CwPAMS Toolkit

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CPA AMS Partnerships and Project Posters

PARTNERSHIP	PROJECT
Assemblies of God Hospital; Norfolk and Suffolk NHS Foundation Trust	Optimising the use of antibiotics and increasing knowledge antimicrobial resistance in a rural healthcare setting in Northern Ghana and wider Community
UK Faculty of Public Health (FPH) – Ghana Public Health Association (GPHA)	To strengthen Antimicrobial Stewardship through improving surveillance and building sustainable capacity in Ledzokuku Krowor Municipal Assembly [LEKMA] Hospital, Ghana
University of Heath and Allied Sciences, Ho Teaching Hospital; University College London Hospitals NHS Foundation Trust	Enhancing Hospital Pharmacists Roles to support the Delivery of Antimicrobial Stewardship programmes in Ho Teaching Hospital, Ghana
North Middlesex University Hospital NHS Trust, London (NMUH) – Korle-Bu Teaching Hospital (KBTH)	Building Professional Capacity and Sustainability to Deliver Effective Antimicrobial Stewardship and IPC Programmes in Accra, Ghana.
Healthcare Improvement Scotland, Ghana Police Hospital; Keta Municipal Hospital	Utilising a Scottish triad approach to developing and implementing antimicrobial stewardship (AMS) in Ghana: Information, Education, Quality Improvement
Makerere University, Mulago Specialised Women and Neonatal Hospital, Kawempe Hospital and Cambridge University Hospitals (CUH)	Kampala Cambridge Antimicrobial Stewardship and Infection Prevention and Control project
Brighton and Sussex University Hospitals NHS Trust (BSUH), Brighton and Sussex Medical School (BSMS) Brighton – University Teaching Hospital (UTH), University of Zambia (UNZA) School of Pharmacy, Lusaka and University Hospital Ndola	Championing Pharmacists as Antibiotic Guardians in Zambia; the Brighton-Lusaka Pharmacy Link Initiative
University of Salford; Pharmaceutical Society of Uganda	Implementing the AMR National Action Plan in Community Outpatient Settings in Kabarole District, Uganda
Health Education England; Manchester University NHS Foundation Trust; Gulu Regional Referral Hospital; Saint Mary's Lacor; University of Manchester; Manchester Metropolitian University	Establishing Effective Antibiotic Stewardship in Gulu Regional Referral Hospital (GRRH), Northern Uganda
Northumbria NHS Foundation Trust; Kilimanjaro Christian Medical Centre	Interventions that are designed to change antimicrobial use for better patient outcomes and avoiding AMR (Antimicrobial resistance)
Nottingham Trent University (NTU); Makerere University, Uganda (MakU); Buckinghamshire Healthcare NHS Trust (BHT)	Strengthening antimicrobial stewardship in Wakiso District, Uganda
London School of Hygiene and Tropical Medicine (LSHTM) and University College London Hospitals NHS Foundation Trust – Makerere University College of Health Sciences and Infectious Diseases Research Collaboration (IDRC)	Capacity Sharing for AntiMicrobial Stewardship (CaSAMS) through the medicines and therapeutic committee at Jinja hospital

APPENDIX 2

CwPAMS Global Health Fellows Project Posters

The posters listed below are available in the Toolkit online resource: ***https://bit.ly/35xMyMU***

PARTNERSHIP	CPHOGH FELLOW	PROJECT POSTER(S)
Assemblies of God Hospital; Norfolk and Suffolk NHS Foundation Trust		
UK Faculty of Public Health (FPH) – Ghana Public Health Association (GPHA)	Edwin L. Panford-Quainoo	1
University of Heath and Allied Sciences, Ho Teaching Hospital; University College London Hospitals NHS Foundation Trust	Misha Ladva	2
North Middlesex University Hospital NHS Trust, London (NMUH) – Korle-Bu Teaching Hospital (KBTH)	Joyce Mahungu	3
Healthcare Improvement Scotland, Ghana Police Hospital; Keta Municipal Hospital	Alison Cockburn Fran Kerr	4, 5
Makerere University, Mulago Specialised Women and Neonatal Hospital, Kawempe Hospital and Cambridge University Hospitals (CUH)	Reem Santos	6
Brighton and Sussex University Hospitals NHS Trust (BSUH), Brighton and Sussex Medical School (BSMS) Brighton – University Teaching Hospital (UTH), University of Zambia (UNZA) School of Pharmacy, Lusaka and University Hospital Ndola	Fiona Rees	7
University of Salford; Pharmaceutical Society of Uganda	Amritpal Atwal	8
Health Education England; Manchester University NHS Foundation Trust; Gulu Regional Referral Hospital; Saint Mary's Lacor; University of Manchester; Manchester Metropolitian University	Frances Garraghan	9
Northumbria NHS Foundation Trust; Kilimanjaro Christian Medical Centre	Joseph Brayson Scott Barrett	10 ,11
Nottingham Trent University (NTU); Makerere University, Uganda (MakU); Buckinghamshire Healthcare NHS Trust (BHT)	Bee Yean Ng Claire Brandish Kate Russell-Hobbs	12, 13, 14
London School of Hygiene and Tropical Medicine (LSHTM) and University College London Hospitals NHS Foundation Trust – Makerere University College of Health Sciences and Infectious Diseases Research Collaboration (IDRC)	Preet Panesar	15
CwPAMS	Esmita Charani	16

APPENDIX 3

CwPAMS Global Health Fellows Project Abstracts

PROJECT TITLE / NAME:

Implementation of a delayed prescribing model to reduce antibiotic prescribing for suspected upper respiratory tract infections in a hospital outpatient department, Ghana.

FELLOW'S NAME, JOB TITLE AND PRIMARY ORGANISATION

Edwin L. Panford-Quainoo, Pharmacist & PhD Student (Global Health)

PROJECT SPECIFICS

CwPAMS partnership name: *Faculty of Public Health & Ghana Public Health Association*

Area/Institution/Country/ Local Partner(s): *LEKMA Hospital, Accra, Ghana*

Which partnership goal did your project contribute to?

Goal No.2: 5-10% reduction in overall antibiotic prescriptions (measured using Defined Daily Dose) in LEKMA Hospital. In addition to other partnership defined projects, we implemented Delayed/Back-up Prescribing Project in order to reduce antibiotic prescribing for URTIs.

INTRODUCTION TO PROJECT

Upper respiratory tract infections (URTIs) antibiotic prescriptions account for vast majority of antibiotics prescribing in primary care. There is strong evidence delayed/back-up prescribing (where antibiotics can be accessed at a later time after initial consultation) is one strategy that can be implemented to reduce antibiotic prescribing.

OVERALL PROJECT GOAL (AND INDICTORS)

To establish the clinical/operational impact of different delayed prescribing models of antibiotics for management of URTIs within the outpatient department (OPD) in LEKMA Hospital.

Show reduction in antibiotic usage/prescribing.

SUMMARY OF ACTIVITIES/METHODS

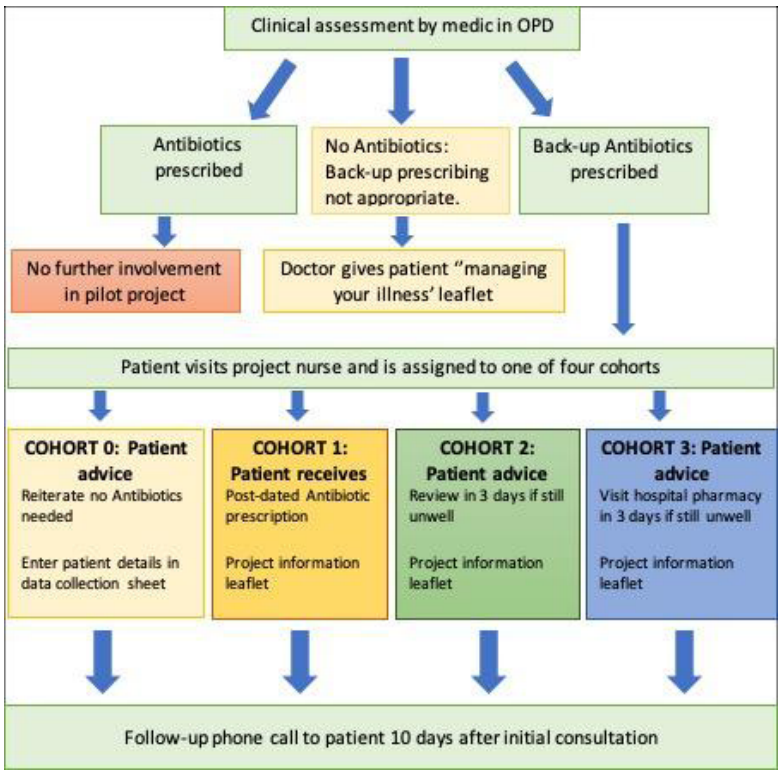


***Figure 1**: Patient pathway for delayed/back-up prescribing project*

The delayed/back-up prescribing model involved patients seen in OPD diagnosed with a suspected URTI and the attending clinician considered it as clinically appropriate not to initiate antibiotics. Clinicians, in discussion with the patient, had 4 options:

- Not prescribing antibiotics (COHORT 0)
- Giving the patient a post-dated prescription to collect after 3 days if required (COHORT 1)
- Offering a reassessment follow-up appointment in 3 days' time (COHORT 2)
- Forwarding prescription to hospital pharmacy for patient to collect in 3 days' time if required (COHORT 3)

Patients were contacted 10 days after their initial appointment to record whether they remained symptomatic, sought further healthcare advice, and/or taken antibiotics. They were also asked to rate their experience using a Likert scale.

RESULTS INCLUDING OUTCOMES OR OUTPUTS (AND INDICATORS) – YOU ARE ENCOURAGED TO INCLUDE TABLES/FIGURES/PICTURES TO A MAXIMUM OF 5 IN TOTAL

Characteristic			Cohort				*P* value
			0	1	2	3	
Participants	(% of total)		61 (43%)	16 (11%)	44 (31%)	21 (15%)	
Sex	(n, % of cohort)	Females	41 (67%)	9 (56%)	24 (55%)	13 (62%)	*N.S.*
Age distribution	(mean, IQR in years)		22.5 (2 - 49)	19 (4-63)	17 (4-30.5)	24 (5-46)	*N.S.*
Diagnosis	(n, % of cohort)	Sore throat	46 (75%)	10 (63%)	33 (75%)	13 (62%)	*N.S.*
		Common cold	9 (15%)	3 (19%)	7 (16%)	3 (14%)	
		Sinusitis	3 (5%)	1 (6%)	4 (9%)	2 (10%)	
		Other	2 (3%)	1 (6%)	0 (0%)	2 (10%)	
		Not specified	1 (2%)	1 (6%)	0 (0%)	1 (5%)	
Symptoms at day 10	(n, % of cohort)		1 (2%)	4 (25%)	3 (7%)	4 (19%)	* p <0.05
Antibiotics taken	(n, % of cohort)		0 (0%)	0 (0%)	0 (0%)	1 (5%)	*N.S.*
Experience reported as good/very good			57/57 (100%)	5/5 (100%)	30/34 (88%)	10/11 (91%)	** p <0.001
	(n, % of respondents)						

***Table 1**: Summary of cohort and outcomes*

- From December 2019 to February 2020, 142 patients attending LEKMA hospital OPD were eligible for delayed/back-up prescribing. Of these, 87 (61%) were female, 52 (37%) were male and 3 (2%) did not specify gender (Table 1).
- Regarding the different models of delayed/back-up prescribing, 61 (42.96%) patients were managed conservatively without a back-up prescription or reassessment option (Cohort 0), 16 (11.27%) were in Cohort 1, 44 (30.99%) were in Cohort 2, and 21 (14.78%) were in Cohort 3 (Table 1).
- Only one individual in the entire cohort took antibiotics (a delayed prescription, collected at day 3).
- Successful contacts were made to 141 patients on day 10 to record outcome data.
- Most patients [103 (95%)] rated their experience as good/very good. None rated the care received as poor.
- When considered by cohort, Cohort 0 were most satisfied with their experience (p < 0.001, Table 1).

CONCLUSION

This service improvement project showed support from both clinicians and patients for more dedicated interventions to reduce inappropriate prescribing/use of antibiotics in LMICs irrespective of delay/back-up prescribing model used. Success of the model is reflected through significant reduction in antibiotic use for URTIs in LEKMA outpatients during the project with no serious illness or adverse events recorded over the 10-day follow-up period. Furthermore, upscaling implementation delayed/back-up prescribing in LMICs could contribute to improvement in clinicians' confidence, optimise antibiotic prescribing and reduce antimicrobial resistance.

FUTURE PLANS / NEXT STEPS / PLANS FOR SUSTAINABILITY FOR THE PROJECT
Further in-depth exploration of clinicians and patients' experiences, and perceptions need to be captured to help optimise delayed/back-up prescribing implementation. Extended project schemes along the same model should be used in different settings and with larger cohorts of patients to prove the applicability of the model to other LMIC settings using a bigger data set.
PERSONAL REFLECTION LEADING ON THE PROJECT
Although providing a clear sense of purpose and justification was done prior to commencement of the real challenge was to ensure constant communication to keep the team in Ghana motivated and engaged both individually and as a group.

PROJECT TITLE / NAME:

Roll out of Ghana national antimicrobial guidelines and WHO AWaRe guidelines to doctors and pharmacists at the Korle Bu Teaching Hospital (KBTH) via a CwPAMs application (app)

FELLOW'S NAME, JOB TITLE AND PRIMARY ORGANISATION

Joyce Mahungu, Lead Pharmacist HIV & Infectious Diseases, North Middlesex University Hospital (NMUH)

PROJECT SPECIFICS

CwPAMS partnership name*:* KBTH (Accra, Ghana) and NMUH (London, UK)

Which partnership goal did your project contribute to?

Building professional capacity and sustainability; rolling out WHO and Ghana national prescribing guidelines *via* the CwPAMS app

INTRODUCTION TO PROJECT

KBTH is an approximately 2000-bedded hospital; it is the largest teaching hospital in Ghana and the third largest in Africa. It is the leading national referral centre in Ghana and serves a population of approximately 24 million people.

The 2014 WHO global report documents antimicrobial resistance (AMR) in Ghana, AMR is also reported in the National Action Plan and a report by the World bank in 2016. In the winter of 2018, NMUH and KBTH formed a partnership. The aim was to build professional capacity and sustainability to deliver effective antimicrobial stewardship (AMS) and infection prevention and control (IPC) programmes in KBTH. Secondly to ensure NHS colleagues benefitted from new skills learned in the LMIC settings and as part of the project.

OVERALL PROJECT GOAL (AND INDICTORS)

Improve access to the Ghana national antimicrobial guidelines and WHO AWaRe guidelines for all clinical staff at the KBTH by rolling them out using the CwPAMS app.

Indicator: Number of pharmacists and doctors who download the app, details usage of guidelines on the app.

SUMMARY OF ACTIVITIES/METHODS

Twelve pharmacists were trained on the app and asked to train and recruit pharmacist and doctor colleagues at KBTH. Momentum was maintained via monthly email and WhatsApp© communication.

A 30-point questionnaire was developed and distributed electronically via SmartSurvey®. Recruited KBTH colleagues were asked to complete the survey over a four-week period between June and July 2020.

RESULTS INCLUDING OUTCOMES OR OUTPUTS (AND INDICATORS) – YOU ARE ENCOURAGED TO INCLUDE TABLES/FIGURES/PICTURES TO A MAXIMUM OF 5 IN TOTAL

- 17 (45 %) responded to the survey; 14 (82%) were female and 14 (82%) were >30 years old. 11(65%) had worked in their current role for more than 4 years. 16 (94%) were pharmacists and 1(6%), a microbiologist.
- 16(94%) heard about the app during the June 2019 visit. 11(65%) used the app once a week and 4(24%) had not used the app at all since download. This was mainly due to technical issues with the app and lack of data/Wi-Fi.
- 13 (76%) found the app easy to navigate and 14 (82%) reported that it was easy to recommend to colleagues. 16(94%) said they would recommend it to colleagues, yet only 3 (17%) recommended the app to more than 6 people.

CONCLUSION

Pharmacists in LMICs are powerful advocates in the fight against AMR. Further work needs to be done to engage with prescribers to focus on their training needs for building knowledge and developing antimicrobial stewardship strategies.

FUTURE PLANS / NEXT STEPS / PLANS FOR SUSTAINABILITY FOR THE PROJECT

Work with prescribers to determine resources they would like to be included in the app

PERSONAL REFLECTION LEADING ON THE PROJECT

Leading a project from 5,000 km away with colleagues who have fulltime jobs has many challenges. Keeping momentum going through WhatsApp© and email conversations was cost effective solution.

Annex: **Roll out of Ghana national antimicrobial guidelines and WHO AWaRe guidelines to doctors and pharmacists at the Korle Bu Teaching Hospital (KBTH) via a CwPAMs application (app)**

OBJECTIVES	ACHIEVED	COMMENTS
Number of KBTH pharmacists who downloaded the app	No	Current general data protection regulations (GDPR) mean we're not able to access identifiable details of colleagues who downloaded the app and their usage of it. Data available shows that there were 17 (2 doctors) hits to the Ghana app page in June 2019 and 438 in November 2019 (50 doctors). These two peaks coincide with UK partners visits to hospitals in Ghana (KBTH & other hospitals) as well as world antibiotic awareness week in November 2019
Number of KBTH doctors who downloaded the app	No	
Review CwPAMs app metrics to determine clinical areas in the hospital where the app is being used frequently	Not fully	
Train Asiwome Aggor on the CwPAMS app.	Achieved	Trained in June 2019 in Ghana, refreshed knowledge in September 2019 whilst in London
Plan to roll out the app to KBTH pharmacists and doctors	Achieved	12 pharmacists (including Asiwome) trained in June 2019 in Ghana as super-users
KBTH pharmacists will regularly (weekly) feedback data on which colleagues they have recruited onto the app. I will then acknowledge this with an email to those doctor colleagues. I'll email them the data collection sheet (Doctors full name, gender, cadre, speciality, email address etc) so I can use this data to contact the doctors and track their use off the app using the CwPAMS metrics.	Not fully achieved	Only two pharmacists gave me details of the colleagues they had recruited. One pharmacist gave me details of 32 doctors she had recruited. 30 in December 2019 and 2 in June 2020. One pharmacist gave me details of nursing colleagues they recruited. None of the remaining 10 super-users KBTH pharmacists provided details of colleagues or responded to any communication. Project lead in Ghana was on long term sick leave at the end of 2019, during this time the project stalled. NMUH planned to revisit KBTH in March 2020, unfortunately due to the COVID-19 pandemic, this did not happen. The COVID19 pandemic further stalled all activities as colleagues focused on their day-today jobs

PROJECT TITLE/NAME:

Understanding Antimicrobial Use and Evaluating Knowledge Awareness and Practice of Antimicrobial Stewardship Amongst Healthcare Providers at Ho Teaching Hospital, Ghana

FELLOW'S NAME, JOB TITLE AND PRIMARY ORGANISATION

Misha Ladva, CPhOGHFellow, Sponsor Regulatory Advisor, University College London

PROJECT SPECIFICS

CwPAMS partnership name: Ho Teaching Hospital, Ho, Ghana

Area/Institution/Country/ Local Partner(s): University College London Hospitals

Which partnership goal did your project contribute to?

Improve pharmacists' Knowledge, Awareness and Practice around antimicrobial stewardship (AMS)

INTRODUCTION TO PROJECT

Antimicrobial resistance (AMR) is a significant problem globally. In Low -and Middle- Income Countries (LMICs) in particular, AMR is a large problem with there being little to no antimicrobial stewardship (AMS) programmes in place, or those that have been trialled have yet to be successfully implemented. In order to achieve the aim of enhancing antimicrobial stewardship knowledge, and practice amongst healthcare providers in LMICs, more specifically Ghana, a partnership between an English NHS Trust, (University College London Hospitals) and a Ghanaian Teaching Hospital, (Ho Teaching Hospital, HTH) was established. Together, with increasing knowledge and practice through the implementation of education programmes, we also wanted to understand what policy was currently in place and how antibiotics were used in practice and whether any intervention was required on a prescribing level.

OVERALL PROJECT GOAL (AND INDICTORS)

Goal = To reduce inappropriate use of antibiotics for hospitalized inpatients at Ho Teaching Hospital and have an understanding of the processes currently. To help implement an AMS team and guidance on appropriate use of Antimicrobials. To understand the knowledge awareness and practice of healthcare professionals at Ho Teaching hospital.

Indicator = Understand the use of antimicrobials currently with the GPPS. Implement an AMS team and help to establish guidance. Evaluate the use of educational training programmes.

SUMMARY OF ACTIVITIES/METHODS

The Global point prevalence survey (GPPS) was undertaken in July 2019. Inpatients that were on antimicrobials in the wards prior to 8am on the day of the survey were included in accordance to GPPS collection instructions. 112 patients were included in the survey in July and multidisciplinary teams of 6 to 7 people comprised of pharmacists, doctors, nurses, midwifes and technical staff were allocated two to three wards each. The surveys were then collated and the anonymised data was entered, validated and analysed and reported using the web platform dedicated to GPPS.

Knowledge Awareness and Practice on antibiotics was evaluated by surveying 50 health care providers pre and post educational training over a three day period in Ho. The health care providers were given a questionnaire to complete which covered terms such as AMS/AMR and the AWaRe list. As part of the second stage of understanding knowledge awareness and practice interviews were undertaken with 18 participants of different healthcare backgrounds.

RESULTS INCLUDING OUTCOMES OR OUTPUTS (AND INDICATORS) – YOU ARE ENCOURAGED TO INCLUDE TABLES/FIGURES/PICTURES TO A MAXIMUM OF 5 IN TOTAL

Outcome 1 = *To reduce inappropriate use of antimicrobials in HTH*

- Indicator = understand the use of antimicrobials using the GPPS.
- Output 1 = Healthcare providers understand that there is the need for targeted treatment as opposed to reliance on empirical treatment
- Indicator = GPPS findings showed 95% of antibiotics prescribed were for based on empirical treatment

The results from the GPPS found that use of antibiotics in the adult wards was 64.3% with paediatric and neonatal wards being 73.4%. The most common antibiotics being used were penicillin's and cephalosporins, with the main diagnosis being malaria.

Outcome 2 = to understand the knowledge awareness and practice of healthcare providers at HTH

- *Indicator = evaluate the use of educational training programmes*
- *Output 2 = shared learning between healthcare providers is necessary*
- *Indicator = results from pre and post survey showing post education 90% were aware of AMS terms*

The pre survey prior to educational training found that more than 50% were not familiar with AMS terms and the AWaRe list. However post survey results found that 90% of respondents were then confident in understanding and had awareness of these terms. The results from interviewee discussions found that there needs to be increased shared learning between healthcare workers and increased support from those in higher positions.

CONCLUSION

The GPPS findings can not be conclusive as there are many factors that can influence prescribing patterns, particularly in tropical climates where the majority of antibiotics in this instance were prescribed for malaria.

The results from the knowledge awareness and practice surveys and interviews show that there is a need for shared learning between healthcare providers and better communication. It shows that there is also a need for more training on a more consistent basis.

FUTURE PLANS/NEXT STEPS/PLANS FOR SUSTAINABILITY FOR THE PROJECT

The GPPS needs to be undertaken at least four times in order to see trends and to plan interventions. An AMS guidance document i currently being finalised to ensure that policy is adhered to at HTH.

PERSONAL REFLECTION LEADING ON THE PROJECT

This is my first time leading on deliverables on a project. I feel that the education sessions, a few which I had lead on were a success. I received feedback from the healthcare providers present at the session that the sessions were informative. I feel I have developed my capabilities presenting and delivering information as this is also the first time where I have done this.

With regards to the GPPS I was responsible for delivering the training for data collection day and overall for the GPPS information session. As data was able to be collected efficiently this shows that the training day was a success. I feel I have grown as a leader and have gained skills I would not have been able to gain without the fellowship.

PROJECT TITLE / NAME

Supporting a Scottish triad approach to stewardship in Ghana: Information, education, quality improvement

FELLOW'S NAME, JOB TITLE AND PRIMARY ORGANISATION

Fran Kerr, Antimicrobial Pharmacist, NHS Lanarkshire

PROJECT SPECIFICS

Project Partnership: Healthcare Improvement Scotland – Ghana Police Hospital and Keta Municipal Hospital

- Project Lead: Dr Jacqueline Sneddon, Project Lead for Scottish Antimicrobial Prescribing Group (SAPG)
- Area/Institution: Ghana Police Hospital and Keta Municipal Hospital
- Population Served: Ghana

Ghana police hospital serves the Accra District, the second most populated region in Ghana after the Ashanti Region, with a population of 4,010,054 in 2010, accounting for 16.3 per cent of Ghana's total population.

- The hospital is run by the police department and provides care to police and their families as well as those in the nearby locality
- Local Partner(s):
- Daniel Afriyie, Pharmacist and member of Hospital Core Management Team, Ghana Police Hospital.
- Nurse Matron, Esi Braimah (local nursing contact)

Keta municipal hospital is located in the smaller more rural setting of Keta with a population of 23,207.

- Local partnership: Israel Abebrese Sefah, Head of Pharmacy Department, Keta Municipal Hospital.
- Hope Kordorwu , Senior Nurse , Monitoring and Evaluation Nurse (local nursing contact)
- Contacts for the medical team are still being arranged.
- Start Date: 01/02/19 Estimated Duration: 14 months
- Health Theme: Antimicrobial treatment of infection.
  Anticipated Beneficiaries: doctors, nurses, pharmacists, clinical assistants and patients admitted to hospital

INTRODUCTION

Antimicrobial resistance had been identified by the World Health Organisation (WHO) as one of the top 10 threats to global health in 2019. Main recommendations in Its Global Action Plan on Antimicrobial resistance include improving awareness and understanding of antimicrobial resistance and optimizing the use of antimicrobial agents. Studies undertaken in several African countries to date have shown concerns with antibiotic utilization across different healthcare settings, however middle- and lower-income countries struggle with the resource to make improvements to antimicrobial prescribing. While Ghana does have an AMR action plan and national formulary including preferred antimicrobial agents in infection this is not yet widely disseminated within the country.

The overall goal of the project is to develop and implement robust and reliable systems and processes for antimicrobial stewardship in Ghana Police Hospital and Keta Municipal Hospital. The component of the project I am leading is the provision of an education programme to the healthcare staff on antimicrobial stewardship.

The local teams our group will be working with comprise a mixture of healthcare staff and managers in the two hospitals in Ghana. Specifically, in the Ghana Police Hospital Danial Afriyie, Pharmacist and member of the Hospital Core Management Team and Israel Abebrese Sefah, Head of the Pharmacy Department in Keta Municipal Hospital are the lead LMIC partners and in-country co-coordinators for Ghana. At Ghana police hospital we have identified 5 medical staff, 5 pharmacists, 2 pharmacy staff, 2 midwives, 5 nurses and 2 lab staff to be included in the training. At Keta hospital we have identified 3 medical staff, 1 physician's assistant, 1 pharmacist, 3 pharmacy staff, 7 nurses, 2 midwives, 2 lab staff and one other member of staff.

In May 2019 a scoping visit to the two hospitals in Ghana was undertaken by three members of our project group. During this visit a point prevalence audit was undertaken to assess the level of any antimicrobial stewardship processes already in place and evaluate the educational needs of the healthcare staff regarding their use of antimicrobials to treat infections.

OVERALL PROJECT GOAL (AND INDICATORS)
Overall Project Goal: By April 2020 to develop and implement robust and reliable systems (accountability) and processes (practical tools) for antimicrobial stewardship in Ghana Police Hospital and Keta Municipal Hospital, Ghana. This will include education sessions to facilitate to delivery of a local stewardship programme and a supported point prevalence survey across each hospital to provide baseline surveillance data on antibiotic use. Goal for section of project I am leading: To implement an antimicrobial stewardship education programme comprising train the trainer sessions and for a total of 40 professionals , 20 staff per hospital (medical, pharmacy, nursing and lab staff). Indicator = Number and % of hospital staff trained. Results of pre and post training assessments for all training sessions.
OUTCOMES (AND INDICATORS)
Outcome 1 =Healthcare staff demonstrate improved practice related to AMS and prescribing practice. (Both Hospitals) Indicator = Improved PPS results achieved following training visit compared to the baseline PPS results. Improvement demonstrated in results of pre and post training assessments for all training sessions. Outcome 2 = Clinical teams consistently follow local antibiotic guidelines with resultant behaviour change around prescribing practice. (Both Hospitals) Indicator = Improvement demonstrated in PPS results following training visit. Outcome 3 (Keta Hospital only) = Core local project team utilise QI tools locally to improve prescribing. Indicator = QI project undertaken after training team leave Ghana.
OUTPUTS (AND INDICATORS)
Output 1 = (1.1) 40 staff trained as trainers to teach colleagues how to follow guidelines. Indicator = 4 categories of personnel trained and demonstrate improved knowledge from questionnaire results. Output 2 = Local AMS guidelines are developed and made available and accessible to all clinical teams. Indicators = (2.1) Presence of antibiotic guidelines on ward areas audited at end of training visit. (2.2) Participation in global PPS and targeted improvement audits. Output 3 (Keta Hospital only) = Local QI project on AMS started by core team Indicator 3 (Keta Hospital only) = Core local improvement team start and run Quality improvement project on AMS.
ACTIVITIES
Feb – May 2019: Initial planning, relationship building May 2019: Initial scoping visit to Ghana and initial PPS conducted Aug 2019: Education resource design, Antibiotic Campaign planning Sept 2019: (In Ghana): Delivery of education programme: 4 categories of personnel trained (20 in each hospital; medical doctors, nurses, pharmacists and pharmacy staff, laboratory technologists) Pre/ post training questionnaires including behaviour change questions AMR action plan agreed. Antibiotic Guardian Campaign launch Nov 2019: Follow up PPS conducted by local team Jan/Feb 2020: Follow up visit, follow up behaviour change questionnaire
INPUTS
Training plan Antimicrobial guidelines in concise easy to use format Antibiotic Guardian campaign design Resources developed for use in delivering the training sessions Assessment questionnaires produced for pre and post training assessments.

QUALITY IMPROVEMENT TOOLS
I plan to build on the Quality Improvement knowledge of the local quality improvement team and contribute to project planning for a 6 month project on AMS starting when we leave Ghana. I will provide mentorship and support the team remotely over this time period. Tools I plan to utilise include the PDSA cycle (Plan do study act) to facilitate small scale testing of ideas to improve prescribing and testing materials. I will also use a variety of other tools including process mapping and run charts to help the local team fully understand the issues they are facing and help display results quickly and easily to the teams. I will also use some of the liberating structures techniques to start discussion in the room around ideas for change. It is important that the team take ownership of the issues they identify and actively look for their own solutions to resolve them.
BUDGETING
Travel (return flights from UK to Ghana), accommodation (5 nights hotels), subsistence (meals, etc).
SUSTAINABILITY
Collaborative working and ensuring ownership of project at local level will contribute significantly to the sustainability of the project. Use of behavioural change methodology and quality improvement approach ongoing support remotely will ensure teams are able to continue to improve prescribing once project team has left. Implementation of a train the trainer approach when delivering the training programme in the Ghana hospitals will increase awareness of the prescribing issues and increase capacity for delivery of the project objectives. Ongoing support will be provided for training, including materials, facilitator information and linking with NHS staff. Ongoing management support for local AMS lead partners both with a senior role in the hospital and a commitment to ongoing antimicrobial prescribing improvements
RISKS TO PROJECT
◆ Lack of engagement from the Ghana hospital management and healthcare staff ◆ Healthcare staff in Ghana hospitals not released from work to attend the training sessions. ◆ Insufficient time to deliver the training programme when on site in Ghana. ◆ Lack of support locally once project team has left may result in difficulty in sustaining change. ◆ Responsibility for project success being transferred to an individual and not a team

I had responsibility for outcomes related to Keta Municipal Hospital:

Project outcomes

Overall project aim: To implement an antimicrobial stewardship education programme comprising train the trainer sessions and for a total of 20 staff in Keta hospital (medical, pharmacy, nursing and lab staff).

Results:

- 32 staff trained over 2, 1 day sessions
- 144 were trained by staff as cascaded training. Percentage of prescribers is not possible due to staff turnover

KETA OCCUPATION	DAY 1	DAY 2	TOTAL
Nurse	8	8	16
Medical doctor	2	2	4
Hospital management	1	2	3
Physician assistant	2	2	4
Midwife	0	2	2
Medical lab scientist	1	0	1
Lab Technologist	0	0	0
Pharmacist	2	0	2
Public health	0	0	0
Not identified	0	0	0
Total	16	16	32

Table 1: Break down of staff trained at Keta hospital team in 1 day teaching session delivered twice:

Knowledge Quiz

Participants were asked to complete a quiz (scored out of 13) to measure knowledge of antimicrobial resistance. Pre and post test scores were collected from participants who used their own unique code to identify themselves anonymously

Results - Keta

On day 1, the pre-test score was missing for one participant and the post-test score was missing from one participant. On day 2 post-test scores were missing from two participants. The mean scores were: pre-test 9.1 (range 5-13) and post-test 10.9 (range 8-13).

Pre and post test scores were matched for participants therefore a paired t test was conducted using scores from participants who had completed both the pre and post-tests (n= 28). The differences between the scores was highly significant (p=0.00001) suggesting that the training had made a positive difference to participants' knowledge.

Attitudes and behaviours survey

Participants were asked to complete a series of questions to assess attitudes about use of antibiotics at the beginning and again at the end of the day.

Results – Keta Hospital

On day 1, the pre-education survey was missing for one participant and the post-education survey was missing from one participant. On day 2 post-education survey were missing from two participants. Where participants left a question blank we added a 'don't know' category. Pre and post education surveys were analysed for participants with complete data only (n=28). Results of pre and post education attitudes are presented in table 2 and discussed below.

Table 2: Attitudes and behaviours: Pre and post education responses to survey questions by staff at KMH

STATEMENT		*Strongly disagree*	*Disagree*	*Neither agree nor disagree*	*Agree*	*Strongly agree*	*Don't know*
Antimicrobial resistance (AMR) is a serious problem	Pre	2			4	21	1
	Post					28	
I am worried that antibiotics will soon become ineffective	Pre	1	1		11	14	1
	Post		1		1	26	
I am worried patients will develop antibiotic resistant infections	Pre	2	1		13	12	
	Post				4	23	1
Following national or local antibiotic prescribing guidelines will help to prevent the development of AMR	Pre	2	1	1	10	14	
	Post				3	25	
It is part of my professional role to reduce the risks of AMR	Pre	2			10	15	1
	Post				1	27	
I am able to access the GSTG easily	Pre	3	6	4	12	2	1
	Post		3	1	10	14	
I find it easy to adhere to GSTG whenever I prescribe or administer antimicrobials	Pre	1	2	10	14	1	
	Post		1	4	7	16	
My peers support adherence to GSTG when prescribing or administering antimicrobials	Pre		6	14	6	2	
	Post		2	5	13	8	
I feel confident about questioning a colleague about an antibiotic prescription not in line with the GSTG	Pre	2	4	11	9	2	
	Post	1		1	9	17	
I plan to adhere to GSTG whenever I prescribe or administer an antibiotic	Pre	2		3	16	7	
	Post			1	2	25	

Pre-training most staff were aware of the problem of antimicrobial resistance. After the training session more staff strongly agreed that they were worried antibiotics could become ineffective, felt able to question non-compliance with the guidelines and planned to follow the guidelines.

Further outcomes for the project:

Output 1 = (1.1) 20 staff trained as trainers to teach colleagues how to follow guidelines	Completed
Indicator = 4 categories of personnel trained and demonstrate improved knowledge from questionnaire results.	Completed
Output 2 = Local AMS guidelines are developed and made available and accessible to all clinical teams.	Completed
Indicators = (2.1) Presence of antibiotic guidelines on ward areas audited at end of training visit	Completed A local antibiotic policy for common conditions is available on the wall in all clinical areas and all prescribers a have a copy.
(2.2) Participation in global PPS and targeted improvement audits.	2nd pps completed but results not entered onto the database yet due to covid. A 3rd PPs is planned for October
Output 3 (Keta Hospital only) = Local QI project on AMS started by core team	Completed
Indicator 3 (Keta Hospital only) = Core local improvement team start and run Quality improvement project on AMS.	Completed Results show increased compliance with policy from 18% to 70% initially and then sustained at 59% for patients being treated for pneumonia in outpatients. 19% Reduction of use of co-amoxiclav in prescribing for patients with pneumonia in the out patients department. See submitted manuscript and abstract for full write up.

PROJECT TITLE/NAME:

Implementation of an antimicrobial stewardship (AMS) programme in Ghana Police Hospital

FELLOW'S NAME, JOB TITLE AND PRIMARY ORGANISATION

Alison Cockburn, Lead Antimicrobial Pharmacist, NHS Lothian.

PROJECT SPECIFICS

CwPAMS partnership name: Healthcare Improvement Scotland

Area/Institution/Country/ Local Partner(s): Ghana Police Hospital

Which partnership goal did your project contribute to?

By April 2020 to develop and implement systems for AMS in Ghana Police Hospital and Keta Municipal Hospital.

INTRODUCTION TO PROJECT

The Scottish Antimicrobial Prescribing Group (SAPG) were successful in securing a global volunteering grant from the Fleming Fund's Commonwealth Partnerships for Antimicrobial Stewardship (AMS) initiative led by the Tropical Health and Education Trust (THET) in partnership with the Commonwealth Pharmacists Association (CPA). The grant was used to support the development of antimicrobial stewardship in two hospitals in Ghana.

OVERALL PROJECT GOAL (AND INDICATORS)

Overall Project Goal: By April 2020 to develop and implement robust and reliable systems (accountability) and processes (practical tools) for antimicrobial stewardship in Ghana Police Hospital and Keta Municipal Hospital, Ghana. This will include education sessions to facilitate to delivery of a local stewardship programme and a supported point prevalence survey across each hospital to provide baseline surveillance data on antibiotic use.

Goal for section of project I am leading: To implement an antimicrobial stewardship education programme comprising train the trainer sessions and for a total of 35 professionals (medical, pharmacy and nursing staff) in the Ghana Police Hospital.

Indicators = Number of hospital staff trained.

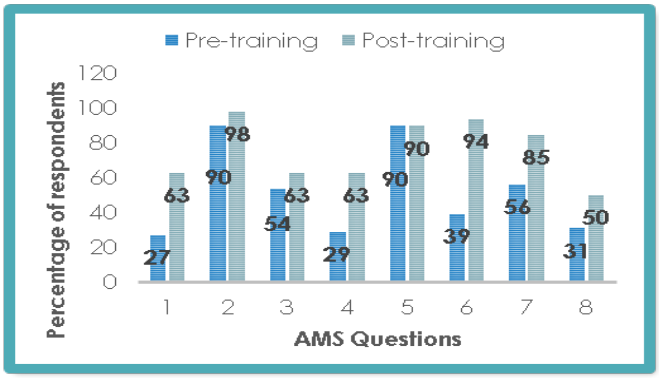
Results of pre and post training assessments for all training sessions.

SUMMARY OF ACTIVITIES/METHODS

A scoping visit (including a PPS) to GPH was undertaken to meet the healthcare staff and identify their AMS education needs. Education materials were developed in conjunction with the lead partner for the project in GPH and then delivered to multidisciplinary groups of healthcare staff in the hospital over two consecutive days. A "train the trainer" approach was employed so that the training could be cascaded to other members of the healthcare teams after the initial training was completed.

An action plan (including undertaking PPS) for further development of AMS within GPH was produced with the core AMS team within GPH following implementation of the training.

RESULTS



Outcome: Healthcare staff demonstrate improved practice related to AMS and prescribing practice.
Output: Improvement demonstrated in results of pre and post training assessments for all training sessions.

Results: 35 healthcare multidisciplinary staff participated in the training delivered at GPH which was subsequently cascaded to over 30 staff.

Initial pre and post training evaluation of the questionnaire completed by the staff demonstrated significant improvement in knowledge gained, participants attitudes to AMS and their role in facilitation of improvements in implementation of AMS in GPH.

Substantial progress with the GPH action plan has been achieved to date.

CONCLUSION
The education programme achieved significant improvements in the participants' level of knowledge and attitudes and behaviours around AMS. In addition, further progress with cascading the training by the staff was achieved as part of their AMS action plan.
FUTURE PLANS/NEXT STEPS/PLANS FOR SUSTAINABILITY FOR THE PROJECT
As part of the GPH AMS action plan further cascading of training is planned along with ongoing PPS and frequent review meetings with the hospital management team to ensure implementation of improvements in AMS.
PERSONAL REFLECTION LEADING ON THE PROJECT
Leading development of the training programme helped develop my leadership skills immensely. Effective communication with the staff at GPH and the project team, development of the training materials and coordination of the programme were all instrumental in developing my skills.

Annex: **Implementation of an antimicrobial stewardship (AMS) programme in Ghana Police Hospital**

GOAL FOR SECTION OF PROJECT I LED	OUTCOMES/INDICATORS PROGRESS	PROGRESS
To implement an antimicrobial stewardship education programme including train the trainer sessions in Ghana Police Hospital.	Outcome1: Healthcare staff demonstrate improved practice related to AMS and prescribing practice –Indicator1: Improvement demonstrated in results of pre and post training assessments.	Results of pre and post training assessments: Significant improvements in knowledge and attitudes and behaviours around AMS in healthcare staff following the training.
	Output 1: Number of GPH staff trained:	Total of 35 healthcare staff trained and cascaded to a further 30 staff.
	Output 2: Participation in global PPS	Baseline and post-training PPS completed at GPH.

PROJECT TITLE/NAME:

A point prevalence survey of antimicrobial prescribing at Kilimanjaro Christian Medical Centre (KCMC)

FELLOW'S NAME, JOB TITLE AND PRIMARY ORGANISATION

Joseph Brayson

Chief Pharmaceutical Officer's Global Health Fellow

Senior Clinical Pharmacist (Antimicrobials)

Clinical Teaching Fellow

Northumbria Healthcare NHS Foundation Trust (NHCT)

PROJECT SPECIFICS

CwPAMS partnership name: NHCT-KCMC

Area/Institution/Country/ Local Partner(s): KCMC, Moshi, Tanzania

Which partnership goal did your project contribute to?

Data collection and monitoring

INTRODUCTION TO PROJECT

This project sought to address the sparsity of antimicrobial prescribing data in Tanzania which is crucial in targeting interventions and tracking changes.

We therefore plan to establish baseline data for antimicrobial usage at KCMC using it raise awareness and begin a wider AMS campaign.

OVERALL PROJECT GOAL (AND INDICTORS)

Goal: Increase awareness of antimicrobial usage and microbial resistance at KCMC

Indicators: Complete GPPS to establish data and monitor changes

SUMMARY OF ACTIVITIES/METHODS

Phase 1: KCMC antimicrobial stewardship (AMS) team visited Northumbria hospital.to showcase AMS work e.g. clinical pharmacist input/MDT working. GPPS trialled on wards at NHCFT

Phase 2: Follow up visit to KCMC to train and complete GPPS in June 19. Analysis and feedback of results to the board of directors as well as clinical staff (e.g. microbiology consultants) highlighting areas of good practice as well as areas for improvements.

Phase 3: A follow up visit to KCMC in Nov 19 to repeat the Global PPS and analyse results

RESULTS INCLUDING OUTCOMES OR OUTPUTS (AND INDICATORS) – YOU ARE ENCOURAGED TO INCLUDE TABLES/FIGURES/PICTURES TO A MAXIMUM OF 5 IN TOTAL

1. Produce a greater understanding of antimicrobial usage and resistance with staff at KCMC.
Output/Indicators: The Global PPS will be used to establish baseline data

594patients were reviewed with 194 included in the GPPS. Antimicrobial prescribing data was documented for each of these. The GPPS database allows comparison to similar hospitals in neighbouring countries (fig 1).

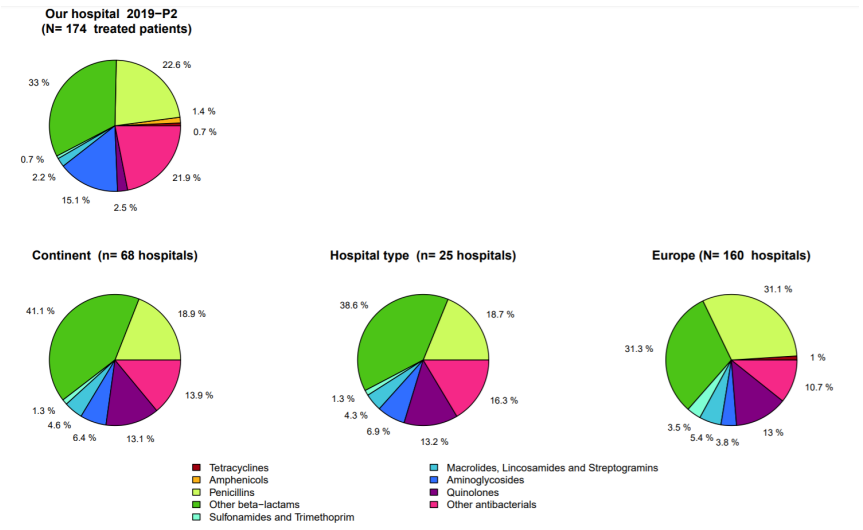


Figure 1. Breakdown of antibiotics prescribed for KCMC inpatients (top left) compared with other hospitals within the continent (bottom left), hospital type (bottom middel) and Europe (bottom right).

Prescribing was broken down into categories and the most commonly prescribed antibiotics were compared to neighbouring countries (fig.2).

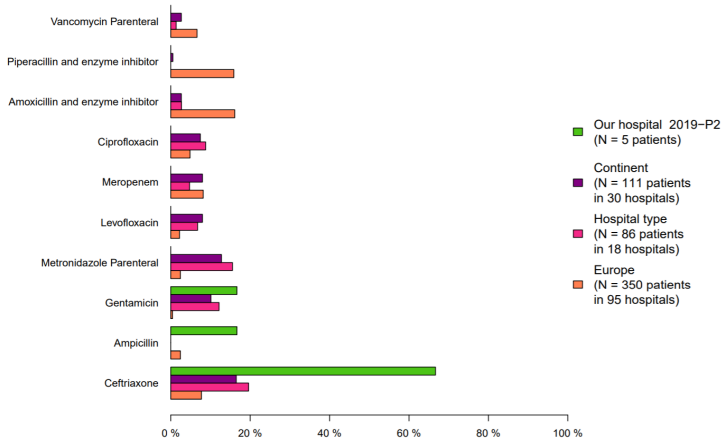


Figure 2. A breakdown of antibiotics prescribed for pneumonia in both adults and children in June 19.

Ampicillin and ceftriaxone were identified as high usage compared to comparators at 20% and 70% (vs.1% and 20%). This highlights a tendency towards broad spectrum, lower cost antibiotics despite widespread resistance concerns and provided a target for further interventions.

2. Monitor any changes in prescribing as a result of increased awareness
Output/Indicators: GPPS report will highlight changes in prescribing

The repeat GPPS showed alterations in a number of prescribing areas including the previously identified broad spectrum antibiotics (fig.3).

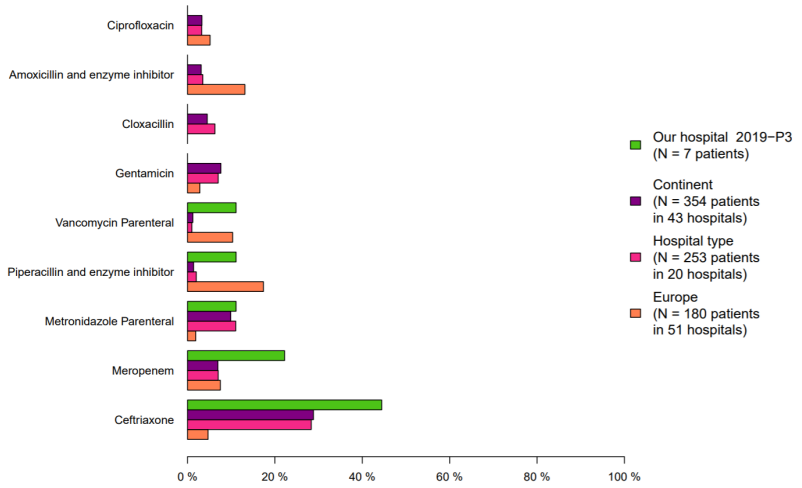


Figure 3. A breakdown of antibiotics prescribed for pneumonia in both adults and children in Nov 19.

The two antimicrobials identified as targets for intervention (ampicillin and ceftriaxone) in the first survey have had their usage reduced to 0% and 45% respectively.

CONCLUSION

Simply having prescribing data available within Tanzania is an important progression for global AMS allowing targeted interventions to be made for maximal input and effective AMS.

The reduction in prescribing of certain broad-spectrum antibiotics with known resistances (ampicillin/ceftriaxone) of almost 50% in just 6 months clearly demonstrates the potential benefits of this type of data collection and analysis.

FUTURE PLANS/NEXT STEPS/PLANS FOR SUSTAINABILITY FOR THE PROJECT

It is important to continue collecting data on a long-term basis to ensure accurate surveillance of antimicrobial usage. The initial two surveys were set up as the first two of regular annual surveys so that staff at KCMC are aware there will be ongoing monitoring.

It is also important to empower staff – particularly pharmacy professionals - to act on the data and provide them with the tools to make a difference.

PERSONAL REFLECTION LEADING ON THE PROJECT
This project has involved working in resource poor settings which requires a higher level of adaptability and reactivity. I have developed these skills and other to bring back to my role within the NHS.

Annex: **A point prevalence survey of antimicrobial prescribing at Kilimanjaro Christian Medical Centre (KCMC)**

OUTPUT	INDICATOR	ACHIEVED	DATE
Collect baseline data on antimicrobial prescribing at KCMC	GPPS complete	Yes	June 19
Collect follow up data at 6months on antimicrobial prescribing at KCMC	GPPS complete	Yes	Nov 19
OUTCOME	**INDICATOR**	**ACHIEVED**	**DATE**
Use antimicrobial data to raise awareness of AMR and change practices in AMS through multifactorial approach	Change in prescribing trends seen between two GPPS	Yes	Nov 19

PROJECT TITLE/NAME:

Taking the Lead: Empowering Pharmacy in Delivery of Antimicrobial Stewardship (AMS)

FELLOW'S NAME, JOB TITLE AND PRIMARY ORGANISATION

Scott Barrett, Lead Clinical Pharmacist, Northumbria NHS Foundation Trust

Chief Pharmaceutical Officer Global Health Fellow

PROJECT SPECIFICS

CwPAMS partnership: Kilimanjaro Christian Medical Centre (KCMC), Tanzania.

Providing vitally needed AMS Awareness training for hospital staff, district hospitals and rural dispensaries

INTRODUCTION TO PROJECT

Following successful grant application within CwPAMS, several scoping meetings identified that no formal AMS training was available to KCMC staff or students. This formed a vital aspect of the overall project led by pharmacy.

OVERALL PROJECT GOAL

Provide AMS training workshops at KCMC between June and November 2019 for doctors, nurses, pharmacists, interns and students. Also, local community health workers (CHW), district hospitals and rural dispensaries.

SUMMARY OF ACTIVITIES/METHODS

Leaders of this major change at KCMC undertook four-week observorship in the UK including chief pharmacist, education lead pharmacist and infectious disease consultant. During this time AMS and infection prevention and control (IPC) awareness presentations and activities were designed ensuring the key messages provided relevant to varied audiences. KCMC board level backing was provided via medical director with pharmacy leading this work.

Training venues were booked to commence at reciprocal visit of UK pharmacy team to KCMC. Primary visit focused on training of hospital staff, secondary visit district hospital, rural dispensaries and public awareness.

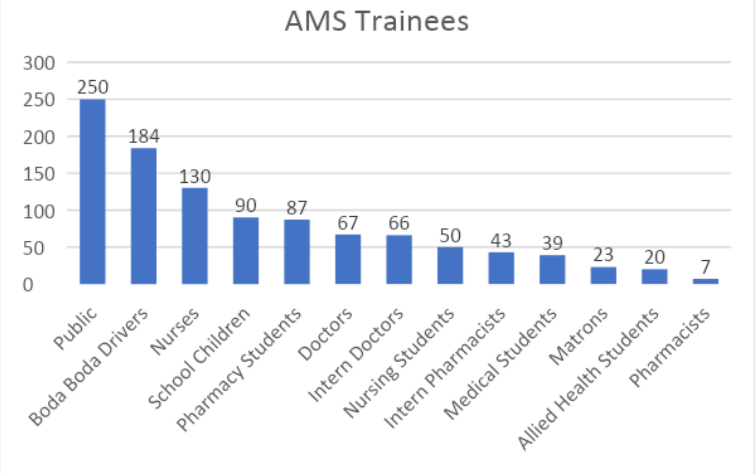
Varied training formats were used depending on audience; formal lectures, interactive classroom activities, case-based discussions within clinical environment, poster presentations, role-play activities. For sessions with public, schools and boda-boda taxis drivers, Swahili translators were included and posters and handouts translated so key messages were understood. Participants completing brief questionnaires to gauge success.

KCMC board supported promotion of the training. KCMC staff utilised 'WhatsApp' groups for messaging within healthcare teams. This was used to maximise audiences, send key AMS messages, gain feedback on training.

RESULTS

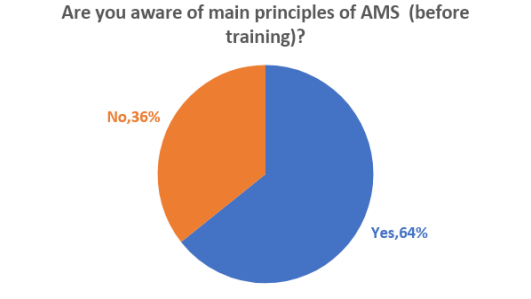
Output 1 = KCMC staff provided with AMS Awareness training.

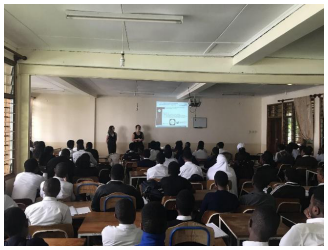
- Indicator = Medics, pharmacists & interns. Target 225, achieved 206.
- Indicator = Nurses (including CHW & district hospital). Target 140, achieved 130.
- Indicator = Students. Target 180, achieved 196.
- Indicator = Public, Boda-boda drivers, School children. No formal target, achieved 524.

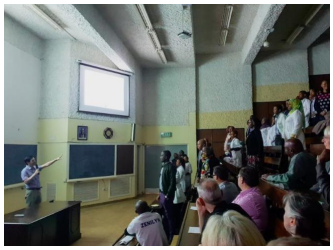


Output 2 = KCMC staff understand main principles of AMS & IPC.

- Indicator = Post AMS training target >75%, achieved 100%.
- (Baseline Understanding: AMS = 64%, IPC = 79%)







CONCLUSION

KCMC pharmacy team showed incredible strength of leadership in raising the profile of AMS. Their willingness lead on training raised the profile of pharmacy at KCMC and demonstrated the difference they can make for patient safety.

Public AMS teaching linked with WAAW was a huge success reaching 524 trainees.

Disruption COVID19 meant team were unable to provide training into rural dispensaries.

FUTURE PLANS/NEXT STEPS/PLANS FOR SUSTAINABILITY FOR THE PROJECT

Pharmacy team at KCMC continue to lead on AMS training of staff within hospital as well as CHWs. Although they were unable to provide rural dispensaries training this is planned for WAAW 2020.

PERSONAL REFLECTION LEADING ON THE PROJECT

Following KCMC team 4-week UK observorship, only a 1-week gap before UK team visit. This created momentum, commitment and fully utilised the time available at KCMC. Early achievements galvanized the pharmacy team to realise the difference they could make.

Annex: **Taking the Lead: Empowering Pharmacy in Delivery of Antimicrobial Stewardship (AMS)**

PROVIDING VITALLY NEEDED AMS AWARENESS TRAINING FOR HOSPITAL STAFF, DISTRICT HOSPITALS AND RURAL DISPENSARIES			
OBJECTIVE	**INDICATOR**	**OUTPUT**	**OBJECTIVE MET Y / N**
KCMC staff provided with AMS Awareness training	Medics, pharmacists & interns - Target 225	Achieved 206	N
	Nurses (including CHW & district hospital) - Target 140	Achieved 130	N
	Students - Target 180	Achieved 196	Y
	Public, Boda-boda drivers, School children - No formal target	Achieved 524	Y
KCMC staff understand main principles of AMS & IPC	Post AMS training target >75%	Achieved 100%.	Y
	(Baseline Understanding: AMS = 64%, IPC = 79%)		

PROJECT TITLE/NAME:

A point prevalence study of empirical antimicrobial treatment on the maternity ward in Fort Portal Regional Referral Hospital (FPRRH).

FELLOW'S NAME, JOB TITLE AND PRIMARY ORGANISATION

Amritpal Atwal, Senior haematology/oncology pharmacist, University Hospitals Birmingham NHS Foundation Trust

PROJECT SPECIFICS

CwPAMS partnership name: FPRRH Uganda. In collaboration with Knowledge 4 change (K4C)

Area/Institution/Country/ Local Partner(s): University of Salford, Manchester

Which partnership goal did your project contribute to? Anti-microbial stewardship.

INTRODUCTION TO PROJECT

With the collaboration of K4C there was been extensive support being provided to the maternity ward to reduce empirical prescribing and use the infection diseases laboratory to provide targeted treatment. Using previous data from May 2019, this study was conducted to compare and contrast the addition of pharmacist intervention on the daily ward round, to assess impact on prescribing practices.

OVERALL PROJECT GOAL (AND INDICTORS)

To reduce empirical anti-microbial treatment of post-natal women in FPRRH.

The project goal was to be achieved through the below outcomes:

- *Adherence local prescribing guidelines.*
- *Good documentation of antibiotic choice and review date*
- *Use of cultures and sensitivities to guide prescribing.*

SUMMARY OF ACTIVITIES/METHODS

A point prevalence study was undertaken on 16th January 2020 with the help of local staff. Drug charts and notes were examined on the maternity ward at FPRRH with a locally designed audit form. Data was collected on antimicrobial choice, route, dose, diagnosis, indication, guidance compliance and whether it was targeted/empirical.

RESULTS INCLUDING OUTCOMES OR OUTPUTS (AND INDICATORS) – YOU ARE ENCOURAGED TO INCLUDE TABLES/FIGURES/PICTURES TO A MAXIMUM OF 5 IN TOTAL

Outcome 1 = Antimicrobial usage is in line with guideline
Indicator = The correct antimicrobial at the correct dose for a specified duration is prescribed for the indication as per the guideline or sensitivities. 92% of patients were prescribed in compliance with national guidelines.

Outcome 2 = improved documentation in notes regarding treatment
Indicator = 12.5% improved documentation in medical notes.

Output 1 = A pharmacist on the mternal ward round rationalises anti-microbial prescribing.

Indicator = There is a 4% reduction of empirical anti-microbial treatment over a seven month period.

CONCLUSION

Having a multi-disciplinary approach to ward rounds does make an impact on empirical anti-microbial prescribing practices. To ensure the best care of patients is maintained, more involvement needs to occur nationally to prevent procurement issues of antimicrobials.

FUTURE PLANS/NEXT STEPS/PLANS FOR SUSTAINABILITY FOR THE PROJECT

I hope to stay involved with the work of K4C even after the conclusion of the fellowship. I hope to contribute to ongoing pharmacy support and re-audit pharmacist intervention on ward rounds. I also hope to contribute to local anti-microbial guidelines which could be in line with local sensitivity data to ensure appropriate anti-microbial use.

PERSONAL REFLECTION LEADING ON THE PROJECT

Behavioural change at a local level is key to implementing sustainable change. Training and supporting the team to maintain the service once our team is back in the UK is vital.

PROJECT TITLE/NAME:

Pharmacist-Led Commonwealth Health Partnership develops infection prevention and control, antimicrobial stewardship and intra-country collaborative working in Zambian hospitals.

APPLICANTS

Fiona Rees, Specialist Pharmacist – Gastroenterology & Chief Pharmaceutical Officer Fellow – Global Health

Institution: Brighton & Sussex University Hospitals Trust

Contact details (e-mail): Fiona.rees2@nhs.net

KEYWORDS:

Antimicrobial stewardship

Infection Prevention & Control

Chief Pharmaceutical Officer Fellowship

Global Health

Health Partnership

Infection Prevention & Control

Pharmacy

Zambia

ABSTRACT OF YOUR RESEARCH

Project objectives

Mis- and overuse of antimicrobials combined with poor infection prevention & control (IPC) results in antimicrobial resistance (AMR)[1]. Health Partnerships may enhance antimicrobial stewardship (AMS) through sharing up-to-date evidence and implementing best practice[2,3].

Brighton Lusaka Health Link (BLHL) is a Health Partnership between Lusaka University Teaching Hospitals (UTH), Zambia and Brighton & Sussex University Hospitals NHS Trust (BSUH), UK. The Brighton Lusaka Pharmacist Link (BLPL) ensures pharmacists are pivotal and were awarded a Commonwealth Partnerships for Antimicrobial Stewardships Scheme (CwPAMS) grant[4] to improve AMS (including IPC) at UTH. As part of this project I was asked to lead on optimisation of the use of antimicrobials and improve IPC practice by:

- Improved AMS practice and awareness of clinicians and domestic staff.
- Implementation of IPC on at least 5 medical wards.

Description of methods

BLPL conducted a three-day conference in Zambia for government-level stakeholders plus UTH pharmacists, physicians, nurses and allied healthcare professionals to increase awareness of AMS plus provide management tools. This included workshops detailing UTH AMR patterns, use of point prevalence surveillance (PPS), importance of multi-disciplinary team (MDT) approach, barriers to appropriate prescribing, IPC (including bare below the elbows (BBE) dress code) and training methodologies, therefore encompassing the World Health Organisation AMR Competency Framework[5].

WHO AMR Competency Framework[5]			
Foundations that build awareness of AMR	Appropriate use of antimicrobial agents	IPC	Diagnostic stewardship & surveillance

IPC training was provided by the experienced Ndola Teaching Hospital (NTH) IPC team, so promoting intra-country collaboration. These workshops adopted 'Train the Trainer' methodology, so post conference UTH staff could facilitate future training and employ strategies for AMS, PPS, IPC and data collection.

SUMMARY OF OUTPUTS

Our project outputs covered AMS and IPC and a proactive MDT committee was established to manage activities (I was not part of this development).

BLHL commissioned a Zambian-based project leader for over-arching control of CwPAMS in Zambia. All work was pre- and post-workshop was co-developed with them (plus other CwPAMS colleagues as appropriate).

AMS:

Appointment of a specialist AMS pharmacist who I have collaborated with to help develop antimicrobial guidelines to be used specifically at UTH. Unfortunately, due to COVID-19 the authorisation of these guidelines has been put on hold.

Two PPS were undertaken which was enabled by the pilot data collection that I suggested during the UK visit to Zambia. The GPPS data indicated the high use of antimicrobials including beta-lactam antibacterials, low alignment with guidelines and documentation on certain ward-types.

A modified antimicrobial prescribing chart was developed by other members of the BLHL, but I led on development of training materials for the launch of this chart and our Zambian colleagues led on the launch strategy. The chart was piloted from December 2019 to February 2020 on Intensive Care and Emergency wards. Feedback was sought and while there were positive elements reported including its reasoning and ease of use, it was felt that lack of awareness and training on the chart plus loss of charts had resulted in reduced use.

It was identified that an AMS training programme was required at the initial 3-day workshop where it was decided that myself and University of Zambia (UNZA) colleague would lead on the development of this and it would be case-base driven and in-house training. During the project time, the requirements developed, and Zambian colleagues decided that a more formal training programme was required that included background antimicrobial training, as well as case studies, and was to be done via a Zambian-based expert panel. The work that had been developed by myself was included in this programme plus I reviewed the proposed programme; this is now undergoing accreditation by UNZA for professional recognition.

IPC:

It was identified that BBE was not a familiar and accepted practice in UTH and Zambia. Based on information provided in the 3-day workshop UTH colleagues wanted to get this approved. I led on the letters required for this to be formally approved by Hospital Pharmacists Association of Zambia (HOPAZ) and developed training materials for this to be incorporated into the IPC training. Anecdotally, this practice has not been taken up by the majority of the UTH staff, indicating more support is required to install this practice into the organisation.

I co-led the set up UTH IPC training to be facilitated by NTH, tasks mainly orientated around budgeting. This training resulted in 97 UTH staff being trained, across a variety of professions and hospital areas:

Profession	Number (%)
Registered nurse	61 (63)
Housekeeping	9 (9)
Pharmacy	8 (8)
Student nurse	7 (7)
IPC team	4 (4)
Portering	4 (4)
Environmental	2 (2)
Unknown	2 (2)

WHO alcohol handrub production facility was installed, and production commenced at UTH. I co-led on the application to secure additional funds (from THET Health Worker Action Fund, HWAF) to expand production facilities to three additional Zambian hospitals, with UTH and NTH jointly managing installation, quality, and training.

I was asked to help with the development of educational videos on IPC, AMS and handrub production (in association with Commonwealth Pharmacy Association) and led on the organisation of the UTH and NTH contributions (e.g. video interview questions and video provision).

Handwashing/use of handrub increase has been observed, thought to be both due to training and COVID-19.

PUBLICATIONS:

The BLHL has also been successful in the acceptance of Pharmaceutical Journal opinion piece[6], poster presentation at International Pharmaceutical Federation (FIP) 2020, which I have co-authored.

CONCLUSIONS

While robust data of outputs is not available, benefits to practice have been observed and this project demonstrates that pharmacists can lead AMS and IPC improvements, be innovative and flexible to changing demands of the organisation plus foster intra-country working collaborations and seeds national IPC capacity-building. These are especially pertinent during the current COVID-19 pandemic.

RECOMMENDATIONS/NEXT STEPS

Robust monitoring and evaluation (M&E) of the project outputs has not been successful, with only small-scale monitoring occurring. This is despite support for M&E and provision of M&E tools to Zambian colleagues. While it is recognised by UTH/UNZA staff that M&E needs improvement to ensure outputs are useful, consistently adhered to and identify areas for development, they do not feel they have the skills to complete this effectively. This may be due to M&E not being a priority within UTH. To address this, I have led on scoping of formal clinical M&E training that is facilitated by Gondar University Hospital, Ethiopia (so fostering further intra-African collaboration) which we hope will not only help analyse this projects outputs but can be transferred to other projects plus provide a good foundation for further M&E training (within hospitals and UNZA) and provide competitive edge for application of future development aid.

Further support is also required to determine if there are barriers to changes, including behavioural, which may hinder progress with IPC and AMS implementation locally and nationally; we feel this would be best addressed using psychology services.

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F. Rees — Brighton & Sussex University Hospitals, Brighton, United Kingdom

Brighton-Lusaka Health Link — Brighton & Sussex University Hospitals, Brighton, United Kingdom; University Teaching Hospital (UTH), Lusaka, Zambia

PROJECT TITLE

Assessing CwPAMS partnerships in Uganda using the WHO ESSENCE Criteria for capacity building strengthening initiatives

AUTHORS

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- P Ahabwe — Infectious Diseases Institute, Makerere University Uganda
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INTRODUCTION

Capacity building for antimicrobial stewardship requires investment in workforce infrastructure and knowledge exchange. We assessed the Commonwealth Partnerships for Antimicrobial Stewardship (CwPAMS) partnerships in Uganda using the WHO ESSENCE Criteria for capacity building strengthening initiatives.

METHODS

Two in-country visits were undertaken to specifically assess the health of the partnerships. The first was to participate in the inception meetings for the partnerships in Ghana and Uganda. The second was a longer stay in Uganda to monitor the progress of the partnerships with Tropical Health Education Trust (THET) colleagues. We visited each of the partnership sites in Uganda and interviewed the partners on the progress of the projects, resolving any issues and supporting more effective collaboration. The WHO ESSENCE seven principles for capacity building focus on networking, communication, monitoring and evaluation, governance, strong support and mentorship structures, and flexibility for resilience and continuity. The ESSENCE criteria were applied to health partnerships as a guiding framework for assessing the sustainability and effectiveness of the partnerships.

RESULTS

The partnerships in Uganda provided an interesting example for assessment. The UK teams presented different levels of international work experience and the partnerships were at different levels of maturity. It was evident that those teams with previous experience of global health and partnerships were more familiar with the local context and flexible to adapting to unexpected change. Participating in the monitoring visits enabled us to perform an outsider review of the progress of the projects and observe the differences between the partnerships. Insider knowledge and perspectives were made available through having in-country representatives participating in the monitoring programme. Table 1 summarises the key features of the CwPAMS partnerships in Uganda and assesses them against the ESSENCE criteria. There were key lessons learnt from the evaluation of these partnerships, highlighting the role that pharmacists can play in supporting in-country monitoring of the partnerships by providing practical as well as contextual insights.

CONCLUSIONS

Having local pharmacists involved in the monitoring and evaluation assures contextual input and relevant stakeholder engagement is critical to ensuring oversight and carry out, with the funders in-person monitoring visits for engagement and troubleshooting. To develop sustainable partnerships, it is critical to support within continent and country collaborations where the potential for knowledge exchange is greatest.

Table 1 Evaluating the Uganda CwPAMS partnerships against the ESSENCE criteria for capacity building

ESSENCE CRITERIA	OVERVIEW OF THE CWPAMS PARTNERSHIPS IN UGANDA
Network, collaborate, communicate and share experiences	Though there was an initial networking event, teams that had pre-existing history of collaboration displayed a more cohesive approach to the partnership and had already established communication networks which helped the delivery of the work.
Understand the local context and accurately evaluate existing capacity	Some of the partnerships had not interacted in person prior to being awarded the funding for the partnership. These partnerships had a few more adjustments at the initial stages of the partnership.
Ensure local ownership and secure active support	In the second monitoring visit, half-way through the partnerships, it was clear that those that had not included the right stakeholders, and assured and respected the local ownership of the research had bigger issues to overcome in implementing the desired change. Ensuring local ownership requires building trust, maintaining relationships, mutual respect and communicating effectively. The in-person monitoring visits were essential to engage with the stakeholders and trouble shoot early on to intervene and support teams that were struggling.
Build in monitoring, evaluation and learning from the start	The CwPAMS was very pro-active in promoting monitoring, evaluation and learning from the start and all teams were very pro-active and focused on this element. The in-person monitoring visits were essential to engage with the stakeholders and trouble shoot early on to intervene and support teams that were struggling. They should be integral to these partnerships.
Establish robust governance and support structures, and promote effective leadership	Governance and support structures were adhered to. The leadership was not always equal between the UK and African partners. Learning point: establish clear leadership in both countries from the beginning and all communication for the partnership should include the nominated leaders on both sites.
Embed strong support, supervision and mentorship structures	Though there was support and mentorship, there was also miscommunication and sometimes unidirectional communication. Learning point: match mentors with not only leadership but also LMIC experience and ensure close supervision of the progress of the partnerships. The mentor should be accessible by both partners, not just the UK partner. Having in-country support is critical. There should be a nominated person (e.g. the two pharmacists in Uganda) who could step in and support the local teams.
Think long term, be flexible and plan for continuity	This was difficult to achieve. The teams had clinical duties. It would have been good to be able to fund for a project manager (at limited hours) to support the clinical teams.

PROJECT TITLE

Kampala Cambridge Antimicrobial Stewardship (AMS) and Infection Prevention and Control (IPC) project

FELLOW'S NAME, JOB TITLE AND PRIMARY ORGANISATION

Reem Santos, Principal Pharmacist - Antimicrobial Stewardship and Infectious Diseases

Chief Pharmaceutical Officer's Global Health Fellow

PROJECT SPECIFICS

CwPAMS partnership name:

Cambridge University Hospitals (CUH) NHS Foundation Trust – Makerere University

Area/Institution/Country/ Local Partner(s):

UK: CUH, UK

Uganda: Mulago Womens and Neonatal Sep (MSWNH) Hospital and Kawempe National Referral Hospital (KNRH)

Which partnership goal did your project contribute to?

Reduction in morbidity and mortality on the delivery and neonatal unit

INTRODUCTION TO PROJECT

The Cambridge-Kampala AMS and IPC partnership brought together multidisciplinary healthcare staff from CUH and two Ugandan hospitals, KNRH, a government funded institution, and MWNSH, which despite being nationally owned, was privately funded. The partnership's focus was to reduce infection rates in the delivery and neonatal units.

OVERALL PROJECT GOAL (AND INDICTORS)

Goal = To reduce morbidity and mortality on the delivery and neonatal unit. The burden of healthcare-associated infections is resource-constrained settings. To increase alcohol hand rub use among healthcare workers.

Indicator = 30% reduction in the number of infections and deaths after admission, in mothers and babies on the delivery and neonatal wards

METHODS

Data from direct observations of infection control practices at both institutions and literature reviews were collated to identify barriers to HH. We applied the Behaviour Change Wheel framework to these barriers and used behavioural change techniques (BCT) to inform intervention design.

Education and training was a common theme. A customised training programme was therefore developed, centred around the specified BCT. Thirteen face-to-face interviews of Ugandan HCW were conducted two months after the training, to monitor progress of the interventions and alcohol hand rub (AHR) usage was monitored.

RESULTS

Outcome 1 = Improve hand hygiene through increased use of alcohol hand rub among healthcare workers
Indicator = restructuring of the environment to increase physical availability and accessibility of alcohol hand rub

In the governmental institution (KNRH), hospital administrators supported the notion of in-house AHR production to achieve a more affordable and sustainable source of AHR for the hospital.

"They need my input as a pharmacist to manufacture the gel on a large scale. That one I have done my part. I have trained myself"' [Pharmacist]

The first batch of locally produced AHR was released in February 2020 to coincide with the launch of the new dispensers throughout the hospital.

Further changes to the physical environment included sinks with running water.

At the privately funded MSWNH, an increased awareness of IPC led to increased purchase of commercial AHR.

"After that training everything is being done as we are told. … The running water is there but the soap and the alcohol was not in place, so after that training things were put in place to practice that kind of thing which we learned from there" [Administrator]

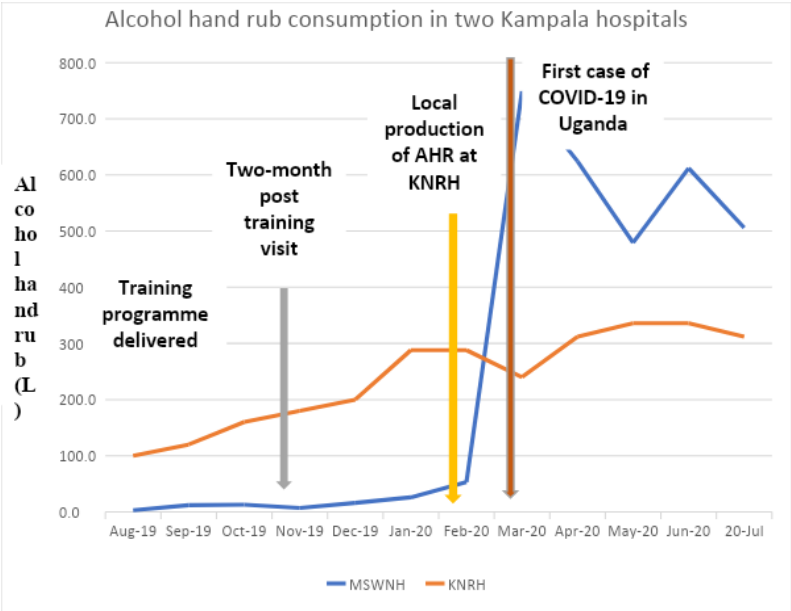


Figure 1: Procurement of alcohol hand rub at MSWNH and KNRH

CONCLUSION

Expanding the partnership to include a multidisciplinary team (doctors, nurses and pharmacists) and applying behavioural science to the design of our training, resulted in an improvement in hand hygiene by Ugandan HCW as measured by an increase in consumption of AHR.

FUTURE PLANS/NEXT STEPS/PLANS FOR SUSTAINABILITY FOR THE PROJECT

Embedding IPC into organisational culture by supporting the newly formed medicines and therapeutics committee.

PERSONAL REFLECTION LEADING ON THE PROJECT

I am inspired by how passionate and driven the pharmacists at KNHR and MSWNH are, and how much they have achieved in such a short period of time.

PROJECT TITLE/NAME:

Capacity Sharing for Antimicrobial Stewardship (CaSAMS) through the Medicines and Therapeutics Committee

FELLOW'S NAME, JOB TITLE AND PRIMARY ORGANISATION

Preet Panesar, Lead Antimicrobial Pharmacist, CPhOGHFellow

University College London Hospitals NHS Foundation Trust

Others involved in the project and partnership:

Clare Chandler (project lead UK)	London School of Hygiene and Tropical Medicine (LSHTM) Infectious Disease Research Collaboration (IDRC)	Principle investigator & project lead for UK team
Freddy Kitutu (project lead Uganda)	Makerere University Pharmacy Department (MakPD) Infectious Disease Research Collaboration (IDRC)	Project manager & co-ordinator in Uganda
James Kapisi	Infectious Disease Research Collaboration (IDRC)	Project co-ordinator in Uganda
Moses Kamya	Infectious Disease Research Collaboration (IDRC) Makerere University School of Medicine (MakSOM)	Support for the project
Sarah Staedke	London School of Hygiene and Tropical Medicine (LSHTM) Infectious Disease Research Collaboration (IDRC)	Researcher
William Olum	Jinja Regional Referral Hospital	Chief Pharmacist
Michael Brown	University College London Hospitals NHS Foundation Trust	Infectious Diseases consultant
Sarah Logan	University College London Hospitals NHS Foundation Trust	Infectious Diseases consultant
Ben Killingley	University College London Hospitals NHS Foundation Trust	Infectious Diseases consultant
Gabriel Pollaro	University College London Hospitals NHS Foundation Trust	Researcher
Corina Weir	The Manchester Change Exchange (TCE)	Behaviour scientist
Niall Anderson	The Manchester Change Exchange (TCE)	Behaviour scientist

PROJECT SPECIFICS

CwPAMS partnership name:

London School of Hygiene and Tropical Medicine (LSHTM) and University College London Hospitals NHS Foundation Trust (UCLH) – Makerere University College of Health Sciences and Infectious Diseases Research Collaboration (IDRC)

Area/Institution/Country/ Local Partner(s):

- UK – London School of Hygiene and Tropical Medicines, University College London Hospitals, The Manchester Change Exchange
- Uganda – Infectious Disease Research Collaboration (IDRC), Makerere University Pharmacy Department (MakPD), Jinja Regional Referral Hospital (JRRH)

Which partnership goal did your project contribute to?

Strengthen the antimicrobial stewardship roles and responsibility of the Medicines and Therapeutic Committee at Jinja Regional Referral Hospital and develop its capacity to optimize antimicrobial use

INTRODUCTION TO PROJECT

The Ugandan government is committed to addressing antimicrobial resistance and published a National Action Plan in 2018. One of the objectives is to establish or strengthen antimicrobial stewardship (AMS) programmes; in hospitals these are co-ordinated via the Medicines and Therapeutic Committees (MTCs).

OVERALL PROJECT GOAL (AND INDICTORS)

Goal = To strengthen the antimicrobial stewardship (AMS) roles and responsibilities of the MTC at Jinja Regional Referral Hospital (JRRH) and develop its capacity to optimize antimicrobial use

Indicator = Presence of a functioning multidisciplinary committee responsible for antimicrobial stewardship

SUMMARY OF ACTIVITIES/METHODS

We set out to co-develop with JRRH health workers (HWs) a functional MTC with focus on AMS, informed by findings from a baseline situational analysis of health facility and health worker capacity and practices of AMS. This analysis compromised of (a) point prevalence survey identifying prescribing practices in hospitalised patients and (b) semi-structured questionnaires to assess HWs awareness of antimicrobial resistance (AMR) and AMS.

The above was complimented by supporting the MTC to develop terms of reference, processes and procedures to implement AMS interventions. Educational workshops and on-the-job training were carried out to increase knowledge and capacity of AMS for all HWs. In addition, a video showcasing AMS in practice at UK hospital was used in training workshops as a practical example.

RESULTS INCLUDING OUTCOMES OR OUTPUTS (AND INDICATORS) – YOU ARE ENCOURAGED TO INCLUDE TABLES/FIGURES/PICTURES TO A MAXIMUM OF 5 IN TOTAL

Outcome 1 = Jinja hospital demonstrates quality AMS programme

Indicator = Presence of functioning committee responsible for AMS, minutes of the meetings and attendance available

The MTC oversees AMS at JRRH is chaired by a physician and the lead pharmacist is the secretariat. The MTC has recently developed terms of reference, as well as a detailed work plan of planned AMS activities over the year.

Outcome 2 = MTC participates in local adaptation of guidelines

Indicator = GPPS conducted and results fed back to MTC members

From data collected in December 2019, the prevalence of patients receiving at least one antimicrobial agent was 56%. Antimicrobial use at JRRH was higher than other in-country hospitals (fig 1). Figure 2 shows the most commonly used antimicrobials, however there was no microbiology data available on organisms identified or susceptibility.

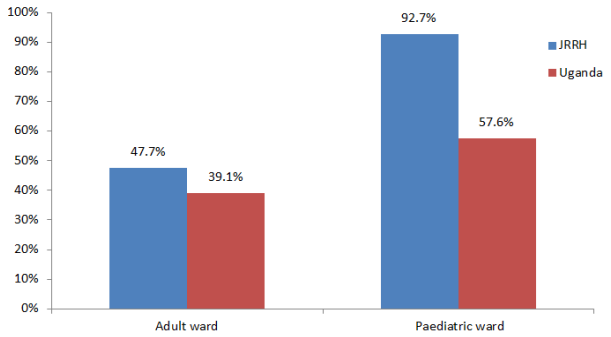


Fig 1. Antimicrobial prevalence in adults and paediatrics compared with other in-country hospitals

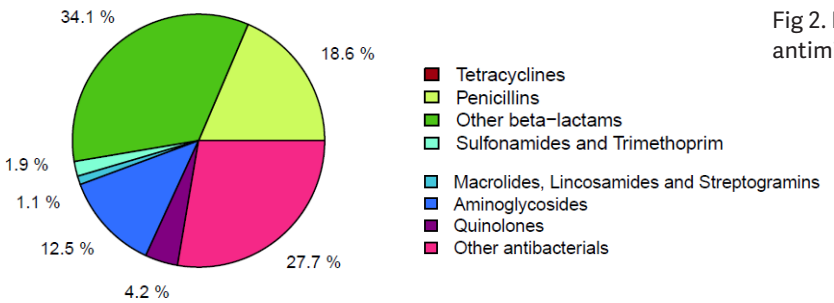


Fig 2. Proportion of antimicrobial use

In December 2019, the mean AMR awareness score was 76.2%. HWs were satisfied with the hospital environment, although essential supplies were often out of stock (fig 3). Additionally, 60% agreed optimum antibiotics were not available and 66% stated the range of diagnostic services was not sufficient.

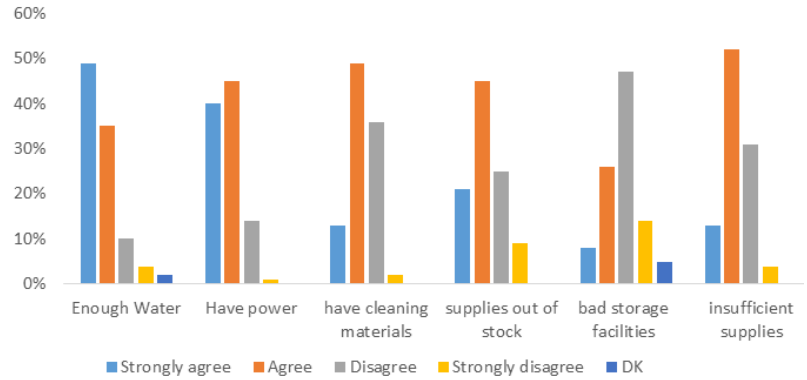


Fig 3. Health workers response to AMR awareness questionnaire

Output1 = MTC members trained on roles and functions

Indicator = 70% of MTC members trained on AMS

Support was offered to the MTC via weekly zoom calls as well as via workshops that consisted of lectures, practical sessions and group work. Pre and post questionnaires showed an increase in HWs knowledge of AMS (fig 4).

	Pre-test (%)	Post-test (%)
Average Score	49	67
Lowest Score	19	38
Highest Score	77	96

Fig 4. Knowledge scores pre- and post-training

Output 2 = AMS guidelines are in place and used appropriately

Indicator = Guidelines available on hospital wards

The CPA Microguide app was promoted at all workshops. In addition, the MTC have developed a local SOP for suspected bacterial infection which available on all wards.

CONCLUSION

JRRH has succeeded in formalising an MTC to optimise antimicrobial use and developed a detailed work plan of AMS interventions for implementation. Training delivered to HWs has increased awareness and knowledge of AMS. However, the hospital is hindered by inadequate supplies of critical medicines, lack of diagnostic services and reagents and unsuitable storage facilities.

FUTURE PLANS/NEXT STEPS/PLANS FOR SUSTAINABILITY FOR THE PROJECT

The focus has been on understanding challenges faced and collecting quantitative data on antimicrobial use as well as qualitative data on HWs views and barriers to implementing AMS.

It is envisaged that the Ugandan team will continue to promote AMS. The involvement of IDRC provides the potential for on-going engagement as there is already an established partnership based on previous work.

PERSONAL REFLECTION LEADING ON THE PROJECT

This project has given me the opportunity to experience healthcare in low-middle income setting, and appreciating the structures and processes in the NHS that at times feel stifling. I have a lot of respect for all the health workers at JRRH who are overburdened with work yet were very welcoming, gave up their time and were genuinely interested in what we had to say.

I have learnt to adapt my work to the timing and last minute changes in agendas, and the resilience to be able to work under pressure and during any setbacks.

Annex: **Project Evaluation Capacity Sharing for Antimicrobial Stewardship (CaSAMS) through the Medicines and Therapeutics Committee**

The aim of the project was to strengthen the antimicrobial stewardship roles and responsibility of the MTC at Jinja regional referral hospital and develop its capacity to optimize antimicrobial use. The following outcomes and outputs describe the activities conducted to help achieve the overall objective. The table below describes progress with each of the indicators and a RAG rating has been used to depict whether the indicator were met or not met.

OUTCOME	INDICATOR	PROGRESS	MET / NOT MET
Jinja hospital demonstrates quality AMS programme	◆ Presence of functioning committee responsible for AMS ◆ Minutes of the meetings and attendance available	◆ Jinja Regional Referral Hospital has a functioning Medicines and Therapeutic Committee (MTC) that oversees antimicrobial stewardship. ◆ The Committee is chaired by a physician and the lead pharmacist is the secretariat. ◆ Minutes from the committee meetings are available. ◆ The MTC as recently developed terms of reference, as well as a detailed work plan with specific individuals identified to lead on each of the objectives of the work plan and a timeline for achieving these.	Met
MTC participates in local adaptation of guidelines	◆ GPPS conducted and results fed back to MTC members	◆ Staff at Jinja hospital conducted GPPS in December. ◆ The preliminary GPPS results were presented back to Jinja staff at the 2-day workshop in February. ◆ As part of the workshop, Jinja staff worked in groups to interpret the results and identify action plans for implementation.	Met
MTC members trained on roles and functions	◆ 70% of MTC members trained on AMS	◆ MTC staff members received training covering a range of topics a few of which included antimicrobial resistance global and national situation, competencies of healthcare staff in antimicrobial stewardship, role of the MTC and infection prevention and control (IPC) and methods to review antimicrobial use.	Met
AMS guidelines are in place and used appropriately	◆ Guidelines available on hospital wards	◆ The CPA Microguide app was promoted at all workshops and staff were encouraged to download the app. ◆ The MTC have developed a local SOP for suspected bacterial infection which available on all wards.	Partly met

PROJECT TITLE/NAME:

Demonstrating the benefits of the Global Health Fellowship to the NHS

FELLOW'S NAME, JOB TITLE AND PRIMARY ORGANISATION

Frances Garraghan – Lead Antimicrobial Pharmacist.

Manchester University NHS Foundation Trust.

PROJECT SPECIFICS

This project was part of a wider project from 4 CPhOGHFellows

"Evaluation of leadership skills developed by NHS pharmacists as part of the Commonwealth Partnerships for Antimicrobial Stewardship (CwPAMS) Scheme and the Chief Pharmaceutical Officer Global Health (CPhOGH) Fellowship and impact of this on the NHS"

My individual goals were to determine the additional activities fellows had undertaken and evaluate the impact of the fellowship on the NHS.

INTRODUCTION TO PROJECT

The ChPOGH Fellowship has been newly developed and it is important to assess its impact in order to determine its value continue to develop pharmacists in global health in the future. It is essential for the sustainability of future fellowships that we are able to demonstrate the key benefits that participating in these schemes bring back to the NHS.

OVERALL PROJECT GOAL (AND INDICTORS)

To evaluate the impact of participation in the CwPAMs scheme and CPhOGH Fellowship and consider if there are any benefits to NHS.

SUMMARY OF ACTIVITIES/METHODS

- A pre and post leadership skills questionnaire to gauge success of the CPhO GH fellowship.
- Monitoring of fellow's additional activities throughout the year, this was done through fellows individually reporting additional activities and via the use of social media.

RESULTS INCLUDING OUTCOMES OR OUTPUTS (AND INDICATORS) – YOU ARE ENCOURAGED TO INCLUDE TABLES/FIGURES/PICTURES TO A MAXIMUM OF 5 IN TOTAL

The table below shows the key benefits which the CPhOGH Fellows have delivered back to the NHS

Development of leaders	Behaviour change	Working in resource limited settings	Development of networks	Understanding of working in LMICs
Negotiation skills	Approach to education and training	Work beyond traditional boundaries		
Academia	How to build cohesive relationships			
Communication skills	To work differently and innovatively	"improvements don't always require money"	Research	Greater understanding of public health issues
Difficult conversations	Reflection	Expect the unexpected	Increased exposure for local Trusts	
Caring for colleagues		How collaborative efforts can provide further benefits to all	National	
Project management skills		International		

As a result of being involved in the fellowship the fellows undertook a wide range of extra activities, which further strengthened their experience and benefits back to the NHS. A summary of these is listed below.

Journal publications	Conference oral presentations	Conference poster presentations	Blogs
Podcasts	Webinars	Research opportunities	Academic teaching
Trust Board presentations	Community engagement	CPA handwashing video	PHE world antibiotic awareness week messaging campaign

CONCLUSION

The development of the CPhOGH Fellows has had wide ranging benefits to the individual fellows and the NHS Trusts for which they work. Some of the key benefits are the development of a group of well-rounded leaders who are experienced in working in resource limited settings, with the ability to work innovatively outside of their traditional boundaries.

FUTURE PLANS/NEXT STEPS/PLANS FOR SUSTAINABILITY FOR THE PROJECT

The project group will continue to evaluate the impacts of the fellowship and submit a manuscript for publication.

PERSONAL REFLECTION LEADING ON THE PROJECT

I have found this project very challenging at times, but it has been amazing to work as part of this team, influenced by my peers and mentored by Diane.

PROJECT TITLE/NAME:

Evaluation of leadership skills developed by NHS pharmacists as part of the Chief Pharmaceutical Officer Global Health (CPhOGH) Fellowship.

FELLOW'S NAME, JOB TITLE AND PRIMARY ORGANISATION

Bee Yean Ng

Specialist Antimicrobial Pharmacist

Buckinghamshire Healthcare NHS Trust

PROJECT SPECIFICS

CwPAMS partnership name:

Nottingham Trent University – Makerere University Partnership

Institution:

Buckinghamshire Healthcare NHS Trust – Manchester University NHS Foundation Trust

Which partnership goal did your project contribute to?

NHS staff demonstrate improved leadership skills

INTRODUCTION TO PROJECT

The Commonwealth Pharmacists Association (CPA) and the Tropical Health and Education Trust (THET) received UK aid funding through the Department of Health and Social Care's Fleming Fund, for the pioneering (CwPAMS). The Fleming fund has provided a platform for Global Health with the formation of 12 CwPAMS with Ghana, Tanzania, Uganda and Zambia which is in line with the UK 5-year Antimicrobial Resistance (AMR) Action Plan and 20-year Vision for AMR. These partnerships allow bilateral learning between the UK low- and-middle income countries to develop solutions in tackling AMR and enable leadership skills to be brought back to the UK.

Recognising the importance of leadership training, the Chief Pharmaceutical Officer for England Global Health Fellowship (CPhOGH) was developed. 16 pharmacists who were part of the CwPAMS were appointed as the first CPhOGH fellows.

The fellowship is developed and sponsored by Health Education England (HEE) with technical support from the Commonwealth Pharmacists' Association (CPA). It aims to develop pharmacists' leadership and project management skills through mentorship and access to global health experts who have received leadership training.

In order to assess the impact of the CPhOGH fellowship on leadership skills, a questionnaire was created. The questionnaire is aligned with the Faculty Peer Assessment Tool (used with permission from the Royal Pharmaceutical Society) and the NHS Healthcare Leadership Model.

OVERALL PROJECT GOAL (AND INDICTORS)

To evaluate the impact of participation in the CwPAMs scheme and CPhO Global Health (GH) Fellowship on leadership skills.

Indicator

A pre and post questionnaire to be completed by fellows' senior colleagues to gauge impact of the CPhO GH fellowship on leadership skills.

SUMMARY OF ACTIVITIES/METHODS

A questionnaire was sent to all CPhOGH fellows for 2 weeks, requesting quantitative and qualitative leadership feedbacks from at least two senior colleagues per fellow. The senior colleagues should know the fellows for at least one year as the questionnaire required the senior to assess the fellow leadership skills pre and post fellowship.

RESULTS INCLUDING OUTCOMES OR OUTPUTS (AND INDICATORS) – YOU ARE ENCOURAGED TO INCLUDE TABLES/FIGURES/PICTURES TO A MAXIMUM OF 5 IN TOTAL

Outcome

Impact of the CPhOGH fellowship and CwPAMS on leadership skills of participating pharmacists

Indicator

Quantitative and qualitative data on formal and informal opportunities to demonstrate leadership skills and experiences throughout the CPhOGH fellowship as evaluated by senior colleagues of the CPhOGH fellows.

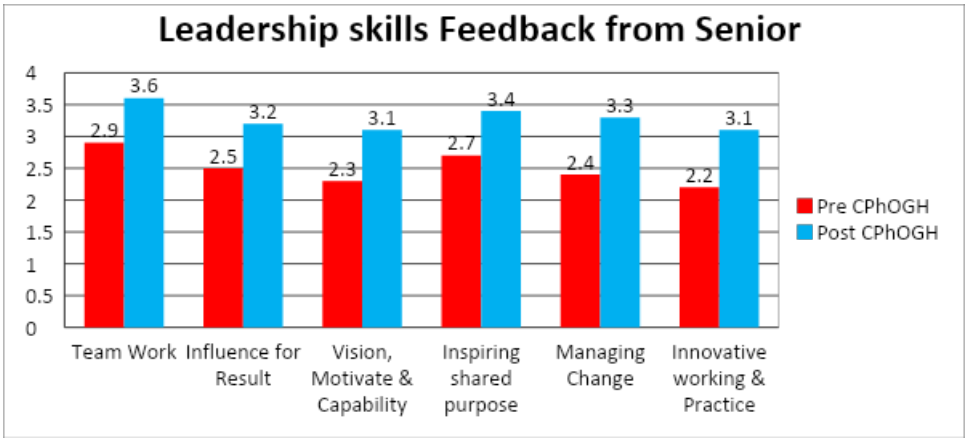


Figure 1: Average pre and post leadership skills feedback completed by senior colleagues (0= unable to comment, 1= essential, 2= proficient, 3= strong and 4=exceptional)

25 responses for 14 fellows were received. 10 fellows received at least two feedback responses.

The quantitative part of the questionnaire required the seniors to rate the fellows using a five-parted scale on each dimension. Figure 1 demonstrated an overall improvement across all dimensions with managing changes and innovative working showing the most improvement.

The general feedbacks from the qualitative data were positive. The fellows are more confident in voicing their opinions and introducing new concept such as behaviours change approach within and outside their organisations. The fellows also demonstrated increase adaptability to changes especially during the COVID-19 pandemic.

100% (n=25) of their seniors think the fellows are ready for more senior roles and 88% (n=22) of their seniors would recommend CPhOGH fellowship to others pharmacy colleagues.

CONCLUSION

Majority of the CPhOGH fellows have enhanced leadership skills post CPhOGH fellowship.

FUTURE PLANS/NEXT STEPS/PLANS FOR SUSTAINABILITY FOR THE PROJECT

To present the data at the Chief Pharmaceutical Officer Conference to support the continuation of the CPhO GH Fellowship.

PERSONAL REFLECTION LEADING ON THE PROJECT

- To allow more time for the questionnaire responses.
- To construct the questionnaire and send it out to senior colleagues before the CPhOGH fellowship due to potential bias of assessing pre and post leadership skills at the same time.
- There are fellows who looking into different aspects such as the impact of CwPAMS (non-fellow) versus CPhO GH fellowship and CPhOGH fellows self assessment pre and post questionnaire. As a result, this abstract should amalgamate with other abstracts looking into different aspects to provide a more comprehensive view on both schemes.

PROJECT TITLE:

Evaluating the impact of participation in the Commonwealth Partnerships for Antimicrobial Stewardship (CwPAMS) Programme on pharmacy staff and consideration of benefits to the National Health Service (NHS)

FELLOW'S NAME, JOB TITLE AND PRIMARY ORGANISATION

Claire Brandish, Lead Anti-Infectives Pharmacist, Buckinghamshire Healthcare NHS Trust (BHT)

PROJECT SPECIFICS

CwPAMS partnership name: Nottingham Trent University / Makerere University / BHT

Area/Institution/Country/ Local Partner(s): BHT/ Manchester Foundation Trust / Commonwealth Pharmacy Association (CPA), Health Education England (HEE)

Which partnership goal did your project contribute to?

NHS staff demonstrate improved leadership skills and understanding of the global context of antimicrobial resistance (AMR) in their work

INTRODUCTION

A peer review, conducted by four of the CPhOGH fellows, was proposed to assess:

the impact, if any, of participation in the CwPAMS Programme and the CPhOGH Fellowship on pharmacy staff and;

to consider if any benefits to the NHS were derived

This is a collaborative piece of work but I have specifically considered the impact on pharmacy staff involved in the CwPAMS programme and the perceived benefits to the affiliated NHS organisations.

OVERALL PROJECT GOAL (AND INDICTORS)

To evaluate the impact of participation in the CwPAMs scheme and consider if there are any benefits to NHS

To publish a peer reviewed paper to evaluate the impact on leadership skills and additional opportunities that have been gained through the CwPAMs scheme and CPhOGH Fellowship.

Indicator = Quantitative and qualitative data to demonstrate leadership skills and experiences throughout the CwPAMS (+/- CPhOGH Fellowship) scheme (s) and reported benefits to the NHS

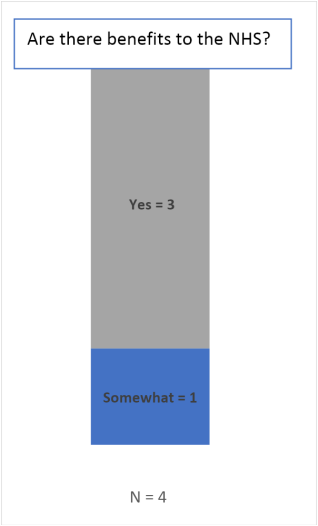
SUMMARY OF METHODS

A questionnaire was sent to pharmacy staff involved in the CWPAMs programme who were not enrolled on the CPhOGH Fellowship. The questionnaire involved a combination of 28 open and Likert rated scale statements. A similar questionnaire was issued to the CPhOGH Fellows to further consider if there are additional advantages in undertaking a Fellowship alongside a global health project.

RESULTS

Outcome 1 = There was a lack of engagement with the questionnaire from pharmacy staff involved only with the CwPAMs programme
Indicator = 8/21 CwPAMs participants responded in comparison to all 16 CPhOGH Fellows.

Outcome 2 = Pharmacy staff involved with the CwPAMs programme reported benefits to the NHS.
Indicator = All respondents answered the open question about key benefits.



"… simple small steps can lead to enormous differences … these lessons can be applied here too"

"enhanced personal development…those who volunteered demonstrated leadership skills and resilience during the COVID pandemic."

"…reflecting on our practices…how we can improve"

"Improved teaching and communication skills"

"Improved awareness of global challenges of AMR"

"Improving my management skills including prioritisation, organisation and presentation skills"

"Raises profile of organisation for education and research"

"Built better relationships with our infection control team"

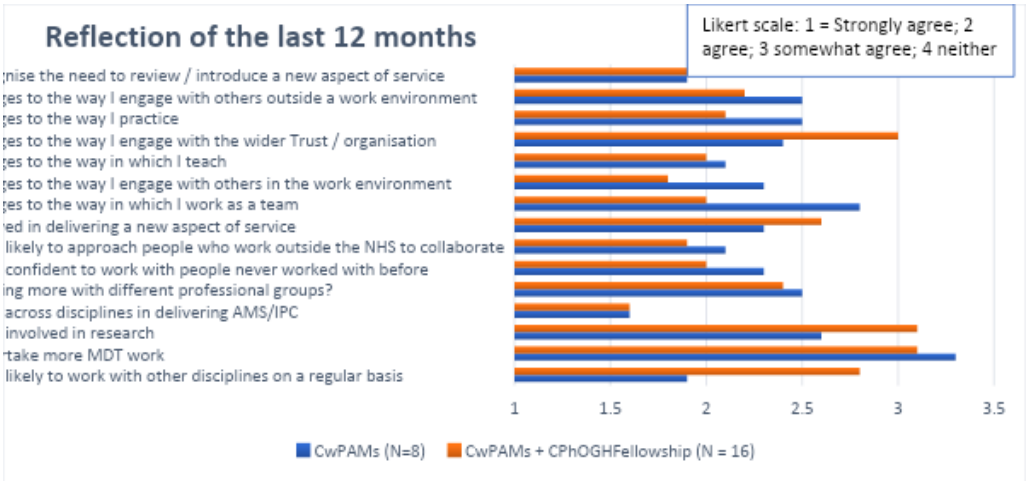
"Promoted AMS on the elderly ward in which I currently work"

"Learning from the project applied to everyday work: influencing and leading on change, behavioural change, barriers to change including a range of factors not just healthcare related, e.g. cultural"

"Development of networks"

Output 1 = all pharmacy staff involved in the CwPAMS +/- the CPhOGH Fellows programme reported positive changes to work or new experiences over the past year.

Indicator = All statements scored 3.3 or less by pharmacy staff involved in CwPAMs +/- CPhOGH Fellowship.



CONCLUSION

All pharmacy participants in the CwPAMs programme reported benefits to their NHS organisations and the qualitative data provides some valuable insights. The quantitative data is unsuitable for statistical analysis due to the low numbers and additional benefits attributed to the CPhOGH Fellowship are not evidenced.

FUTURE PLANS

Interviews with CPhOGH Fellows and CwPAMs pharmacy participants may be useful in understanding a more holistic view of the impact of these opportunities.

PERSONAL REFLECTION LEADING ON THE PROJECT

Previous experiences and job role are likely to influence results and create bias. Consideration should be given to the absence of 13 respondents from the CwPAMs programme – is this lack of engagement or other priorities?

This has been a challenging project and demonstrates that collaboratively working produces better quality results.

Annex: **Evaluating the impact of participation in the Commonwealth Partnerships for Antimicrobial Stewardship (CwPAMS) Programme on pharmacy staff and consideration of benefits to the National Health Service (NHS)**

OBJECTIVE	MET OBJECTIVE?	COMMENT
Evaluate impact of CwPAMs programme on pharmacy staff	Partially	Response rate to questionnaire poor but would not have been possible to demonstrate statistical significance when compared with CPhOGH Fellows even with full response rate. Consideration should be given to undertake a different method, e.g. structured interviews which would allow evaluation without the confines of the questionnaire
Evaluate if there are any benefits to the NHS through pharmacy staff participation in the CwPAMs programme	Met	Further insights may be gained by the above, however, all respondents reported specific benefits to the NHS in terms of work undertaken or on a personal development level.
Produce a Peer Review manuscript of this project	Partially	Each of the four CPhOGH Fellows will have produced a short communication / manuscript and separate project evaluation of the induvial components of this project. However, this information will be more powerful and meaningful if presented together and the plan is to progress this to a collaborative manuscript submission.

PROJECT TITLE:

Evaluation of the Chief Pharmaceutical Officer Global Health (CPhOGH) Fellowship scheme as part of the Commonwealth Partnerships for Antimicrobial Stewardship (CwPAMS) Scheme.

FELLOW'S NAME, JOB TITLE AND PRIMARY ORGANISATION

Kate Russell-Hobbs, Senior Pharmacist HIV/GUM/ID, Buckinghamshire Healthcare NHS Trust

PROJECT SPECIFICS

CwPAMS partnership name: Nottingham Trent University – Makerere University School of Public Health

Area/Institution/Country/ Local Partner(s): Buckinghamshire Healthcare NHS Trust and Manchester University NHS Foundation Trust.

Which partnership goal did your project contribute to? To evaluate the CPhOGH fellowship (as part of the CwPAMs scheme) and its impact on the pharmacists who took part.

INTRODUCTION TO PROJECT

The first year of the CPhOGH fellowship was launched in June 2019, in conjunction with the CwPAMs projects. Sixteen fellows were selected onto the fellowship and embarked on their fellowship year. Leadership training and mentors were provided in conjunction with modules on global health. The value and experience of the fellowship was assessed via a pre fellowship survey and a post fellowship survey. This project seeks to evaluate the responses of the surveys.

OVERALL PROJECT GOAL (AND INDICATORS)

Goal = To evaluate the impact of participation in the CwPAMs scheme and CPhOGH fellowship and consider if there are any benefits

Indicator = A pre and post leadership skills questionnaire was undertaken to gauge success of the CPhOGH fellowship.

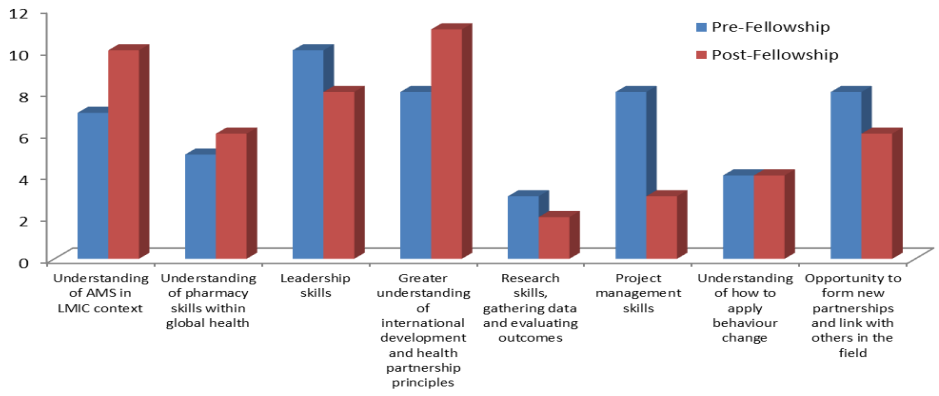
SUMMARY OF ACTIVITIES/METHODS

A baseline survey was conducted prior to the fellowship looking at what fellows hoped to gain in the following year; a post fellowship survey was subsequently conducted in July 2020 addressing what the fellows felt they had gained the most over the year. The outputs of this survey were reviewed and analysed.

RESULTS INCLUDING OUTCOMES OR OUTPUTS (AND INDICATORS) –

Outcome 1 = Impact of the CPhOGH fellowship on participating pharmacists
Indicator = Fellows reported increased awareness of Antimicrobial stewardship (AMS) in a low to middle income country (LMIC) context, understanding of pharmacy skills within global health and a greater understanding of international development and health partnership principles .

See Table 1 below (data based on sixteen fellows responses):



In addition, all 16 fellows felt that the fellowship was positive ranging from positive to very, very positive.

Output 1 = Number of CPhOGH Fellows and other pharmacists involved in the CwPAMs scheme who complete the survey on collection of evidence of leadership skills and experience gained through participation in an international health project.

Indicator = Quantitative and qualitative data on formal and informal opportunities to demonstrate leadership skills and experiences throughout the CPhOGH fellowship was collected via a pre and post fellowship questionnaire and all sixteen fellows fully completed this.

CONCLUSION
The CPhOGH fellowship has been a positive experience for the sixteen inaugural fellows. Hopefully the results of this and other analyses will ensure the continuation of the CPhOGH fellowship for future pharmacists with a passion for global health.
FUTURE PLANS/NEXT STEPS/PLANS FOR SUSTAINABILITY FOR THE PROJECT
To present this data to Dr Keith Ridge: Chief Pharmaceutical Officer at NHS England and also to prepare a manuscript with additional data from other fellows for submission to a suitable journal.
PERSONAL REFLECTION LEADING ON THE PROJECT
The task of evaluating the fellowship has in addition to participating in the CwPAMs project, tested my research and evaluation skills as well as my newly taught leadership skills. Working as part of a team with my colleagues and also an additional fellow has been a lesson in good and frequent communication. Overall the fellowship project has been an excellent opportunity to undertake a research project with excellent support.

Annex 1: **Evaluation of the Chief Pharmaceutical Officer Global Health (CPhOGH) Fellowship scheme as part of the Commonwealth Partnerships for Antimicrobial Stewardship (CwPAMS) Scheme.**

Evaluation of Project August 2020 by Kate Russell-Hobbs (CPhOGH Fellow)

A large unforeseen impact on the project occurred in March 2020 when the COVID-19 pandemic affected healthcare delivery in the UK. All four project participants were redeployed to ITU during this and thus affected the project timelines and ability to undertake all activities in the project plan. This is summarised in the table below:

ACTIVITY	EVALUATION	
Project planning meetings	Regular meetings occurred except during March-June 2020 when Covid-19 affected workload.	Fully Complete
Stakeholder engagement	Continued contact with other fellows on the WhatsApp group with regards to this project and getting feedback.	Fully Complete
Literature search	Undertaken at start of the project and key publications identified.	Partially Complete-will revisit and update when draft manuscript complete.
Review of the answer to the HEE Leadership self-assessment questionnaire undertaken by CPhOGH fellows before fellowship induction.	These were reviewed and adapted according to this project plan.	Fully Complete
Construct a questionnaire based on the baseline questionnaire with additional questions to assess leadership, new skills / experiences gained over past 12 months	This was constructed and sent out with engagement with the fellows via email and WhatsApp.	Fully Complete
Send questionnaire in 5 to CPhOGH fellows to complete	This was sent out to all CPhOGH fellows with all fellows responding	Fully Complete
Interview / reflective writing with / from CPhO GH fellows to capture values and example of demonstrating leadership.	This is still something that there is an intention to complete however due to time constraints this was not started.	Not commenced

Final evaluation and dissemination	The final fellow's event on the 4th September 2020 will be the presentation of this project with an intention of publishing in the Pharmacy Journal if the abstract is accepted.	Partially Complete
Submit manuscript for peer review	A draft will be submitted by the individual fellows prior to the final fellow's event on the 4th September however after this event the four drafts form the other fellows who were part of this project will need to be extensively reviewed and amalgamated to form one manuscript for submission.	Partially Complete

APPENDIX 4

Definitions

Antibiotic: Antibiotic refers to agents that act against (kill or inhibit growth) of bacteria

Antimicrobial: Antimicrobial refers to all agents that act against microbial organisms, i.e. bacteria, viruses, parasites and fungi. These agents either kill or inhibit growth of microbial organisms

Antimicrobial Resistance (AMR): Antimicrobial resistance is resistance of a microorganism to an antimicrobial drug that was originally effective for treatment of infections caused by it. Resistant microorganisms (including bacteria, fungi, viruses and parasites) are able to withstand attack by antimicrobial drugs, such as antibacterial drugs (e.g. antibiotics), antifungals, antivirals, and antimalarials, so that standard treatments become ineffective and infections persist, increasing the risk of spread to others. (ref BSAC)

Antimicrobial Stewardship (AMS): A number of definitions of antimicrobial stewardship exist.

The definition of stewardship is "the job of supervising or taking care of something." In simple terms Antimicrobial Stewardship is to "take care" of antimicrobials. Recognised definitions include "the optimal selection, dosage, and duration of antimicrobial treatment that results in the best clinical outcome for the treatment or prevention of infection, with minimal toxicity to the patient and minimal impact on subsequent resistance."[1]

It also can be defined as an "organisational or healthcare system-wide approach to promoting and monitoring judicious use of antimicrobials to preserve their future effectiveness."[2]

Community-acquired infection: An infection acquired in the community, outside of a health-care setting.

Competencies: "The development of observable ability of a person (or individual health worker) that integrates knowledge, skills and attitudes in their performance of tasks. Competencies are durable, trainable and, through the expression of behaviours, measurable."[3]

De-escalation: The narrowing or streaming of from broad to narrow-spectrum based on culture and sensitivity results. This may involve stopping antibiotics when used in combination or changing to narrow spectrum agents.

Defined daily dose (DDD): Assumed average maintenance dose per day for a medicine used for its main indication in adults as established by the WHO Collaborating Centre for Drug Statistics and Methodology.[4]

Empiric: Initial antimicrobial treatment targeted at the most probable causative microorganism.

Health-care-associated infection (nosocomial or hospital infection): An infection occurring during care within a hospital or other health-care facility, which was not present or incubating at the time of admission. Health-care associated infections can also appear after discharge.

Low- and middle- income countries (LMIC): A collective term for low income-, lower-middle-income- and higher-middle-income countries, based on the World Bank's grouping of countries according to gross national income (GNI) per capita for a specified year. For 2019, low-income countries are defined as having a GNI per capita of US$ 995 or less in 2017, and lower-middle income countries a GNI per capita of US$ 996–US$ 3 895.[5]

Multidrug-resistant bacteria: Bacteria that are resistant to at least one agent in three or more antibiotic categories. Extensively drug-resistant (XDR) is non-susceptibility to at least one agent in all but two or fewer antibiotic categories (i.e. bacterial isolates remain susceptible to only one or two categories), and pan drug-resistant (PDR) is non-susceptibility to all agents in all antibiotic categories.[6]

Point prevalence: refers to the prevalence measured at a particular point in time.

Quality Indicator: measurable factor that demonstrate whether the quality outcome has been achieved.

Snapshot audit: Refers to an audit taking place for a limited period e.g. 1 week, where the data included is a sample of the total. The sample should be representative of the total population to avoid bias.

Surgical Antibiotic Prophylaxis (SAP): The use of antibiotics to prevent infection at the surgical site.

Surveillance: "The ongoing, systematic collection, analysis, and interpretation of health-related data essential to planning, implementation, and evaluation of public health practice" US Centres for Disease Control and Prevention

APPENDIX 5

Key Antimicrobial Stewardship Resources and Guidelines

Review on Antimicrobial Resistance	*https://amr-review.org/*
Global Action Plan on Antimicrobial Resistance	*https://www.who.int/antimicrobial-resistance/global-action-plan/en/*
Antimicrobial stewardship programmes in health-care facilities in low- and middle-income countries: a WHO practical toolkit. World Health Organization.	*https://apps.who.int/iris/handle/10665/329404*
Africa CDC Framework for Antimicrobial Resistance, 2018-2023	*https://africacdc.org/download/africa-cdc-framework-for-antimicrobial-resistance/*
WHO Competency Framework for Health Worker' Education and Training on Antimicrobial Resistance	*https://www.who.int/hrh/resources/WHO-HIS-HWF-AMR-2018.1/en/*
BSAC toolkit BSAC eBook	*http://bsac.org.uk/antimicrobial-stewardship-from-principles-to-practice-e-book/*
Pulcini, C. et al. Developing core elements and checklist items for global hospital antimicrobial stewardship programmes: a consensus approach. Clin. Microbiol. Infect. 25, 20–25 (2019)	*Availabile from: https://doi.org/10.1016/j.cmi.2018.03.033*
Critically Important Antimicrobials for Human Medicine	*https://apps.who.int/iris/bitstream/handle/10665/251715/9789241511469-eng.pdf?sequence=1*
CDC Be Antibiotics Aware	*https://www.cdc.gov/antibiotic-use/index.html*
CDC Core elements of Antimicrobial Stewardship https://www.cdc.gov/antibiotic-use/healthcare/pdfs/core-elements.pdf	
WHO AWaRE Classification on Antibiotics Database	*https://www.who.int/medicines/publications/essentialmedicines/en/*
Infectious disease Society of America	*https://www.idsociety.org/clinical-practice/antimicrobial-stewardship/*
WHO Africa	*https://www.afro.who.int/*
Antimicrobial Stewardship Toolkit Best Practices from the GNYHA/UHF Antimicrobial Stewardship Collaborative	*file:///C:/Users/Chris/Documents/Kelly/Commonwealth%20Pharmacy%20Project/References/gnyha_antimicrobial_stewardship_toolkit_finalv2_dec2011.pdf*

Antimicrobial Resistance National Action Plans and Educational Resources

- Library of National Antimicrobial Resistance Action Plans *https://www.who.int/antimicrobial-resistance/national-action-plans/library/en/*
- Additional resources are also available *https://www.who.int/antimicrobial-resistance/national-action-plans/en/*

Please see below for the National AMR Action Plans for the countries participating in CwPAMS projects.

Ghana	Ghana National Action Plan for Antimicrobial Use and Resistance 2017-2021	*https://www.moh.gov.gh/wp-content/uploads/2018/04/NAP_FINAL_PDF_A4_19.03.2018-SIGNED-1.pdf*
Tanzania	The United Republic of Tanzania The National Action Plan on Antimicrobial Resistance 2017-2022	*https://www.afro.who.int/sites/default/files/2017-07/NATIONAL%20ACTION%20PLAN%20FNL%2010%20May%202017.pdf*
Uganda	Government of Uganda Antimicrobial Resistance National Action Plan 2018-2023.	*https://cddep.org/wp-content/uploads/2018/12/GoU_AMR-NAP.pdf*
	Medicines and Therapeutics Committee Manual 2018 Uganda	*https://www.health.go.ug/cause/medicine-and-therapeutics-committees-manual/*
Zambia	Multi-sectoral National Action Plan on Antimicrobial Resistance. Government of the Republic of Zambia 2017-27.	*https://www.afro.who.int/sites/default/files/2018-08/ZNPHI%20Document.pdf*

APPENDIX 6

Educational Resources for AMS

Platforms delivering courses supporting knowledge required for the WHO AMR competencies

Learning platforms	*https://www.globalhealthlearning.org/courses* *http://bsac.org.uk/global/* *http://esgap.escmid.org/* *https://www.train.org/cdctrain/course/1075730/compilation* *https://learn.nps.org.au/mod/page/view.php?id=4282*
Lectures	Antimicrobial Stewardship around the Globe *https://www.escmid.org/escmid_publications/escmid_elibrary/?q=++KN0714&id=2173&L=0&x=0&y=0&tx_solr%5Bsort%5D=created_desc%2BDESC*
Fact sheets	*https://www.who.int/news-room/fact-sheets/detail/antimicrobial-resistance* *https://www.who.int/news-room/fact-sheets/detail/antibiotic-resistance*
Resources for Nursing Staff	BSAC nursing forum: a global meeting forum for discussion and resource sharing *http://bsac.org.uk/nursing-ams-forum-launched/*

Resources / information on sepsis

- WHO Factsheet: Sepsis
  https://www.who.int/news-room/fact-sheets/detail/sepsis
- Lecture: Improving outcomes in septic shock: Optimizing antimicrobial therapy by Anand Kumar
  https://empendium.com/mcmtextbook/lectures/intensive/201260,improving-outcomes-in-septic-shock-optimizing-antimicrobial-therapy

Useful links in relation for falsified and counterfeit medicines

- *https://www.wwarn.org/about-us/medicine-quality*
- *https://www.who.int/medicines/publications/drugalerts/en/*
- *https://www.reactgroup.org/toolbox/understand/how-did-we-end-up-here/problems-related-to-quality-of-antibiotics/*
- *http://digicollection.org/whoqapharm/p/about/*

Resources / information on surgical prophylaxis

- Surgical site infections: prevention and treatment. NICE guideline [NG125] Published date: 11 April 2019
  https://www.nice.org.uk/guidance/ng125/chapter/Recommendations
- ASHP, IDSA, SIS, and SHEA Clinical Practice Guidelines for Antimicrobial Prophylaxis in Surgery
  https://www.ashp.org/-/media/assets/policy-guidelines/docs/therapeutic-guidelines/therapeutic-guidelines-antimicrobial-prophylaxis-surgery.ashx

Quality Improvement Resources

- NHS Improvement Quality, Service Improvement and Redesign tools
  https://improvement.nhs.uk/documents/2142/plan-do-study-act.pdf
- Institute of healthcare improvement
  http://www.ihi.org/resources/Pages/HowtoImprove/default.aspx
- Course: Quality Improvement in Healthcare: The Case for Change
  https://www.futurelearn.com/courses/quality-improvement

Clinical Audit Resources

- *https://www.hqip.org.uk/resource/documenting-local-clinical-audit-a-guide-to-reporting-and-recording/#.XmjqgW52v4h*
- *https://www.hqip.org.uk/wp-content/uploads/2018/02/guide-to-quality-improvement-methods.pdf*
- *http://www.clinicalauditsupport.com/clinical-audit-resources.html*

Infection Control Resources

World Health Organisation (WHO) guidance documents

WHO have developed a number of resources that case support assessment of infection prevention and control, to highlight gaps and design interventions. Below are several links to key guidance documents:

- *https://www.who.int/infection-prevention/en/*
- The core components of IPC
  https://www.who.int/gpsc/ipc/en/
- Water and Sanitation for Health (WASH)
  https://www.who.int/water_sanitation_health/en/
- Guidelines for the prevention and control of carbapenem-resistant Enterobacteriaceae, Acinetobacter baumannii and Pseudomonas aeruginosa in health care facilities
  https://www.who.int/infection-prevention/publications/guidelines-cre/en/

Infection Control Assessment Tools

- Facility implementation manual
  https://www.who.int/infection-prevention/tools/core-components/facility-manual.pdf?ua=1
- Key assessment tool
  https://www.who.int/infection-prevention/tools/core-components/IPCAF-facility.PDF?ua=1
- Water and Sanitation for Health Facility Improvement Tool (WASH FIT):
  https://apps.who.int/iris/bitstream/handle/10665/254910/9789241511698-eng.pdf;jsessionid=22DF20F68914A13BDD4826E7BF5DA534?sequence=1
- WHO Surgical safety checklist
  http://www.who.int/patientsafety/safesurgery/checklist/en/

Infection Control Training Materials

- WHO Advanced Infection Prevention and Control Training, slides 9-27 particularly relevant
  https://www.who.int/infection-prevention/tools/core-components/advanced-training-leadership.pdf?ua=1
- Leadership and Programme Management in Infection Prevention and Control: Student Hand book - focus on handouts 1&2
  https://www.who.int/infection-prevention/tools/core-components/student-handbook.pdf?ua=1
- Trainer guide
  WHO IPC Trainer's Guide
- Using Infection Control to Combat Antimicrobial Resistance
  https://www.futurelearn.com/courses/infection-control-antimicrobial-resistance

Infection Control Videos

- Overview of the WHO core components
  https://www.youtube.com/watch?time_continue=2&v=LZapz2L6J1Q
- IPC Leadership video
  https://www.youtube.com/watch?v=92bFMeS35vA&feature=youtu.be
- Webinars and modules on handwashing
  https://globalhandwashing.org/learn/education-modules/
- My 5 Moments for hand hygiene
  http://www.who.int/gpsc/5may/background/5moments/en/

Healthcare Apps supporting AMS

APP	DESCRIPTION
Commonwealth Partnership for Antimicrobial Stewardship *https://viewer.microguide.global/CPA/CWPAMS#content,0f7a1785-a02e-45a9-a0ae-6e6ee0d22339*	Hosted by Commonwealth Pharmacist Association. A central repository for national guidelines and tools used in the Commonwealth Partnership for Antimicrobial Stewardship projects.
Infectious Disease Society of America *https://www.idsociety.org/practice-guideline/IDSA-practice-guidelines-app/*	A central repository for national guidelines. May be used for development of evidence based guidelines where gaps in national guidelines have been identified.
My Bug Freely available for download in the Appstore or Googleplay store	An App for the recording of microbiology culture results and antibiotic treatments for patients with chronic diseases. For information *http://esgap.escmid.org/?p=1525*
WHO Antimicrobial Stewardship Freely available for download in the Appstore or Googleplay store	

Behaviour Change Resources

- The Change Exchange Resources
  https://www.mcrimpsci.org/elearningresources/

Commitments and Pledges

Antibiotic Guardian is a Global project for everyone (healthcare workers, students and educators and members of the public) to pledge to safe guard antimicrobials as a valuable resource.	*https://antibioticguardian.com/*
Antibiotic Guardian Africa is supported by the African Union and Africa Centres for Disease Control and Prevention as part of their commitment to slow resistance and to cut the unnecessary use of antibiotics.	*https://antibioticguardian.com/africa/*

Tools for Staff or Public Educational Campaigns

RESOURCE	COMMENTS
Review on Antimicrobial Resistance *https://amr-review.org/home.html*	Useful infographics at *https://amr-review.org/infographics.html*
Antibiotic Guardian *https://antibioticguardian.com/* *https://antibioticguardian.com/africa/*	

Social media

Healthcare social media hashtags and
global communities related to Antibiotic Resistance:

- #AfricaWAAW on *www.symplur.com*
- #AntibioticResistance
- #AntimicrobialResistance
- #OneHealth
- #InfectionControl
- #WAAW2019
- #WAAW19

APPENDIX 7

Resources for Public Awareness and Education

Pledges

- Antibiotic Guardian: A collection of resources and promotional materials.
  https://antibioticguardian.com/public/
- *https://antibioticguardian.com/africa/*

Fact sheets

- Antimicrobial Resistance
  https://www.who.int/news-room/fact-sheets/detail/antimicrobial-resistance
- Antibiotic resistance
  https://www.who.int/news-room/fact-sheets/detail/antibiotic-resistance

Resources aimed at Children

- e-Bug Health Educator Training. Improve your ability to teach children and young people how to prevent the spread of infection and to use antibiotics responsibly.
  https://www.futurelearn.com/courses/e-bug-health-educator-training
- Antibiotic guardian Young and Family
  http://antibioticguardian.com/Resources/junior-family-antibiotic-guardian/
- Design of an AMR Awareness Session for Primary School Children
  (link)

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1 Gerding DN. The search for good antimicrobial stewardship. Jt Comm J Qual Improv. 2001;27(8):403-404

2 National Institute for Health and Care Excellence. Antimicrobial stewardship: systems and processes for effective antimicrobial medicine use. London: NICE; 2015 *https://www.nice.org.uk/guidance/ng15* [Accessed April 2020]

3 *https://www.who.int/hrh/resources/WHO-HIS-HWF-AMR-2018.1/en/* [Accessed April 2020]

4 WHO Collaborating Centre for Drug Statistics and Methodology. Available at : *https://www.whocc.no/ddd/definition_and_general_considera/* [Accessed April 2020]

5 Antimicrobial stewardship programmes in health-care facilities in low- and middle-income countries: a WHO practical toolkit. World Health Organization; 2019. *https://apps.who.int/iris/handle/10665/329404.* [Accessed April 2020]

6 Magiorakos AP, Srinivasan A, Carey RB et al. Multidrug-resistant, extensively drug-resistant, and pandrug-resistant bacteria: an international expert proposal for interim standard definitions for acquired resistance. Clin Microbiol Infect 2012; 18: 268–81.