Strengthening of the National Health Research Systems of African EDCTP Participating States – 2020 Survey Report

Final report | 29 March 2022

Report

About EDCTP

The European & Developing Countries Clinical Trials Partnership (EDCTP) is a public–public partnership between 14 European and 16 African countries, supported by the European Union.

EDCTP's vision is to reduce the individual, social and economic burden of poverty-related infectious diseases affecting sub-Saharan Africa.

EDCTP's mission is to accelerate the development of new or improved medicinal products for the identification, treatment and prevention of infectious diseases, including emerging and re-emerging diseases, through pre- and post-registration clinical studies, with emphasis on phase II and III clinical trials. Our approach integrates conduct of research with development of African clinical research capacity and networking.

The second EDCTP programme is implemented by the EDCTP Association supported under Horizon 2020, the European Union's Framework Programme for Research and Innovation.

About the WHO African Region

The World Health Organization (WHO) is building a better future for people everywhere. Health lays the foundation for vibrant and productive communities, stronger economies, safer nations and a better world. Our work touches lives around the world every day – often in invisible ways. As the lead health authority within the United Nations (UN) system, we help ensure the safety of the air we breathe, the food we eat, the water we drink, and the medicines and vaccines that treat and protect us. The Organization aims to provide every child, woman and man with the best chance to lead a healthier, longer life.

The WHO African Region is one of the six regions of WHO. The Organization's presence in the region consists of the WHO Regional Committee for Africa, a Secretariat for the African region, three Inter-country Support Teams (ISTs) and WHO Country and Liaison Offices located in 47 Member States.

Contents

Abstract

Background:

Worldwide research is key and central in the pursuit of universal health coverage (UHC) and Sustainable Development Goals (SDGs). Health challenges and health systems set-ups invariably differ from country to country and continent to continent, warranting contextualised healthcare interventions. The need to generate local evidence to solve local challenges through research cannot be overemphasized. However, weak local capacity and inadequate resources has remained the bane of appropriate and timely high-quality research in the African region. WHO African Region (WHO AFRO) facilitated the adoption of a regional strategy for strengthening national health research systems (NHRS) in 2015(1). In 2020, the performance of the NHRS among the 47 member states of the WHO African region compared to the 2018 data was repeated. More so, in 2020, EDCTP followed the same process among its African participating states – 17 countries at the time of this survey – and assessed the progress made since the 2018 barometer assessment.

Methods:

We employed the barometer developed for the WHO AFRO to regularly monitor the performance of NHRS of member states. Using information generated by an online survey based on a structured questionnaire, quantitative and qualitative data were collected and analysed in Excel Software to calculate NHRS function and sub-function indices, as well as performance against a set of indicators. The barometer scores for each EDCTP participating state were interpreted according to a set of values ranging from 0% to 100%. Thematic analysis using manual coding was used to analyse the qualitative data. For comparative analysis, the 2018 data was used as the comparator.

Results:

In 2020, overall, 16 out of 17 EDCTP participating states responded to the questionnaire and the performance of all indicators in the four domain areas improved as compared to 2018. As a result, the gap to meeting the 2025 target has been reduced with an impressive eight indicators either reaching or surpassing this target. Likewise, the majority (8 out of 17) of 2020 individual regional health research system barometer scores improved their barometer scores in comparison to 2018. More specifically, sub-domain average scores for governance of research for health and developing and sustaining resources for research for health (R4H) gained 3% and 11%, respectively, from 76% and 63%, though statistical evidence of true differences was low. However, producing, using research and financing of research for health declined by 3% and 2%, respectively, over the 2018-2020 period. Overall, the regional health research systems barometer average score improved by 3% in 2020 as compared to 2018.

Grossly, 50% (8 out of 16) of EDCTP participating states showed declines in their respective national research for health system barometer score in 2020 as compared to 2018. Specifically, 3 out of 16 countries showed indicators lower by at least 10% in 2020 as compared to 2018. Encouragingly, six countries reported individual improvements in their respective gains with three of them showing gains of at least 10%.

Among the constraints to strengthening NHRS are the lengthy ethical clearance timelines, weak research coordination mechanisms, poor knowledge translation platforms, weak enforcement of research laws and regulation, inadequate research infrastructure, limited resource mobilization strategies and skills, and perennial donor dependence.

Conclusion:

There has been an improvement in the overall regional health research systems barometer for the 16 EDCTP partner countries since the last assessment in 2018. Overall, in 2020, the performance of half the indicators in the four domain areas improved as compared to 2018. The survey also highlighted the areas with slow improvement that require a concerted effort from 2014, 2018 and 2020. Moreover, the regional health research systems barometer average score increased by 3% in 2020 as compared to 2018. Furthermore, the study provides an opportunity for countries to understand how to continually improve areas without consistent gains from 2014 to 2020 and the impact COVID-19 might have contributed on individual countries that reported declines in barometer scores. For those countries that have progressed, there is need to share best practice(s) in their areas of excellence in NHRS.

Background

Research is central in the pursuit of universal health coverage and Sustainable Development Goals. Health challenges and health systems set-ups invariably differ, warranting contextualised healthcare interventions. Therefore, there is emphasis on generation of local evidence to solve local challenges through research. However, weak local capacity and inadequate resources have remained the bane of timely and appropriate, high-quality research in the African region. WHO African Region (WHO AFRO) facilitated the adoption of a regional strategy for strengthening national health research systems (NHRS) in 2015 (1).

The European & Developing Countries Clinical Trials Partnership (EDCTP) is a public-public partnership between currently 18 African and 14 European countries. These 30 countries, also called the Participating States (PSs), are full members of the EDCTP Association. The Association is the legal structure for the implementation of the second EDCTP programme (EDCTP2; 2014-2023) which is co-funded by the European Union (EU) under its Framework programme for research and innovation, Horizon 2020.

EDCTP aims to support collaborative research that accelerates the clinical development of new or improved interventions (drugs, vaccines, microbicides and diagnostics) to prevent or treat HIV, tuberculosis, malaria and neglected infectious diseases including emerging and re-emerging infections affecting sub-Saharan Africa. EDCTP mainly funds clinical trials and product-focused implementation research in sub-Saharan Africa. It also supports relevant individual, institutional, national and regional capacities for clinical research as well as research ethics review in sub-Saharan countries.

Currently, EDCTP is working with the 17 African Participating States (PSs) as full members and one aspiring PS (Angola) to support the strengthening of their national health research systems to optimize research production and utilization in making progress towards capacity enhancement for achieving national targets for Sustainable Development Goals (SDGs) and

Universal Health Coverage (UHC). However, EDCTP funded activities span 42 African countries – stretching beyond African countries involved in its governance. The EDCTP work plan for 2019 includes a strategic cooperation initiative with WHO-AFRO for the development and strengthening of the national health research systems of African Partner States of EDCTP. This project is jointly implemented with the World Health Organization.

Main Objectives

The main objective of this assignment is to contribute to the strengthening of the national health research systems for the effective uptake of clinical research results for translation into policy and practice. EDCTP regional networks and research consortia include institutions in almost all WHO AFRO member states.

Specific Objectives

1. To assess the performance of the NHRS among the 17 EDCTP African participating states.
2. To assess changes in the NHRS barometer scores since the 2018 NHRS survey.

Justification of the 2020 barometer score assessment

As part of EDCTP's preparation for the strategic partnership meetings in 2020, a situation analysis of developments and gaps in the national research health systems, including preparedness for public health emergencies in the EDCTP African participating states and Research Ethics Committees (RECs) was carried out. EDCTP requires an easily readable report to effectively portray the current status of national health research systems and capacity to tackle public health emergencies.

Methodology

The completed survey data was received from EDCTP as a:

1. Microsoft Excel file electronic format for 16 NHRS indicators, which was provided as a separate document.
2. Microsoft Word document showing the number of 2020 health publications in the EDCTP African participating states bibliometric analysis report.

A questionnaire which was used for data collection was also provided. Notably, a thorough data cleaning process was the first performed to authenticate the data received.

2.1   Data management and cleaning

The consulting team members did primary and secondary data cleaning in Excel and STATA version 16 MP for MacBook. The objectives of data cleaning were:

1. **To merge the electronic Excel main questionnaire and the Microsoft Word publications data.**
   Specifically, the main questionnaire had 10 modules which were verified against the Microsoft Excel data file. We then merged the Microsoft Word data with the number of 2020 health publications per country to the Excel main data file using countries as unique identifiers.
2. **To check all data entry errors and any inconsistencies in the electronic data received.**
   Firstly, the number of questions listed in the main questionnaire were cross examined against the main data set. Secondly, we performed variable consistency checks within the country specific main data (Excel) file, looking at variable coding, outliers, variable responses, and labelling. To note, all binary responses (Yes; No), were value labelled as (Yes=1; No=0) for easy calculation of indicators.
3. **To assess any inconsistencies in the country specific data filling.**
   The main data file had 42 entries which were checked for duplicates on data identifiers

(countries that responded). We identified that three countries (Algeria, Cape Verde, and Nigeria) had two entries each (duplicates) and this was referred to data managers. EDCTP then provided primary data sources (country-specific questionnaires) for reference in resolving the duplicates. With respect to value labelling, we checked whether labels in the questionnaire were consistent with the main excel file.

4. **To assess completeness of the data entered.**
   All the variables were checked for completeness while data conversions were also performed. For example, budget amounts (national, ministry of health and health research) were converted to the United States dollar (using the mid-2020 $US exchange rate per country) for consistency in indicator calculations. We further completed a United Nations mid-2020 country specific population variable which was used to calculate indicators on health research staff, universities with faculties of health sciences and health research publications density per 100 000 population.
5. **Further quality control**
   - How many countries were with the following discrepancies?
   We performed comparisons of responses of countries for the governance of research for health sub- functions [(1) health research policy index (RHRPI) (2) health research law index (RHRLI), (3) strategic health research plan index (RSHRPI), (4) ethical review committee index (RERCI), (5) health research priority list index (RHRPLI)]. Overall, there were six countries who had at least one inconsistent result in 2020 as compared to 2018. An inconsistent result with respect to governance of health for research for the five sub-functions identified was defined as at least one negative result in 2020 as compared to 2018. After communication with individual countries, revisions on inconsistent results were performed on six countries with regards to sub-function indicators under governance of research for health.
   - Incomplete data
   In addition, we checked for the overall participation of EDCTP countries focusing at (1) country response rate out of 17 and (2)

individual sub-function responses, notably research for health publications sub-function since it was not assessed in past years. To note, there were no positive feedback aimed at improving overall country response rate out of the 17 EDCTP members states.

2.2 Statistical analysis for health coverage indicators

A secondary analysis was performed using STATA 16 and Microsoft Excel since the primary data had not been analysed. The following steps were taken during the data analysis:

- Collating all the data received from the respondents and verifying the health coverage indicators
- Reviewing and analysing data on current NHRS status for the 17 EDCTP African countries based on the formulation by Kirigia et al to generate 17 barometer scores for 2020.
- Compare barometer scores from 2018 against 2020 estimates and show gains/losses for individual countries as well as the aggregate score for the17 EDCTP countries separately.

All individual sub-function indices were calculated for 17 EDCTP countries using the formula:

$$Sub\ function\ index = \frac{Actual\ score - Minimum\ score}{Maximum\ score - Minimum\ score}$$

Actual scores ranged from 0-100%, indicating the level of performance of a country for a particular indicator; for example, binary responses scored either 100% (Yes=1) or 0% (No=0). The actual score was then referenced against the minimum and maximum score to give the sub-function index. The maximum and minimum values were statistics obtained from a list of actual scores from all the 39 countries showing the best and worst performing country respectively. More so, sub-function scores that captured population density had their actual scores divided by the country specific population (UN Mid-2020 estimates) before being compared against the maximum and minimum values.

To obtain the overall score of a specific country, we averaged the 17 individual sub-function scores for each country, whilst the region aggregate score was the mean score of the 39 countries.

2.3 Indicator definitions

The following health coverage indicators have been defined and described in detail elsewhere and were considered for analysis according to Kirigia et al 2014 and Rusakaniko et al 2018 (2,3,4).

A: Governance of research for health

1. Health research policy index (RHRPI)
2. Health research law index (RHRLI)
3. Strategic health research plan index (RSHRPI)
4. Ethical review committee index (RERCI)
5. Health research priority list index (RHRPLI)
6. Health research focal point index (RHRFPI)

B: Developing and sustaining resources for research for health (R4H)

7. Universities with faculties of health sciences/ medicine (RUFHSI)
8. Health research institutes or council (RHRCI)
9. R4H programme (RHRPRI)
10. R4H programme staff density index (RHRHRI)
11. NGOs undertaking R4H index (RNGOI)

C: Producing and using research

12. R4H programme action plan index (RHRPAI)
13. Knowledge translation platform index (RKTPI)
14. Health research management forum index (RHRMFI)
15. R4H publications per 100,000 population index (RPPCI)

D: Financing of R4H

16. Budget line for R4H index (RBLHRI)
17. Government spending on R4H index (RHRBI)

Efforts were also made to make comparisons of progress from 2014, 2018 and 2020. Changes in barometer scores were compared between 2018 and 2020 to see whether there were any positive or negative significant changes over time.

Overall, 16 out of 17 (94.1%) EDCTP African participating states responded to the questionnaire to evaluate the state of their national research for health system barometer scores and the individual sub-function scores. Specifically, Tanzania was the only EDCTP participating state that did not respond to the questionnaire.

3.1 Summary of all indicator achievements in the four domain areas

A total of 17 sub-functions were assessed under the four domains. Overall, 8 out of 17 sub-functions showed fewer countries responding positively in 2020 as compared to 2018. Of note, among all indicators, fewer number of countries reported positively in 2020 thus creating a bigger gap towards the 2025 targets. In particular are the sub-functions on (i) program action plan (ii) knowledge translation platform (iii) NGOs performing research for health (R4H) who have three fewer countries in 2020. Likewise, in 2020, under the governance of research for health function, legislation on R4H, ethics review committees and research priority lists sub-functions had one less country in 2020 as compared to 2018 (Table 1).

Conversely, three out of four sub-functions under financing for health saw increases in the number of countries reporting investing at least 2% of the national health budget in R4H, investing at least 5% of health sector development assistance in R4H and regularly tracking R4H spending from all sources of four, three and three countries respectively. As a result, the performance of these two key indicators has now surpassed the 2025 target. Other notable improvements were on countries with universities with faculties of health sciences/medicine and presence of a health research focal point, improving by two and one country, respectively. Notably, 7 out of 16 countries reported an increased number of articles published in peer reviewed journals by at least 30%, namely: Cameroon, Congo, Ethiopia, Ghana, Niger, Nigeria and South Africa. However, Burkina Faso, The Gambia, Mali and

Senegal published fewer number of articles per 100 000 population in 2020 as compared to 2018.

Moreso, four indicators remained unchanged over the two time points namely: valid health research policies, health research strategic plans, health research management forum and having a dedicated budget line for R4H with 13, 10, 10 and 14 countries reporting positively, respectively. Overall, in 2020, three indicators namely: ethics review committees, presence of universities with faculties of health sciences or medicine and tracking of R4H spending from all sources were responded positively by all countries that responded to the questionnaire. However, the least positive responses were recorded under financing of research for health NHRS function with only three countries indicating investing at least 5% of health sector development assistance in research for health namely: Burkina Faso, Cameroon and Uganda.

Moreover, the following countries regressed with respect to:

- Programme action plan (Congo, Ghana and Mali)
- NGOs performing R4H (Angola, Ethiopia and Gabon)
- R4H programme (Mali and Uganda).

Table 1: Summary of the country achievements for all indicators in the four domain areas showing regional averages for the 16 out of 17 EDCTP countries

	Achievement 2018 (n=17)	Achievement 2020 (n=16)	Target by 2025	Countries not meeting the target
Governance of Research for Health				
Countries with valid health research policies	13	13	17	Angola, Gabon, Gambia (3)
Countries with legislation on R4H	12	11	14	Angola, Ethiopia, Gabon, Gambia, Mozambique (5)
Countries with health research strategic plans	10	10	17	Angola, Gabon, Gambia, Ghana, Mozambique, Nigeria (6)
All countries with national or institutional ethics review committees	17	16	17	-
All countries with health research priority lists	12	11	17	Ethiopia, Gabon, Gambia, Mali, Uganda (5)
All countries with health research focal point	14	15	17	Congo (1)
Developing & sustaining resources				
Countries with universities with faculties of health sciences/medicine	14	16	7	-
Countries with health research institutes or council in health research	16	15	10	Gambia (1)
Countries with a R4H programme	15	13	13	Gabon, Mali, Uganda (3)
Countries with NGOs performing R4H	16	13	13	Angola, Ethiopia, Gabon (3)
Producing and using health research				
Countries with a programme action plan	13	10	15	Congo, Gabon, Gambia, Mali, Nigeria, Uganda (6)
Countries with a knowledge translation platform	12	9	17	Congo, Gabon, Gambia, Mali, Nigeria, South Africa, Uganda (7)
Countries with a health research management forum	10	10	15	Angola, Cameroon, Gabon, Gambia, Mozambique, Nigeria (6)
Each country to increase the number of articles published in peer reviewed journals by at least 30%.	Not assessed	7	5	Angola, Burkina Faso, Gabon, Gambia, Mali, Mozambique, Senegal, Uganda, Zambia (9)
Financing				
Countries that have a dedicated budget line for R4H.	14	14	13	Angola, Gabon (2)
Countries investing at least 2% of the national health budget in R4H	1	5	5	Angola, Congo, Ethiopia, Gabon, Gambia, Ghana, Mali, Mozambique, Niger, Nigeria, Senegal (11)
Countries investing at least 5% of health sector development assistance in R4H	0	3	5	Angola, Congo, Ethiopia, Gabon, Gambia, Ghana, Mali, Mozambique, Niger, Nigeria, Senegal, Zambia, South Africa (13)
Countries regularly tracking R4H spending from all sources	13	16	9	-

3.2   Overall regional NHRS performance for the EDCTP countries

Table 2 shows trends in regional health research system barometer scores from 2018 to 2020. Overall, the regional health research systems barometer (RHRSB) average score increased from 62% in 2018 to 65% in 2020 an increase by 3% between the two periods though there was no evidence of significant differences. This was because of the gains observed in two out of four NHRS functions in 2020 as compared to 2018, in particular: governance in research for health (+3%), developing and sustaining resources for research for health (+11%) outweighed declines in producing and using research (-3%) and financing of research for health (-2%) (Table 2).

3.3   Governance of R4H

Overall, the average score for the governance of research for health improved by three percent in 2020 as compared to 2018. More specifically, three out of six sub-functions under governance of research scored higher barometer scores in 2020 than 2018, with the regional health research focal point, research policy and strategic health research plan indexes gaining 12%, 5% and 4%, respectively, though there was no evidence of a significant increased barometer scores over the two time points. Impressively, in 2020, the ethical review committee index was comparative to that of 2018 with a barometer score having reached the intended 2025 target of 100%. However, both the health research law and health research priority list indexes shrunk by 2% each in 2020 as compared to 2018. Notably, all negative gains in barometer scores had minimal statistical significance suggesting lack of true differences. As a result, comparing gains vs loses in all sub-functions barometer scores performances in 2020 showed a positive improvement as compared to 2018 (Table 2).

3.4   Developing and sustaining resources for R4H

The developing and sustaining resources for research for health function recorded an improvement of 11% in 2020 as compared to 2018. This was mainly driven by gains in the universities

with faculties of health sciences/medicine and research for health staff density indexes of 61% and 11%, respectively. Of note is the fact that there was evidence of a significant improvement in the former. However, declines of 13% and 7% were also recorded on NGOs research for health and research for health programme indexes respectively, whilst the health research institutes, or council score remained unchanged (Table 2). Of significance is that the developing and sustaining resources for R4H NHRS function showed the greatest gains in 2020 as compared to 2018 among the four NHRS functions. However, of concern, in 2020, the regional NGOs R4H index score was the second worst performing sub-function (from 94% to 81%) when compared to 2018 among the 17 sub-functions.

3.5   Producing and using research

The producing and using research NHRS function barometer score recorded most declines in 2020 when compared against other NHRS functions of magnitude 3%. Major declines in sub-functions score under this NHRS group were noted on knowledge translation platform and R4H programme action plan indexes losing 15% and 13%, respectively. The two were the least performing sub-functions in 2020 as compared to 2018 resulting in the overall average score for the NHRS function declining. However, there was no evidence of statistical differences on both. The health research management forum index and regional research for health publications per 100,000 population recorded a four percent increase in 2020 as compared to 2018 each; however, the latter was the least performing index score when compared against other sub-functions.

3.6   Financing of R4H

Likewise, the financing of R4H declined by two percent in 2020 as compared to 2018. Moreso, this was contributed by lower values in 2020 for the regional government spending on R4H index of 11% as compared to 2018; however, the regional budget line for R4H index showed an improvement of six percent. Overall, there was no statistical evidence to support the two percent difference in the average barometer score or for sub-function scores under this NHRS function (Table 2).

Table 2: Trends and comparison in average regional health research system barometer scores

	% (2018) n=17	% (2020) n=16	% (2020) - (2018) (+/-)	p-value
A. Governance of research for health				
1. Regional health research policy (RHRPI)	76	81	+5	0.727
2. Regional health research law (RHRLI)	71	69	-2	0.900
3. Regional strategic health research plan (RSHRPI)	59	63	+4	0.814
4. Regional ethical review committee (RERCI)	100	100	-	0.305
5. Regional health research priority list (RHRPLI)	71	69	-2	0.900
6. Regional health research focal point (RHRFPI)	82	94	+12	0.282
Average score for the governance of R4H	*76*	*79*	*+3*	*0.837*
B. Developing and sustaining resources for R4H				
7. Regional universities with faculties of health sciences/medicine (RUFHSI)	39	100	+61	0.002
8. Regional health research institutes or council (RHRCI)	94	94	-	-
9. Regional R4H programme (RHRPRI)	88	81	-7	0.573
10. Regional R4H programme staff density per 100,000 population (RHRHRI)	0.002	12	+11	0.151
11. Regional NGOs R4H index (RNGOI)	94	81	-13	0.252
Average score for developing and sustaining resources for R4H	*63*	*74*	*+11*	*0.497*
Average score for developing and sustaining resources for R4H*	*79*	*89*	*+10*	*0.427*
C. Producing and using research				
12. Regional R4H programme action plan (RHRPAI)	76	63	-13	0.410
13. Regional knowledge translation platform (RKTPI)	71	56	-15	0.364
14. Regional health research management forum (RHRMFI)	59	63	+4	0.811
15. Regional R4H publications per 100,000 population (RPPCI)	4	8	+4	0.627
Average score for producing and using research	*53*	*48*	*-3*	*0.774*
Average score for producing and using research*	*69*	*61*	*-8*	*0.630*
D. Financing of R4H				
16. Regional budget line for R4H (RBLHRI)	82	88	+6	0.624
17. Regional government spending on R4H (RHRBI)	30	19	-11	0.456
Average score for financing of R4H	*56*	*54*	*-2*	*0.907*
Regional health research systems barometer (RHRSB) average score	*62*	*65*	*+3*	*0.858*
Regional health research systems barometer (RHRSB) average score*	*70*	*72*	*+2*	*0.899*

A positive (+) and negative (-) difference shows an improvement and a decline in the barometer score respectively. A p-value comparing individual sub-function and average barometer scores at the two time points. *: Average barometer scores after excluding outliers in staff density and R4H publications. ± The average score was calculated excluding the staff density per 100 000 population score (9%) because it's an outlier. ±± The revised regional health research systems barometer score captures the revised B and C average scores.

3.7 Summary of the four NHRS functions

In summary, the 47% (8 out of 17) of 2020 individual regional health research system barometer scores improved in comparison to 2018, with the overall regional health research systems barometer score increasing by three percent. More specifically, sub-domain average scores for governance of research for health and developing and sustaining resources for research for health improved by 3% and 11% respectively, though statistical evidence of true differences was minimal. However, producing and using research and financing of research for health, declined by 3% and 2% respectively over the years 2018-2020. Strikingly, all countries reported presence of an ethical review committee and universities with faculties of health sciences or medicine, thus the latter gaining 61% in 2020 compared to 2018. Other notable improvements were on health research focal point and research for health programme staff density with increases of individual barometer scores of 12% and 11% respectively.

On the contrary, the highest declines in individual barometer scores were noted for regional NGOs research for health, R4H programme action plan, regional knowledge translation platform and government spending on R4H each losing at least 10%.
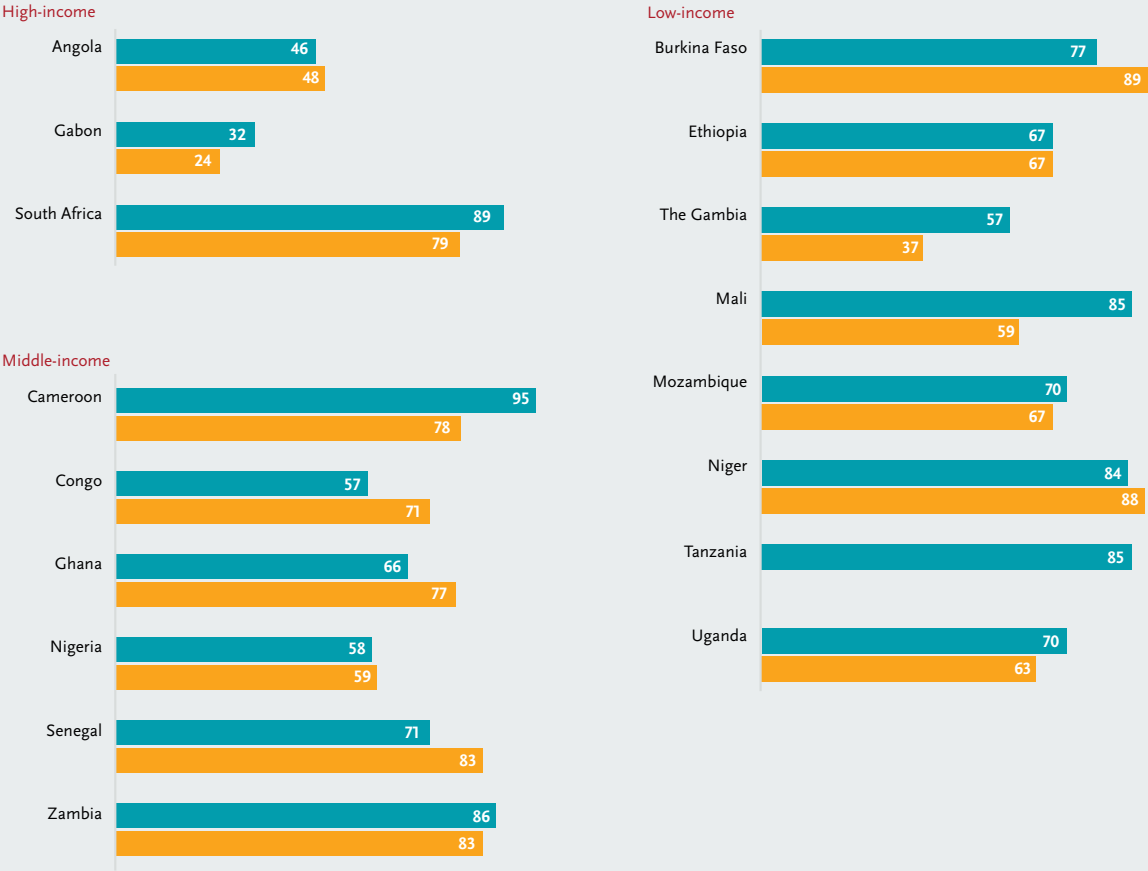
A sensitivity analysis was done by excluding the sub-functions barometer scores for R4H staff density and the regional R4H publications per 100,000 population as they were considered outliers affecting their respective mean NHRS function barometer scores. Of note is the fact that after excluding the sub-function barometer scores in the two NHRS functions, mean barometer scores for developing and sustaining resources for R4H and producing and using research improved by 15% and 13% respectively. As a result, the overall regional health research systems barometer average score in 2020 was 7% better. However, since this is applied at both time points, the differences remained relatively constant, though significantly lower with respect to meeting the 2025 targets.

3.8 Individual Country Barometer Scores

Country barometer scores for 2018 and 2020 were computed for the different countries and compared to see whether there were any significant changes over the two time points and the summary is shown in Figure 1.

Figure 1: EDCTP participating states national research for health system barometer scores by economic group (17 countries) as described by Kirigia *et al*, 2016 (See reference 3).

High-income

Country	2018	2020
Angola	46	48
Gabon	32	24
South Africa	89	79

Middle-income

Country	2018	2020
Cameroon	95	78
Congo	57	71
Ghana	66	77
Nigeria	58	59
Senegal	71	83
Zambia	86	83

Low-income

Country	2018	2020
Burkina Faso	77	89
Ethiopia	67	67
The Gambia	57	37
Mali	85	59
Mozambique	70	67
Niger	84	88
Tanzania	85	
Uganda	70	63

Fifty percent of the EDCTP participating states showed declines in their respective national research for health system barometer scores in 2020 as compared to 2018. Specifically, of the 16 EDCTP countries with indicators at both time points, eight countries had lower barometer scores in 2020 than 2018 characterised by 3 out of 16 (Cameroon, The Gambia and Mali) having declines of at least 20%. Other notable declines were for South Africa and Gabon which had 10% and 14% lower values in 2020 as compared to 2018, respectively. However, increases were reported in 6 out 17 EDCTP countries with outstanding improvements recorded for Burkina Faso (12%), Senegal (12%), Ghana (11%) and Congo (8%). The barometer score for Ethiopia remained unchanged between the two time points, whilst relatively smaller improvements were identified for Angola (2%) and Nigeria (1%).

Discussion

The EDCTP participating member states have made significant progress in strengthening their NHRS since the baseline assessment of 2014 to 2020. The average regional barometer score increased from 62% in 2018 to 65% in 2020. This indicates that overall EDCTP participating countries NHRS performance has increased by 3%. There was an increase in the 2020 survey scores for three of the four NHRS functions, in comparison to the 2018 survey scores. The 2020 survey score for the Producing and using research function decreased by 3% despite an increase in the scores for the sub-functions for number of publications, and existence of a research management forum. The decrease in the score for the Producing and using research function was due to significantly low scores for the sub-functions for the existence of a R4H programme action plan and a knowledge translation platform. in 2020 in comparison to 2018. However, improvements were also registered for some indicators under the different objectives of the EDCTP research for health strategy and in some cases, already meeting the 2025 targets.

Identified constraints to strengthening NHRS include the weak research coordination mechanisms, poor knowledge translation platforms, weak linkages between government institutes that are involved in capacity building, undertaking and coordination of research. The low government financing for health and donor dependence is undermining efforts to build sustainable capacity for health research. The performance of NHRS varied within countries of the same level of economic development and between the different categories too.

4.1   Governance for research

The impact of COVID-19 on research agenda cannot be over emphasized. It is very important to note that national governments as stewards of the country's research agenda should set the strategic vision in policies and strategic plans, develop and enforce laws and regulations for research and protect research participants through ethical processes during this pandemic and never lose the target for 2025. These serve to ensure that all resources and activities respond

to the country's needs in the face of COVID-19. It is key that local evidence gaps identified are addressed and research evidence supports the government's development agenda as well as the UHC aspiration. Little progress has been realised in these areas with regards to development of health research policies and strategies, development of health research priority list and regional ethical review committee. While in some cases they are guiding implementation, in others they are expired but still under use or are stuck in protracted development processes just as noted in 2018. Similar to 2018, the extent of implementation of the policies and strategies was not assessed but the cited infrastructure, human and financial constraints, do impact implementation compounded by the emergence of COVID-19. Research laws and legislations were in place in only 71% of countries in 2018 and declined by 6% to 65% in 2020. Rusakaniko et al (2018) found out that in many cases these laws were embedded in other overarching laws for science and technology and the public health act, or multiple co-related instruments were in use. For example, in the Republic of Congo, there is a low for research in science and technology which could include biomedical research.

The Africa research strategy committed countries to putting in place national health research institutions (Kirigia *et al*, 2015). To note, significant progress was realised in this area up to 2018, though some gains realized were eroded in 2020. Of great concern is the fact that in 2018 the ownership of this institution emerged as an issue in that, where they are not government owned, they do not focus on the government prioritised research agenda. This calls for the need to focus on strengthening governance for research to foster collaboration whereby the institutions undertake research addressing priority questions identified by the government's country specific research agenda. This might perhaps reflect the weak planning of countries in defining country specific research agenda with well-defined research priorities. Additionally, a decline from 71 to 69 on research priority list agendas was noted. This may be due to reduced efforts in sourcing unpublished government documents because of increased commitments to COVID-19 activities. This could be improved through strengthening of a

functional coordination mechanisms between government ministries and research institutions. Of note is previous efforts that have mainly focussed on governments coordinating of donor activities and investment without paying much attention to coordination between government owned institutions.

An excellent progress has been realised in strengthening research ethics which has been maintained at 100%. Over the last decade, there has been significant investment towards strengthening of ethics and regulatory capacity in Africa. This has contributed to the improved NHRS through the work of different initiatives like the European & Developing Countries Clinical Trials Partnership (EDCTP), NIH Fogarty, Africa Medicines Harmonisation Initiative, Africa Vaccines regulators Forum (AVAREF) and others[6]. But this gained progress is being retained as noted in 2020. The NHRS governance for research function could be further strengthened by simplifying the ethical clearance process expediting ethical reviews during health emergencies. It is important that universities (public and private) and governments research institutions embark on massive training of key staff in data management, analysis and protection.

4.2   Creating and sustaining resources

To attain UHC, countries must generate country specific contextually relevant evidence that led to the adoption of local or home-grown solutions, while ensuring global scientific and policy alignment in cross-country or cross-regional health challenges. In this regard, building local capacity to undertake research, manage and coordinate research processes is key. Our results show a positive trend from 2018 to 2020 in reference to training researchers and building capacity to conduct research through universities that can foster research training. We look at these findings in two ways, where capacity has been built; there is need to ensure functionality which we did not undertake in this assessment. However, when we look at the financing for research, there is concern regarding functionality which may be justified given the very low levels of funding for research in Africa. However, this may undermine the investments in capacity building where researchers seek other opportunities.

Sitthi-armon et al (2000) noted that the human resource constraints have contributed to limited capacity by developing countries to undertake research and use its results in evidence based policy formulation. [7].

Universal health coverage requires multi-dimensional and multisectoral interventions and in this regard, the availability of multidisciplinary research teams as highlighted by the respondents is beneficial. Of concern however is the loss of competent researchers through retirement and attrition, and lack of research infrastructure including equipment. Respondents noted the role of partnerships in ameliorating these challenges. Nonetheless, partnerships may or may not be beneficial depending on how they are negotiated and implemented. Furthermore, strong partnerships in research have to be ensured at two levels, coordination at the national level to ensure alignment with defined national priorities and at the institutional level to ensure mutual benefits and skills transfer[8].

We noted an increasing role of NGOs in undertaking research which is commendable but there was 13% decline in 2020 which demonstrated the need to build their capacity to maximize their contribution to evidence generation and employ evidence-based programming. NGOs contribute to research processes and support uptake of evidence into policy and decision making in programming but, their varied capacity in policy engagement, limited capacity to undertake research beyond their programmes, weak linkages with the researchers and donor dependency are major concerns[9].

4.3   Producing and using research

The use of research to inform evidence-based policy formulation is gaining momentum in Africa and everywhere in the world. This process is qualified by coordinating the research process, using evidence in policy development and decision making thereby increasing publications in peer reviewed journals by African scientists. Knowledge management is key to translate it into action. Over the years more countries have put in place knowledge translation platforms which have been instrumental in development of evidence informed treatment policies[10],

guidelines as well as policies[11]. We however highlight that getting evidence into policy takes more than having platforms in place, additional facilitating factors relate to the quality and timeliness of the evidence, effective dissemination and the implementation feasibility of the research recommendations[12,13]. More specific, in addition to the mentioned countries; Cameroon, Ethiopia, Ghana and Uganda also recorded more than 1000 publications suggesting an upward trend as reported by Hoffman *et al* (2009). Suggestively, an introspection to population adjustments for the number of publications per 100 000 people may be useful to qualify for the personnel which uses or have easy access to the information from health publications.

4.4   Financing for research

The financing of both R4H NHRS score and the budget line for R4H index remained constant over the two time points. The responsibility for building research capacity primarily lies with national governments and this must be reflected in making adequate investments. In this survey respondents ranked government third as a source of funding for health research. More so, the government spending on R4H index decreased by 11% and the performance was a lot below 50% and the statistical evidence was limited. The Abuja declaration[14] committed African countries to allocate at least 15% of their national budget to health, and we see a similar trend to R4H. Despite this declaration coming into force in 2001, by 2014 only four countries had met the target[14]. On other hand the low funding could be attributed to a low GDP and as such a limited fiscal space. This then calls for innovative ways to raise resources to fund health research for health.

Efficient use of donor funds is another good option to be pursued in funding. But the major concern is the failure to address the country's research priorities[15]. However, with good governance, enforcement of legislation and development of prioritized research agenda, donor funds can be used more effectively to reinforce the limited local research investments. The low funding for research will undermine the investment in capacity building and strengthening governance for research.

4.5   Country Specific performance

Turning to individual country performance, we observed numerous variations and it is not clear what explains the performance of the NHRS. Within the high-income category performance barometer scores ranged from a high 79% for South Africa to as low as 18% in Gabon. In the low middle income category, performance ranged from as high as 83% for Zambia and Senegal to as low as 37% in Ghana. While in the low-income category, performance ranged from as high as 89% for Burkina Faso to as low as 59% in Mali. We also noted that majority of low-income countries and low middle income countries were performing better than high income countries. This is contrary to the previous studies that showed a positive correlation between GDP, expenditure on R4H and human development index with health research publications [16,17]. The lack of consistencies with respect to known factors contributing to positive national NHRS scores warrants determining whether there is lack of reliability in how the questionnaire collects the country information. This may be because of changes in the personnel responding to questions or inappropriate unknowledgeable people responding to the questionnaire. However, among the plausible explanations affecting the NHRS performance are the availability of research institutions (like the case of South Africa and Nigeria) and funding for health like the case of Burkina Faso that has allocated at least 2% of their health budget to research (with barometer scores of 89%) and South Africa that created a health research fund. Long term capacity building offers another explanation like the case of the 17 EDCTP supported countries that have benefitted from building capacity for ethics in research and infrastructure and skills to undertake clinical trials for a period of time (4).

4.6   Implications for policy and research

In order to realise functional NHRS, the four objectives of the Regional health research strategy must be strengthened namely: governance of research for health, developing and sustaining resources for R4H, producing and using R4H, and Financing of R4H. The

findings of this assessment provide evidence to inform the development and strengthening of health research policy and strategic plan to address identified gaps as well as consolidations of gains being lost. These strategic documents should articulate the vision and goal for health research in the country, priority interventions, implementation arrangements, roles and responsibilities of stakeholders, sustaining gained mileage and a monitoring framework. These should guide resource mobilisation and allocation decisions. Laws and legislations must be developed where they are lacking and enforced.

In the same vein of 2018 assessment, countries should endeavour to build a system for health research taking into account the different components of systems. These include, mobilizing inputs (human, financial, institutions, infrastructure, tools and guidance documents), undertaking processes (implementation of interventions, capacity building), producing outputs (using inputs to undertake processes, e.g. researchers trained), outcomes (capacity built, timely production of evidence, publication in peer reviewed journals) and impact (strengthened NHRS). There is need to intervene in all the components of the system in order to realise strengthened NHRS. This should be backed by strong monitoring and evaluation to assess progress made and sustain or retain it.
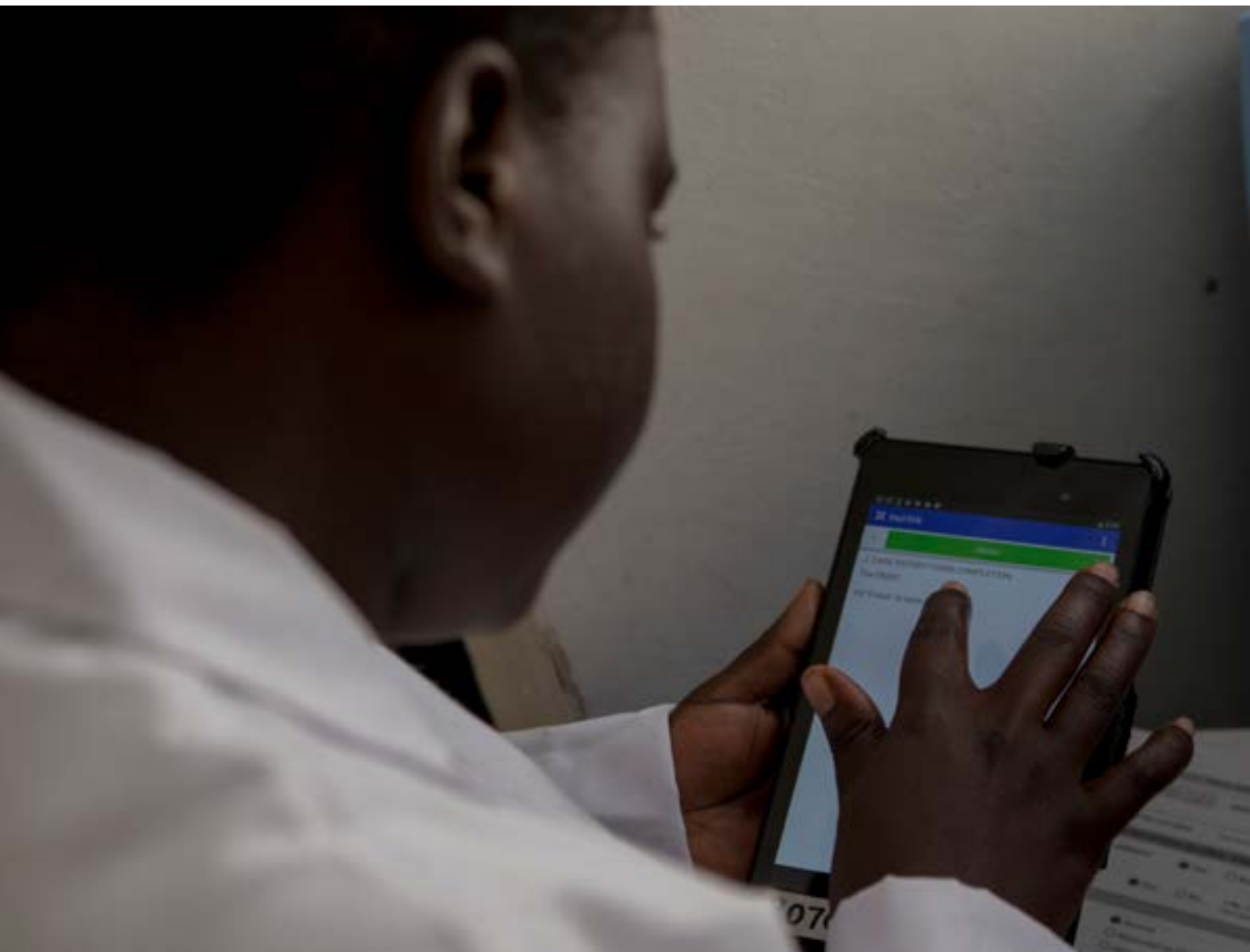
6 Challenges observed and recommendations

This report highlights the challenges that were experienced mostly during the data collection process.

	Challenges	Recommendations
1	There were delays in the designing of the online Survey Monkey data collection form which was intended to be send out for respective country responses. Overall, this resulted in the hold-up of the data collection process and the general reporting timelines.	Improve the group skills with respect to online data collection skills, in particular developing forms and managing the data as it is received. This can be achieved through by providing data collection and management training workshops to all countries.
2	After the online questionnaire was sent out, there were further delays in responding to the form with some countries spending months to complete and finally sent back. Likewise, this delayed pooling the dataset and eventual analysis.	Improve accessibility to the Survey Monkey database by housing it on the African Health Observatory platform.
3	Some countries had to modify certain responses at the last minute for clarity.	Promote internal validity of the questionnaire responses, through improved coordination when the questionnaire is sent out, so that the most knowledgeable person responds to it, that is identifying a key focal point.
4	Some parts of the questionnaire were incomplete resulting in data being sourced from other avenues, notably manuscript publication data.	Country specific publications should also be uploaded and deposited on the African Health Observatory platform to improve transparency and accessibility of these publications.
5	Access to documents like policy, priority list, strategies, etc was also a challenge resulting in people reporting negative results.	Country specific documents should be uploaded and reposited on the African health observatory platform to improve transparency and accessibility in particular, on research governance (research laws, strategies, priorities, policies and proof of presence of ethical committees).
6	Lack of consistency in the focal person in each country who answered the questionnaire 2014,2018 and 2020.	Country specific focal person who is knowledgeable and have access to key documents should be identified and coordinate responses physical and electronic questionnaires.
7	The presence of COVID 19 made all countries to focus on the pandemic more than anything else which might have made countries neglect gained achievements in their UHC.	The identification of a key focal person will enable to maintain consistent country specific information and data at each given point in time.

7 Conclusion

Overall, in 2020, the performance of key indicators in the four NHRS functions improved slightly in comparison to 2018. As a result, there is still a gap to meeting the 2025 target that has been created with six indicators [(i) presence of national or institutional ethics review committees (ii) tertiary institutions training health research (iii) presence of a health research institutes or council in health research (iv) an increase in the number of articles published in peer reviewed journals by at least 30% (v) having a dedicated budget line for R4H (vi) regularly tracking R4H spending from all sources] surpassing this target. Though there have been improvements in the amount being invested in research for health with nine more countries investing at least 2% of their national health budget, producing and using R4H remains the least performing NHRS function. More specific, most increases were observed in R&D coordination mechanism with all countries reporting positively as compared to 2018. However, an increase in the number countries (61%) with health research promoting unit within the ministry of health and with universities/colleges that have a training programme in health research was reported. These findings call for the strengthening of the NHRS. To strengthen NHRS, it takes more than availability of policies and strategies, presence of research institutes, research coordination mechanisms etc. These must be implemented, laws enforced and mechanisms functional.

8 References

1. World Health Organisation: The World Health Report 2013: Research for Universal Health Coverage. In. WHO. Geneva Switzerland; 2013.
2. Kirigia JM, Ota MO, Motari M, Bataringaya JE, Mouhouelo P: National health research systems in the WHO African Region: current status and the way forward. *Health Res Policy Syst* 2015, 13:61.
3. Kirigia JM, Ota MO, Senkubuge F, Wiysonge CS, Mayosi BM: Developing the African national health research systems barometer. *Health Res Policy Syst* 2016, 14(1):53.
4. Rusakaniko S,
5. Umeokafor N, Isaac D, Jones K, Umeadi B: Enforcement of occupational safety and health regulations in Nigeria: An exploration. *European Scientific Journal* 2014, 3:93-104.
6. Whitaker C, Singh M, Fakier N, Nderu M, Makanga M: The development of bioethics in Africa: the role of the European and Developing Countries Clinical Trials Partnership. Highlights EDCTP's activities to strengthen bioethics capacity in Africa. June 2018, the Central European Journal of Medicine (one of series of articles on 'Medical Ethics in the 70 Years after the Nuremberg Code, 1947 to the Present'). *Central European Journal of Medicine* 2018.
7. Sitthi-Amorn C, Somrongthong R: Strengthening health research capacity in developing countries: a critical element for achieving health equity. *BMJ* 2000, 321(7264):813-817.
8. Binka F: Editorial: north-south research collaborations: a move towards a true partnership? *Trop Med Int Health* 2005, 10(3):207-209.
9. Pollard A, Court J: How civil society organisations use of evidence to influence policy processes: A literature review. In. Edited by Institute OD. London UK; 2005.
10. Nabyonga-Orem J, Ssengooba F, Macq J, Criel B: Malaria treatment policy change in Uganda: what role did evidence play? *Malar J* 2014, 13:345.
11. Lavis J, Sewankambo N: Turning health research into policy: final technical report. Accesible from https://idl-bnc-idrc.dspacedirect.org/bitstream/handle/10625/56835/IDL-56835.pdf?sequence=2&isAllowed=y. 2015.
12. Hennink M, Stephenson R: Using research to inform health policy: barriers and strategies in developing countries. J Health Commun 2005, 10(2):163-180.
13. Hofman KJ, Kanyengo CW, Rapp BA, Kotzin S: Mapping the health research landscape in Sub-Saharan Africa: a study of trends in biomedical publications. *J Med Libr Assoc* 2009, 97(1):41-44.
14. Declaration A.: Abuja declaration on HIV/AIDS, tuberculosis, and other related infectious diseases, accessed from https://au.int/sites/default/files/pages/32894-file-2001-abuja-declaration.pdf on 12 February 2019. In. Abuja Nigeria; 2001.
15. Lansang MA, Dennis R: Building capacity in health research in the developing world. Bull World Health Organ 2004, 82(10):764-770.
16. Rahman M, Fukui T: Biomedical research productivity: factors across the countries. *Int J Technol Assess Health Care* 2003, 19(1):249-252.
17. Uthman OA, Uthman MB: Geography of Africa biomedical publications: an analysis of 1996-2005 PubMed papers. *Int J Health Geogr* 2007, 6:46.

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