Registration of antimicrobials, Kenya, Uganda and United Republic of Tanzania, 2018
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Objective To determine the proportion of essential and non-essential antimicrobial medicines that are registered on the drug registers in Kenya, Uganda and United Republic of Tanzania.

Methods We categorized all antimicrobials on the national drug registers and essential medicines lists of the three countries using the British National Formulary. We also categorized all antibiotics according to the World Health Organization access, watch and reserve (AWaRe) classification. We calculated the proportions of essential and non-essential antimicrobials that were registered by antimicrobial class and AWaRe classification.

Findings In 2018, Kenya had 2105 registered antimicrobials, Uganda had 1563 and the United Republic of Tanzania had 1327. Of these medicines, 1353 (64.3%) were non-essential in Kenya, 798 (51.1%) in Uganda and 706 (53.2%) in the United Republic of Tanzania. Kenya had 160 antimicrobials on its national essential medicines lists, Uganda had 187 and the United Republic of Tanzania had 182; of these, 33 (20.7%), 50 (26.7%) and 52 (28.6%) were not registered, respectively. High proportions of antmycobacterial and antiparasitic medicines were not registered. Of essential access antibiotics, 14.3% (4/28) were not registered in Kenya, 8.6% (3/35) in Uganda and 20.5% (8/39) in the United Republic of Tanzania, nor were 25.0% (3/12) of watch antibiotics in Kenya, 14.3% (2/14) in Uganda and 19.1% (4/21) in the United Republic of Tanzania.

Conclusion Suboptimal registration of essential antimicrobials and over-registration of non-essential antimicrobials may encourage inappropriate use, especially since non-essential antimicrobials do not appear on national treatment guidelines. Countries should prioritize registration of the antimicrobial medicines on their essential medicines lists.

Abstract: العربية | 中文 | Français | Русский | Español at the end of each article.

Introduction
The World Health Organization (WHO) promotes the rational use of medicines and universal access to medicines through the WHO Model List of Essential Medicines, which guides the development of national lists of essential medicines. Essential medicines lists are designed to facilitate the procurement of appropriate medicines and are linked to standard treatment guidelines to ensure the appropriate clinical use of these medicines. Of the 194 Member States, at least 156 have essential medicines lists.

Although access to essential antimicrobials is fundamental to the human right to health and a key component of sustainable development goal 3.8, more than 1 million children in the world die every year from untreated pneumonia and sepsis. At the same time, antimicrobial resistance is a serious threat to global public health. Increased antibiotic use has mainly occurred in low- and middle-income countries where the threat to global public health. Increased antibiotic use has resulted in a shift towards the use of broad-spectrum and last-resort antibiotics. The United Republic of Tanzania has recently adopted the AWaRe classification for antibiotics: access antibiotics should be dispensed at all levels of the healthcare system.

WHO has warned that “without harmonized and immediate action on a global scale, the world is heading towards a post-antibiotic era in which common infections could once again kill.” In 2015, the World Health Assembly endorsed a five-point antimicrobial resistance global action plan, a key component of which is optimizing the use of antimicrobials in humans. In 2017, the WHO Model List of Essential Medicines adopted the AWaRe classification for antibiotics, that is, access, watch and reserve. Access antibiotics are those that have activity against common susceptible bacteria and show lower resistance potential than antibiotics in other groups. Access antibiotics are recommended as first- or second-line treatments and access to these antibiotics should be ensured.

Watch antibiotics have higher resistance potential while reserve antibiotics are the last-resort options that should be reserved for treatment of infections caused by multidrug-resistant bacteria. WHO recommends that watch and reserve antibiotics be prioritized as targets of national and local stewardship programmes and monitoring.

The East African Community, which comprises Burundi, Kenya, Rwanda, South Sudan, Uganda and United Republic of Tanzania, have a high burden of infectious diseases. Kenya, Rwanda, Uganda and United Republic of Tanzania have high levels of resistance to common antimicrobials and sub-optimal availability of essential antimicrobials in healthcare facilities. Data on antimicrobial resistance and availability of essential antimicrobials in Burundi and South Sudan are lacking.

Kenya, Uganda and United Republic of Tanzania have national action plans on antimicrobial resistance. Their essential medicines lists are linked to standard treatment guidelines to promote universal access to and appropriate use of antimicrobials. The United Republic of Tanzania has recently adopted the AWaRe classification for antibiotics: access antibiotics should be dispensed at all levels of the...
health system, watch antibiotics should be dispensed from district hospitals and reserve antibiotics should be used at tertiary hospitals.\textsuperscript{24}

Marketing authorization, or registration, by a national medicines regulatory agency is the first step towards making medicines available at the country level. Registrations are typically driven by market potential and may not reflect public health need. For instance, national drug registers include thousands of products, while essential medicines lists in low- and middle-income countries prioritize a few hundred of the most essential medicines. However, the registration of even this smaller subset of essential medicines is not guaranteed if the market is not attractive to pharmaceutical manufacturers.

Lack of registration of essential medicines may promote the use of non-essential medicines and, in less regulated markets, the use of unlicensed forms of a drug. Medicines circulating on the market without an approval from the national regulatory agency are illegal. Moreover, unregistered medicines may not meet necessary quality standards. Such medicines do not enter the market through reputable channels and are often transported under poor conditions.\textsuperscript{29} The use of unregistered medicines can lead to treatment failure and contribute to antimicrobial resistance if a treatment course contains only a fraction of the correct dose, or the medicine is so badly made that the active ingredients are not dispersed properly.\textsuperscript{30,31}

Systematic studies on registration of essential medicines in sub-Saharan Africa are lacking. A study on registration of first-line drugs for cryptococcal meningitis in low- and middle-income countries showed that neither flucytosine nor amphotericin B was registered in the correct dose and form in Uganda and in the United Republic of Tanzania.\textsuperscript{22} In Kenya, amphotericin B was registered, but flucytosine was not.\textsuperscript{32}

Previous analysis of Uganda’s national drug register showed critical under-registration of essential medicines in the country.\textsuperscript{33} Research has shown inappropriate use of medicines when recommended treatment options are not available.\textsuperscript{34}

Recently the East African Community harmonized registration processes for medicines and created a common market for medicines within the community.\textsuperscript{35} Therefore, a closer look at registration of medicines in the region is important to understand if non-availability of essential antimicrobials is associated with non-registration. Such information could help policy-makers understand gaps in availability across the region and inform policies to contain antimicrobial resistance, and improve access to essential medicines.

The aim of our study was to ascertain the extent to which antimicrobials on the essential medicines list and non-essential antimicrobials are registered on the national drug registry in Kenya, Uganda and United Republic of Tanzania. We highlight specific examples of unregistered essential medicines and registered non-essential medicines to show the potential implications for availability and antimicrobial resistance. We could not include Burundi, Rwanda and South Sudan because of the lack of publicly available national drug registers. We determined the registration status of antimicrobials on the national essential medicines lists, which indicates their availability within the country, and calculated the proportion of registered non-essential antimicrobials. We also calculated the proportion of registered and essential antibiotics according to the AWaRe classification.

**Methods**

**Data sources**

We used the 2016 essential medicines lists for Kenya and Uganda (688 and 682 essential medicines, respectively) and the 2017 essential medicines list for the United Republic of Tanzania (838 essential medicines) to identify the antimicrobials recommended for use in these countries by their respective ministries of health.\textsuperscript{24,25} We also accessed the national drug registers for the three countries on 26 February 2018. The national drug registers listed 6151, 3896 and 3590 products for Kenya, Uganda and United Republic of Tanzania, respectively.

**Data extraction**

We extracted the following information on antimicrobials from the essential medicines lists: generic name of the medicine, recommended strength and formulation, and the level of the health system at which the medicine should be available and used. We excluded non-medicinal products on the lists as well as veterinary products on Kenya’s national drug register.

We categorized medicines on the essential medicines lists as registered or unregistered according to whether any products with the same generic name, strength and formulation appeared on the national drug registers. We classified medicines on the essential medicines list that were on the national drug register, but in a different strength, route of administration or preparation as unregistered. However, we allowed a different dosage if the different strengths on the national drug register multiplied to the strength recommended on the essential medicines list. We identified and sorted all medicines containing an antimicrobial agent by type of antimicrobial; we sorted antibiotics by class using the British National Formulary system (Box 1).\textsuperscript{36} The antimicrobial combinations category included medicines with two or more different classes of antimicrobial agent. The other category included antimicrobial agents that target more than one class of microorganism. We categorized essential antibiotics as access, watch, reserve or unclassified according to the AWaRe tool from the WHO Model List of Essential Medicines.\textsuperscript{7}

We calculated the relative proportions of registered and unregistered essential antimicrobials in total and

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**Box 1. Categorization of antimicrobials**

**Antimicrobials**

Antibiotics; antivirals; antifungals; antimalarials; antiparasitics; antituberculars; combinations; and other.\textsuperscript{4}

**Antibiotic classes**

Penicillins; macrolides; quinolones and fluoroquinolones; aminoglycosides; first-generation cephalosporins; second-generation cephalosporins; third-generation cephalosporins; fourth-generation cephalosporins; tetracyclines; penems and carbapenems; combinations of different classes of antibiotic; and other antibiotics.

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\textsuperscript{4} Contain two or more different antimicrobial agents.

\textsuperscript{5} Antibiotics that target more than one type of microorganism.

Note: Categorization was according to the British National Formulary.\textsuperscript{36}
by class. For access, watch and reserve antibiotics that appeared on the essential medicines list, we also calculated the proportion that were not registered.

We categorized medicines on the national drug register as essential or non-essential according to whether their generic name, strength and formulation appeared on the national essential medicines lists. We classified medicines on the drug register that were on the essential medicines lists, but in a different strength, route of administration or preparation as non-essential. We identified all medicines containing an antimicrobial agent from the national drug register. We then categorized antimicrobials and antibiotics using the same system as for the essential medicines lists. We calculated the relative proportions of essential and non-essential antimicrobials and access, watch, reserve and unclassified antibiotics registered in each country.

Results

For Kenya 20.6% (33/160) of antimicrobials on the national essential medicines lists were not registered, and 64.3% (1353/2105) of the registered antimicrobials were non-essential medicines. For Uganda and the United Republic of Tanzania the proportions for unregistered antimicrobials were 26.7% (50/187) and 28.6% (52/182), respectively and the proportions of non-essential antimicrobials were 51.1% (798/1563) and 52.8% (1327/2509) respectively (Table 1).

Unregistered essential antimicrobials

Table 2 shows the proportion of essential antimicrobial medicines that were unregistered. In Kenya and Uganda, antiparasitic antimicrobials had the highest proportion of unregistered essential medicines (35.7%; 5/14 and 57.9%; 11/19, respectively). In both countries, these unregistered essential antiparasitic medicines included pentamidine, sulfadiazine and melarsoprol.

In the United Republic of Tanzania, antimycobacterials had the highest proportion of unregistered essential medicines (56.0%; 14/25). Only one product of a combination of rifampicin, isoniazid, pyrazinamide and ethambutol was registered, and no combinations of rifampicin and isoniazid were registered.

In Kenya, no products of bedaquiline (used to treat multidrug-resistant tuberculosis) were registered. In both Uganda and Kenya, no products containing an intravenous infusion of sulfamethoxazole–trimethoprim in the dose recommended on the respective essential medicines lists were registered.

In total, about a fifth to a quarter of essential antimicrobial medicines were unregistered in the three countries.

Registered non-essential antimicrobials

Kenya had the highest proportion (69.0%; 864/1253) of registered non-essential antibiotics (Table 3). All second-generation cephalosporins registered in Kenya and almost all those registered in the United Republic of Tanzania were non-essential. All fourth-generation cephalosporins registered in Kenya and Uganda were non-essential. In all three countries, a high proportion of registered combination antimicrobials were non-essential (Table 3). Of these non-essential registered combination antimicrobials, one in Kenya, 13 in Uganda and 16 in the United Republic of Tanzania were topical preparations containing an antibiotic and an antifungal with a corticosteroid.

AWiRe

The highest proportions of registered antibiotics in all three countries were in the access category and the lowest proportion were in the reserve category (Table 4). The proportions of unregistered access antibiotics were 14.3% (4/28) in Kenya, 6.6% (3/35) in Uganda and 20.5% (8/39) in the United Republic of Tanzania. Of the watch antibiotics on national essential medicines lists, 25.0% (3/12), 14.3% (2/14) and 19.0% (4/21) were not registered. In United Republic of Tanzania, two of three reserve antibiotics on the essential medicines list were not registered.

Discussion

For all three countries, more than half of registered antimicrobials were non-essential and up to a third of essential antimicrobial medicines were not registered.

In the United Republic of Tanzania, the antimycobacterial category had the highest proportion of unregistered essential medicines. Only one product for the combination rifampicin, isoniazid, pyrazinamide and ethambutol was registered, which is recommended for the initial phase of treatment of tuberculosis in standard treatment guidelines. Furthermore, the country had no registered combinations of rifampicin and isoniazid, which is recommended for continuation therapy in the treatment of newly diagnosed tuberculosis. The United Republic of Tanzania is on the WHO list of 30 countries with the highest tuberculosis burden in the world and therefore access to appropriate antimycobacterials is vital. There is multidrug-resistant tuberculosis in Kenya, but bedaquiline is not registered for use, even though WHO recommends this medicine always be included in the long-course treatment of multidrug-resistant tuberculosis. The non-registration of some antimycobacterials in Kenya and in the United Republic of Tanzania may be due to parallel tuberculosis programmes that procure medicines internationally and import them on a special import licence.

All three countries have a high proportion of unregistered essential antiparasitic medicines. In Kenya and Uganda, three essential antitypano-
somal medications; pentamidine, suramin sodium and melarsoprol, are not registered. In the early 1960s, trypanosomiasis prevalence fell to low levels in the WHO African region, but a lack of regular surveillance, reduced allocation of resources, changing health priorities and non-availability of medications led to the resurgence of the disease, causing epidemics in some areas. Therefore, antitrypanosomal medications remain on the essential medicines lists and standard treatment guidelines in both countries. Although no cases of trypanosomiasis have been reported in Kenya since 2012, and only 10 cases were reported in Uganda in 2016, the fact that these antitrypanosomal medications are not registered is nevertheless of concern.

Penicillins are categorized as access antibiotics and are recommended first-line treatment for several infections in the Tanzanian standard treatment guidelines, but a high proportion of penicillins in the essential medicines list are not registered. Sulfamethoxazole+trimethoprim is recommended by WHO as the first-line treatment for lower urinary tract infections and second-line treatment for acute invasive diarrhoea and bacterial dysentery. Although these infections are among the top 10 causes of death in Kenya and Uganda, no products containing an intravenous infusion of sulfamethoxazole–trimethoprim in the dose recommended on the respective essential medicines lists were registered in either country.

Lack of registration of essential antimicrobial medicines risks the use of unregistered products. Availability of unregistered medicines has previously been reported in Kenya and Uganda. In Kenya, 42.2% of antimalaria medicines and 27.4% (26/95) of antiretroviral medicines sampled were not registered. A Ugandan study of six tracer medications identified five unregistered brands of rifampicin that were available in medicine outlets. Such medicines may be substandard. Substandard medicines promote antimicrobial resistance and the spread of drug-resistant infections.

The availability of unregistered medicines is an enforcement issue that is not addressed here.

Expedited regulatory approvals were introduced to facilitate and speed up the registration processes for es-
sential medicines. The WHO collaborative registration procedure allows accelerated registration of finished pharmaceutical products that have been prequalified by WHO, \(^46,47\) including products approved through Article 58 of the European Union and the Plan for AIDS Relief of the United States Food and Drug Administration. \(^48,49\)

Further support for national medicine regulatory agencies comes from regional harmonization of regulatory requirements. The East African Community, in collaboration with the New Partnership for Africa’s Development, launched the East African Community Medicines Registration Harmonization project in 2012. \(^35\) Joint registrations at this level could also improve access to essential antimicrobial medicines in the region if these products are prioritized.

More than half of the antimicrobial medicines registered in Kenya, Uganda and United Republic of Tanzania are non-essential. Antimicrobial medicines that are not included in essential medicines lists do not appear in standard treatment guidelines, which is likely to lead to the inappropriate use of these non-essential antimicrobials. Our data show that particularly high proportions of non-essential second- and fourth-generation cephalosporins are registered. Second-generation cephalosporins are watch antibiotics, indicating that they have a high resistance potential and their use should be limited. Fourth-generation cephalosporins are reserve antibiotics and as such, should be a last-resort solution for multidrug-resistant infections. Therefore, the high rate of registration of non-essential second- and fourth-generation cephalosporins is alarming.

In addition, we found a high proportion of registered non-essential combination antimicrobials containing topical preparations containing an antibiotic and an antifungal with a corticosteroid. A Tanzanian study reported the overprescribing of antibiotics for fungal skin infections and identified the excessive use of fixed-dose combinations of an antibiotic, antifungal medicine and a steroid as a contributory factor. \(^50\) The registration of such products has the potential to encourage inappropriate

| Antimicrobial                        | Kenya | Uganda | United Republic of Tanzania |
|--------------------------------------|-------|--------|----------------------------|
|                                      | Registered antimicrobials, no. | Registered non-essential antimicrobials, no. (%) | Registered antimicrobials, no. | Registered non-essential antimicrobials, no. (%) | Registered antimicrobials, no. | Registered non-essential products, no. (%) |
| Antibiotics                          |       |        |                            |
| Macrolides                           | 152   | 92 (60.5) | 87 | 49 (56.3) | 70 | 13 (18.6) |
| Penems and carbapenems               | 46    | 26 (56.5) | 20 | 9 (45.0) | 22 | 11 (50.0) |
| Penicillins                          | 318   | 224 (70.4) | 269 | 180 (66.9) | 221 | 156 (70.6) |
| Aminoglycosides                      | 64    | 40 (62.5) | 64 | 33 (51.6) | 38 | 22 (57.9) |
| First-generation cephalosporins     | 39    | 36 (92.3) | 33 | 26 (78.8) | 30 | 21 (70.0) |
| Second-generation cephalosporins    | 90    | 90 (100.0) | 49 | 32 (65.3) | 40 | 39 (97.5) |
| Third-generation cephalosporins     | 173   | 98 (56.6) | 108 | 56 (51.9) | 91 | 33 (36.3) |
| Fourth-generation cephalosporins    | 13    | 13 (100.0) | 7 | 7 (100.0) | 13 | 3 (23.1) |
| Tetracyclines                        | 48    | 35 (72.9) | 26 | 12 (46.2) | 15 | 10 (66.7) |
| Quinolones and fluoroquinolones     | 150   | 106 (70.7) | 114 | 50 (43.9) | 99 | 46 (46.5) |
| Combinations of different classes of antibiotic | 47 | 22 (47.8) | 54 | 34 (63.0) | 26 | 17 (65.4) |
| Other antimicrobials                 | 113   | 82 (72.6) | 132 | 69 (52.3) | 95 | 47 (49.5) |
| Subtotal                             | 1253  | 864 (69.0) | 963 | 556 (57.7) | 760 | 418 (55.0) |
| Antiparasitics                       | 152   | 114 (75.0) | 60 | 22 (36.7) | 56 | 13 (23.2) |
| Antivirals                           | 193   | 64 (33.2) | 187 | 68 (36.4) | 199 | 102 (51.3) |
| Antimalarials                        | 133   | 71 (53.4) | 136 | 49 (36.0) | 114 | 70 (61.4) |
| Antimycobacterials                   | 17    | 6 (35.3) | 25 | 6 (24.0) | 15 | 1 (66.7) |
| Antifungals                          | 242   | 157 (64.9) | 157 | 67 (42.7) | 137 | 63 (46.0) |
| Combinationsa                        | 77    | 56 (72.7) | 28 | 28 (100.0) | 34 | 34 (100.0) |
| Otherb                              | 38    | 21 (55.3) | 9 | 4 (44.4) | 12 | 5 (41.7) |
| Total                               | 2105  | 1353 (64.3) | 1565 | 800 (51.1) | 1327 | 706 (53.2) |

\(^a\) Combinations contain two or more different antimicrobial agents.

\(^b\) Other is antimicrobials that target more than one type of microorganism.
use and may consequently contribute to antimicrobial resistance.

Data on the consumption of antimicrobials in Kenya, Uganda and United Republic of Tanzania are still limited. Kenya and Uganda did not submit data to the WHO report on surveillance of antibiotic consumption 2016–2018, while the United Republic of Tanzania submitted only limited import data as a proxy for consumption. Our findings on the registration status of AWaRe antimicrobials support the Tanzanian import data, showing that most antibiotics are in the access category and a significant proportion (over 20%) are unclassified.

Our study has some limitations. We did not examine other legal routes to availability of medicines, including those used by governments and donors, which procure medicines using a special import licence. We accessed the national drug registers for the three countries in February 2018 and the national essential medicine lists valid at that time; we did not take account of any changes since that date.

Alignment of the register of medicinal products and the essential medicines list, which in turn is linked to treatment guidelines, is important to ensure the appropriate use of medicines. The reasons for suboptimal registration of essential medicines in Kenya, Uganda and United Republic of Tanzania need to be examined. All three countries should add explicit commitment to improving drug registration procedures to their national antimicrobial resistance action plans. They should also implement measures to prioritize registration of essential antimicrobials and restrict registration of non-essential antimicrobials. Kenya and Uganda should follow the lead of the United Republic of Tanzania and adopt the AWaRe categorization in their essential medicines lists to increase awareness of resistance potential and the caution needed when access, watch and reserve antibiotics are used.

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Table 4. AWaRe categorization of registered and essential antibiotics, Kenya, Uganda and United Republic of Tanzania, 2018

| AWaRe category       | Kenya               | Uganda            | United Republic of Tanzania |
|----------------------|---------------------|-------------------|-----------------------------|
| Access               |                     |                   |                             |
| Number of registered access antibiotics (% of all registered antibiotics) | 503 (40.1) | 438 (45.5) | 332 (43.7) |
| Number of essential access antibiotics | 28 | 35 | 39 |
| Number of unregistered essential access antibiotics (% of all essential access antibiotics) | 14 (13.3) | 3 (8.6) | 8 (20.5) |
| Watch                |                     |                   |                             |
| Number of registered watch antibiotics (% of all registered antibiotics) | 348 (27.8) | 279 (29.0) | 239 (31.4) |
| Number of essential watch antibiotics | 12 | 14 | 21 |
| Number of unregistered essential watch antibiotics (% of all essential watch antibiotics) | 3 (25.0) | 2 (14.3) | 4 (19.1) |
| Reserve              |                     |                   |                             |
| Number of registered reserve antibiotics (% of all registered antibiotic products) | 6 (0.5) | 6 (0.6) | 3 (0.4) |
| Number of essential reserve antibiotics | 1 | 0 | 3 |
| Number of unregistered essential reserve antibiotics (% of all essential reserve antibiotics) | 0 (0.0) | 0 (0.0) | 2 (66.7) |
| Unclassified*        |                     |                   |                             |
| Number of registered unclassified antibiotics (% of all registered antibiotics) | 396 (31.6) | 240 (24.9) | 186 (24.5) |
| Total                | 1253                | 963               | 760                         |

* None of the unclassified antibiotics was on the essential medicines list.
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Purpose To determine the proportion of essential and non-essential antimicrobials in the national drug registers of Kenya, Uganda, and Tanzania, 2018.

Methods We used the British National Formulary (BNF) to identify the categories of essential and non-essential antimicrobials in the national drug registers of the three countries.

Results In 2018, Kenya had 2105 antimicrobials registered, Uganda had 1563, and Tanzania had 1327. Among these, Kenya had 1353 (64.3%) non-essential antimicrobials, Uganda had 798 (51.1%) non-essential antimicrobials, and Tanzania had 1064 (79.5%) non-essential antimicrobials.

Conclusion The classification of antimicrobials in the national drug registers of East African countries is not aligned with the World Health Organization's (WHO) antimicrobial classification (Access, Watch, Reserve) for essential and non-essential antimicrobials.
Результаты В 2018 г. в Кении было зарегистрировано 2105 противомикробных препаратов, в Объединенной Республике Танзания — 1327, а в Уганде — 1563. Из них к неосновным препаратам относились 1353 (64,3%) в Кении, 706 (53,2%) в Объединенной Республике Танзания и 798 (51,1%) в Уганде. В национальном списке основных лекарственных препаратов Кении было 160 противомикробных препаратов, в Объединенной Республике Танзания — 182 и в Уганде — 187, из этих препаратов 33 (20,7%), 52 (28,6%) и 50 (26,7%) соответственно не были зарегистрированы. Значительная часть противотуберкулезных и антипаразитарных препаратов не была зарегистрирована. Что касается антибиотиков, среди основных лекарственных препаратов из группы широкого действия 14,3% (4/28) не были зарегистрированы в Кении, 20,5% (8/39) в Объединенной Республике Танзания и 8,6% (3/35) в Уганде, а для антибиотиков из группы наблюдения эта доля составила 25,0% (3/12) для Кении, 19,1% (4/21) для Объединенной Республики Танзания и 14,3% (2/14) для Уганды.

Вывод Недостаточная регистрация основных лекарственных препаратов противомикробного действия и избыточная регистрация неосновных противомикробных препаратов могут способствовать ненадлежащему применению, особенно потому, что неосновные противомикробные препараты не фигурируют в национальных руководящих принципах лечения. Странам следует уделять первоочередное внимание регистрации противомикробных препаратов в списках основных лекарственных препаратов.

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