The Fleming Fund

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MOTT MACDONALD

ANTIMICROBIAL RESISTANCE
Fleming Fund Policy Brief

November 2022

Uganda

This Policy Brief summarises the cost of AMR surveillance in Uganda.[1]

Antimicrobial resistance (AMR) is evolution in action - microorganisms exposed to antimicrobial drugs adapt to survive. Humans, animals, and the environment are all susceptible, spreading resistant microorganisms and existing antimicrobial medicines become ineffective.

Surveillance is the first, essential step to combat the global health threat of (AMR). Uganda's government has set an important precedent by committing to build an effective AMR surveillance system, in partnership with the Fleming Fund and other donors.

To help further its development, the Fleming Fund's initial study of the system's costs and expected benefits in Uganda's surveillance network comprises **11 human health and six animal health surveillance sites**, each testing samples from patients and animals, and supported by one of two national reference laboratories, and within the framework of a coordinated human-animal- environmental AMR surveillance policy.

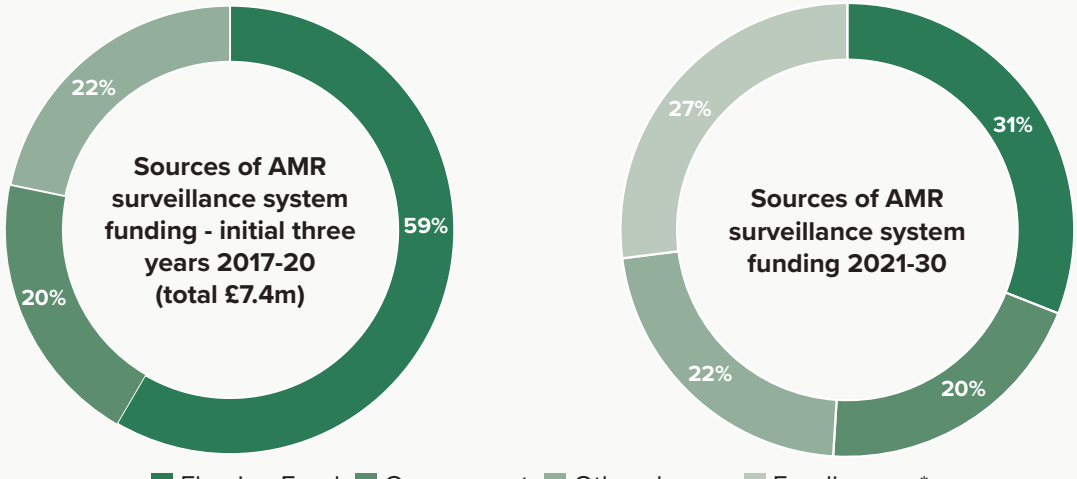
This Brief provides a snapshot of the study's results; an accompanying methodological note gives the background to explain the study's model.

Where does the funding come from?

In its first three years (to the end of 2020, based on expenditure, excluding environmental health), the Fleming Fund covered almost 60% of costs, with the government and other donors each covering around 20%.

While the Fleming Fund has been extended into a second phase, if national aspirations are to be achieved, there is still a considerable portion of the surveillance system's needs that are currently unfunded, potentially putting it in danger.

Sustainability can only be achieved if the looming 'funding gap' is reduced through some combination of increased government or donor contributions and reduced costs through the improved, efficiency, and effectiveness of AMR surveillance.



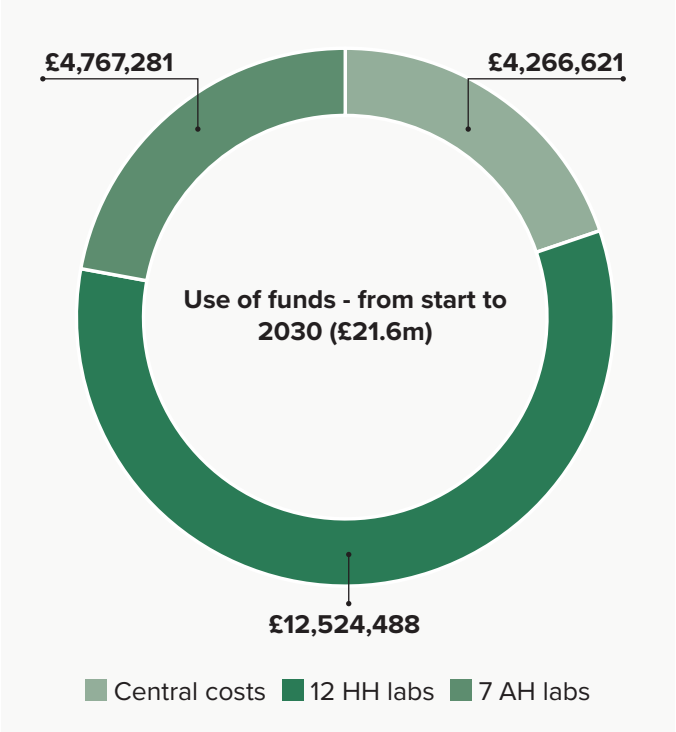
* Original version of the study has been revised to take account of the UK's extension of the Fleming Fund contract and to clarify uncertainty of future funding.

What are the funds spent on?

Surveillance of bacterial species causing severe and non-severe infections; drug sensitivity testing to establish AMR levels, types and patterns; AMU surveillance; and interpretation and use of the data at clinical and policy levels.

This next Figure shows how those funds are expected to be used over the full period to 2030.

Human health operational surveillance activities (laboratories) absorb more than half of the total, and animal health and coordination require smaller amounts. If environmental health was also included this would add an estimated £7.5m to the total.



The costs related to setting up the surveillance system will establish policy frameworks, and purchasing major equipment items that if properly maintained will function for many years.

Among the costs that will continue are those of the reagents and consumables (such as protective clothing for staff) that are used every time a sample is processed. From 2022-25, the Fleming Fund is forecast to cover around two-thirds of the continued cost (approx. £1m), with the remainder uncovered.

From 2026 onwards, these vital inputs to maintain the surveillance system are not funded. While a small part of the system's overall cost, if these inputs run short, AMR surveillance could grind to a halt.

What does this tell us about costs?

The study also provides some cost approximations that could be useful for AMR planning in Uganda and elsewhere:

£2.5m
The average annual cost of operating an AMR surveillance system for human and animal health
(Basic environmental surveillance would add **£300k**).[2]

£130k
The average annual cost per laboratory[3]
This is the average of more costly human health laboratories, and animal health laboratories that contain more limited equipment and carry out more limited testing.

£11 - £15
Average cost per human health sample, depending on assumptions[4]
Animal health samples could be obtained for £8 each.

These estimates are comparable with those of other studies of AMR - although these omit factors such as One Health policy and Animal Health labs which are included in the Uganda study. One of these (Gelband)[5] found that establishing a network of 8 laboratories in Kenya would cost US$2m, followed by $160k annually.

Outputs/benefits of AMR surveillance system

Extensive interviews and site visits in Uganda confirmed that while not yet quantifiable in economic terms, there is consensus about the benefits the surveillance system should deliver – detailed on page 3.

Benefit quantification will become clearer over time - as the AMR surveillance system's effectiveness increases and complementary policies are put in place on changing antimicrobial use - based on surveillance data.

[1] Foundations for Costing and Benefit Identification of National AMR Surveillance', Fleming Fund. 29 July 2022.
[2] Incomplete breakdown between different cost categories as not specified by some stakeholders, but infrastructure, human resources and supply chain elements are usually the three leading categories.
[3] Based on Uganda's 17 human and animal health laboratories, each processing an average of 220-250,000 samples annually and jointly serving a (human) population of 45m.
[4] Not to be confused with the cost per isolate, which would be significantly higher, as not all samples produce isolates.
[5] Gelband H, Okeke IN, Aboderin AO, Matinez E, Matu M. East Africa Public Health Laboratory Networking Project. Strengthening the Role of Laboratories in Tracking Antimicrobial Drug Resistance in East Africa. Center for Disease Dynamics, Economics & Policy; 2016.

AMR surveillance direct benefits

Facility (including patient/animal cases)	
	Information to guide antimicrobial treatment when laboratory results analysed regularly and communicated to clinical staff.[6]
	Early detection of outbreaks of AMR strains or hospital-acquired infections generally.
	Antimicrobial use (AMU) data used to improve use of antimicrobials at site level.
	Improved diagnosis of common and rare bacterial infections, including cases shown to be non-AMR.[7]
National	
	Information to update standard treatment guidelines – evidence-based public health policy.
	Information to update guidelines for AMU in animals.
	Information to track trends in AMR, including geographic variations and links between human and animal AMR.
	Improved surveillance of bacterial infections.
	Macroeconomic benefits as disease burden decreases (see facility level).
Global	
	Promotes the understanding of AMR by country rather than universal patterns to help complete global picture.
	Assists Uganda to assess progress and needs against other countries.

There would also be a range of indirect expected benefits to Uganda's health system, including resilience to other future disease epidemics.

Scenarios

The results above are from the Base Case, which include the best estimate for the expensive lab equipment used (see Methodology Note). If this rate could be raised through better efficiency, then unit costs would fall.

The boundaries between surveillance and clinical use are blurred; and the same equipment could also deliver clinical, as well as AMR surveillance benefits. The surveillance system can be protected from inflation because key major equipment items have already been purchased, with multi-year maintenance contracts in place.

What next?

Potential next steps in Uganda for AMR could include:

[6] This is not a direct benefit of surveillance. Included, given the significance as a positive externality of improving surveillance when existing clinical laboratory services are not present.
[7] Once the surveillance system is fully operational, a much larger volume of samples (blood, urine, stool, swab) will be taken and analysed for patient care than will be needed for AMR surveillance, although this will use and benefit from the resources applied for the establishment and operation of the AMR surveillance system. This clearly has national and global, as well as facility level, effects.