facilities

F.5.1. Background

As nations commit to achieving universal health coverage by 2030, there is a growing acknowledgement that simply ensuring access to health services is not enough.¹¹⁶ Health outcomes will still be poor if the quality of care is low. While low quality of health care is experienced in HICs as well, it is particularly a problem for LMICs. For instance, 50% of health

¹¹⁶ Delivering quality health services: a global imperative for universal health coverage. Geneva: World Health Organization, Organisation for Economic Co-operation and Development, and The World Bank; 2018.

care facilities in LMICs lack piped water and 39% lack handwashing soap¹¹⁷; and poor-quality services are associated with a higher predicted risk of neonatal mortality in Africa.¹¹⁸ Furthermore, health systems in LMICs are often pluralistic, involving a mix of public and private (not-for-profit and for-profit) actors, and adding further complexity to the problem.

In this context, regulation is a key intervention employed by governments to ensure patient safety and quality of care.¹¹⁶ However, delivery of this function is often weak, defeating the purpose of regulation. To remedy this situation, governments in turn adopt specific strategies or measures to strengthen regulation. However, the effectiveness of these has not be evaluated to a great extent in LMICs.

The Kenya Patient Safety Impact Evaluation (KePSIE), a collaboration between the Kenyan Ministry of Health and the World Bank Group, is a notable exception in this regard.¹¹⁹ This randomised controlled trial sought to evaluate the impact of innovative regulatory interventions in public and private facilities in 3 Kenyan counties. Kenya has been a pioneer in this area and gazetted the regulatory reforms in a new law in 2017. The interventions include the use of a Joint Health Inspections Checklist (JHIC), which combines areas covered by multiple regulatory agencies; increased inspection frequency; risk-based inspections where warnings, sanctions and time to re-inspection depend on inspection scores; and visible display of regulatory results outside facilities. The KePSIE trial is providing a rigorous quantitative assessment of these strategies. However, considering these interventions are highly complex, requiring behaviour change by regulatory managers, front line inspection staff, health facilities, and clients, this warranted additional qualitative assessment.

F.5.2. The award

The "Understanding the Impact of Innovations in the Regulation of Kenya's health facilities" (MR/P014291/1, £387,784) project was a full grant funded under Call 3 of the HSRI from March 2017 to February 2020. The project was intended as a companion study to the KePSIE trial – a qualitative evaluation alongside the impact evaluation to be undertaken through the trial. Its aim was to gain understanding of the effectiveness of the regulatory innovations that were part of the KePSIE trial, and to consider their wider implications for the creation of a cost-effective, sustainable, and equitable regulatory system. To elaborate, the project team wished to understand why certain aspects in the regulations do (or do not) work and therefore investigated the mechanisms and processes involved, the implementation, and any reasons for variations in the level of implementation. Other important dimensions included legitimacy, potential for corruption and regulatory costs, particularly the cost of inspections.

The project was led by Dr Francis Wafula (Strathmore University, Kenya) and Professor Catherine Goodman (London School of Hygiene and Tropical Medicine). Dr Wafula and Professor Goodman are experienced researchers with a track record in the regulation of health care markets in low-income settings. They were supported by Professor Gilbert Kokwaro (Strathmore University) and Dr Njeri Mwaura (World Bank). While Professor Goodman was Dr Wafula's PhD supervisor and a long-time research collaborator, the other team members had not worked with Dr Wafula prior to the project.

¹¹⁷ Cronk, Ryan, and Jamie Bartram. "Environmental conditions in health care facilities in low-and middle-income countries: coverage and inequalities." International journal of hygiene and environmental health 221.3 (2018): 409-422.

¹¹⁸ Gershon RRM, Karkashian CD, Grosch JW, et al. Hospital safety climate and its relationship with safe work practices and workplace exposure incidents. American Journal of Infection Control. 2000;28(3):211–21.

¹¹⁹ https://pubdocs.worldbank.org/en/116841496767771026/KePSIE-Brief-20Jan2016.pdf

Methodologically, the project deployed standard process evaluation methods. However, the team piloted a novel scorecard-based approach to allow the lay public to gauge the quality of good services, for example, whether a star-based system (1 star is poor, 5 stars is good) or a smiley-based system (big smile versus frown) works better.

Since the project involved evaluating government regulatory interventions, stakeholders such as the Ministry of Health and regulatory agencies were engaged right from the proposal writing phase to ensure the project tackled the most relevant and appropriate research questions. The regulators involved were the Medical Practitioners and Dentists Council, the Nursing Council, the Pharmacy and Poisons Board, the Clinical Officers Council, the Medical Laboratory Technicians and Technologists Board, the Nutritionists and Dieticians Institute, the Radiation Protection Board, and the Public Health Officers and Technicians Council. At the proposal stage, the engagement was mostly through bilateral meetings or phone calls. During the implementation stage, the engagement with policy makers was almost constant as opposed to the engagement with the practitioners which was mostly through the professional associations and episodic.

The fact that the work was highly embedded within the broader policy space and stakeholders had been actively engaged facilitated smooth project implementation. The project team members were seen as trusted partners rather than outsiders or evaluators, which meant that people within the government, regulatory bodies, and health facilities were free and honest with their opinions. Only the broader political climate (a contested election and subsequent re-election) during the study period posed a slight challenge which led to a no-cost extension.

F.5.3. Findings (Outputs, outcomes, impacts)

The study evaluated four main dimensions of the new regulatory system – it's effectiveness, legitimacy, potential for corruption, and social accountability. The resultant findings indicate

- The new system is indeed more effective than the old one, especially because it allows a lot more facilities to be covered. Since the new system is risk-based, inspector visits prioritise facilities that are at a higher risk of performing badly based on objective risk assessment criteria. Consequently, resources are not used to inspect facilities that are likely to be of a high quality, but to inspect ones that have performed poorly in the past and highlighting areas that need work, thus helping them to improve.
- 2. The new system enjoys a considerable degree of legitimacy. Practitioners trust the system because they can engage with inspectors who are looking at a very objective set of criteria. Moreover, the facility does not have to close immediately if it is performing poorly and is given a defined amount of time to get things in order before another inspection. So, the inspection is seen as a quality improvement exercise rather than a policing effort, which makes a very big difference to how the system is viewed.
- 3. The opportunity for corruption and bribery is really low because there is a reporting mechanism with hotlines for people to report back on the inspections if needed. Moreover, since closures are discouraged, there is no immediate threat to incomes, removing the incentive for bribery. Finally, using the electronic system allows institutional memory, which means that subsequent inspections, usually by a different person, are likely to capture any prior oversights, mistakes, or indiscretions.

Overall, the new system incentivised improvement and led to improvement of facilities across the board because the poorest performing facilities were improving. The cost of conducting an inspection was also calculated to give implementers an idea of the costs involved in implementing the system elsewhere. The findings have been disseminated in the form of a policy brief to the Ministry of Health and other potential users. The team has had further engagements with the government in this regard, with the learnings from the study directly informing the nationwide scale-up of the reforms, which is currently underway. The findings will be disseminated more publicly once the three planned peer-reviewed manuscripts from the study are published.

The study has also contributed to building health systems research capacity in Kenya. For Dr Wafula, the capacity building was in the form of building and managing a research team. The project has also helped train four junior researchers. One research officer employed on the grant is completing a PhD by building on work he did in the project. Another team member went on to do a master's at the London School of Hygiene and Tropical Medicine, having won a Wellcome Trust Master's Fellowship building on a component of this work. A third team member built a skill set around economic analysis and costing has been co-leading the costing component of this work and is transitioning to a new project funded by the Multilateral Initiative on Malaria, while the fourth team member developed qualitative research skills which she is now using in another HSRI study on regulation of healthcare professionals in Kenya and Uganda.

One of the "coolest" things the study enabled according to Dr Wafula was a Theory of Change workshop with colleagues from the Ministry of Health and Regulatory Bodies. The key question behind the workshop was "What are the pathways to change that the regulatory reforms are supposed to deliver and how are they supposed to work?" As part of the workshop, participants (including the study team) had in-depth discussions about health systems research, process evaluation, and the usefulness of a Theory of Change. It was especially informative for the policy makers who were introduced to the Theory of Change as a potential tool for their government projects. Thus, the session was in effect "health systems research training embedded within a Theory of Change workshop".

Kenya is seen as a leader in the field of smart, risk-based health systems regulation with other African countries trying to learn from the Kenyan system. This includes countries like Uganda, Burkina Faso, Nigeria, and the Democratic Republic of Congo (on study tour invitation by the World Bank). Dr Wafula is a core participant in this engagement and has been providing advice to the heads of the Ugandan regulatory agencies for doctors and nurses who are trying to come up with a joint regulatory inspection system.

F.5.4. Next steps

Dr Wafula is collaborating with Gerald McGovern (Warwick Business School) on another HSRIfunded study (MR/S013172/1¹²⁰), which is looking at how smart, risk-based, and responsive regulation can be used to improve regulation of healthcare professionals. He is further considering applying for a full HSRI grant to specifically look at strengthening the Kenyan and Ugandan regulation and build on the previous two pieces of work.

Findings from the HSRI studies could now inform regulatory reforms globally, not just in Africa, owing to Dr Wafula's recent appointment to the World Health Organization technical expert group on regulation. The appointment is an acknowledgement of Dr Wafula's extensive work on the topic, of which the HSRI-funded studies are an important component. The close working relationship with the World Bank in this and other projects also provides further opportunity for wider outreach and dissemination and could result in the findings feeding into health system regulations elsewhere in the world.

¹²⁰ Call 5, Foundation grant, due to finish September 2021
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F.6. Investigating the determinants of health worker performance in Senegal

F.6.1. Background

Human resources are an essential element in the effort to improve health systems in LMICs. Particularly in sub-Saharan African countries (SSA), low performance of health care workers and low quality of care are major barriers, often seen to be related to low salaries and working conditions. These issues are central to the functioning of any health care system.

There has been a growing interest in performance management as an approach to address these issues, and Performance-Based Financing (PBF) is one the central policy reforms in this area over the past several decades. PBF programmes have been trialled in a large number of pilot studies across LMICs with support from international sponsors and are thought to improve the quantity and quality of care through improved motivation and resourcing.

In 2014, the World Bank was preparing a large, randomised field experiment of a PBF-based approach in Senegal, in the area of maternal and child health. The primary objective of the study was to measure positive impacts on utilisation and satisfaction, but was not designed to consider unintended consequences, or to help understand the mechanisms through which the programme would affect health care workers.

F.6.2. The award

The HSRI-funded project, "Investigating the determinants of health worker performance in Senegal", was funded from HSRI call 1 and ran from June 2015 to February 2018 (MR/M014681/1, £500,950). Taking advantage of the unique opportunity to 'piggy-back' on the World Bank study, and aiming to address the gaps perceived therein, the project pursued four main research questions:

- How is the PBF programme being implemented?
- Does PBF improve performance of staff?
- Is PBF generating undesirable outcomes?
- What are the causal pathways through which PBF affects performance of staff?

The project was undertaken by a core team in London, in collaboration with a local partner, the Institute of Population, Development and Reproductive Health (IPDSR). The IPDSR, in turn was responsible for hiring local fieldworkers and managed the data collection on site in collaboration with a research fellow from the London team posted in Senegal for extended periods during the study.

Local collaborators were essential to the study as it involved intensive in-person data collection. In addition to survey questionnaires addressed to health care facilities and workers, Direct Clinical Observations (DCOs), i.e., members of the research team observing consultations in person, was an important part of the study methodology. To complement the DCOs, the study made use of 'standardised patients', i.e., pretend patients played by recruited members of the community according to pre-prepared protocols, to collect a robust measure of provider performance. The strong disciplinary perspective based on economics made the project stand apart from many others in the HSRI portfolio.

The main challenge was the local partner. Project lead, Dr Lagarde, had not previously worked in Senegal and therefore did not have an established working relationship with a research organisation in the country. The Health and Development Institute (ISED), originally named in the grant application, turned out not to be a viable option, and the London-based PI instead entered into collaboration with the Institute of Population, Development and Reproductive Health (IPDSR).¹²¹ As the larger programme the project was meant to evaluate also got delayed, the timing worked out well.

The project team continued engagement with the larger programme stakeholders, including representatives from the World Bank and at national level in Senegal. This helped the project team understand the schedule for the programme and obtain feedback on the research tools to be used in the project. Local stakeholders were also engaged to identify relevant cases for the standardised patient module.

A key lesson from the experience was the importance of clear communication between the project partners at all times to avoid misunderstandings and delays. In addition, it would have been useful to have been able to spend time in country ahead of the study, to speak to people and establish relationships, but many researchers do not have the resources available for this type of pre-award scoping activity.

F.6.3. Findings (Outputs, outcomes, impacts)

The study found no evidence that the financial incentives offered by the scheme had measurably improved the quality of care. The quality of care was found to be low due to a lack of effort from care providers during consultations. Whereas financial incentives appeared to be ineffective, the study pointed to a broader set of factors associated with care quality, including trust, continuity of care, overconfidence¹²² on the part of the health care providers, and the ability of patients to provide relevant information to care providers.¹²³

Overall, the main impact of the project has been to provide new and robust evidence concerning the effectiveness of a popular type of policy initiative. Since the study, PBF has come to be seen less favourably in Senegal, a development the project findings have likely contributed to. By highlighting inefficiencies in resources allocation, i.e., that governments spend money on programmes that do not have the desired effect, the findings can ultimately contribute to a better use of available funds.

In addition to the project findings, the project helped build capacity, especially among a number of young researchers at the IPDSR, who had not previously been exposed to the kind of project design and methods used.

F.6.4. Next steps

The study has contributed to the policy debate on PBF initiatives. Negative results are often not viewed as attractively as results which highlight positive outcomes, but these can be equally impactful, providing a basis for better informed policy decisions and potentially avoiding the use of funds on ineffective initiatives.

Nested in the broad study of the PBF programme, the study started to investigate other underresearched aspects that are likely to influence provider performance and quality of care (e.g. over-confidence). Next steps will include improving the understanding of the determinants of care performance: If financial incentives are not effective, what is?

¹²¹ http://ipdsr.ucad.sn/

 ¹²² Kovacs R, "Overconfident health workers provide lower quality healthcare", Journal of Economic Psychology
¹²³ An article summarising key findings from the project overall is expected to be published in due course.

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F.7. System-Integrated Technology-Enabled Model of Care Aiming to Improve the Health of Stroke Patients in Resource-Poor Settings in China

F.7.1. Background

Stroke affects millions of people, particularly in low- and middle-income countries (LMICs). In China, the risk of reoccurrence among stroke survivors is particularly significant, and vulnerable rural populations have limited access to secondary prevention and rehabilitation.

The SINEMA project builds on several previous studies, representing two main prior streams of work: The team has conducted research on chronic disease prevention in rural China, involving efforts to train primary care providers, dubbed 'village doctors'.¹²⁴ Building on this, several other studies have developed technological tools, apps for mobile phones or tablets, to facilitate communication and data collection with local care providers.¹²⁵

Many healthcare systems are focussed on acute care, delivered by specialists in urban locations. Such systems are poorly suited to manage chronic conditions, especially in rural areas. A systems-based approach, focussed on integrating expertise between different levels of the care system and on building capacity at the local level, was therefore considered the most promising approach. The increasingly widespread use of mobile smart phones has provided an opportunity to deploy new and innovative tools.

F.7.2. The award

The award, "System-Integrated Technology-Enabled Model of Care Aiming to Improve the Health of Stroke Patients in Resource-Poor Settings in China" (MR/N015967/1, £505,839), was funded under Call 2 and was implemented between April 2016 and March 2019. The interventional study aimed at training primary care providers – including 'village doctors' – in order to provide higher quality, evidence-based care for stroke patients in rural China.

The study stands out with respect to its focus on primary care in rural areas in support of vulnerable patient groups and its use of mobile technology. The software served the dual purpose of providing knowledge to users and decision support to primary care providers, while also collecting patient data for monitoring and evaluation. Compared to previous versions, the primary novelty in the SINEMA study was the use of voice messages. In addition, the rigorous implementation of a randomised controlled trial (RCT) to evaluate effects of the intervention, while not unique, is unusual in the field and has been used as a case study for others to follow.

¹²⁴ Yan LL, Fang W, Delong E, et al. Population impact of a high cardiovascular risk management program delivered by village doctors in rural China: design and rationale of a large, cluster-randomized controlled trial. BMC Public Health. 2014; 14(1).

¹²⁵ Tian M, Ajay VS, Dunzhu D, et al. A cluster-randomized, controlled trial of a simplified multifaceted management program for individuals at high cardiovascular risk (SimCard Trial) in rural Tibet, China, and Haryana, India. Circulation. 2015; 132:815-824.

Zhou B, Zhang J, Zhao Y, et al. Caregiver-Delivered Stroke Rehabilitation in Rural China (The RECOVER Trial): A Randomized Controlled Trial. Stroke. 2019; 50: 1825–1830.

Chen S, Gong E, Kazi DS, et al. Using Mobile Health Intervention to Improve Secondary Prevention of Coronary Heart Diseases in China: Mixed-Methods Feasibility Study. JMIR mHealth and uHealth. 2018; 6(1). (TAKEMeds project)

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Figure 70 Summary of the SINEMA model



Source: Gong E, Gu W, Sun C, et al. System-integrated technology-enabled model of care to improve the health of stroke patients in rural China: protocol for SINEMA—a cluster-randomized controlled trial. American Heart Journal. 2019; 207:27-39.

Dr Lijing Yan led the study with a core team at Duke Kunshan University, supported by a number of co-investigators and advisors including academics, and health sector and industry stakeholders. The core team also worked closely with two local partners, led by the local Centres for Disease Control and Prevention (CDCs), at the site of the intervention.

The project was implemented in 50 villages in Nanhe county in China's Hebei province. It was carried out in three main stages: (1) Analyses of system barriers in patients' access to care, involving consultations with local stakeholders; (2) Development of technological tools and intervention design; and (3) Implementation and evaluation through a cluster-RCT.

The implementation of the project was successful but also faced several challenges. The 'village doctors' already had a very heavy workload as a result of their existing responsibilities, and additional demands from the study were therefore not always easy to accommodate. The study team was mindful of this and provided different types of support and encouragement ranging from using technology to send reminders and help ease the workload, to financial incentives and recognition (prizes) for good performance. Another challenge, related to reliance on technology in the project, was the occasional discontinuation of service in the areas participating in the study. The study team was able to mitigate this through close monitoring, and also invested significant resources in obtaining and analysing compliance data, e.g., the extent to which participants listened to mobile messages.

The project team engaged with a variety of stakeholders, not least as part of the first phase of the study. In addition to the participants from the health care system, the study team also engaged with local government officials from the start through joint meetings and workshops,

and obtained an official endorsement of the project. The officials were kept updated throughout the duration of the project.

F.7.3. Findings (Outputs, outcomes, impacts)

The project achieved two main results.

- 1. Fidelity: The intervention was accepted by the participants and was implemented as planned, including the initial training and subsequent use of the telephone app
- 2. Patient outcomes: The intervention was found to lead to reduction in blood pressure, stroke recurrence, hospitalisation, and mortality as well as overall improvements in lifestyle

The results have been described in five publications as of now, and further manuscripts are being prepared for submission.¹²⁶

Capacity-building was an integral part of the study design, and occurred across multiple levels of the health system through a 'cascading training' approach, which included the two CDCs involved, nurses and physicians at the secondary care level, and primary care providers in the villages. In addition, the members of the research team benefitted from their involvement, including notably the project manager who was able to advance her career. More generally, owing to its rigorous research design, the study has been used as a case study in research training.

The HSRI scheme was instrumental in allowing the project to take place. Positioned in the gap between small developmental studies and large multi-million global trials, the project was eligible for HSRI funding and benefitted from the resources it provided, resulting in a high-quality study.

F.7.4. Next steps

The study has shown that the intervention works, and the findings have been disseminated through publications and conferences.

Further impact beyond the study participants would require the intervention to be scaled up. So far, funding has not been secured for this purpose from private sponsors in China. The study team is currently exploring government funding sources in China. Despite large rural populations with relatively low-income levels, international funding dedicated to research in LMICs is often no longer available for research in China. Therefore, the team is also currently pursuing funding for a scale-up study in Nepal through the Joint Global Health Trial scheme.

F.8. Citizen-Led Accountability: Applying systems thinking to understand and strengthen health system responsiveness to marginalised communities

F.8.1. Background

In many LMICs like Guatemala, the right to health is inhibited by deficiencies in the health system, including inadequate infrastructure, human resources, and medicines and equipment. As a result, health inequalities are high in Guatemala: chronic malnutrition affects 50% of children under five and the maternal mortality ratio is estimated to be 290 per 100,000 live births.¹²⁷ Indigenous people (making up half of the 15.6 million population) are disproportionally

¹²⁶ https://gtr.ukri.org/projects?ref=MR%2FN015967%2F1; Yan LL, Gong E, Gu W, et al. Effectiveness of a primary carebased integrated mobile health intervention for stroke management in rural China (SINEMA): A cluster-randomized controlled trial. PLoS medicine. 2021;18(4):e1003582.

¹²⁷ UNICEF. The State of the World's Children 2009: maternal and newborn health. 2009.

affected; the burden of morbidity and mortality is almost twice as high for indigenous people compared to the non-indigenous population.¹²⁸ These health system failures are reflective of Guatemala's governance environment, which is among the weakest in the region according to the World Bank's Worldwide Governance Indicators for the period 1996–2015.¹²⁹

Strengthening citizen-led accountability initiatives has potential to redress the causes of health inequalities and promote better health systems governance. These initiatives put users of services at the frontline of accountability enabling those affected to advocate for change. In the last decade, many initiatives have emerged that support citizens to act collectively and engage with state authorities to demand accountability in the health system, as well as other public sectors.¹³⁰ Positive results have been demonstrated in areas including improved user satisfaction, citizen and community empowerment, reduction in informal charges, and increased resource allocation for drugs and petrol, though broader structural changes have proven more resistant to citizen-led initiatives.¹³¹

The current evidence base is limited by the methodological challenge of capturing the complex nature of change pathways, which depend on dynamic interactions among state and social actors and adaptive response to context.¹³⁰ Applying a systems thinking approach can help address this challenge by generating knowledge that is useful for understanding the complex function of citizen-led accountability initiatives and how they can contribute to health system strengthening. Systems thinking is an applied research paradigm that seeks to understand health systems as complex, adaptive systems to solve problems.¹³² Applying a systems thinking approach can improve health accountability initiatives, whose function depends on building networks of relationships – mobilising citizen networks in marginalised communities, forming strategic alliances with civil society organisations, and engaging with state authorities at multiple levels – and promoting the transformation of the power dynamics of marginalisation.¹³³

F.8.2. The award

The "Citizen-Led Accountability: Applying systems thinking to understand and strengthen health system responsiveness to marginalised communities" (MR/P004555/2; £100,429), was a foundation grant funded through Call 3 of the HSRI from August 2016 to May 2018. The project aimed to develop a systems thinking approach to understand the function of networks in citizen-led accountability initiatives and how they contribute to health system strengthening. Insights from the study were to inform policymakers, practitioners, donors, and other

¹²⁸ Ministerio de Salud Pública y Asistencia Social (MSPAS), Instituto Nacional de Estadística (INE), ICF International. Encuesta Nacional de Salud Materno Infantil 2014-2015. Informe Final. Guatemala: MSPAS/INE/ICF. 2017.

¹²⁹ Cross HE, De La Cruz M, Dent J. Government stewardship and primary health care in Guatemala since 1996. Public Adm Dev. 2019; 39:11–22.

¹³⁰ Citizenship DRC. Blurring the Boundaries. Citizen Action across States and Boundaries. A Summary of Findings from a Decade of Collaborative Research on Citizen Engagement. 2011. Brighton: Development Research Centre on Citizenship, Participation and Accountability.

¹³¹ Molyneux S, Atela M, Angwenyi V, Goodman C. Community accountability at peripheral health facilities: a review of the empirical literature and development of a conceptual framework. Health policy and planning. 2012; 27(7): 541–54.

¹³² Swanson RC, Cattaneo A, Bradley E, et al. Rethinking health systems strengthening: key systems thinking tools and strategies for transformational change. Health Policy Plan. 2012; 27(4): 54-61

¹³³ Fox J. Social Accountability: What Does the Evidence Really Say? World Development. 2015:72.

stakeholders interested in strengthening bottom-up citizen-led accountability initiatives to improve public health services.

The study was led by Professor Ana-Karin Hurtig from Umea University in Sweden, and included a multidisciplinary team from Umea University and the Centre for the Study of Equity and Governance in Health Systems (CEGSS) in Guatemala. Dr Walter Flores and Alison Hernandez at CEGSS conceptualised the idea for the study and Prof Hurtig supported the CEGSS team in grounding the project in the systems thinking paradigm, and application of the methodological approach which was relatively novel: it took a qualitative comparative analysis approach, combining social network analysis (SNA), interpretive discussions and case studies to gain a holistic view of municipal-level citizen-led initiatives and their collective action.

The study was implemented in rural municipalities in Guatemala. The study team selected three cases of municipal-level initiatives - each coming from different regions of the country with active and well-organised citizen-led networks. These initiatives were led by a community defender, a volunteer nominated by the community to mobilise accountability action in three main domains – grassroots network development, monitoring of health services and engaging with authorities. The study comprised of two phases. The first phase sought to understand the transmission of information within citizen-led accountability networks, the qualities of relationships that connect citizens in networks of collective action, and to examine patterns of interaction between these networks and state authorities. In this phase, a workshop was held with the community defenders and their collaborators (people who support them in their work for health accountability) to gather insights to generate a network map showing the connections between defenders and their collaborators, and how they were linked up in collective action. In the second phase, qualitative interpretative sessions were held with community defenders and their collaborators to provide a deeper understanding of what the relational qualities mean in practice, and the conditions shaping the network's capacity to achieve health system responsiveness. These insights helped community defenders to shape an action plan for strengthening their citizen-led initiative.

The study team engaged with key stakeholders throughout the project through regular meetings to share and discuss emerging findings. These meetings provided a helpful forum to discuss implementation challenges. Professor Hurtig explained: "[The project] looked quite neat on paper, but there were a lot of challenges to get it running". The study team had to take a 'more flexible approach' with the methodology to adapt to the practical challenges of doing participatory research. Some of the participants reported it was difficult to fully understand the network maps, reflecting the challenges of making complex information accessible to participants with low literacy levels. There was also a 25% decline in the number of participants in the second phase due to scheduling conflicts or decreased motivation. However, the overall quality of the participants input was sufficient to enable robust analysis of the network connections and their meaning. The study team observed that the power dynamics between participants with central roles tended to be more vocal than those in a supporting role. Future consideration will be given to adapt the interpretative discussion guide to encourage participants in supporting roles to share their views.

F.8.3. Findings (Outputs, outcomes, impacts)

The study assessed how citizen-led accountability initiatives build collective power to redress health system failures affecting marginalised communities. The research found evidence to counter the tendency to underestimate the resources and capabilities that marginalised citizens have for building power in marginalised communities. The study team identified a range of important factors for enabling citizen-led networks to effectively mobilise resources to shift the power in accountability ecosystems.¹³⁴

Network qualities such as cohesiveness and centralisation enabled grassroot leaders to adopt a 'with the grain' best fit approach to weave together different resources and capacities; this was critical to mobilise and adapt citizen-led initiatives to the local socio-political context and advocate for solutions for health service deficiencies.

Building a strong community base of support was fundamental for mobilising collective action to voice and demand attention on health systems failures; this grass root support helped citizenled initiatives to gain recognition and legitimacy as 'representatives of the people' and engage with authorities with a bolstered position.

Establishment of strategic alliances with authorities helped to build the 'political capabilities' of citizen-led initiatives and achieve incremental power shifts in the accountability ecosystem, which is critical to sustain and leverage the impact of citizen-led initiatives as their focus expands to the national level.

The study team gained new insights on the change processes of citizen-led initiatives and evidence to support the importance of 'adaptive network building' to enable contextually embedded approaches that leverage collective power of the users of the health services and grass root leaders on the frontlines of accountability. Professor Hurtig clarified: "So often these activities [citizen-led initiatives] are done in a homogeneous way when it comes to training in the different communities and municipalities. But with this project, it was seen that communities look different and also have different influential drivers; [hence] it is important to tailor the training and also the activities [to the local context]". The study team at CEGSS published a review on systems thinking approach to tackle health inequalities¹³⁵ and an article based on their 10 years' experience and the lessons learned from supporting indigenous citizen-led accountability action in Guatemala.¹³⁶

The study findings were disseminated in a series of workshops held at five municipalities in Guatemala. The workshops provided an opportunity to discuss the findings and also facilitated connecting the study participants to local health authorities, public service authorities and civil society organisations which resulted in new alliances being established. The study team also held a three-day realist evaluation workshop at Umea University for researchers collaborating in or conducting health systems research using complexity-sensitive methodological approaches in India, Zambia, Sweden and Cambodia. The study team reported the workshop 'inspired' researchers to use similar network mapping approaches to better understand and support health system interventions in other countries.

The study team established a formal alliance with the national Network of Community Defenders of the Right to Health (REDC-SALUD) and the national Human Rights Ombudsman. These alliances provide citizen-led initiatives working for improved health rights in marginalised rural communities with greater access to mechanisms for demanding accountability for health system failures and enhanced positioning to leverage their evidence for influencing policy. A

¹³⁴ Hernández A. Building collective power in citizen-led initiatives for health accountability in Guatemala: the role of networks. BMC health services research. 2020; 20:1-4.

¹³⁵ Hernández A, Ruano AL, Marchal B, San Sebastián M, Flores W. Engaging with complexity to improve the health of indigenous people: a call for the use of systems thinking to tackle health inequity. International Journal for Equity in Health. 2017;16(1):1-5.

¹³⁶ Flores W, Hernández A. Health Accountability for Indigenous Populations: Confronting Power through Adaptive Action Cycles. IDS Bulletin. 2018.

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year after this study was completed, the municipal-level initiatives involved in the study signed a letter of agreement with the national Ombudsman office and established collaborations with national level think tanks.

F.8.4. Next steps

As a result of the study, the CEGSS is implementing procedures to understand citizen-led initiative networks in other municipalities and at the national level to tailor the technical assistance and support CEGSS provides to citizen-led initiatives. There is also potential to adopt methods for high income countries. According to Professor Hurtig: "Sometimes there is a false dichotomy between what is happening in LMICs and what is happening in high income countries. There are a lot of things high income countries can learn, conceptually and methodologically, from this project."

F.9. Strengthening South Africa's health system through integrating treatment for mental illness into chronic disease care

F.9.1. Background

South Africa is experiencing a quadruple burden of chronic communicable diseases and noncommunicable diseases (NCDs).¹³⁷ Mental disorders are highly prevalent amongst people living with chronic communicable diseases (such as HIV) and NCDs (such as diabetes). Multiple systematic reviews report significant associations between mental disorders and these chronic diseases. Consistent with analogous work conducted in other LMICs, studies in South Africa have shown that people living with chronic HIV and diabetes are at increased risk of mental disorders.¹³⁸ In turn, untreated mental disorders increase the risk of sub-optimal adherence to HIV and diabetes treatment, consequently leading to more rapid disease progression and treatment failure.¹³⁹

Despite the high burden associated with mental disorders, there is a substantial treatment gap in South Africa, with less than a quarter of people with such disorders accessing treatment.¹³⁹ This high prevalence of untreated mental disorders is a major concern for public health as mental disorders are the third largest contributor to the national burden of disease, and also contribute to the morbidity and mortality associated with chronic communicable diseases and NCDs.¹⁴⁰ Health systems in LMICs must respond to mental health risks for treatment failure among chronic disease patients as treatment failure increases health service utilisation and costs.

Integrating mental health services into chronic disease care may be a powerful step towards improving treatment adherence and disease outcomes among people at high risk for treatment failure. Despite these benefits, mental health services are largely absent from chronic disease care in LMICs. This is partly because of limited capacity to deliver additional mental health services in low-resourced and chronically overburdened health services and the limited availability of specialist mental health staff in LMICs.

¹³⁷ Mayosi BM, Lawn JE, van Niekerk A, Bradshaw B, Abdool Karim SS, Coovadia HM, for the Lancet South Africa Team. Health in South Africa: changes and challenges since 2009. Lancet 2012; 380: 2029-2043.

¹³⁸ Prince M, Patel V, Saxena S, Maj M, Maselko J, Phillips MR, Rahman A. No health without mental health. Lancet 2007; 370: 859-877.

¹³⁹ Stein DJ, Seedat S, Herman A, Moomal H, Heeringa SG, Kessler RC et al. Lifetime prevalence of psychiatric disorders in South Africa. British Journal of Psychiatry 2008; 192(2):112-117.

¹⁴⁰ Bradshaw D, Norman R, Schneider M. A clarion call for action based on refined DALY estimates for South Africa. S Afr Med J 2007; 97(6):438, 440.

South Africa's mental health care policy framework (2013-2017) embraces task shifting as a strategy for expanding access to mental health care in chronic disease services.¹⁴¹ In this approach, mental health care tasks previously undertaken by mental health specialists are shifted to community health workers (CHWs). However, the integration of mental health care into chronic disease services in South Africa has been hampered by unanswered questions about whether horizontally integrated (HI) services offer an advantage over vertically integrated services (VI).¹⁴² In an HI approach, CHWs without specialty mental health training would be 'designated' to provide additional mental health care and support to patients in addition to their usual chronic disease duties. In contrast, in a VI model, mental health care would be delivered by 'dedicated' CHWs as an additional resource to the existing chronic disease team. Both collaborative care models require staff to be trained and supervised by mental health specialists. While the merits of integrated collaborative care models have been outlined for other types of health services, there have been no studies comparing the relative effectiveness of collaborative care models on mental health and chronic disease outcomes in South Africa.

F.9.2. The award

The "Strengthening South Africa's health system through integrating treatment for mental illness into chronic disease care" (MIND; MR/M014290/1; £898,776), was a full grant funded through Call 1 of the HSRI from April 2015 to March 2020. The project aimed to compare the effectiveness and cost-effectiveness of integrating the 'designated' and 'dedicated' collaborative care models into chronic disease services. The study comprised of two phases. The first phase sought to conduct an in-depth analysis of the barriers to integration, and the feasibility and acceptability of models of service integration. Findings from this phase were used to adapt the collaborative care models for optimal integration into chronic disease services. In the second phase, a clustered randomised controlled trial (RCT) was conducted in 24 HIV and 24 diabetes clinics with 1340 patients receiving HIV or diabetes care. MIND was led by Professor Bronwyn Myers, Chief Specialist Scientist in the Alcohol, Tobacco, and other Drug Research Unit at the South African Medical Research Council (SA-MRC), and included a multidisciplinary team from the University of Cape Town, the Western Cape Department of Health, and Oxford University.

The idea for MIND was developed in collaboration with the Western Cape Department of Health (WCDOH). The WCDOH identified the evidence needs to be addressed and were "intimately involved in framing the objectives and thinking through what would be feasible" at the proposal design phase. Insights from MIND were expected to guide WCDOH's service delivery plans to prioritise the provision of mental health care for chronic disease patients and also influence regional and national health policies and legislation, with a view to strengthening the provision of mental health care within South Africa's public health system. Findings from this study can guide other LMICs given the similarities between the burden of disease, treatment populations, and treatment systems in South Africa and other LMICs.

The MIND methodological approach was relatively novel: the formative work used innovative quantitative analytical approaches, with a very strong focus on ethnography, and quantitative comparative analysis to compare the implementation capability of various primary health

¹⁴¹ Department of Health. National Mental Health Policy Framework and Strategic Plan, 2013. Pretoria: Department of Health.

¹⁴² Briggs CJ, Garner P. Strategies for integrating primary health services in middle- and low-income countries at the point of delivery. Cochrane Database of Systematic Reviews 2006 (2).

care facilities. The study also compared two approaches to resourcing mental health services and finding the most cost-effective way to deliver these services.

MIND was implemented in the Western Cape Province of South Africa. The study team engaged with key stakeholders throughout the project. A stakeholder advisory group (SAG) was created to bring together perspectives from CHWs, non-governmental organisations), and mental health and chronic disease service patients. The SAG ensured the trial was responsive to the needs of the health system, its partners and service constituency and guided implementation strategies. As Professor Myers explained: "Because of the active advisory group, additional collaborators joined the project MIND fold to add new studies and questions. A postdoctoral fellow [joining the study team] led very interesting qualitative work around implementation questions and process evaluation, which wasn't part of the original study, but has added value."

Enrolment of primary health clinics in the clustered RCT began in April 2017 and participants started to be recruited in May 2017.¹⁴³ Recruitment was expected to run until December 2018 but was delayed by several challenges. Professor Myers explained: "At one point we were a year behind our timeline. The preparatory stage just took much longer than we had originally anticipated. Even though we partnered with the Department of Health, we still needed to get a series of approvals to work across twenty-four sites and we spent a lot of time getting support and building readiness to implement the trial."

F.9.3. Findings (Outputs, outcomes, impacts)

MIND assessed the barriers to, and feasibility and acceptability of, integrating mental health care in chronic disease services from the perspective of CHWs, facility managers responsible for HIV and diabetes service delivery, and patients accessing these services.^{144,145,146} The formative research strongly supported the need for mental health care within the context of chronic disease services. It also provided insights into the constraints within the health system and broader social context that require consideration when integrating mental health care into chronic disease services. These insights informed the design of the mental health service package for optimal integration into chronic disease services.

The trial showed that both the dedicated and designated collaborative care models match in terms of their feasibility and acceptability.^{147,148} The study also developed economic evaluation

¹⁴³ Myers B, Lund C, Lombard C, Joska J, Levitt N, Butler C, Cleary S, Naledi T, Milligan P, Stein DJ, Sorsdahl K. Comparing dedicated and designated models of integrating mental health into chronic disease care: study protocol for a cluster randomized controlled trial. Trials. 2018;19(1):1-3.

¹⁴⁴ Sorsdahl K, Naledi T, Lund C, Levitt NS, Joska JA, Stein DJ, Myers B. Integration of mental health counselling into chronic disease services at the primary health care level: Formative research on dedicated versus designated strategies in the Western Cape, South Africa. Journal of Health Services Research & Policy. 2020:1355819620954232.

¹⁴⁵ Myers B, Joska JA, Lund C, Levitt NS, Butler CC, Naledi T, Milligan P, Stein DJ, Sorsdahl K. Patient preferences for the integration of mental health counseling and chronic disease care in South Africa. Patient preference and adherence. 2018;12:1797.

¹⁴⁶ Brooke-Sumner C, Petersen-Williams P, Kruger J, Mahomed H, Myers B. 'Doing more with less': a qualitative investigation of perceptions of South African health service managers on implementation of health innovations. Health Policy and Planning. 2019 Mar 1;34(2):132-40.

¹⁴⁷ Myers B, Petersen-Williams P, van der Westhuizen C, Lund C, Lombard C, Joska JA, Levitt NS, Butler C, Naledi T, Milligan P, Stein DJ. Community health worker-delivered counselling for common mental disorders among chronic disease patients in South Africa: a feasibility study. BMJ open. 2019;9(1):e024277.

¹⁴⁸ Jacobs Y, Myers B, van der Westhuizen C, Brooke-Sumner C, Sorsdahl K. Task Sharing or Task Dumping: Counsellors Experiences of Delivering a Psychosocial Intervention for Mental Health Problems in South Africa. Community Mental Health Journal. 2020:1-2.

protocols to provide much needed evidence to demonstrate the cost effectiveness of integrating mental health care and chronic disease services.¹⁴⁹ MIND results have directly informed a policy report commissioned by the Department of Health to advocate for greater investment in the integration of mental health care in chronic disease services.¹⁵⁰ The study findings are also contributing to broader policy discussions about the role of CHWs and the scope of their work.

To date, MIND has reported its findings in 13 academic publications. In addition, the study team has prepared policy briefs and participated in numerous national consultations to share key insights from the study. MIND's results have been presented to audiences of policymakers, health professionals and NGOs at numerous regional, national and international workshops and conferences to raise awareness and support for MIND initiatives. The study team has developed a website that includes links to project activities and resources.¹⁵¹

The delay in starting the RCT brought with it unexpected benefits: A brief feasibility study conducted between the formative research and the trial led to the development of a method for assessing clinics' preparedness for implementing mental health interventions. This method can now be used by health planners to assess and build organisational readiness of facilities in LMICs which enables adoption of interventions developed by the MIND project.¹⁵²

During the implementation of MIND, a series of capacity building workshops were held, and the study team provided training at several primary health care clinics to build readiness to implement MIND interventions. Through this training, CHWs were provided with evidence-based screening and intervention tools to identify and address mental disorders among chronic disease patients. A co-investigator reported: "The willingness of primary health care staff to assist with the implementation of project MIND despite the many challenges was wonderful to see and experience".¹⁵² The study team also collaborated with the South Africa Addiction Technology Transfer Centre (SA-AATC), which provides resources for professionals in the HIV, mental health, addictions treatment and recovery services fields, to build capacity and scale up the use of MIND screening tools and interventions. The SA-AATC has committed funding to disseminate training briefs to NGOs and other service providers to facilitate wider use of MIND interventions.

MIND has also supported the career development of early career researchers. The University of Cape Town provided funding for the training of two students through the African Mental Health Research Initiative (AMARI). As a result, one student completed a master's degree to develop their skills in mental health research and a postdoctoral researcher is adapting MIND interventions for the Ethiopian context.

A post-doctoral researcher working on the project was awarded an intramural career development award from the SA-MRC. Collaboration with the Industrial Engineering Department at the University of Stellenbosch supported Professor Myers to co-supervise two industrial engineering students. As a result, the students were able to use MIND data and

¹⁴⁹ Mutyambizi-Mafunda V, Myers B, Sorsdahl K, Lund C, Naledi T, Cleary S. Integrating a brief mental health intervention into primary care services for patients with HIV and diabetes in South Africa: study protocol for a trialbased economic evaluation. BMJ open. 2019;9(5):e026973.

¹⁵⁰ Academy of Science of South Africa. Provider core competencies for improved Mental health care of the nation. 2021.

¹⁵¹ Myers B, Breuer E, Lund C, Petersen Williams P, van der Westhuizen C, Brooke-Sumner C, Naledi T, Stein DJ, Sorsdahl K. Assessing capability for implementing mental health counselling within primary care facilities in a middle-income country: A feasibility study. Journal of psychiatric and mental health nursing. 2019;26(5-6):163-74.

¹⁵² http://projectmind.mrc.ac.za/index.html (Accessed 22 March 2021)

experiences to develop a web-based tool that can predict recruitment accrual and resource needs. This tool helps enhance trial planning and implementation and is freely available.¹⁵³

F.9.4. Next steps

The study team was awarded further funding (£143,556) from the UK Medical Research Council for an additional year to investigate the longer terms impacts of project MIND.¹⁵⁴ In addition, the groups at the SA-MRC and University of Cape Town were awarded funding from the UK Medical Research Council for MINDS-Y (£151,025), a 3-year programme to adapt the programme of mental health services developed in project MIND for youths (15- to 24-year-olds) at risk of treatment failure for chronic diseases.¹⁵⁵ The rural health district within the Western Cape Department of Health has also requested the MIND team to develop a training programme for all its community health workers based on the MIND package of care. It is hoped that all CHWs in this district will be trained in the MIND intervention by the end of 2021.

F.10. Verbal Autopsy with Participatory Action Research (VAPAR): expanding the knowledge base through partnerships for action on health equity

F.10.1. Background

Accurate statistics on causes of death in LMICs are vital to allow these causes to be addressed by policy, but it is estimated that for around half of worldwide deaths the cause is not registered and underlying causes are hence not accurately represented in the statistics that underpin decision making. WHO promotes the use of a technique called verbal autopsy (VA) where information on causes and circumstances of death is gathered using standardised interviews with family members or others who can give evidence. Researchers have developed software to automate the analysis of VA interview data, which allows processing of more cases and in turn reducing the number of death records where the cause is unregistered.

VA methods have mainly been developed to obtain information on medical causes of death. However, while the social determinants of heath are accepted as the fundamental causes of avoidable mortality and health inequalities, systematic and scalable circumstantial categorisations of deaths have not been developed.

F.10.2. The award

This line of research has been supported by HSRI foundation stage grant MR/N005597/1 ("Developing a people-centred health systems research methodology", £99,604 over 18 months) as well as HSRI full grant MR/P014844/1 ("Verbal Autopsy with Participatory Action Research (VAPAR): expanding the knowledge base through partnerships for action on health equity", £705,467 over 5 years, currently ongoing). The team is led by Lucia D'Ambruoso, Senior Lecturer at the University of Aberdeen, who also has affiliations with the University of Umeå, Sweden and the University Witwatersrand, South Africa. Co-PI Professor Peter Byass passed away unexpectedly in 2020; he was Professor of Global Health at the University of Umeå, Sweden.

South African collaborators were involved in the design of the project and relevance to the local context was at the heart of the approach. Collaborators from the South African MRC/Wits

¹⁵³ Spies R, Siegfried N, Myers B, Grobbelaar SS. Concept and development of an interactive tool for trial recruitment planning and management. Trials. 2021;22(1):1-9.

¹⁵⁴ https://gtr.ukri.org/resources/outcome.Ref=MR%2FM014290%2F1 (Accessed 22 March 2021)

¹⁵⁵ https://gtr.ukri.org/projects?ref=MR%2FR018464%2F1 (Accessed 22 March 2021)

Agincourt research unit provided close connections to the relevant rural communities and policy stakeholders, as well as strategic links to groups such as INDEPTH (The International Network for the Demographic Evaluation of Populations and Their Health, a network of >40 health and demographic surveillance systems in sub-Saharan Africa and South Asia). The Department of Health of Mpumalanga province took part in the project (as participants in the foundation stage and as co-investigators in the full grant) and the project also included a range of project partners, including Statistics South Africa (the national statistical authority) and WHO.

The research took place in Mpumalanga Province, South Africa and made use of the Agincourt Health and Socio-Demographic Surveillance System (HDSS) in Mpumalanga, which is one of Africa's largest population-based cohorts conducting annual updates on vital events including births, deaths, migration, and socioeconomic status.

In the early stages of the research, the work focussed on enriching data on causes of death by including additional categories in VA assessments that focus on circumstances of death beyond the immediate medical cause (Circumstances Of Mortality CATegories, COMCATs). These data then formed the basis for a series of participatory action research rounds where the researchers engaged with communities to identify their priorities for health improvement, and to plan, enact, and reflect on actions.

The project is unique in the way it sees researchers as facilitators of relationships between communities on the one side and public authorities and services on the other. It seeks to build ownership of locally relevant solutions, mutual understanding, and trust. The project uses participatory action research (PAR), a methodology that is built around equitable collaboration with stakeholders. The early phase of the project involved policymakers, health planners, and managers at the Mpumalanga Department of Health, who contributed to the development of the COMCATs. In later stages, community participants for participatory action research were recruited through the HDSS.

The PAR methodology implies that, while the process is pre-defined, the precise direction of the research cannot be planned in advance, which is a challenge for proposal writing and the team were appreciative of the funders' flexibility and openness to the approach. The methodology explicitly allows for iteration and adjustment as part of the process. Sharing of power and control through the research process with community stakeholders was reflected in the nomination of relatively unanticipated local priorities such as lack of clean water and alcohol and drug abuse, which are more social and logistical problems. This posed a challenge to the project as it required engagement with policy stakeholders outside the Department of Health, and thus a more multi-sectoral approach than had been initially envisioned. The multi-sectorial work was very challenging but also necessary to address the identified issues. Government stakeholders reported significant benefit in convening in neutral research spaces to build shared understandings of how to progress integrated, locally focussed cooperative action and learning.¹⁵⁶

Further challenges associated with using PAR, especially in a context like South Africa where there tends to be a great degree of confrontation, are that individual participants may dominate the discussion or even intimidate other participants, which undermines the aim to include all relevant voices. However, a regular and stable learning platform process providing

¹⁵⁶ Van Der Merwe MS, D'Ambruoso L, Witter S, et al. Collective reflections on the first cycle of a collaborative learning platform to strengthen rural primary health care in Mpumalanga, South Africa. Health Research Policy and Systems 2021;19:66.

'safe spaces' for evidence, dialogue, learning and action has allowed the team to document a marked transition: from initial tension and blame to willingness, commitment and capacity for cooperative health action. Some quotes from stakeholders who participated in the learning platform process in 2019 included the following.

- "The workshops reconfirmed that community participation is key to planning and improving service delivery" [Government stakeholder]
- "There have been a lot of service delivery protests in communities, but they did not accomplish much; everyone realized that it is time to shift our ways of thinking and initiate dialogue, unite, and collaborate and create sustainable partnerships to solve community problems" [Community stakeholder]

F.10.3. Findings (Outputs, outcomes, impacts)

The project has led to 16 publications with a further three in submission. The COMCATs tools, which allow assessment of VA data in greater detail are a key output of the foundation stage project and have been further refined drawing on VA data from across South Africa, in collaboration with the SAMRC SAPRIN (South African Population Research Infrastructure Network).¹⁵⁷ The research team have incorporated COMCATs into open-source software to analyse VA data that is freely available.¹⁵⁸ Moreover, circumstances of mortality have been used to understand barriers to access in injuries, trauma, and time-critical conditions,^{159,160} and COMCAT has been taken up in a national cause of death study in South Africa.¹⁶¹ The PI has also co-authored a commentary in Lancet Global Health on the role of VA in health systems strengthening.¹⁶²

Other publications document the processes and results of identifying community priorities, as well as a protocol to evaluate the project itself. The PAR process was found feasible and acceptable to communities. Priorities identified included the abovementioned water access, alcohol, and drug abuse as well as under-5 mortality. For each, contributory factors were identified and stakeholder actions were prioritised.

Researchers have engaged widely with stakeholders as part of the project, and this has contributed to formal and informal capacity building. Community stakeholders, who engaged weekly over an extended time period, have received a formal certification of their participation. The cross-sectoral work has allowed the research team to build relevant networks with government departments beyond the area of health (e.g. Department of Water and Sanitation, local municipalities). Government stakeholders, specifically in the Department of

¹⁵⁷ http://saprin.mrc.ac.za/

¹⁵⁸ Byass, P., Hussain-Alkhateeb, L., D'Ambruoso, L. et al. An integrated approach to processing WHO-2016 verbal autopsy data: the InterVA-5 model. BMC Med. 2019;17:102.

¹⁵⁹ Edem IJ, et al. External injuries, trauma and avoidable deaths in Agincourt, South Africa: A retrospective observational and qualitative study BMJ Open. 2019;9(6):27576.

¹⁶⁰ Fraser A, et al. Time-critical conditions: Assessment of burden and access to care using verbal autopsy in Agincourt, South Africa. BMJ Glob. Heal. 2020; 5(4): 2289.

¹⁶¹ Bradshaw D, et al. South African National Cause-of-Death Validation Project: Methodology and Description of a National Sample of Verbal Autopsies. Cape Town: South African Medical Research Council, 2020.

¹⁶² D'Ambruoso et al. The case for verbal autopsy in health systems strengthening. The Lancet Global Health. 2016;5: E2-E21.



Health, found the learning platform process acceptable and relevant and have recommended its incorporation into routine primary healthcare planning and review.¹⁶³

During 2020 in the context of the COVID-19 pandemic, the learning platform process has been further adapted with local communities and health officials in order to¹⁶⁴

- Contribute to the development of capacities supporting community health workers and district health system stakeholders to conduct rapid research on local health issues with participatory methods
- Facilitate use of evidence in routine primary health care planning and review, providing timely data on burden of disease, the human experience of that burden, and on feasible local action
- Further develop multisectoral engagement supporting community responses addressing social determinants

The intention is that further embedding and refining the approach will (a) support community health workers to connect routinely with community groups and support rapid generation of evidence on local issues and (b) build mutual understanding of operational contexts and challenges.

There is a project website,¹⁶⁵ and the team maintains active social media accounts on Twitter and Facebook. The PI has also portrayed the work in articles on the website "the Conversation"^{166,167,168} and has been quoted in a news article on VA on the US AP news page.¹⁶⁹ The study team has also contributed to online platforms such as Participedia and CHW Central with blogs for non-academic audiences.^{164,170}

The PI has been invited to chair a session on COMCAT for the WHO Verbal Autopsy reference group and has participated in the WHO Maternal Death Surveillance and Response Group. The PI has an honorary appointment with NHS Grampian in Scotland to progress community engagement and cooperative learning processes as part of the COVID-19 response, and is applying the cross-sectoral collaboration experience and learning gained during the HSRI project in the context of the pandemic.

F.10.4. Next steps

The researchers successfully applied for a costed extension through the UKRI COVID Reallocation Fund to allow the current work to continue until the end of 2022. However, the programme was recently affected by Overseas Development Assistance (ODA) cuts with the final year budget reduced by >60%, posing a serious threat to maintaining the team and

¹⁶³ Van Der Merwe MS, D'Ambruoso L, Witter S, et al. Collective reflections on the first cycle of a collaborative learning platform to strengthen rural primary health care in Mpumalanga, South Africa. Health Research Policy and Systems 2021;19:66.

¹⁶⁴ https://chwcentral.org/twg_article/supporting-chws-to-connect-with-communities-in-rural-south-africa-duringcovid-19/

¹⁶⁵ https://www.vapar.org

¹⁶⁶ https://theconversation.com/when-communities-help-authorities-tally-births-and-deaths-health-care-equalises-48507

¹⁶⁷ https://theconversation.com/worldwide-65-of-deaths-go-uncounted-heres-how-to-change-that-46644

¹⁶⁸ https://theconversation.com/engaging-with-communities-can-help-tackle-poverty-linked-health-problems-55724

¹⁶⁹ https://apnews.com/article/8368ad6b33604514918c4bdee12c6408

¹⁷⁰ https://participedia.net/case/6575; https://participedia.net/case/6570; https://participedia.net/case/6576; https://participedia.net/case/6577; https://participedia.net/case/6574; https://participedia.net/organization/6592

realising impact. However, through support from the GCRF Scottish Funding Council scheme administered by the University of Aberdeen, the team has reprofiled the budget ensuring that the majority of activities, and research team and staff, are unaffected.

If there are no further disruptions to the research, practical impact on the identified health priorities can be expected to occur. Further, the participatory processes that were put in place are expected to persist as legitimate platforms for ongoing learning and improvement beyond the lifetime of the project.

F.11. Social, behavioural and economic drivers of inappropriate antibiotic use by informal private healthcare providers in rural India

F.11.1. Background

Bacterial infections such as tuberculosis, typhoid, and pneumonia are life-threatening conditions that require treatment with antibiotics. Increasingly, the bacteria causing such infections develop antibiotic resistance (ABR). ABR is a natural phenomenon that is to be expected – when exposed to antibiotics, natural selection favours mutations that convey resistance. Bacteria can share genetic material amongst each other, which accelerates the spread of resistance genes. ABR can be combatted through the development of new antibiotics, but development of these has stalled and multiple bacteria have developed resistance to all known antibiotics, causing an imminent threat to global health.

An important approach to minimising ABR is to reduce the use of antibiotics where possible. Antibiotics are commonly used against viral infections such as flu and common cold, which is not necessary and, especially in light of ABR, potentially harmful. In India, first-line health care is often sought from unlicensed, informal providers (IPs). Studies into the quality of care provided by these IPs suggest high levels of antibiotic use despite existing regulation prohibiting any nonmedically qualified providers from dispensing or prescribing antibiotics at all. IPs are difficult to influence through regulation but make up a large part of the Indian health system and hence need to be considered in any effort to influence provider behaviour. Attempts are being made to train and accredit IPs in some parts of India (e.g. West Bengal and Bihar), using funding from philanthropic as well as government sources. While training programmes for IPs have been successful in increasing their knowledge, there has been no measurable change in antibiotic use.

F.11.2. The award

The HSRI foundation grant supported research into the patterns and drivers of antibiotic use by IPs in two rural districts of West Bengal, India. It used a systems approach to guide data collection and conceptualise findings. It collected both quantitative (structured interviews) and qualitative data (in-depth interviews, observations and focus groups). Based on the findings, the researchers obtained a full grant and are working with stakeholders to co-design interventions and plan to obtain feedback on their feasibility and potential effectiveness. The research is unique in addressing drivers of inappropriate antibiotic use by informal providers (as opposed to the formal care system). This is a challenging context but the fact that IPs are so common means that changes in their practice can have widespread impact.

The PI of both the foundation and the full grant (Dr Meenakshi Gautham) is affiliated with the London School of Hygiene & Tropical Medicine (LSHTM) but is based in India most of her time. The foundation stage project was conducted as a collaboration between the LSHTM and the Liver Foundation, a philanthropic organisation funding training for IPs. Ongoing work funded under the full grant involves a wide range of partner organisations (Liver Foundation India, West Bengal University of Animal and Fishery Sciences, UK Royal Veterinary College, UK Institute of

Development Studies, and Public Health Foundation of India). This has allowed the geographic scope of the work to grow to other parts of India, and to include the treatment of animals, where inappropriate antibiotic use is also prevalent and happens through various para veterinary cadres who dispense or prescribe antibiotics beyond their legal remit.

Engaging communities in the research has been a key challenge for the project due to lack of obvious routes of engagement, and due to the complexity of the health care system (comprising a complex system of regulated and unregulated providers as well as regulators). Ongoing work has also been significantly affected by the COVID-19 pandemic. Travel to the study site is no longer possible even within India, and many stakeholders are involved in the response to the pandemic and thus no longer available to engage with the study. To mitigate the impact on the study progress, the study location was moved closer to New Delhi, where the PI is based.

The PI has made use of pre-existing connections with officials from the regional government of Uttar Pradesh to gather advice and insights informally on the role of IPs. Recently, the PI has set up a steering committee for the study which includes government representatives, doctors, and other experts such as microbiologists and veterinarians. They are also seeking to establish relationships with the pharmaceutical industry and the private health sector through the Federation of Indian Chambers of Commerce and Industry (FICCI).

F.11.3. Findings (Outputs, outcomes, impacts)

The project findings shed light on drivers of inappropriate antibiotic use by IPs and have been recently published in the journal *Social Science and Medicine*,¹⁷¹ with a second publication underway. The project documented misconceptions and lack of knowledge about appropriate use of antibiotics among IPs: Only 30% of surveyed IPs knew that antibiotics cannot cure viral infections and only 35% correctly understood the concept of antibiotic resistance as a property of bacteria. The project also documented economic incentives for IPs as they sell antibiotics to patients with a profit. The researchers found that many IPs were unaware that their use of antibiotics was violating existing regulations.

Investigating patient expectations and needs revealed a preference for visiting IPs over government providers (who may be far away or are perceived as dispensing lower quality medicines), and economic pressures to recover as quickly as possible. Patients were also not always compliant with instructions to complete a full course of antibiotics, e.g. due to perceived side effects or in order to save money. In addition to these provider- and patient-related drivers, the project identified advice from formal medical doctors (who themselves over-prescribe antibiotics in exchange for referrals) and aggressive marketing and incentivisation by pharmaceutical companies as key drivers in antibiotic use by IPs. The pivotal role IPs play in health care provision for rural communities means it is difficult to take regulatory action against them. At the same time, a strong medical establishment means it is politically difficult to make drug control regulations more pragmatic, e.g. by allowing IPs the use of a small set of essential antibiotics.

The research also highlights the importance of IPs more generally. They exist in many low-and middle-income countries, and make up important parts of the economic activity in areas outside of health care (e.g. education). As a wider outcome, the project has contributed to

¹⁷¹ Gautham M, Spicer N, Chatterjee S, Goodman C. What are the challenges for antibiotic stewardship at the community level? An analysis of the drivers of antibiotic provision by informal healthcare providers in rural India. Social Science & Medicine 2021;275.

informal health providers being included as a category in an official national survey in India.¹⁷² This is likely to have happened following the publication of an article¹⁷³ co-authored by the PI, a co-investigator, and an associate policymaker.

The project also contributed to capacity building by training early career researchers, one of whom won a Bloomsbury Colleges PhD studentship¹⁷⁴ and is being co-supervised by the PI. Two master's students from LSHTM interned with the PI and the project team to do their master's dissertation and are the lead authors on a manuscript that is about to be submitted to a peer-reviewed journal. Engaging stakeholders and communities as part of the study and in advisory roles also raises awareness of the issue of ABR. In recruiting the study steering committee, the PI has found that stakeholders are keen to be engaged, suggesting there is a high level of interest in the issue of antibiotic use in the informal sector.

In terms of dissemination to a wider audience, the project PI has been invited to speak at highlevel policy events (High-level Meeting on Universal Health Coverage as a Tool to Combat Infectious Diseases co-hosted by the Asia-Europe Foundation Public Health Network and Ministry of Foreign Affairs of Japan¹⁷⁵; Global Conference on Primary Health Care, co-hosted by the Government of Kazakhstan, the World Health Organization and UNICEF¹⁷⁶), and has provided input to WHO consultations on the role of the private sector in universal health coverage. The PI was also recently interviewed about her work by ReACT, an international independent network on antibiotic resistance.¹⁷⁷

F.11.4. Next steps

Immediate next steps are to continue with the co-design and feasibility assessment of an intervention aimed at reducing antibiotic use by IPs of health care. Following this, the PI hopes to run a quantitative study to evaluate the effectiveness of the intervention, which would require further funding.

In addition to the HSRI full grant, the PI is involved in several research projects that build on initial findings, focussing on regulatory options and expanding the work to other countries:

- "Smart regulation of antibiotic use in India: Understanding, innovating and improving compliance", led by the University of Edinburgh and funded by ESRC with £515,425
- Antibiotic stewardship in agricultural communities in Africa and Asia: A unified One Health strategy to optimise antibiotic use in animals and humans, led by LSHTM and funded through the Global Challenges Research Fund, £129,455

The project team has also contributed to a larger six country study that was sponsored by WHO and led by LSHTM which is playing an important role in designing a standardised questionnaire for further studies of health professionals and their perceptions of antibiotic resistance.¹⁷⁸

¹⁷² http://mospi.nic.in/NSSOa

¹⁷³ https://www.ideasforindia.in/topics/governance/the-role-of-informal-rural-healthcare-providers-in-universal-health-coverage.html

¹⁷⁴ https://www.lshtm.ac.uk/study/fees-and-funding/funding-scholarships/2021-22-bloomsbury-phd-studentships

¹⁷⁵ https://asef.org/projects/high-level-meeting-universal-health-coverage-as-a-tool-to-combat-infectious-diseases/

¹⁷⁶ https://www.who.int/teams/primary-health-care/conference

¹⁷⁷ https://www.reactgroup.org/news-and-views/news-and-opinions/year-2021/dr-meenakshi-gautham-informalhealth-providers-key-to-reducing-antibiotic-use-in-rural-india/

¹⁷⁸ https://www.who.int/antimicrobial-resistance/LSHTM-Antibiotic-Prescribing-LMIC-Prescribing-and-Dispensing-2017.pdf?ua=1

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F.12. Building an evidence base to support and enhance community health workers' (informal) use of mobile phones in Ghana, Malawi and Ethiopia

F.12.1. Background

There has been considerable investment in community health worker (CHW) programmes in Ghana, Malawi, and Ethiopia in order to achieve universal healthcare coverage (UHC). M-Health, the use of mobile phones in particular, has transformative potential in health care where physical infrastructure is limited in LMICs. Mobile phones offer the chance for people to speak to a trained professional even where there is a large physical distance between them.

Despite this potential, investment in mHealth by governments and donors has been small scale, and successful pilot projects have not progressed to further scale up. Research has shown that CHWs have a high degree of mobile phone coverage in Africa.¹⁷⁹,¹⁸⁰ However, there is very little known about what CHWs are doing 'informally' with their mobile phones in their work and how this can impact health care.

F.12.2. The award

The "Building an evidence base to support and enhance community health workers' (informal) use of mobile phones in Ghana, Malawi and Ethiopia" study (MR/R003963/1, \pm 197,472) was a foundation grant funded under Call 4 of the HSRI.

The project was funded from January 2018 to December 2019. It aimed to build a comprehensive understanding of current 'informal mhealth' practices in Ghana, Malawi, and Ethiopia. In terms of methodology, a comprehensive policy review of CHW programmes and mHealth initiatives was conducted for each country. This was followed by a questionnaire survey and a range of focus groups with CHWs and patients.

The HSRI award brought together two existing collaborative networks led by PI Professor Kate Hampshire (Durham University, UK), a medical anthropologist with more than 20 years' research experience in Sub-Saharan Africa. Professor Hampshire had already worked with three of the co-investigators in previous work on informal mHealth studies (Albert Ababe, University of Cape Coast, Ghana; Alistair Munthali, University of Malawi; and Elsbeth Robson, University of Hull, UK). The second existing network was through Adetayo Kasim (health research statistician at Durham University) and Ziv Shkedy (Hasselt University, Belgium) who had worked closely with the Ethiopian co-investigator (Kassahun Alemu, University of Gondar) and his team on the Ethiopian Health Extension Programme and statistics capacity building.

During project implementation only minor changes were made to the initial plan. For example, the CHW focus groups planned in Ethiopia were replaced by interviews and instead of large stakeholder meetings, the study team travelled to the stakeholder offices. The latter approach was adopted as unintended organisations turned up to previous larger centralised stakeholder meetings. Other broader challenges related to the political situation, for example, the Ethiopian government cut off the internet for a period of time preventing communication.

Stakeholder engagement was conducted throughout the proposal and implementation stage. How this was done varied depending on the country and context. In Malawi, for example, instead of having an additional meeting for all the stakeholders, the project team

¹⁷⁹ Chang L, Njie-Carr V, Kalenga S. Perceptions and acceptability of mHealth interventions for improving patient care at a community-based HIV/AIDS clinic in Uganda: a mixed-methods study. AIDS Care 2013;25:874–880.

¹⁸⁰ Zurovac D, Larson B, Sudoi R, Snow R. Ownership and use of mobile phones among health workers, caregivers of sick children and adult patients in Kenya: cross-sectional national survey. Globalization & Health 2013; 9(20).

presented at the Ministry of Health's quarterly meeting. All relevant stakeholders attended this meeting, so it was the most efficient way to engage stakeholders. However, in other settings a separate stakeholder meeting was required.

Contacting people for interview and survey, including CHWs, was facilitated through health care provider contacts, such as Dr James Duah, Deputy Executive Director of The Christian Health Association Ghana (CHAG¹⁸¹). CHAG is the second largest health care provider in Ghana employing a full range of clinical staff including CHWs. Without Dr Duah's ability to leverage CHAG contacts, the project would have had difficulty in contacting study subjects due to their placement in rural areas where telephone coverage can be limited.

F.12.3. Findings (Outputs, outcomes, impacts)

A range of costs and benefits of using mobiles in health settings were found, with most of these being as anticipated. Over 99% of CHWs in each country owned a mobile and used them in their work on a regular (often daily) basis. CHWs used their phones for a wide range of purposes, for example, calling for help in an emergency, calling patients to check up on them or remind them of appointments, seeking advice on particular cases from colleagues, organising medicine supplies and other logistics on WhatsApp groups, liaising with community volunteers, and even using the phone torch function to deliver babies at night where there was no electricity. Although no hard health outcomes were measured, both CHWs and their patients reported that this 'informal' use of mobile phones had made a positive difference to quality of care. Overall, nearly 98% of CHWs surveyed stated that their use of a personal mobile phone had resulted directly in improved patient outcomes; 85% claimed that it had saved someone's life.

However, there were also costs of using mobile phones 'informally' in this way, and those costs were borne disproportionately by low-paid CHWs who had to meet the costs of phone credit, battery charging, etc. from the own pockets, spending around 5% of their monthly salaries on this. An additional finding was that CHWs would be 'flashed' – a patient would call a CHW and then hang up with the expectation that they would be called back, transferring the financial burden to the CHW. 'Flashing' also brought additional emotional burden to CHWs who worried about the consequences of not returning a call immediately. More broadly, mobile phones blurred the boundaries between work and non-work, meaning CHWs often felt permanently 'on call'. The study concluded that 'informal mhealth' represents a hugely important emergent health system but there is a need to find ways of supporting CHWs' creativity and dedication without expecting them to bear all the costs personally.

There has been positive feedback on the findings on national level from the Ministries of Health in all three countries. Two papers have recently been published, the first in one in Global Public Health¹⁸² and the most recent in World Development¹⁸³. The project has contributed notably to the capacity building of junior researchers in the team who were given the opportunity to be first authors on publications emerging from the project. Some of the project funds (along with an additional amount of funding from Durham University) were used for a writing workshop for the project team. Consequently, 12 papers have been drafted.

¹⁸¹ The Christian Health Association of Ghana: https://chag.org.gh/

¹⁸² Mariwah S, Machistey A, Albert, AO, et al. Formalising 'informal' mHealth in Ghana: Opportunities and challenges for Universal Health Coverage (UHC). Global Public Health. 2021.

¹⁸³ Hampshire K, Mwase-Vuma T, Alemu K, et al. Informal mhealth at scale in Africa: Opportunities and challenges. World Development. 2021;140:105257.

The interdisciplinary nature of the teams in each of the three African countries facilitated capacity building in research skills. Each team upskilled and trained other teams through workshops. The Ethiopian team, for example, came from a Department of Public Health and was experienced at doing quantitative health research and statistics. One of the Ethiopian team members managed, supervised, and trained people in the teams from Ghana and Malawi in quantitative skills. The Ghanaian team was more skilled with qualitative research, and provided training to the Ethiopian team in this type of analysis. The Malawian team's skills were in data management and running online surveys. Furthermore, the University of Malawi decided to underwrite permanent positions for two junior researchers who were employed there under the HSRI grant.

F.12.4. Next steps

The next steps will include a trial for an intervention regarding mHealth use by CHWs. Although a grant is yet to be written for the trial, two kinds of interventions are being considered building on the findings from the study. The first is giving community health workers a very small monthly allowance for phone use because the current CHW salary expenditure on mobile phones is non-trivial. The second is designing a training package based around handling of sensitive patient data that CHWs have on their phones. Health care providers, such as CHAG, feel the type of mHealth explored in this project has potential to save costs for LMIC health systems. This is because mHealth has the potential to reduce the need for physical presence of CHWs thus reducing human resource budgets in healthcare.

The study team members continue to remain in contact with each other, partly because of upcoming publications from the HSRI study, and partly owing to follow-on projects. One project was funded by Save the Children¹⁸⁴ and continued research in CHWs. The main focus of the project was equitability of CHW programmes and also looked at CHW wellbeing. It was intended to be a systematic literature review, followed by field work in six different countries managed by the new network. However, the project had to be curtailed halfway through due to COVID-19, with only the review being possible.

To conclude, the project was successful in answering its research questions. Furthermore, new knowledge of how CHWs utilise mHealth was generated and research capacity was built within the project team.

F.13. Guideline Adherence in Slums Project – Template-based documentation and decision support for primary healthcare clinics in the private sector

F.13.1. Background

Health care in urban low-resource settings in Nairobi, Kenya faces a range of challenges and needs quality improvement. The provider landscape is complex, with a large and fragmented private sector. Many clinics are run by health professionals such as nurses or clinical officers without oversight from trained physicians and little support for quality improvement.

Private sector health care provision, despite its importance in the landscape, has often been neglected in quality improvement efforts. Clinical practice guidelines are a potentially useful tool for quality improvement but can be challenging to implement in low-resource contexts and require adaptation. There is also a paucity of information on the quality of care that is routinely provided, making it difficult to monitor and reward adherence.

¹⁸⁴ https://www.savethechildren.org.uk/

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F.13.2. The award

The HSRI foundation grant "Guideline Adherence in Slums Project – Template-based documentation and decision support for primary healthcare clinics in the private sector" (MR/N005015/1; £97,921 over 18 months) supported exploratory research into the challenges of guideline adherence in Kenya and tested the usability, acceptability and effectiveness of simple templates to enhance guideline adherence. The study involved 9 private healthcare facilities serving areas of informal settlements in Nairobi, Kenya. Templates were developed for the most common clinical presentations, customised in collaboration with staff at the participating facilities, and subsequently distributed in the form of rubber stamps that clinicians could use to print the templates where they needed them (usually among hand-written clinical notes). Once printed, clinicians completed the template, documenting certain diagnostic steps as well as treatment and follow-up decisions, choosing among a range of pre-defined options. In addition to being highly practical for health care workers to use, the standardised layout of the checklist allows data to be digitised using smartphone cameras which are ubiquitous in Kenya. The data were used by the study team to monitor documentation and treatment decisions and were discussed with facility staff on a monthly basis.

The project PI, Pratap Kumar, is affiliated with the Strathmore University Business School in Nairobi, Kenya, and is also the founder and CEO of Health-E-Net Limited, a Kenyan health-tech company focussing on improving quality of care in low-resource settings through technological innovation.¹⁸⁵ Co-investigator Mercy Njeru (Kenya Medical Research Institute, KEMRI) brought her experience in mixed methods research within the Kenyan health system to the project and oversaw the qualitative work. A challenge to the project has been to secure sufficient staff capacity and continuity in staffing. Co-investigator Mercy Njeru changed her role at KEMRI during the course of the study and was subsequently less available. As a result, the qualitative data has not yet been analysed to a degree that it could be published. Additional capacity was recruited in the form of a research coordinator and a PhD student. In hindsight, the PI would have applied for a larger amount of funding.

In terms of stakeholder engagement, the project built on the PI's experience in volunteering in the context of health care provision in low-resource settings. Understanding the context well was also a crucial part in the preparation for the project. The team also engaged with local NGOs and healthcare provider organisations before applying for HSRI funding.

F.13.3. Findings (Outputs, outcomes, impacts)

The project team has published its findings in two publications to date,^{186,187} describing how the rubber-stamp method allows integration of paper-based record keeping with digitalisation.¹⁸⁸ A key finding is that including standardised paper-based documentation by means of rubber stamps (or pre-printed forms) is feasible and acceptable as part of routine care and improves documentation of care. Furthermore, the findings revealed very high antibiotic use by providers, sometimes despite better knowledge. The data also showed that the use of

¹⁸⁵ http://www.health-e-net.org

¹⁸⁶ Kleczka B, Kumar P, Njeru MK, et al Using rubber stamps and mobile phones to help understand and change antibiotic prescribing behaviour in private sector primary healthcare clinics in Kenya BMJ Global Health 2019;4:e001422

¹⁸⁷ Kleczka B, Musiega A, Rabut G, et al. Rubber stamp templates for improving clinical documentation: A paperbased, m-Health approach for quality improvement in low-resource settings. International journal of medical informatics 2018; 114:121–129.

¹⁸⁸ Kumar P. Digital =/Paperless: innovative interfaces for digital health information management [version 1; not peer reviewed]. Gates Open Res 2019, 3:1622 (poster) (https://doi.org/10.21955/gatesopenres.1116471.1)

templates is effective at steering practitioners to appropriate first-line antibiotics and away from broad-spectrum antibiotics that should be reduced to curb antibiotic resistance. Detailed qualitative data on drivers of provider behaviour are still being prepared for publication.

A third publication, a peer-reviewed commentary, highlights the wider need for such "appropriate" technologies to generate routine data on primary healthcare services.¹⁸⁹

The work has also been discussed at the Global Symposium on Health Systems Research in 2018 and 2020,¹⁹⁰ including a panel session organised by the PI focussed on "using mHealth to create inclusive health systems". The team has engaged with health care practitioners with regard to the findings and continued to provide the technology and services to facilities enrolled in the research project after the conclusion of the grant. In terms of capacity building, the work has allowed graduation of one PhD student (Bernadette Kleczka) through this work and enrolment of a second student in a PhD programme (Anita Musiega).

The technology is being used by World Friends,¹⁹¹ an NGO providing health services in socially disadvantaged areas in Kenya, and similar groups in other countries.

F.13.4. Next steps

The PI sees the technology of paper-based, easily digitizable templates as something that is widely applicable in routine information systems in LMICs. The PI has recently been awarded an NIH grant of USD 3.5 million to improve blood transfusion systems in Kenya and will be applying the rubber stamp template technology there.¹⁹²

The PI is seeking to continue work to apply the technology to quality improvement in health care provision and has also established collaborations with other researchers in this field (including the Universities of Warwick, Liverpool, Heidelberg, and University College London). The PI and a collaborator from the University of Warwick were awarded a networking grant from the Academy of Medical Sciences, UK (GCRFNG\100306). A number of funding applications have been developed with collaborators to set up a trial-based evaluation, though to date unsuccessfully.

The PI sees the next steps as engaging with health care providers on a larger scale, through insurers and other private sector stakeholders on the one hand, and through engaging with local governments who are important actors in the provision of publicly funded health care on the other. As a social entrepreneur, he is well placed to drive implementation into practice through commercialisation. Specific pathways to population health impact include reducing inappropriate antibiotic use and raising standards of care.

F.14. Building resilient health systems: lessons from international, national and local emergency responses to the Ebola epidemic in Sierra Leone

F.14.1. Background

Health systems that are under development, such as in Sierra Leone, struggle to mount effective responses to sudden crises (health crises, but also natural disasters, economic crises), which can severely affect their ability to function. There is therefore an increased interest in the

¹⁸⁹ Kumar P, Sammut SM, Madan JJ, Bucher S, Kumar MB. Digital ≠ paperless: novel interfaces needed to address global health challenges. BMJ Global Health 2021;6:e005780.

¹⁹⁰ https://healthsystemsglobal.org/news/launching-hsr2020/

¹⁹¹ https://www.world-friends.it/en/

¹⁹² http://www.surgery.pitt.edu/news/nhlbi-award-new-grant-drs-juan-puyana-and-pratap-kumar

concept of 'health system resilience', i.e. the ability of a health system to 'anticipate, withstand and/or judiciously engage with catastrophic events' [WHO]. Such crises usually coincide with an influx of international resources and workers, and their effectiveness depends on integrating well with the local context.

Research in the field of medical anthropology studies social and cultural influences on health and well-being, and there is a small body of medical anthropological research specifically on viral haemorrhagic fevers (like Ebola). Anthropological findings have supported the management of outbreaks by enabling international interventions to be more sensitive to local conditions and also elucidated the modes of transmission and conditions that give rise to outbreaks.¹⁹³ In response to the Ebola outbreak in Western Africa, the Ebola response Anthropology Platform (ERAP)¹⁹⁴ was established which provided information on socio-cultural and political aspects of responding to the epidemic based on anthropological research. In documenting the response to the Ebola outbreak on a local level, the Ebola Gbalo project sought to understand how to build on existing capabilities to strengthen the health system in Sierra Leone and how to organise international crisis responses in a way that is most effective and respectful of the local context.

F.14.2. The award

The Ebola Gbalo project (MR/N015754/1, £498,000) documented the response to the 2014-2016 Ebola outbreak in two districts in Sierra Leone through a combined anthropological and health systems approach. The project is unique in giving a detailed account of events at the local level in hard-to-reach communities that were very poorly understood as the Ebola epidemic unfolded in Sierra Leone.

The project was planned collaboratively between LSHTM and Njala University in Sierra Leone. It was led by Professor Susannah Mayhew at LSHTM and greatly facilitated through a collaboration with Professor Paul Richards, who is a retired agricultural anthropologist from the University of Wageningen (Netherlands) with many years of experience in Sierra Leone and a close connection to Njala University. Professor Richards, although not originally working in the area of health, had supported the British government during the Ebola outbreak by providing basic insights on the situation in the country and contributing to the ERAP platform. Professor Richards and Professor Mayhew then became acquainted through senior colleagues at LSHTM and jointly developed the proposal for the Ebola Gbalo project.

The LSHTM team brought expertise in health systems, global health policy, and medical anthropology. From the proposal development stage on, the LSHTM team worked in partnership with Njala University and their School of Community Health Sciences who brought the necessary networks and understanding of the local context as well as infrastructure (guest house, meeting facilities). A research coordinator and three research assistants who were all familiar with the local context and involved in the frontline response to Ebola, were recruited at the start of the study.

Research methods were qualitative in nature and the project applied systems thinking to guide fieldwork and conceptualise findings, taking account of the role of particular actors and the nature and use of power by actors at different levels as well as the role of societal values and trust. Data collection included in-depth unstructured interviews and focus groups with a wide

¹⁹³ Brown H, Kelly AH. Material Proximities and Hotspots: Toward an Anthropology of Viral Hemorrhagic Fevers. Medical Anthropology Quarterly. 2014;28(2):e1548-1387.

¹⁹⁴ http://www.ebola-anthropology.net

range of people in the communities (incl. teachers, village elders, local healers, farmers, and Ebola survivors) as well as people involved in the district, national, and international response (including chiefdom authorities, officials working for the Ministry of Health and Sanitation of Sierra Leone and international agencies such as Médecins Sans Frontières).

In terms of location, the research focussed on the Bo and Moyamaba Districts in Sierra Leone. The original plan had been to investigate Bo and the Western area, but the researchers realised that these areas were too different from each other and consequently requested permission from MRC to change one of the districts. They found that studying two adjacent and quite similar districts allowed for greater depth than trying to handle two completely different contexts. It also had the advantage of profiling and contrasting how early affected districts managed their response before as well as after the international response was mounted.

The implementation of the project was challenging in a variety of ways: There was a lack of good understanding, locally, of what a major international collaborative research project entailed in terms of administration, financial control, and output target. This was resolved by including the LSHTM administrator in one of the early visits to Njala to help set up processes and a dedicated GBP bank account. Accessing remote field sites was difficult due to road conditions and meant that the research team had to travel on foot at times. Building relationships with the local population and gathering truthful accounts of events was greatly helped by the networks and language skills of the local research team but was still challenging. One factor that was particularly helpful in reaching out to communities was that many graduates from the School of Community Health Sciences at Njala University are health workers in the community. In addition to shame and stigma associated with the experiences of the epidemic, the project team experienced a great level of 'research fatigue' among their respondents which they attributed to the fact that these people had experience of one-off research visits that were rarely followed up and consequently perceived research as not bringing them any benefit. Another challenge was that the team found the budget quite constrained for the size of the project, which meant that capacity for data processing (especially transcription) was limited and delayed the analysis phase considerably.

The project team engaged with stakeholders in meetings at the outset of the study, first through a series of courtesy visits to community leaders and district authorities, then through a workshop with local and district stakeholders to outline the project, request comments, and gain buy-in. The team then interviewed key stakeholders at multiple levels as part of the main data collection (incl. the Minister of Health and Sanitation and senior staff in the Ministry as well as district, chiefdom and local authority representatives before moving to community level), and held two dissemination events for stakeholders (one for community and district stakeholders and one for national and international stakeholders) to discuss preliminary findings in the final year. Feedback from senior policy makers was that the findings are useful in shaping health systems in the country in the future.

The team have published their findings and their wider implications in four peer-reviewed publications to date. Dissemination for a wider audience included an opinion piece in The Lancet on applying learnings to the outbreak in DRC,¹⁹⁵ several blogs on the website African

¹⁹⁵ Ebola Gbalo Research Group. Responding to the Ebola virus disease outbreak in DR Congo: when will we learn from Sierra Leone? The Lancet. 2019. 393 (10191):2647–2650.

Arguments¹⁹⁶, articles for The Guardian¹⁹⁷ and BBC News,¹⁹⁸ as well as a project website which includes French translations of key findings for use in DRC.¹⁹⁹ The team felt dissemination could have been made more effective by dedicated funding and expertise for communication and outreach both during the lifetime of the project and after the project funding had come to an end. Language plays an important role in maximising the reach of findings in Africa and translation costs to allow the findings to be used in the DRC response had to be covered through means outside of the project fund. Furthermore, publication usually occurs after the lifetime of the project, which makes it difficult to dedicate resources to further dissemination at the time of publication.

F.14.3. Findings (Outputs, outcomes, impacts)

Key findings from the project are that local communities in Sierra Leone found ways to contain the spread of Ebola outside of formal hierarchies and the formal health system, and that these local learnings and local structures were initially not taken into account by national or international responders. The project documented how isolation and hygiene measures were put in place in remote communities, and documented how local people correctly identified the specific symptoms with which the disease was presenting in the local population (different from those commonly seen elsewhere). It documented a lack of trust in the official communication and reasons for resisting treatment in centralised Ebola treatment centres, e.g. they were far away, and many people died there and were not returned to their families for burial. The project also documented how the response to the epidemic succeeded when local communities were included in shaping the response, for instance, the introduction of locally recruited burial teams, guidelines on home care, and more distributed triage centres that performed Ebola tests and isolated suspected cases nearer to home. The project also generated a detailed understanding of the modes and circumstances under which Ebola spread, and placed individual and group behaviours within the context of the wider system.

The project can be seen as having influenced the international response to the Ebola outbreak in the Democratic Republic of Congo (DRC) through a number of different channels. Project researchers were involved in a panel discussion with representatives from WHO about the response in DRC,²⁰⁰ and took a very clear stance in their various publications,^{195,197} concluding that

"Humanitarian epidemic response frameworks need to be re-thought to improve short and long-term effectiveness."

A researcher (from University of California Berkeley) working on the DRC response requested (and partly funded) French translations of the project's key findings in order to inform the DRC response. The project's findings were also drawn on to inform Sierra Leone's response to COVID-19, which was seen as comparatively effective²⁰¹ and involved communities in finding solutions more than had been the case in previous outbreaks.

¹⁹⁶ https://africanarguments.org/2016/05/how-black-bin-bags-and-common-sense-helped-end-ebola-and-what-wecan-learn-from-it/

¹⁹⁷ https://www.theguardian.com/global-development/2019/jul/18/congo-ebola-crisis-let-locals-lead-world-healthorganization-public-health-emergency

¹⁹⁸ https://www.bbc.co.uk/news/world-africa-52268320

¹⁹⁹ https://responding-to-ebola.org

²⁰⁰ https://www.graduateinstitute.ch/communications/events/what-can-we-learn-ebola-then-and-now

²⁰¹ https://www.nature.com/articles/d41586-020-02173-z

The project contributed to capacity building at Njala University both on the level of the institution and on the level of the researchers. The award has helped to form several new collaborations that are sustained beyond the duration of the project. Institutional capacity was built since it proved necessary to create the necessary infrastructure and train local staff in administering the project funds. The project has also informed changes to the teaching curriculum, with community engagement being taught as part of research training.

The three research assistants at Njala University were trained in qualitative research methods and are in the process of completing their PhD theses based on the research undertaken as part of this project. They remain active in teaching and research and Lawrence Babawo has joined the Sierra Leonean scientific committee advising the government on the COVID-19 pandemic response.

F.14.4. Next steps

Several team members (Susannah Mayhew, Paul Richards, Lawrence Babawo, Ahmed Vandi) have applied to the NIHR Global Health Research Group scheme for future work together in order to find ways to consolidate the findings about improvised local actions and reactions within health systems in Sierra Leone (as applicable, for example, to COVID-19 response). Professor Richards has continued to work in the area of health systems research, despite him being completely new to health research at the start of this project.

The project team have also argued that our understanding of epidemics is hindered by a lack of social science research on epidemic outbreaks. In particular, and as has been argued elsewhere,²⁰² understanding disease transmission at the level of granularity that is afforded by social research methods would allow developing richer epidemiological models of disease outbreaks. They suggest that science as a whole needs to change in its approach and become more accommodating of qualitative, case-study based evidence in relation to the analysis of epidemics and pandemics: "Social science can contribute new ways of thinking about epidemic and humanitarian response that can enable a re-shaping of hierarchies, knowledge and power to value local lives and learning".

F.15. Determinants of medical equipment performance to improve management capacity within the health system in Vietnam

F.15.1.Background

Access to functioning and safe medical equipment at the point-of-care is essential for providing effective health care services to the population.²⁰³ In 2003, a review of the World Bank's global \$1.5 billion investment in medical devices showed that around 30% of medical equipment remained unused, while those in operation have up to 35% downtime because of limited capacity to maintain equipment.²⁰⁴ A review on management of medical equipment in developing countries identified ineffective Health Technology Management (HTM) as the reason for non-functioning medical equipment. The factors contributing to ineffective HTM

²⁰² Ferguson, N. Capturing human behaviour. Nature. 2007; 446:733.

²⁰³ Wang B. A framework for health equipment management in developing countries. Business Briefing: Hospital Engineering and Facilities Management. 2003:2-4.

²⁰⁴ World Bank. Proceedings: International Forum for Promoting Safe and Affordable Medical Technology in Developing Countries. 2003.

included inadequate planning, inappropriate procurement, poorly organised and managed healthcare technical services, and a shortage of skilled personnel.²⁰⁵

In 2005, The UK Department of international Development provided a Series of Guides as part of the broader HTM-capacity building initiatives developed by WHO. The Series of Guides aim to promote evidence-based HTM best practice in developing countries by providing practical advice on all aspects of health technology acquisition and utilisation, and the organisation and financing of healthcare technical services for effective HTM.²⁰⁶

In Vietnam, as in many other countries with a similar income level, financial resources for medical devices and subsequent operations are limited in the health care system. The limited resources need to be managed in a cost-effective way. The Medical Equipment and Infrastructure Institute of Vietnam reported only 20% to 50% of medical equipment is functional in hospitals, dropping to 30% in provincial level hospitals and to 10% in district level hospitals.²⁰⁷ There are no systematic studies investigating the determinants affecting HTM in Vietnam. The guidelines developed by WHO can hence provide a useful framework for assessing the changes needed in HTM practices in Vietnam to improve access to functional and cost-effective medical equipment.

F.15.2. The award

The "Determinants of medical equipment performance to improve management capacity within health system in Vietnam" (MR/M002306/1; £115,295), was a foundation grant funded under Call 1 of the HSRI from March 2015 to March 2017. The project aimed to understand the extent to which Vietnamese healthcare services follow international HTM guidelines and recommendations, with particular focus on identifying the determinants affecting medical equipment performance. The study also aimed to develop education and training interventions to improve HTM. Insights from the study were to inform the Vietnamese Ministry of Health (MOH) in developing national policy to improve HTM. In addition, the project's insights were to guide the Hanoi University of Public Health (HUPH) on the prioritisation of subject areas for the curricula of its master's course in hospital management and continuous professional training for health professionals.

The project was led by Dr Nguyen Thanh Huong, Associate Professor at HUPH, and supported by two co-investigators, Ms Nguyen Nhat Linh from the Department of Medical Equipment Management at HUPH, and Dr Nguyen Minh Tuan, General Director of Medical Device and Construction at the Vietnamese MOH. The study team delivered the project in close collaboration with the MOH, Swiss Tropical & Public Health Institute, Dien Bien Provincial Health Department, Tuyen Quang Provincial Health Department, Khanh Hoa Provincial Health Department, Dak Lak Provincial Health Department, Thua Thien Hue Provincial Health Department, Ninh Thuan Provincial Health Department, Can Tho Provincial Health Department, and six central hospitals from Hanoi and Ho Chi Minh city.

The methodological approach for the study was developed with the Swiss Tropical & Public Health Institute. Dr Nguyen Thanh Huong explains: "This is the first time we [the study team] have developed the scale to measure the knowledge, attitudes and practice of medical equipment management staff. This project is special in terms of its scale and scope in this topic." The study

²⁰⁵ Remmelzwaal BL. The effective management of medical equipment in developing countries. A Series of Five Papers, FAKT Project. 1997; 390.

²⁰⁶ https://www.who.int/management/organize_system_%20healthcare.pdf (Accessed 23 March 2021)

²⁰⁷ Local report by the Medical Equipment and Infrastructure Institute of Viet Nam (unpublished)

team collected data from thirty public hospitals in ten provinces/cities through in-depth interviews, focus groups, and surveys with health professionals, and also conducted an analysis of hospital electronic inventory and accounting data, technical inspections, and checks.

The study was implemented in Vietnam. The MOH was involved from the start of the study and their strong engagement was critical for the successful implementation of the project. Dr Nguyen Thanh Huong explains: "The MOH helped me to reach out to 30 hospitals throughout the country at different levels – central, province and district - it is not easy to start a research project with hospitals because they are already very busy with a lot of priorities".

F.15.3. Findings (Outputs, outcomes, impact)

The study team developed two key research tools to assess the determinants affecting the management of medical equipment in hospitals:

- A medical equipment management knowledge and practice questionnaire for health care professionals, managers, and technicians. This was complemented by a qualitative interview guide for conducting in-depth interviews and focus groups to understand the knowledge of current policies, regulations, and guidelines, and identify factors affecting the management of medical devices, and possible solutions for more effective HTM
- An equipment assessment tool to analyse how effectively twenty-six types of medical devices are being used, maintained, and repaired. Examples of medical devices included incubators, autoclaves, and x-ray machines

Insights from the study have provided invaluable evidence on the determinants affecting medical equipment management in Vietnam. This evidence came at a critical time: in May 2016, the Vietnamese government issued the first Decree on the management of medical devices (Decree No. 36/2016/ND-CPD).²⁰⁸ The results from the study directly informed the policy and recommendations for changes within hospitals and the regulatory framework of the MOH to improve medical device management in Vietnam. Dr Nguyen Thanh Huong said: "This is a rare project: it is not a lot of money or time but has made an important input into a very important policy paper [Decree 36]".

The study also provided evidence to develop a new training module for the master's course on hospital management at HUPH. Each year around 50 students complete the master's course. As a result, several master's students are now working on research in the area of medical equipment management. Evidence from the study also informed the development of training materials for a five-day course to build capacity of health professionals working in the area of hospital management. This course runs at least once a year and trains around 30 health professionals. The course is funded by hospitals, the MOH, or participants.

F.15.4. Next steps

The study team plans to create further health systems research capacity at the HUPH by building a regional team to apply a similar methodology in neighbouring countries. Students and young researchers at HUPH will be encouraged to study HTM.

²⁰⁸ https://www.tilleke.com/wp-content/uploads/2016/10/2016_Oct_Medical_Device_Regulations_Vietnam.pdf



www.technopolis-group.com