Systematic review and bibliometric analysis of African anesthesia and critical care medicine research Part II: A scientometric analysis of the 116 most cited articles

Ulrick Sidney Kanmounye (✉ ulricksidney@gmail.com)
Ngaliema National Reference Hospital  https://orcid.org/0000-0001-6791-1018

Joel Noutakdie Tochie
Universite de Yaounde I Faculte de Medecine et des Sciences Biomedicales

Aime Mbonda
Universite de Yaounde I Faculte de Medecine et des Sciences Biomedicales

Cynthia Wafo Solam
Association of Future African Neurosurgeons

Leonid Daya
Association of Future African Neurosurgeons

Thompson Hope Atem
Association of Future African Neurosurgeons

Arsène Daniel Nyalundja
Association of Future African Neurosurgeons

Daniel Cheryl Eyaman
Association of Future African Neurosurgeons

Review

Keywords: Africa, anesthesia, bibliometrics, global anesthesia, research

DOI: https://doi.org/10.21203/rs.3.rs-41787/v2

License: ☑ This work is licensed under a Creative Commons Attribution 4.0 International License.
Read Full License
Abstract

Background

Scientometrics is used to assess the impact of research in several health fields, including Anesthesia and Critical Care Medicine. The purpose of this study was to define the landscape and key players of Anesthesia and Critical Care Medicine research in Africa.

Methods

The authors searched Web of Science from inception to May 4, 2020, for articles on and about Anesthesia and Critical Care Medicine in Africa with \( \geq 2 \) citations. Quantitative (H-index) and qualitative (descriptive analysis of yearly publications and interpretation of document, co-authorship, author country, and keyword) bibliometric analyses were done.

Results

The search strategy returned 116 articles that had a median of 5 (IQR: 3-12) citations on Web of Science. The most frequent journals were Anesthesia and Analgesia (18, 15.5%), World Journal of Surgery (13, 11.2%), and South African Medical Journal (8, 6.9%). Most (74, 63.8%) articles were published on or after 2013, and seven authors had more than 1 article in the top 116 articles: Epiu I (3, 2.6%), Elobu AE (2, 1.7%), Fenton PM (2, 1.7%), Kibwana S (2, 1.7%), Rukewe A (2, 1.7%), Sama HD (2, 1.7%), and Zoumenou E (2, 1.7%). The bibliometric coupling analysis of documents highlighted 10 clusters with the most significant nodes being Biccard BM, 2018; Baker T, 2013; Llewellyn RL, 2009; Nigussie S, 2014; and Aziato L, 2015. Dubowitz G (5) and Ozgediz D (4) had the highest H-indices among the authors referenced by the most-cited African Anesthesia and Critical Care Medicine articles. The U.S.A. had the largest global node, while South Africa and Uganda had the largest African nodes. The most prominent keywords were anesthesia, mortality, and surgery.

Conclusion

This study highlighted a decline in the number of top-cited African articles and the roles of the U.S.A, Southern African, and East African countries in scholarly output. Future studies should focus on understanding the time trends of the publications.

Background
Scientometrics is the branch of bibliometrics that analyzes the impact of peer-reviewed articles and scientific journals.[1] The impact of peer-reviewed articles can be evaluated both quantitatively and qualitatively. Of the two methods, quantitative scientometrics is more common. Some of the most common quantitative measures include the $h$-index, i10-index, g-index, or Page-Rank index. These indices are commonly used to measure the academic output and rank researchers and academic institutions. Unlike quantitative measures, qualitative scientometrics is less commonly used, and as a result, the description of academic output is often restricted to a quantitative evaluation.[2]

North American researchers and institutions have high H-indices and ranked consistently above European and Asian researchers and institutions.[3, 4] At the other end of the spectrum, African researchers have smaller scholarly outputs and often have fewer resources than their counterparts from the other regions.[5, 6] Lack of funding and protected time are the most important barriers to research in Africa.[7] To mitigate the effects of these barriers, African researchers collaborate with colleagues from high-income countries to apply for grants from foreign funding agencies. Another reason for the lower research output in Africa is the lack of career advancement opportunities.[7] The reason being that few African academic institutions have the resources to support the development of laboratories and academic chairships.

Anesthesia and critical care medicine (ACCM), like other health-related fields, use scientometrics to evaluate scholarly impact. [8–11] However, little is known about the impact of African research. In this manuscript, we aimed to identify the most impactful studies, the greatest contributors, and emerging themes in African anesthesia and critical medicine. In this paper, we use both quantitative and qualitative methods to identify influential authors, countries, and themes in African anesthesia.

**Methods**

*Defining African anesthesia and critical care medicine research*

ACCM research was defined as research on the practice of ACCM in Africa. The study protocol can be accessed online (http://doi:10.13140/RG.2.2.28999.32167).

*Search strategy and data sources*

A systematic search of articles reporting inequities on the practice of ACCM in Africa was performed. The relevant articles were identified using a broad Web of Science search strategy to capture terms associated with "Anesthesia," "Critical care medicine," and "Africa." The advanced search strategy (Additional File 1) was developed by the first author, who has received formal training in information management (USK). All articles published from inception to May 4, 2020, were included irrespective of the language. All articles with $\geq 2$ citations were included.

*Screening and data extraction*

The titles and abstracts of the articles were screened twice by two authors (USK and JNT). After the first screen, all conflicts were resolved by the two authors. The eligible articles were exported as text files then
uploaded unto Bibexcel (Bibexcel, Austria) for bibliometric citation analysis. Later, the data from Bibexcel was uploaded on VOSviewer (University of Leiden, Netherlands) for content analysis. Descriptive analysis of yearly publications was visualized as a bar chart, while bibliometric coupling by document, co-authorship, author country and keyword were visualized as maps. Ethical clearance was not necessary for this study.

**Results**

We found 116 articles on or about African ACCM with ≥ 2 citations. The 116 articles had a median Web of Science citations was 5 (IQR: 3-12) on and 5 (IQR: 3-13) median citations when considering additional citation sources (BIOSIS, Chinese Science Citation, Data Citation, Russian Science, and SCIELO). The median usage count (since 2013) was 2 (IQR: 1-4), and the articles had a median of 23 (IQR: 14-33) references.

The most common journals for the 116 articles were Anesthesia and Analgesia (18, 15.5%), World Journal of Surgery (13, 11.2%), South African Medical Journal (8, 6.9%), and Canadian Journal of Anesthesia (6, 5.2%) (Table 1).

More than half (74, 63.8%) of the articles were published on or after 2013 (Figure 1). Seven authors had more than 1 article in the top 116 articles: Epiu I (3, 2.6%), Elobu AE (2, 1.7%), Fenton PM (2, 1.7%), Kibwana S (2, 1.7%), Rukewe A (2, 1.7%), Sama HD (2, 1.7%), and Zoumenou E (2, 1.7%).

The bibliometric coupling analysis of documents highlighted 10 clusters with a total link strength of 1293 from 84 items and 766 links. The largest nodes were Biccard BM, 2018; Baker T, 2013; Llewellyn RL, 2009; Nigussie S, 2014; and Aziato L, 2015 (Figure 2).

Dubowitz G (5) and Ozgediz D (4) had the highest H-index among the authors referenced by the most-cited African anesthesia articles. Seventy-two authors had an H-index of 2 or higher (Table 2).

Co-author analysis of the articles revealed that the 21 co-author items were grouped into 3 clusters connected by 80 links (total link strength 156) (Figure 3).

Author countries were organized into 8 clusters composed of 43 items with 176 links and a total link strength of 271. The United States of America had the largest global node, while South Africa and Uganda had the largest African nodes (Figure 4).

The most prominent keywords were anesthesia, mortality, and surgery. The keyword was organized into 4 clusters made of 17 items, 85 links, and a total link strength of 208 (Figure 5).

**Discussion**

Anesthesia and Analgesia (15.5%) had the most articles among the 116 studies. The South African Medical Journal (6.9%) was the first African journal in third place, and the Southern African Journal of
Anaesthesia and Analgesia (1.7%) was the first specialty African journal in eleventh place ex aequo. Epiu I had the greatest number of first author articles (2.6%), and the African Surgical Outcomes Study by Biccard et al. was among the most influential papers. Dubowitz et al. had the highest H-index among the references of the most cited articles.

Visibility and citations

African research has lower scientometric measures than Western research.[10] The small number of articles with ≥ 2 citations is alarming but not surprising. Citation metrics are a measure influenced by the relevance and novelty of the study findings, but the visibility equally influences them. High impact journals offer visibility and prestige, but they are very selective. Unfortunately, African researchers often lack the funds, support, and experience to design and carry out studies that are susceptible to be published in high impact factor journals but interestingly both the U.S.A. and Africa share the same top specialty target journals.[9, 10]

Open access equally increases article visibility and citation; however, the open-access costs in some high impact factor journals can be prohibitive.[6, 7, 12] Few African authors can afford the open access fee in high impact factor journals and will either have to opt for a subscription-based journal or a less expensive journal that that will lead to decreased visibility.[12] Most local journals have lower or no publication fees but tend to have smaller readerships and impact factors.[13] Fortunately, an increasing number of high impact factor journals are offering open access fee waivers to authors from low-income countries and reductions for authors from lower- and upper-middle-income countries.[13] Hence, prohibitive publication charges might explain the lower citation metrics in African research.

Another way authors can improve the visibility of their articles is to design and disseminate visual abstracts, organize post-publication journal clubs, and write op-eds on their findings.[12, 14, 15] Little is known about the post-publication practices in African ACCM research. The lack of or inadequate post publication practices in African ACCM research may be responsible for lower visibility and citation metrics.

Keywords

There appears to be a keyword transition from critical care ("severe sepsis" and "septic shock") to anesthesia ("surgery") among the most cited articles on the practice of anesthesia and critical care medicine. The nodes of sepsis were smaller and less connected than those of anesthesia. Also, sepsis was peripheral, while anesthesia was central. The most cited critical care articles were focused on the outcomes of sepsis. This is evidenced by the fact that "severe sepsis," and "septic shock" had strong links with "anesthesia," "mortality," and "Africa."

Sepsis is the most common cause of death from infectious diseases, and Africa has an enormous burden of infectious diseases.[16–18] In particular, the African region is among the most affected by the human immunodeficiency virus and Mycobacterium tuberculosis, the first and second causes of sepsis in
Africa, respectively.

Moreover, sepsis is responsible for USD 10-469 billion in financial loss among African families and states. Despite the considerable clinical and financial burden of sepsis in Africa, it remains under-reported and under-researched. This scientometric analysis highlights the need to increase the visibility of articles on other aspects of critical medicine. For example, research on the other components of the continuum of care such as surveillance, prevention, prehospital care, and rehabilitation must be highlighted.

Although the terms "global health," "low-income countries," and "developing countries" were prominent, there was no noticeable "global anesthesia" node. It appears that global anesthesia research is accessible in Africa, but the term "global anesthesia" is not as popular. Global anesthesia is a growing field that studies and advocates for universal access to safe, timely, and affordable anesthesia care. The year 2010 was a marquee year for global anesthesia as Dubowitz et al. highlighted specialist workforce shortage in low-and middle-income countries and its impact on patient outcomes. In the same year, McQueen published two articles on global anesthesia.

While the three global anesthesia articles were not focused on African anesthesia, they inspired research in the region. This fact is evidenced by Dubowitz et al.'s high H-index among the 116 articles. It is therefore attractive that a decade after the publication of the seminal global anesthesia studies, the term does not figure among the most influential keywords in African anesthesia research.

Biccard et al. identified ten research priorities for Africa: ACCM education, service delivery, peripartum hemorrhage, non-technical skills, infrastructure, context-specific evidence-based practice, economic analyses, information management, quality improvement, and perioperative outcomes. Other than perioperative outcomes (keywords: "mortality" and "surgery"), the other research priorities do not appear among the most cited African ACCM studies. Four of the ten priorities are health systems research, and only two are clinical. This corresponds with our finding that the field of global anesthesia is increasingly popular on the continent.

Author and country contributions

Biccard et al. published the most cited article by a predominantly African team (88 total citations). The study by Biccard et al. was a prospective study of 7-day postoperative mortality in 25 African countries entailing 247 hospitals and 11,422 patients. Moreover, the study was published open access in the Lancet, and unsurprisingly, it tallied a record high number of citations in just three years. The African research collaborative set a precedent for high-impact clinical research in Africa. We anticipate there will be similar initiatives and publications in the next few years. Such initiatives will need to build on the experience of researchers from Southern and East African regions (South Africa, Uganda, Tanzania, Malawi, Mozambique, Madagascar, Uganda, and the Democratic Republic of Congo) given that they had the most cited articles. This is essential because the connections between African countries were sparse.

The U.S.A. and the U.K. contributed more to impactful African ACCM research. On the one hand, this highlights the importance of collaboration between institutions in the "South" and those from the "North."
On the other hand, it draws attention to the lack of representation of African researchers among the most cited African studies. In a systematic review of authorship in African medical research, Hedt-Gauthier et al. found that 68.3% of papers had a collaborator from the "North" and only 23.0% of first authors were local researchers.[28] While we must correct this inequity, we must avoid gift authorship. It is crucial, therefore, that researchers from the host and visiting countries do their parts. Host researchers should contribute significantly, and visiting researchers should make sure their colleagues get the opportunity to contribute early on and often.

Limitations

There are several limitations to the present study. First, the definition of African ACCM research excludes articles by African researchers on the practice Anesthesia abroad. To include such studies would have been time-consuming and incomplete, mainly if African researchers used a foreign affiliation. Next, few African journals can be found on the major search databases. As a result, we might have missed a significant proportion of articles on local practice. We wish to note, however, that articles that are not found in one of the standard databases are less likely to have citation data.

Conclusion

This study is the first comprehensive scientometric analysis of African ACCM research. We noted a decline in the number of top-cited African articles and the premiere journal for impactful African articles in Anesthesia and Analgesia. Also, among African countries, Southern and East African countries were the greatest contributors to the most cited African articles. Future studies should investigate the recent decline in the number of articles and the absence of the term global anesthesia among the principal keywords.

Declarations

Ethics approval and consent to participate

Not applicable

Consent for publication

Not applicable

Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing interests
The authors declare that they have no competing interests.

Funding

Not applicable

Authors' contributions

U.S.K. conceptualized the study, investigated, curated, analyzed, and visualized the data, wrote the original draft of the manuscript, and administered the project. J.N.T., A.M., C.K.W., L.D., T.H.A., A.D.N., and D.C.E. investigated, validated, and wrote the original manuscript draft. All authors have read and approved the manuscript.

Acknowledgments

We wish to thank Daniel S. Nteranya for his help during the initial stages of the investigation.

Abbreviations

ACCM - African anesthesia and critical care medicine

References

1. Nair AS. Scientometrics in medical journals: Indices, their pros and cons. Indian J Anaesth. 2019;63:955–7.
2. Masic I. Medical publication and scientometrics. J Res Med Sci Off J Isfahan Univ Med Sci. 2013;18:516–21.
3. Cools E, Ausserer J, Velde M, Hamm P, Paal P. Publications from university-affiliated anaesthesiology departments: a look at Belgium, France and the Netherlands from 2001 to 2015. Scientometrics. 2019;119:863–878.
4. Wang J-O, Chen T-J, Kao S, Yeh T-C, Chou L-F, Ho S-T. Scientific publications by anesthesia departments in East Asia. Scientometrics. 2012;92:135–43.
5. Conradie A, Duys R, Forget P, Biccard BM. Barriers to clinical research in Africa: a quantitative and qualitative survey of clinical researchers in 27 African countries. Br J Anaesth. 2018;121:813–21.
6. Kokwaro G, Kariuki S. Medical research in Africa: problems and some solutions. Malawi Med J J Med Assoc Malawi. 2001;13:40.
7. Dhalla KA, Guirguis M. Barriers and incentives for conducting research amongst the ophthalmologists in Sub-Sahara Africa. PLOS ONE. 2018;13:e0197945.
8. Culley DJ, Fahy BG, Xie Z, Lekowski R, Buetler S, Liu X, et al. Academic Productivity of Directors of ACGME-Accredited Residency Programs in Surgery and Anesthesiology. Anesth Analg. 2014;118:200–205.
9. Ford DK, Richman A, Mayes LM, Pagel PS, Bartels K. Progressive Increase in Scholarly Productivity of New American Board of Anesthesiology Diplomates From 2006 to 2016: A Bibliometric Analysis. Anesth Analg. 2019;128:796–801.

10. Pagel PS, Hudetz JA. Scholarly Productivity and National Institutes of Health Funding of Foundation for Anesthesia Education and Research Grant Recipients Insights from a Bibliometric Analysis. Anesthesiol J Am Soc Anesthesiol. 2015;123:683–91.

11. Mowafi HA. Bibliometric analysis of the volume and visibility of Saudi publications in leading anesthesia journals. Saudi J Anaesth. 2012;6:393–7.

12. Brink PA. Article visibility: journal impact factor and availability of full text in PubMed Central and open access. Cardiovasc J Afr. 2013;24:295–6.

13. DOAJ. Directory of Open Access Journals. https://doaj.org. Accessed May 20 2020.

14. Ibrahim AM. Seeing is Believing: Using Visual Abstracts to Disseminate Scientific Research. Am J Gastroenterol. 2018;113:459–61.

15. Rajpal S, Resnick DK, Başkaya MK. The role of the journal club in neurosurgical training. Neurosurgery. 2007;61:397–402; discussion 402-403.

16. Otu A, Elston J, Nsutebu E. Sepsis in Africa: practical steps to stem the tide. Pan Afr Med J. 2015;21. doi:10.11604/pamj.2015.21.323.6462.

17. Michaud CM. Global Burden of Infectious Diseases. Encycl Microbiol. 2009;:444–54.

18. Liu L, Oza S, Hogan D, Chu Y, Perin J, Zhu J, et al. Global, regional, and national causes of under-5 mortality in 2000-15: an updated systematic analysis with implications for the Sustainable Development Goals. Lancet Lond Engl. 2016;388:3027–35.

19. Lewis JM, Feasey NA, Rylance J. Aetiology and outcomes of sepsis in adults in sub-Saharan Africa: a systematic review and meta-analysis. Crit Care. 2019;23:212.

20. Ranjeva SL, Warf BC, Schiff SJ. Economic burden of neonatal sepsis in sub-Saharan Africa. BMJ Glob Health. 2018;3:e000347.

21. Coonan TJ, Perndt H, McQueen KA. Global Anesthesia. Anesth Analg. 2018;127:e85–6.

22. Meara JG, Greenberg SLM. The Lancet Commission on Global Surgery Global surgery 2030: Evidence and solutions for achieving health, welfare and economic development. Surgery. 2015;157:834–5.

23. Dubowitz G, Detlefs S, McQueen KAK. Global anesthesia workforce crisis: a preliminary survey revealing shortages contributing to undesirable outcomes and unsafe practices. World J Surg. 2010;34:438–44.

24. McQueen KAK. Anesthesia and the global burden of surgical disease. Int Anesthesiol Clin. 2010;48:91–107.

25. McQueen KAK, Casey KM. The impact of global anesthesia and surgery: professional partnerships and humanitarian outreach. Int Anesthesiol Clin. 2010;48:79–90.

26. Biccard BM. Priorities for perioperative research in Africa. Anaesthesia. 2020;75:e28–33.
27. Biccard BM, Madiba TE, Kluyts H-L, Munlemvo DM, Madzimbamuto FD, Basenero A, et al. Perioperative patient outcomes in the African Surgical Outcomes Study: a 7-day prospective observational cohort study. The Lancet. 2018;391:1589–98.

28. Hedt-Gauthier BL, Jeufack HM, Neufeld NH, Alem A, Sauer S, Odhiambo J, et al. Stuck in the middle: a systematic review of authorship in collaborative health research in Africa, 2014–2016. BMJ Glob Health. 2019;4:e001853.

Tables

Table 1. List of journals with more than two articles among the most cited African anesthesia articles
| Journal                                                      | Number of articles (N=116, %) |
|-------------------------------------------------------------|-------------------------------|
| 1. Anesthesia and Analgesia                                 | 18 (15.5)                     |
| 2. World Journal of Surgery                                 | 13 (11.2)                     |
| 3. South African Medical Journal                            | 8 (6.9)                       |
| 4. Canadian Journal of Anesthesia                           | 6 (5.2)                       |
| 5. Pediatric Anesthesia                                     | 5 (4.3)                       |
| 6. Anaesthesia                                              | 4 (3.4)                       |
| 7. Journal of Clinical Anesthesia                           | 4 (3.4)                       |
| 8. Nigerian Journal of Clinical Practice                    | 4 (3.4)                       |
| 9. BMC Anesthesiology                                       | 3 (2.6)                       |
| 10. Surgery                                                 | 3 (2.6)                       |
| 11. Anesthesiology                                          | 2 (1.7)                       |
| 12. Annales Françaises d'Anesthésie et de Réanimation        | 2 (1.7)                       |
| 13. British Journal of Anaesthesia                          | 2 (1.7)                       |
| 14. Journal of Tropical Medicine and Hygiene                | 2 (1.7)                       |
| 15. Pan African Medical Journal                             | 2 (1.7)                       |
| 16. PLoS One                                                 | 2 (1.7)                       |
| 17. Southern African Journal of Anaesthesia and Analgesia   | 2 (1.7)                       |

**Table 2.** Backward citation analysis of the most cited African anesthesia studies. Only authors with an H-index greater than or equal to 2 are shown.
| Author                  | H-Index | Citation sum within H-core | All citations | All articles |
|-------------------------|---------|----------------------------|---------------|-------------|
| Dubowitz G              | 5       | 115                        | 119           | 6           |
| Ozgediz D               | 4       | 82                         | 82            | 4           |
| Maman AFOB              | 3       | 63                         | 65            | 4           |
| Twagirumugabe T         | 3       | 43                         | 43            | 3           |
| Ttendo SS               | 3       | 15                         | 15            | 3           |
| White MC                | 3       | 30                         | 30            | 3           |
| Lugazia E               | 3       | 82                         | 82            | 3           |
| Pollach G               | 3       | 21                         | 23            | 4           |
| Shrim MG                | 3       | 43                         | 43            | 3           |
| Mijumbi C               | 3       | 79                         | 79            | 3           |
| Rukewe A                | 3       | 15                         | 15            | 3           |
| Chobli M                | 3       | 61                         | 63            | 4           |
| Tindimwebwa JVB         | 3       | 44                         | 44            | 3           |
| Kaggwa S                | 3       | 75                         | 75            | 3           |
| Namboya F               | 3       | 21                         | 23            | 4           |
| Tindimwebwa J           | 3       | 75                         | 75            | 3           |
| Epiu I                  | 3       | 44                         | 44            | 3           |
| Zoumenou E              | 3       | 61                         | 64            | 4           |
| Lipnick M               | 3       | 75                         | 75            | 3           |
| Firth PG                | 3       | 15                         | 15            | 3           |
| Measures E              | 2       | 15                         | 15            | 2           |
| Baxter LS               | 2       | 24                         | 26            | 3           |
| Meara J                 | 2       | 47                         | 47            | 2           |
| Roche A                 | 2       | 35                         | 35            | 2           |
| Stekelenburg J          | 2       | 4                          | 4             | 2           |
| Close KL                | 2       | 24                         | 24            | 2           |
| Nelson BD               | 2       | 21                         | 21            | 2           |
| McQueen KAK             | 2       | 81                         | 81            | 2           |
| Name                    | Age 1 | Age 2 | Age 3 | Age 4 |
|-------------------------|-------|-------|-------|-------|
| Elobu AE                | 2     | 35    | 35    | 2     |
| Thwaites V              | 2     | 5     | 5     | 2     |
| Ravelojaona VA          | 2     | 24    | 24    | 2     |
| Evans F                 | 2     | 27    | 27    | 2     |
| McEvoy MD               | 2     | 14    | 16    | 3     |
| McQueen K               | 2     | 87    | 87    | 2     |
| Thomas J                | 2     | 6     | 6     | 2     |
| Newton MW               | 2     | 14    | 16    | 3     |
| Ndarugirire F           | 2     | 39    | 39    | 2     |
| Bruno E                 | 2     | 24    | 24    | 2     |
| Bulamba F               | 2     | 5     | 5     | 2     |
| Mkandawire N            | 2     | 9     | 9     | 2     |
| Scribante J             | 2     | 8     | 8     | 2     |
| Sama HD                 | 2     | 92    | 94    | 3     |
| Sandberg WS             | 2     | 14    | 14    | 2     |
| Burke TF                | 2     | 21    | 21    | 2     |
| Herbert A               | 2     | 24    | 24    | 2     |
| Mijjumbi C              | 2     | 35    | 35    | 2     |
| Sileshi B               | 2     | 14    | 16    | 3     |
| Enright A               | 2     | 39    | 39    | 2     |
| Ismailova F             | 2     | 80    | 82    | 3     |
| Bould MD                | 2     | 18    | 20    | 3     |
| Missair A               | 2     | 12    | 12    | 2     |
| Shotwell MS             | 2     | 14    | 14    | 2     |
| Chokwe TM               | 2     | 39    | 39    | 2     |
| Towey RM                | 2     | 15    | 15    | 2     |
| Fenton PM               | 2     | 30    | 30    | 2     |
| Galukande M             | 2     | 35    | 35    | 2     |
| van Roosmalen J         | 2     | 4     | 4     | 2     |
| Edgcombe H              | 2     | 5     | 5     | 2     |
| Name                | Month | Value1 | Value2 | Value3 | Value4 |
|---------------------|-------|--------|--------|--------|--------|
| Preston MA          | 2     | 12     | 12     | 2      |
| Was A               | 2     | 12     | 12     | 2      |
| Andriamanjato HH    | 2     | 24     | 24     | 2      |
| Kintu A             | 2     | 35     | 35     | 2      |
| Kinnear JA          | 2     | 18     | 20     | 3      |
| Perrie H            | 2     | 8      | 8      | 2      |
| Kibwana S           | 2     | 4      | 4      | 2      |
| Downing JW          | 2     | 12     | 12     | 2      |
| Ngumi ZWW           | 2     | 89     | 89     | 2      |
| Rakotoarison HN     | 2     | 24     | 24     | 2      |
| Fatiregun A         | 2     | 7      | 7      | 2      |
| Livingston P        | 2     | 31     | 31     | 2      |
| Knowlton LM         | 2     | 121    | 121    | 2      |
| Lokossou T          | 2     | 29     | 29     | 2      |