University of Pittsburgh

# Epidemiology Research and Training in Africa: Past, Present and Future

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*Word Congress of Epidemiology—WCE 2024*
*Cape Town, Sept 24, 2024*

# Outline

- Historical Context of Epidemiology Research and Training in Africa
- Challenges in Training African Epidemiologists
- Field Epidemiology Training in Africa
- MSc Clinical Epidemiology Program in WHO/AFRO
- Epidemiology and public health output trend within WHO/AFRO
- Multi-Country Collaborative Epi COVID-19/SCD Research
- Multi-Country Collaborative Epi Mpox Research: African-led Mpox Research Consortium
- Shaping the Future of Epidemiology Research and Training in Africa

# Historical Context of Epidemiology Research and Training in Africa

- **Colonial Influences**: Early epidemiological research in Africa was largely driven by colonial, military, and commercial interests, focusing on protecting colonial powers and their economic activities rather than addressing the needs of local populations.

- **Lack of Local Training**: While Schools of “Tropical Medicine” thrived in Europe, African institutions lagged in training epidemiologists. Local training focused more on public health practitioners, such as District Health Officers, who worked in national and local government ministries.

- **Gap in African-Led Research**: Epidemiological research led by African scholars was minimal or nul, with little investment in developing homegrown research capacity.

# Challenges in Training African Epidemiologists

- **Little In-Country Programs:** Up until the 1990s, most African scholars seeking advanced epidemiological training had to study abroad, primarily in Europe or North America.

- **Limitations:** This model was inefficient, as many trainees faced difficulties returning or applying their knowledge effectively in their home countries.

- **Focus on Public Health Practice:** In-country training focused mainly on creating public health practitioners for government service, rather than fostering academic epidemiologists who could lead research and shape health policy based on local data.

# Shift Towards In-Country Epidemiology Training and Research

- **The Fogarty International Center's AIDS Training and Research Program (AITRP):** A turning point came in the 1990s with the Fogarty International Center's programs, which aimed to build in-country training for Masters and Doctoral-level epidemiologists across sub-Saharan Africa. This marked the start of a more sustainable, local training model.

- **US CDC Epidemic Intelligence Service (EIS)**: This program provided rigorous field epidemiology training, equipping African health professionals with the skills needed to rapidly respond to public health emergencies, disease outbreaks, and epidemics.

- **Today's Landscape**: As a result, Africa now has a diverse and vibrant set of epidemiology training programs, producing a new generation of African epidemiologists who are driving locally-relevant research and shaping public health responses across the continent by academic institutions, national, continental (Africa-CDC) and international organizations.

# Selected Field Epidemiology Networks in Africa

- **AFENET (African Field Epidemiology Network):**
  - Non-profit supporting Ministries of Health in 11 countries (e.g., Ethiopia, Kenya, Tanzania, Nigeria, South Africa)
  - Offers Field Epidemiology and Laboratory Training Programs (FETP & FELTP)
  - Combines classroom instruction with hands-on training in outbreak investigation, public health surveillance, and laboratory management
  - Funded by CDC, USAID, WHO, and other global partners

- **INCLEN-Africa (International Clinical Epidemiology Network):**
  - Network of clinical epidemiology units in 9 African countries (e.g., Uganda, Kenya, Nigeria)
  - Focuses on evidence-based healthcare, capacity building, and research partnerships
  - Institutes are based in leading medical institutions with Masters or PhD-level training

Nachega et al. *Int J Epidemiol*, Volume 41, Issue 6, December 2012, Pages 1829–1846

# AFENET NCD TRAINING CURRICULUM, KAMPALA, May 13-17, 2024

# Selected Field Epidemiology Networks in Africa (Cont'd)

- **IeDEA (International Epidemiologic Databases to Evaluate AIDS):**
  - Regional consortia in East Africa (Kenya, Uganda, Tanzania) and Southern Africa
  - Tracks ~120,000 HIV-infected adults and children in East Africa
  - Capacity building in Epidemiology, Biostatistics, and Data Management linked to post-graduate training at universities

- **INDEPTH (International Network for Demographic Evaluation of Populations and Their Health):**
  - Network of 42 health and demographic surveillance sites in Africa and Asia
  - Focuses on multi-site field research projects and data sharing
  - Provides Masters-level training in population-based field epidemiology at the University of the Witwatersrand, Johannesburg

Nachega et al. *Int J Epidemiol*, Volume 41, Issue 6, December 2012, Pages 1829–1846

Young et al. BMC Medical Education (2017) 17:46
DOI 10.1186/s12909-017-0885-4

BMC Medical Education

RESEARCH ARTICLE Open Access

# Building capacity in Clinical Epidemiology in Africa: experiences from Masters programmes

Taryn Young[1,2*], Celeste Naude[1], Tania Brodovcky[3] and Tonya Esterhuizen[1]

## Abstract

**Background:** To describe and contrast programmatic offering of Clinical Epidemiology Masters programmes in Africa, to evaluate experiences of graduates and faculty, and assess if graduates are playing roles in research, practice and teaching of Clinical Epidemiology.

**Methods:** We searched and identified relevant programmes, reviewed programmatic documentation, interviewed convenors and surveyed graduates. Participants provided informed consent, interviews with faculty were recorded and transcribed for analysis purposes, and graduates participated in an online survey.

**Results:** Five structured Masters programmes requiring health science professionals to complete modules and research projects were assessed. Demand for programmes was high. Graduates enjoyed the variety of modules, preferred blended teaching, and regarded assessments as fair. Graduates felt that career paths were not obvious after graduating. Despite this, some have gone on to promote and teach evidence-based health care, and conduct and disseminate research. Areas of concern raised by faculty were quality assurance; research project initiation, implementation and supervisory capacity; staff availability; funding to support implementation and lack of experiential learning.

**Conclusion:** Although faced with challenges, these programmes build capacity of health professionals to practice in an evidence-informed way, and conduct rigorous research, which are central to advancing the practice of Clinical Epidemiology in Africa.

**Keywords:** Clinical Epidemiology, Capacity, Masters programmes, Africa

# MScClinEpi Training in Africa: Programmatic Description

| Name of Institution | University of Cape Town | Makerere University | University of Pretoria | Stellenbosch University | University of Zimbabwe |
|---|---|---|---|---|---|
| Academic Department/Division/School/Centre where programme is situated | School of Public Health and Family Medicine | Department of Medicine | The School of Health Systems and Public Health | Community Health Division and Centre for Evidence-based Health Care | Department of Community Medicine |
| Name of programme | Master of Public Health (Clinical Research track) | Master of Science in Clinical Epidemiology and Biostatistics | Master of Science in Clinical Epidemiology | Master of Science in Clinical Epidemiology | Masters in Clinical Epidemiology |
| Year when programme started | MPH started in 1999. Clinical Epidemiology track started 2012 and incorporated into Epidemiology track 2014. | 2000 | 2004 | 2008 | 1994 |
| Credit/equivalent value of the programme | 180 credits<br>1 credit = 10 hours | 64 credit units (CU)<br>1 CU = 15 contact hours | 180 credits<br>1 credit = 10 hours | 180 credits<br>1 credit = 10 hours | 180 credits<br>1 credit = 10 weighted hours |
| Fulltime or part-time | Fulltime or part-time | Fulltime | Part-time | Part-time | Part-time |
| Minimum duration of programme | 1.5 to 2 years fulltime or<br>3 to 4 years part-time | 2 years | 2 years | 2 years | 3 years |
| Structured modules credit value | 120 credits | 55 CU | 80 credits | 120 credits | 1400 weighted hours |
| Number of modules | Compulsory: 7<br>Elective: 3 | Compulsory: 19 | Fundamental: 3<br>Compulsory: 6<br>Elective: 3 | Compulsory: 8<br>Elective: 2 | Compulsory: 8 |
| Type of offering | Contact (face:face)<br>All modules are contact for a half week block (14–16 h) plus 8 or 9 sessions of 2 h spread throughout the semester | Contact (face:face)<br>All modules are contact as lectures or classes | Contact (face:face)<br>Contact lectures and individual computer-based tutorials and exercises, group work, assignments and self-study | Blended (face:face and online)<br>Combination of contact lectures, e-learning using online learning platform, self-study (reading, formal and projects) | Blended (face:face and online)<br>Distance learning with residential contact components twice per year (January and June) |
| Assessment | Formative assessments (50%) and summative assessments (50%) | Formative assessment (40%) and summative assessment (60%) | Formative assessments and summative assessments | Formative assessments (50%) and summative assessments (50%) | Formative assessment (25%) and summative assessment (75%) in year 1; only formative assessments in year 2 |
| Research project credit value | 60 credits | 9 CU (4 CU for research proposal + 5 CU for dissertation) | 100 credits | 60 credits | 400 weighted hours |
| Format | Research project resulting in 1 | Dissertation | Research project resulting in 1 | Research project resulting in 1 | Dissertation |

Young et al. BMC Med Educ. 2017 Feb 27;17(1):46


JOURNAL ARTICLE

# Current status and future prospects of epidemiology and public health training and research in the WHO African region

Jean B Nachega ✉, Olalekan A Uthman, Yuh-Shan Ho, Melanie Lo, Chuka Anude, Patrick Kayembe, Fred Wabwire-Mangen, Exnevia Gomo, Papa Salif Sow, Ude Obike, Theophile Kusiaku, Edward J Mills, Bongani M Mayosi, Carel IJsselmuiden

*International Journal of Epidemiology*, Volume 41, Issue 6, December 2012, Pages 1829–1846, https://doi.org/10.1093/ije/dys189

**Published:** 29 December 2012 **Article history** ▾

**The first article commissioned for each of the six WHO regions by the International Epidemiological Association to provide an overview of epidemiology capacity—defined as training, research, funding and human resources—and to make recommendations to address current challenges.**

**Goal: Information gathered aimed to support strategic planning by the International Epidemiological Association, governments and non-government organizations involved in public health and epidemiological training and research.**

# Epidemiology and Public Health Research Output in WHO/AFRO

- From 1991 to 2010, epidemiology and public health research output in the WHO/AFRO region increased from 172 to 1086 peer-reviewed articles per annum [annual percentage change (APC) = 10.1%, P for trend < 0.001].

- The most common topics were HIV/AIDS (11.3%), malaria (8.6%) and tuberculosis (7.1%). Similarly, numbers of first authors (APC = 7.3%, P for trend < 0.001), corresponding authors (APC = 8.4%, P for trend < 0.001) and last authors (APC = 8.5%, P for trend < 0.001) from Africa increased during the same period.

- South Africa leads in publications (1978/8835, 22.4%), followed by Kenya (851/8835, 9.6%), Nigeria (758/8835, 8.6%), Tanzania (549/8835, 6.2%) and Uganda (428/8835, 4.8%) (P < 0.001, each vs South Africa).

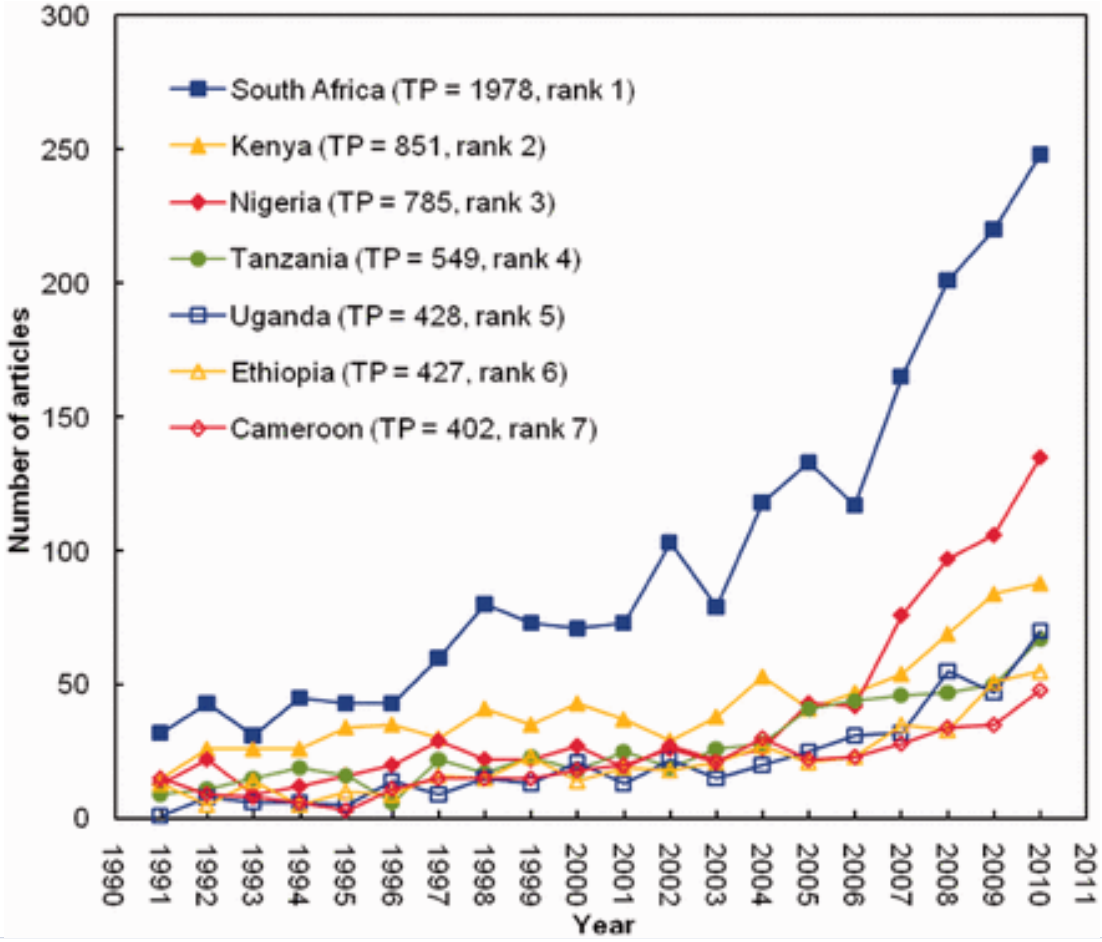
- Independent predictors of relevant research productivity were 'in-country numbers of epidemiology or public health programmes' [incidence rate ratio (IRR) = 3.41; 95% confidence interval (CI) 1.90–6.11; P = 0.03] and 'number of HIV/AIDS patients' (IRR = 1.30; 95% CI 1.02–1.66; P < 0.001).

**Nachega et al. *Int J Epidemiol*, Volume 41, Issue 6, December 2012, Pages 1829–1846**

# Map representing WHO/AFRO public health and epidemiology publications indexed by SCI (1991–2010)

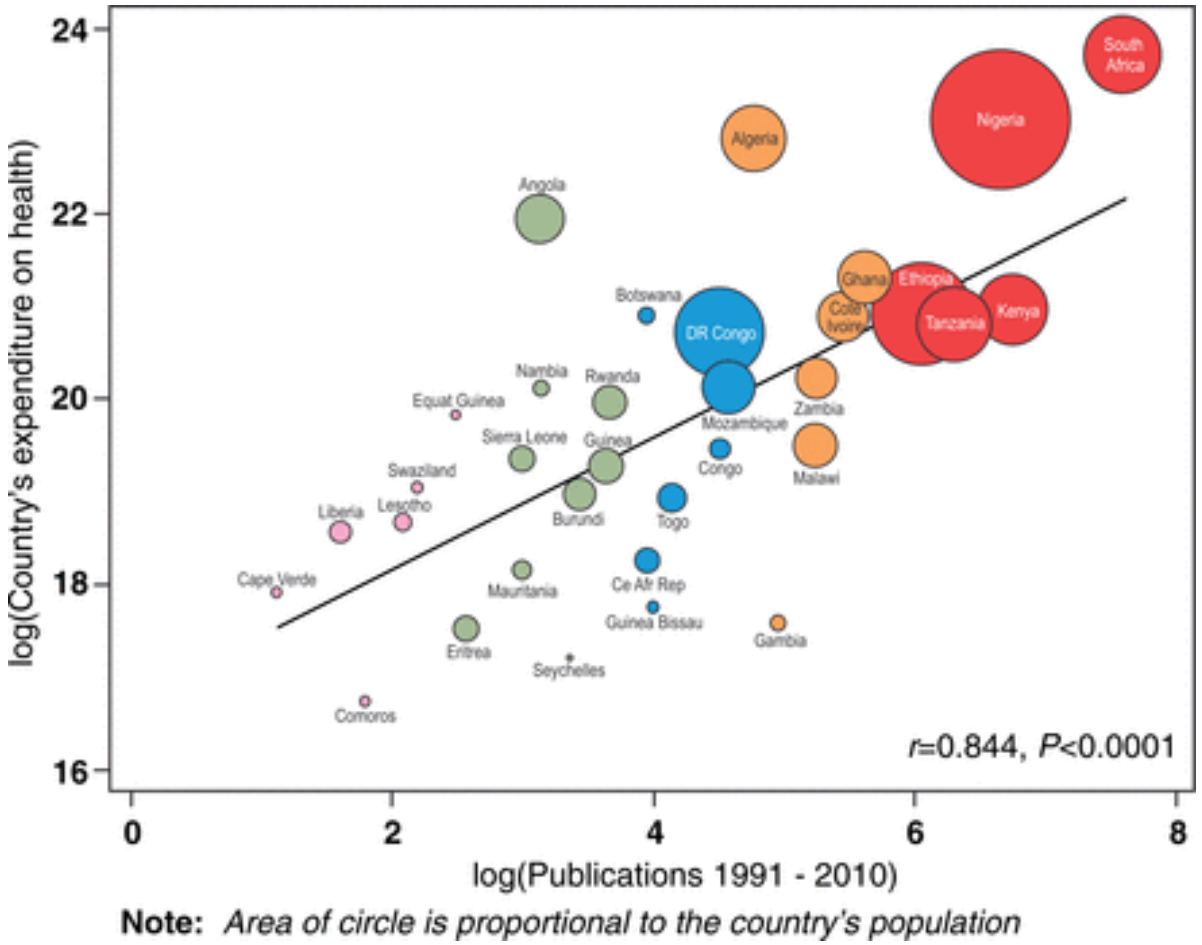

*Nachega et al. Int J Epidemiol*, Volume 41, Issue 6, December 2012, Pages 1829–1846

# Top seven countries (highest quintile) and trends in epidemiology and public health articles output indexed by SCI (1991–2010).




*Nachega et al. Int J Epidemiol*, Volume 41, Issue 6, December 2012, Pages 1829–1846, https://doi.org/10.1093/ije/dys189

# Scatter plot showing association between total publications and country's expenditure on health (as % of GDP)




**Note:** *Area of circle is proportional to the country's population*

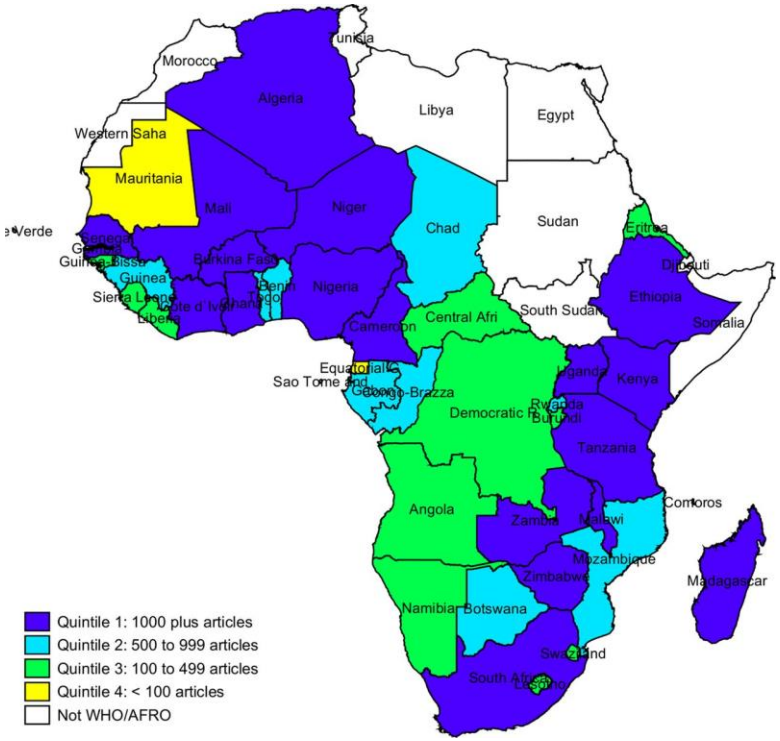
*Nachega et al. Int J Epidemiol*, Volume 41, Issue 6, December 2012, Pages 1829–1846, https://doi.org/10.1093/ije/dys189

BMJ Open

# Increasing the value of health research in the WHO African Region beyond 2015—reflecting on the past, celebrating the present and building the future: a bibliometric analysis

Olalekan A Uthman,[1,2] Charles Shey Wiysonge,[1,3] Martin O Ota,[4] Mark Nicol,[5] Gregory D Hussey,[5] Peter M Ndumbe,[4] Bongani M Mayosi[6]

**Map of health research in the WHO African Region indexed in PubMed from 2000 to 2014.**




Olalekan A Uthman et al. BMJ Open 2015;5:e006340


## ABSTRACT

**Objective:** To assess the profile and determinants of health research productivity in Africa since the onset of the new millennium.

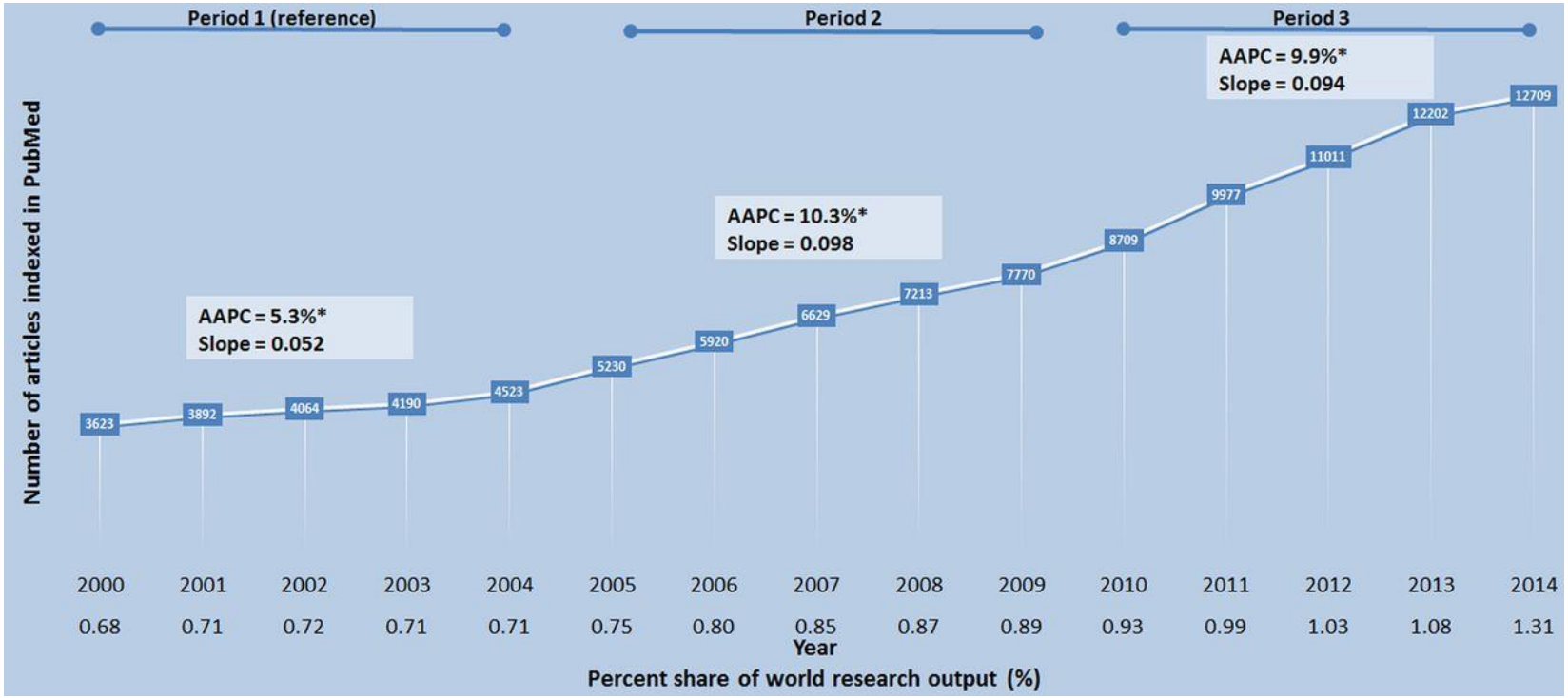
**Design:** Bibliometric analysis.

**Data collection and synthesis:** In November 2014, we searched PubMed for articles published between 2000 and 2014 from the WHO African Region, and obtained country-level indicators from World Bank data. We used Poisson regression to examine time trends in research publications and negative binomial regression to explore determinants of research publications.

**Results:** We identified 107 662 publications, with a median of 727 per country (range 25–31 757). Three countries (South Africa, Nigeria and Kenya) contributed 52% of the publications. The number of publications increased from 3623 in 2000 to 12 709 in 2014 (relative growth 251%). Similarly, the per cent share of worldwide research publications per year increased from 0.7% in 2000 to 1.3% in 2014. The trend analysis was also significant to confirm a continuous increase in health research publications from Africa, with productivity increasing by 10.3% per year (95% CIs +10.1% to +10.5%). The only independent predictor of publication outputs was national gross domestic product. For every one log US$ billion increase in gross domestic product, research publications rose by 105%: incidence rate ratio (IRR=2.05, 95% CI 1.39 to 3.04). The association of private health expenditure with publications was only marginally significant (IRR=1.86, 95% CI 1.00 to 3.47).

**Conclusions:** There has been a significant improvement in health research in the WHO African Region since 2000, with some individual countries already having strong research profiles. Countries of the region should implement the WHO Strategy on Research for Health: reinforcing the research culture (organisation); focusing research on key health challenges (priorities); strengthening national health research systems (capacity); encouraging good research practice (standards); and consolidating linkages between health research and action (translation).

# Trends in the WHO/AFRO health research article outputs indexed in PubMed (2000–2014; AAPC, average annual percentage change). *AAPC is significantly different from zero (0), p=0.0001.




**Olalekan A Uthman et al. BMJ Open 2015;5:e006340**



BMJ Open

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Infectious Diseases



PERSONAL VIEW | ONLINE FIRST



# Advancing detection and response capacities for emerging and re-emerging pathogens in Africa

Prof Jean B Nachega, MD PhD † • Sabin Nsanzimana, PhD † • Angeli Rawat, PhD • Lindsay A Wilson, MSc • Prof Philip J Rosenthal, MD • Mark J Siedner, MD • Prof Jay K Varma, MD • Peter H Kilmarx, MD • Leon Mutesa, PhD • Prof Marcel Tanner, PhD • Prof Agnes Binagwaho, PhD • Jamie Forrest, PhD • Prof Placide Mbala-Kingebeni, PhD • Prof Jean-Jacques Muyembe-Tamfum, PhD • Prof Francine Ntoumi, PhD • Prof Alimuddin Zumla, PhD • Prof Tulio de Oliveira, PhD • Prof Edward J Mills, PhD • Show less • Show footnotes

Published: December 20, 2022 • DOI: https://doi.org/10.1016/S1473-3099(22)00723-X • 

Research

JAMA Pediatrics | Original Investigation

# Assessment of Clinical Outcomes Among Children and Adolescents Hospitalized With COVID-19 in 6 Sub-Saharan African Countries

Jean B. Nachega, MD, PhD, MPH; Nadia A. Sam-Agudu, MD; Rhoderick N. Machekano, PhD, MPH; Helena Rabie, MBChB, PhD; Marieke M. van der Zalm, MBChB, PhD; Andrew Redfern, MBChB, MPhil; Angela Dramowski, MBChB, PhD; Natasha O'Connell, MBChB, MMed; Michel Tshiasuma Pipo, MD; Marc B. Tshilanda, MD; Liliane Nsuli Byamungu, MD, MSc; Refiloe Masekela, MBChB, PhD; Prakash Mohan Jeena, MBChB, PhD; Ashendri Pillay, MBChB; Onesmus W. Gachuno, MBChB, MMED; John Kinuthia, MBChB, MMED, MPH; Daniel Katuashi Ishoso, MD; Emmanuella Amoako, MBChB; Elizabeth Agyare, MBChB; Evans K. Agbeno, MBChB, MPH; Charles Martyn-Dickens, MBChB; Justice Sylverken, MD; Anthony Enimil, MBChB; Aishatu Mohammed Jibril, MBBS; Asara M. Abdullahi, MBBS; Oma Amadi, MBBS; Umar Mohammed Umar, MD; Lovemore Nyasha Sigwadhi, MSc; Michel P. Hermans, MD, PhD; John Otshudiema Otokoye, MD, MPH; Placide Mbala-Kingebeni, MD, PhD; Jean-Jacques Muyembe-Tamfum, MD, PhD; Alimuddin Zumla, MD, PhD; Nelson K. Sewankambo, MD; Hellen Tukamuhebwa Aanyu, MBChB; Philippa Musoke, MBChB, PhD; Fatima Suleman, BPharm, PhD; Prisca Adejumo, RN, PhD; Emilia V. Noormahomed, MD, PhD; Richard J. Deckelbaum, MD; Mary Glenn Fowler, MD; Léon Tshilolo, MD, PhD; Gerald Smith, MSc; Edward J. Mills, PhD, MSc; Lawal W. Umar, MBBS; Mark J. Siedner, MD; Mariana Kruger, MMed, MPhil, PhD; Philip J. Rosenthal, MD; John W. Mellors, MD; Lynne M. Mofenson, MD; for the African Forum for Research and Education in Health (AFREhealth) COVID-19 Research Collaboration on Children and Adolescents

Opinion

EDITORIAL

## Global Representation During a Global Pandemic

Ethwako Mlia-Phiri, MMed; Samantha Lissauer, BMedSci, MBChB, MRCPCH, PhD; Jill E. Weatherhead, MD, PhD

*Clinical Infectious Diseases*

MAJOR ARTICLE

# Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) Infection and Pregnancy in Sub-Saharan Africa: A 6-Country Retrospective Cohort Analysis

Jean B. Nachega,[1,2,3,4a] Nadia A. Sam-Agudu,[5,6,7,a] Rhoderick N. Machekano,[8] Philip J. Rosenthal,[9] Sonja Schell,[10] Liesl de Waard,[10] Adrie Bekker,[11] Onesmus W. Gachuno,[12] John Kinuthia,[12,13] Nancy Mwongeli,[13] Samantha Budhram,[14] Valerie Vannevel,[15] Priya Somapillay,[16] Hans W. Prozesky,[1,] Jantjie Taljaard,[1] Arifa Parker,[1] Elizabeth Agyare,[17] Akwasi Baafuor Opoku,[18] Aminatu Umar Makarfi,[19] Asara M. Abdullahi,[20] Chibueze Adirieje,[5] Daniel Katuashi Ishoso,[21] Michel Tshiasuma Pipo,[22] Marc B. Tshilanda,[22] Christian Bongo-Pasi Nswe,[23,24] John Ditekemena,[21] Lovemore Nyasha Sigwadhi,[8] Peter S. Nyasulu,[8] Michel P. Hermans,[25] Musa Sekikubo,[26] Philippa Musoke,[27] Christopher Nsereko,[28] Evans K. Agbeno,[29] Michael Yaw Yeboah,[19] Lawal W. Umar,[30] Mukanire Ntakwinja,[31] Denis M. Mukwege,[31] Etienne Kajibwami Birindwa,[32] Serge Zigabe Mushamuka,[32] Emily R. Smith,[33] Edward J. Mills,[34] John Otokoye Otshudiema,[35] Placide Mbala-Kingebeni,[36] Jean-Jacques Muyembe Tamfum,[36] Alimuddin Zumla,[37,38] Aster Tsegaye,[39] Alfred Mteta,[40] Nelson K. Sewankambo,[41] Fatima Suleman,[42] Prisca Adejumo,[43] Jean R. Anderson,[44] Emilia V. Noormahomed,[45] Richard J. Deckelbaum,[46] Jeffrey S. A. Stringer,[47] Abdon Mukalay,[48] Taha E. Taha,[3] Mary Glenn Fowler,[49] Judith N. Wasserheit,[50] Refiloe Masekela,[51] John W. Mellors,[52] Mark J. Siedner,[53,54,] Landon Myer,[55] Andre-Pascal Kengne,[56] Marcel Yotebieng,[57] Lynne M. Mofenson,[58,b] Eduard Langenegger,[10,b] for the AFREhealth Research Collaboration on COVID-19 and Pregnancy

# AFREhealth Protocol: In-Hospital Mortality & Associated Factors Among Sickle Cell Disease Patients Before & During COVID-19 Pandemic in 10 African Countries

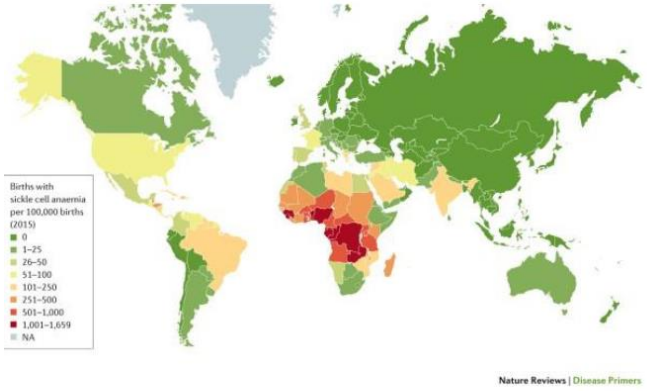



FIGURE 1 : Map of the Estimated Numbers of Births with Sickle Cell Anaemia by Kato, G. J. et al. (2018) *Nat. Rev. Dis. Primers*

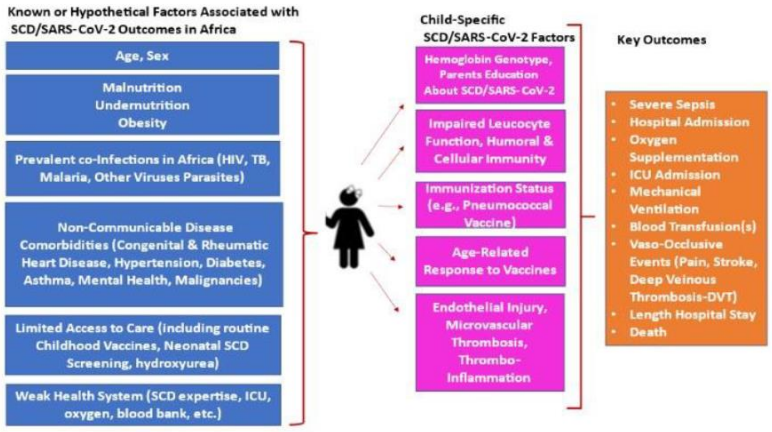



FIGURE 4A: Known or Hypothetical Factors Associated with SCD & SARS-CoV-2 Infection

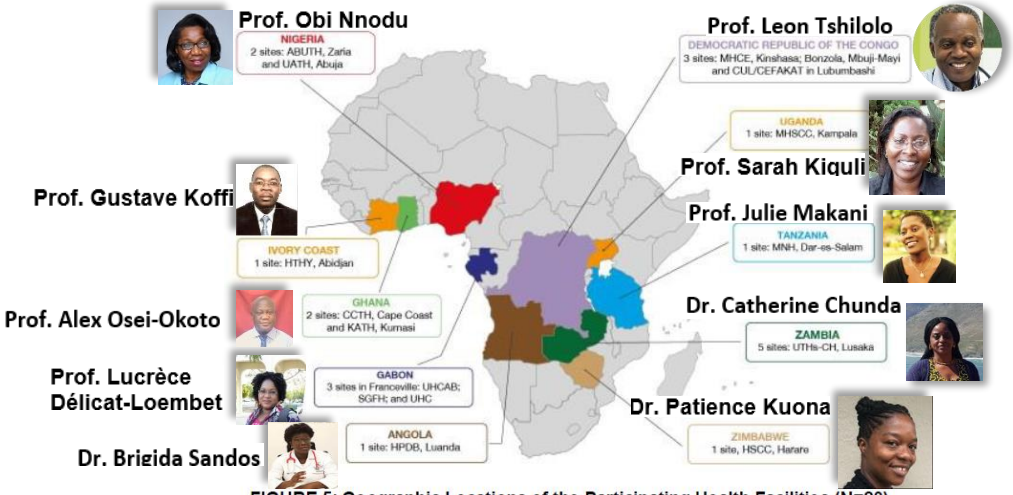



FIGURE 5: Geographic Locations of the Participating Health Facilities (N=20)

Sickle In Africa

NIH Fogarty

SPARCo Sickle African Research Consortium

Purpose Life Sciences

African Forum for Research and Education in Health

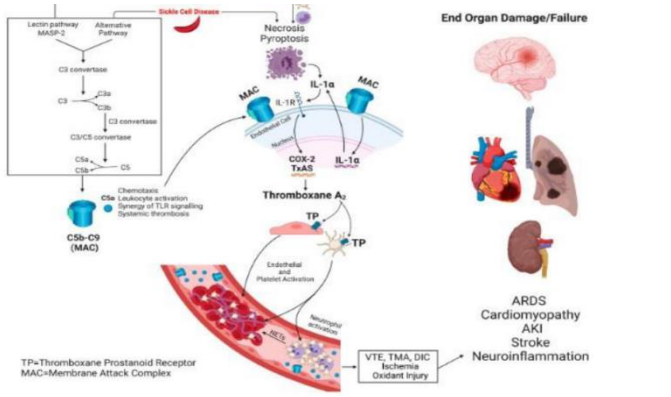



FIGURE 4B: Putative Mechanism of Complement-mediated Microvascular Thrombosis and Vaso-Occlusive Disease in SCD and COVID-19. *KC Chiang et al. Biomedicines 2023*

THE LANCET
Global Health



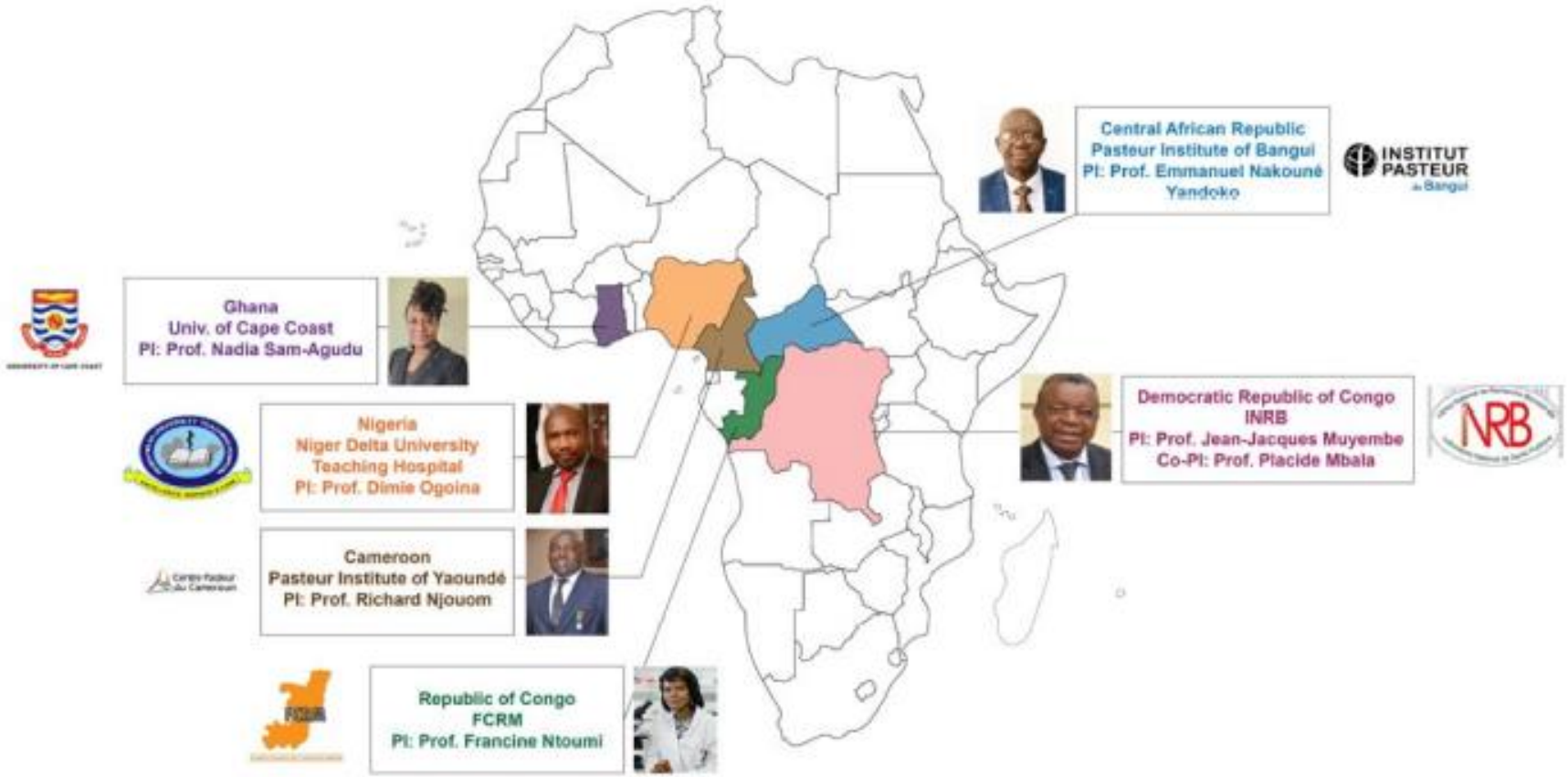
COMMENT | VOLUME 12, ISSUE 7, E1086-E1088, JULY 2024 Download Full Issue

# The surge of mpox in Africa: a call for action

Jean B Nachega • Nadia A Sam-Agudu • Dimie Ogoina • Placide Mbala-Kingebeni • Francine Ntoumi • Emmanuel Nakouné • Richard Njouom • Rosamund F Lewis • Monica Gandhi • Philip J Rosenthal • Angeli Rawat • Lindsay A Wilson • Jason Kindrachuk • Laurens Liesenborghs • Edward J Mills • Wolfgang Preiser • Anne W Rimoin • Nancy J Sullivan • Martine Peeters • Eric Delaporte • Cheryl Baxter • Lee Harrison • Michel P Hermans • Emma L Mohr • Gregg Gonsalves • Nicaise Ndembi • Alimuddin Zumla • Jean Jacques Muyembe-Tamfum • for the Mpox Research Consortium • Show less

MpoxReC
Africa-led Mpox Research Consortium

# MpoxReC African Core Partners and Principal Investigators




MpoxReC
Africa-led Mpox Research Consortium

# Mpox Research Consortium Specific Objectives


MpoxReC
Africa-led Mpox Research Consortium

nature medicine



Brief Communication | Published: 13 June 2024

# Sustained Human Outbreak of a New MPXV Clade I Lineage in the Eastern Democratic Republic of the Congo

Emmanuel Hasivirwe Vakaniaki, Cris Kacita, Eddy Kinganda-Lusamaki, Áine O'Toole, Tony Wawina-Bokalanga, Daniel Mukadi-Bamuleka, Adrienne Amuri-Aziza, Nadine Malyamungu-Bubala, Franklin Mweshi-Kumbana, Léandre Mutimbwa-Mambo, Freddy Belesi-Siangoli, Yves Mujula, Edyth Parker, Pauline-Chloé Muswamba-Kayembe, Sabin S. Nundu, Robert S. Lushima, Jean-Claude Makangara-Cigolo, Noella Mulopo-Mukanya, Elisabeth Pukuta-Simbu, Prince Akil-Bandali, Hugo Kavunga, Ombotimbe Abdramane, Isabel Brosius, Eugene Bangwen, Koen Vercauteren, Nadia A. Sam-Agudu, Edward J. Mills, Olivier Tshiani-Mbaya, Nicole A. Hoff, Anne W. Rimoin, Lisa E. Hensley, Jason Kindrachuk, Cheryl Baxter, Tulio de Oliveira, Ahidjo Ayouba, Martine Peeters, Eric Delaporte, Steve Ahuka-Mundeke, Emma L. Mohr, Nancy J. Sullivan, Jean-Jacques Muyembe-Tamfum, Jean B. Nachega ✉, Andrew Rambaut, Laurens Liesenborghs & Placide Mbala-Kingebeni ✉ — Show fewer authors

*Nature Medicine* (2024) | Cite this article

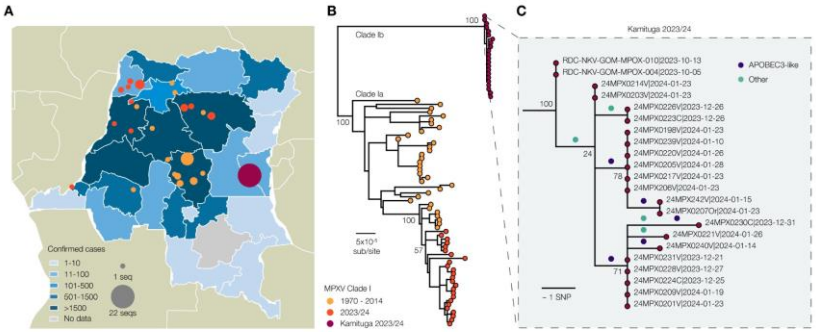
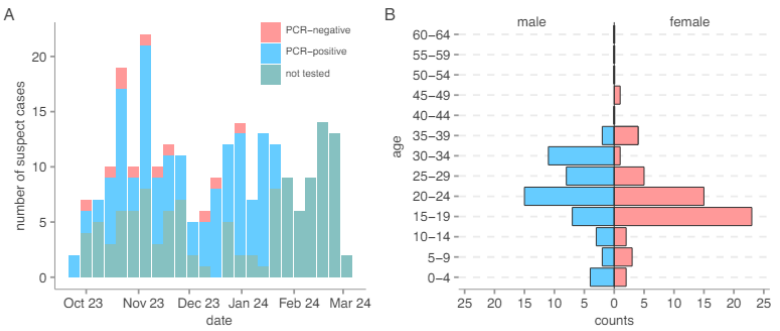



**Figure 1. MPXV infection dissemination and genetic analysis in the DRC1.** (A) Map of the DRC with Provinces colored by the number of reported cases. MPXV genomes available are indicated by colored circles. (B) Maximum likelihood phylogeny of clade I genomes. (C) The Kamituga cluster with reconstructed mutations colored by whether they are consistent with APOBEC3 deamination (dark blue) or not (green). Vakaniaki EH *et al.* Nature Medicine 2024, In Press.



# Shaping the Future of Epidemiology Research and Training in Africa

**Global Health Impact**: Over the past 15 years, the global health movement has increasingly emphasized the need to build local research capacity and focus training where the burden of disease is greatest. Africa now leads this movement, particularly in areas like HIV, TB, and emerging and re-emerging infectious diseases.

**Reversing the Flow of Training:** Leading epidemiology programs at institutions such as UCT, Wits, and Stellenbosch are now drawing students from Europe and North America. These students come to Africa to train where the disease burden is highest, reversing the historical trend of African students traveling abroad for training.

**Looking to the Future:** The future of epidemiology training in Africa will center on strengthening local programs, expanding focus areas to include non-communicable diseases, and positioning African scholars as leaders in global health research. There will also be a strong emphasis on multidisciplinary approaches and data science, equipping the next generation to address emerging health challenges both in Africa and globally.

# Acknowledgements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**Grants Support**
NIH/NIAID 5U01AI096299-13
NIH/FIC R21 TW011706-01
NIH/FIC R25 TW011217-02
NIH/FIC D43TW010937-02
NIH/FIC D43TW011827-01A1


# THANK YOU