



# USAMRU-KENYA

US Army Medical Research Unit-Kenya : The Walter Reed Project



## Excellence in USAMRU-Kenya Research

A Bibliometric Evaluation

Prepared by the Gorgas Memorial Library

June 2011

# USAMRU-KENYA ORGANIZATIONAL RELATIONSHIPS

- ▶ Represents a Special Foreign Activity of the Walter Reed Army Institute of Research, part of the U.S. Army Medical Research and Materiel Command, Fort Detrick, MD



# USAMRU-KENYA ORGANIZATIONAL RELATIONSHIPS

- ▶ Affiliated through a Cooperative Agreement with the Kenya Medical Research Institute (KEMRI)



- ▶ Includes laboratories in Nairobi and field sites in western Kenya

- Kisumu
- Kisian
- Kombewa
- Kericho



# USAMRU-KENYA MISSION



- ▶ To develop and test improved means for predicting, detecting, preventing and treating infectious disease threats to military and civilians in East Africa



# USAMRU–KENYA HISTORY



- ▶ 1969 – Activated on a temporary basis at the invitation of the Government of Kenya to study trypanosomiasis
- ▶ 1973 – Established as a permanent activity

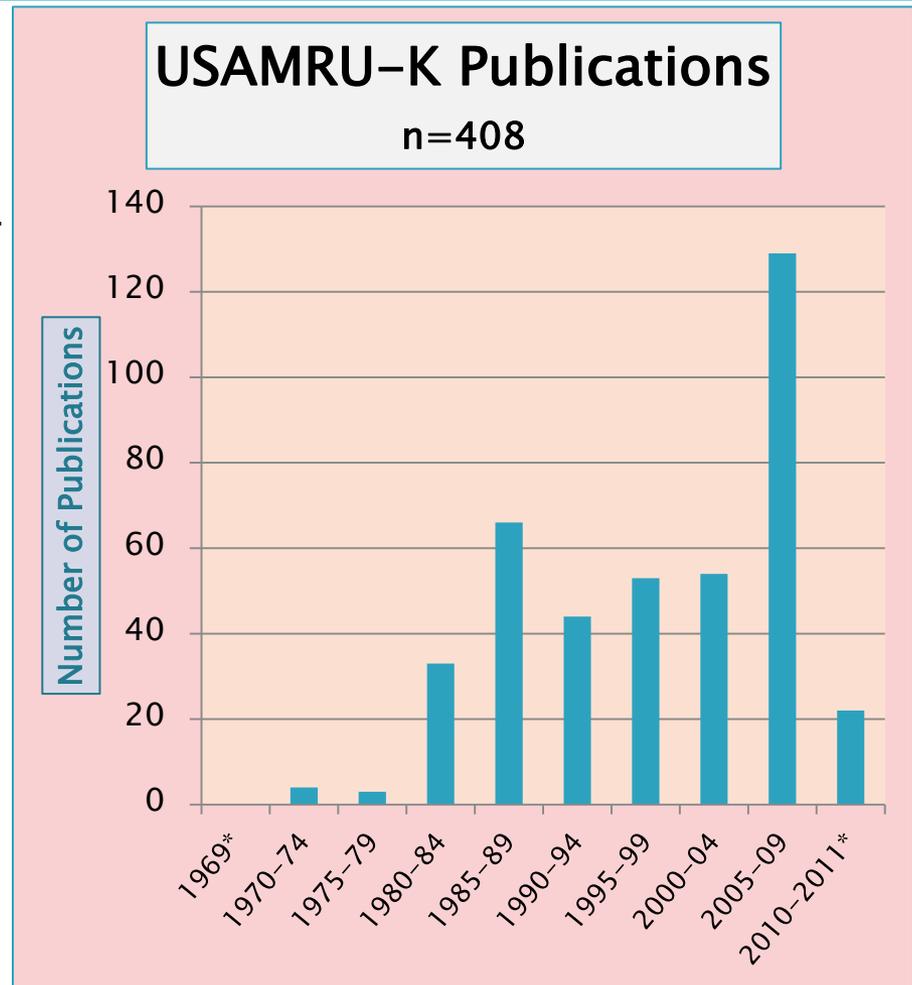


- ▶ Analysis performed using Web of Knowledge® tools
  - **Web of Science® (publication years 1969–2011\*)**  
Database of citations to the scholarly literature in the sciences, social sciences, arts, and humanities including proceedings of international conferences, symposia, seminars, colloquia, workshops, and conventions (using citations as of June 2, 2011).
  - **Journal Citation Reports® 2009**  
A resource tool for journal evaluation, using citation data drawn from over 7,500 journals from over 3,300 publishers in over 80 nations. Updated annually.

# PUBLICATIONS IN WEB OF SCIENCE\*



- ▶ USAMRU–Kenya researchers published a total of 408 papers (i.e., articles, meeting abstracts, proceedings papers and reviews) covered in Web of Science in the period 1969–2011\*
- ▶ Early USAMRU–Kenya work was also published in technical reports that are not represented in Web of Science
- ▶ USAMRU–Kenya publishing began appearing consistently in the 1980's and was notably prolific in the period 2005–2009



\*2011 represents a partial period

# USAMRU–Kenya ON THE CONTINUUM



## Earliest Citation in Web of Science®

- ▶ Published in 1972 and focused on USAMRU–K early research on trypanosomiasis

Duxbury RE, Welde BT, Sadun EH, Anderson JS, Muriithi IE. Immunization of cattle with X-irradiated African trypanosomes. *Transactions of the Royal Society of Tropical Medicine and Hygiene* 1972;66(2):349–&.

## Most Current Citation in Web of Science®

- ▶ Published in 2011 and highlighting USAMRU–K recent research on AIDS in Africa

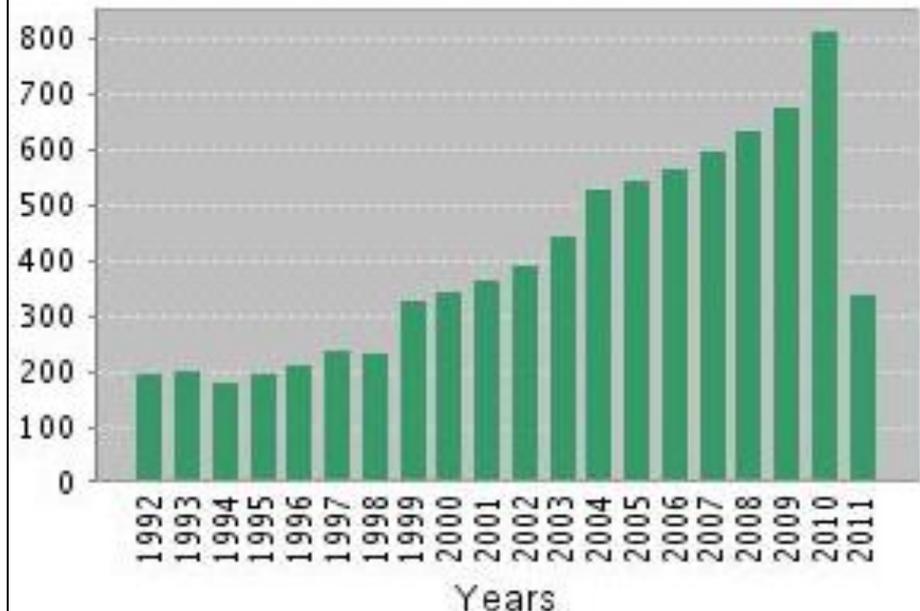
Todd CS, Stibich MA, Laher F, Malta MS, Bastos FI, Imbuki K, Shaffer DN, Sinei SK, Gray GE. Influence of Culture on Contraceptive Utilization Among HIV–Positive Women in Brazil, Kenya, and South Africa. *Aids and Behavior* 2011 Feb;15(2):454–68.

# CITATIONS TO USAMRU-KENYA PUBLICATIONS\*



- Citations to USAMRU-K papers steadily increase over time and have an average of 22.33 citations per paper
- In 2010, there were over 800 citations to USAMRU-K publications
- USAMRU-K publishing has an overall h-index of 53<sup>1</sup>

## Citations in Each Year



<sup>1</sup>The h-index reflects productivity and impact.  $h > 20$  is highly respected;  $h > 45$  associated with high honors (e.g., NAS membership).

Results found: 408

Sum of the Times Cited [?]: 9,070

[View Citing Articles](#)

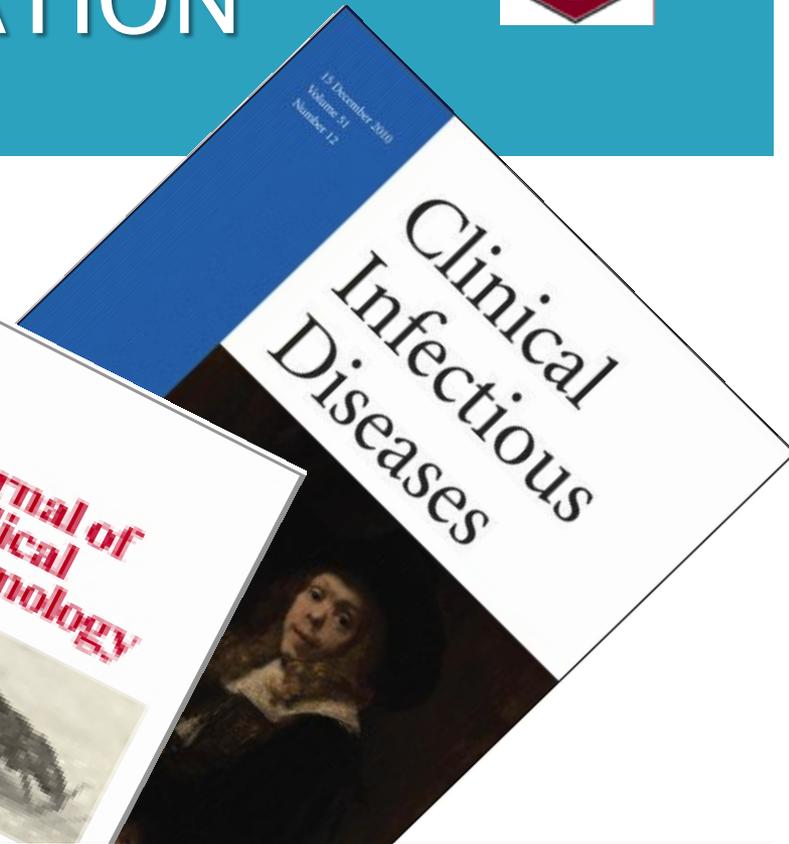
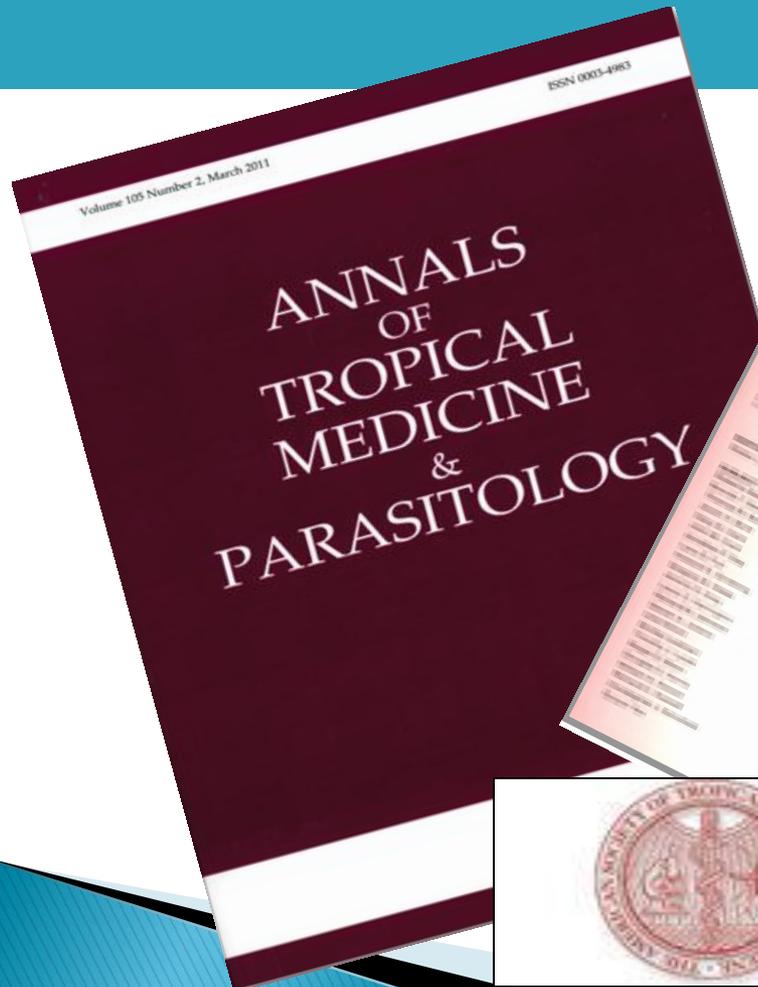
[View without self-citations](#)

Average Citations per Item [?]: 22.23

h-index [?]: 53

\*2011 represents a partial period

# USAMRU-KENYA SOURCES OF PUBLICATION



# USAMRU–Kenya Publication Sources



Source Title	Record Count	% of 408
AMERICAN JOURNAL OF TROPICAL MEDICINE AND HYGIENE	94	23.04%
ANNALS OF TROPICAL MEDICINE AND PARASITOLOGY	29	7.11%
TRANSACTIONS OF THE ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE	29	7.11%
JOURNAL OF MEDICAL ENTOMOLOGY	17	4.17%
JOURNAL OF THE AMERICAN MOSQUITO CONTROL ASSOCIATION	13	3.19%
JOURNAL OF INFECTIOUS DISEASES	12	2.94%
MALARIA JOURNAL	11	2.70%
EAST AFRICAN MEDICAL JOURNAL	10	2.45%
EXPERIMENTAL PARASITOLOGY	8	1.96%
EMERGING INFECTIOUS DISEASES	7	1.72%
INTERNATIONAL JOURNAL OF INFECTIOUS DISEASES	7	1.72%
CLINICAL INFECTIOUS DISEASES	6	1.47%
JOURNAL OF IMMUNOLOGY	6	1.47%
MEDICAL AND VETERINARY ENTOMOLOGY	6	1.47%
TROPICAL MEDICINE & INTERNATIONAL HEALTH	6	1.47%

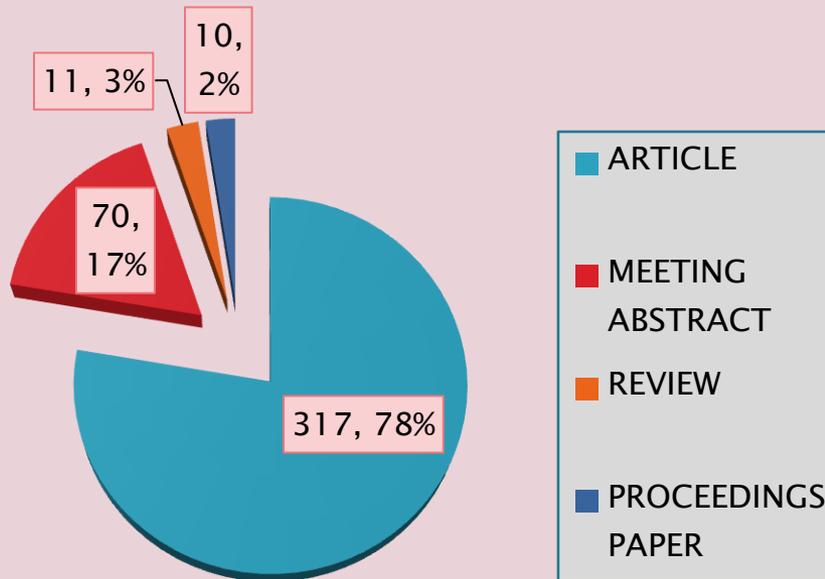
- A majority (63.97% ) of USAMRU–K publications appear in these 15 journals
- Over one third (37.25%) of USAMRU–Kenya publications appear in three academic and society journals
  - *American Journal of Tropical Medicine and Hygiene*
  - *Annals of Tropical Medicine and Parasitology*
  - *Transactions of the Royal Society of Tropical Medicine and Hygiene*

# USAMRU–Kenya Publications by Document Type



## Number of Publications

n=408



- ▶ 78% of USAMRU–K publishing appears in research articles
- ▶ Additionally, 19% of USAMRU–K research is presented at meetings and/or published in proceedings

# What do citation patterns tell us about journals?

Christenson J A, Sigelman L. *Accrediting knowledge: Journal stature and citation impact in social science*. Soc. Sci. Quart, 66:964–75, 1985.

[The authors] conclude that citation data "permit scholars to evaluate the importance of journals based not on opinion but on the frequency of citations" and that "frequency of citation implies scholarly acceptance, or at least acknowledgment of importance through utilization of others' work."



# Top Sources\* of USAMRU–Kenya Publications Analyzed Using Journal Citation Reports®

ISI Web of Knowledge<sup>SM</sup>

Journal Citation Reports®

Analyzed using JCR, 6 of the top 10 journal sources for USAMRU–K publishing have an impact factor > 2



2009 JCR Science Edition

## MARKED JOURNAL LIST

Sorted by: Impact Factor

Abbreviated Journal Title	ISSN	2009 Total Cites	Impact Factor	5-Year Impact Factor	Immediacy Index	2009 Articles	Cited Half-life	Eigenfactor™ Score	Article Influence™ Score
EMERG INFECT DIS	1080-6040	18017	6.794	6.497	1.304	349	4.6	0.07791	2.175
J INFECT DIS	0022-1899	38500	5.865	5.698	1.665	478	7.6	0.11360	2.117
MALARIA J	1475-2875	2511	2.995	3.150	0.545	310	2.6	0.01205	0.861
AM J TROP MED HYG	0002-9637	15931	2.795	2.907	0.466	380	9.1	0.03283	0.852
T ROY SOC TROP MED H	0035-9203	7857	2.553	2.518	0.714	217	>10.0	0.01254	0.717
INT J INFECT DIS	1201-9712	1237	2.167	2.338	0.473	146	3.6	0.00505	0.684
J MED ENTOMOL	0022-2585	5297	1.921	2.215	0.287	202	8.7	0.01147	0.673
EXP PARASITOL	0014-4894	4069	1.773	1.776	0.339	180	>10.0	0.00681	0.430
ANN TROP MED PARASIT	0003-4983	2803	1.368	1.590	0.182	88	>10.0	0.00436	0.461
J AM MOSQUITO CONTR	8756-971X	1777	0.906	1.033	0.108	83	>10.0	0.00283	0.268

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\*The East African Medical Journal is not included in JCR.



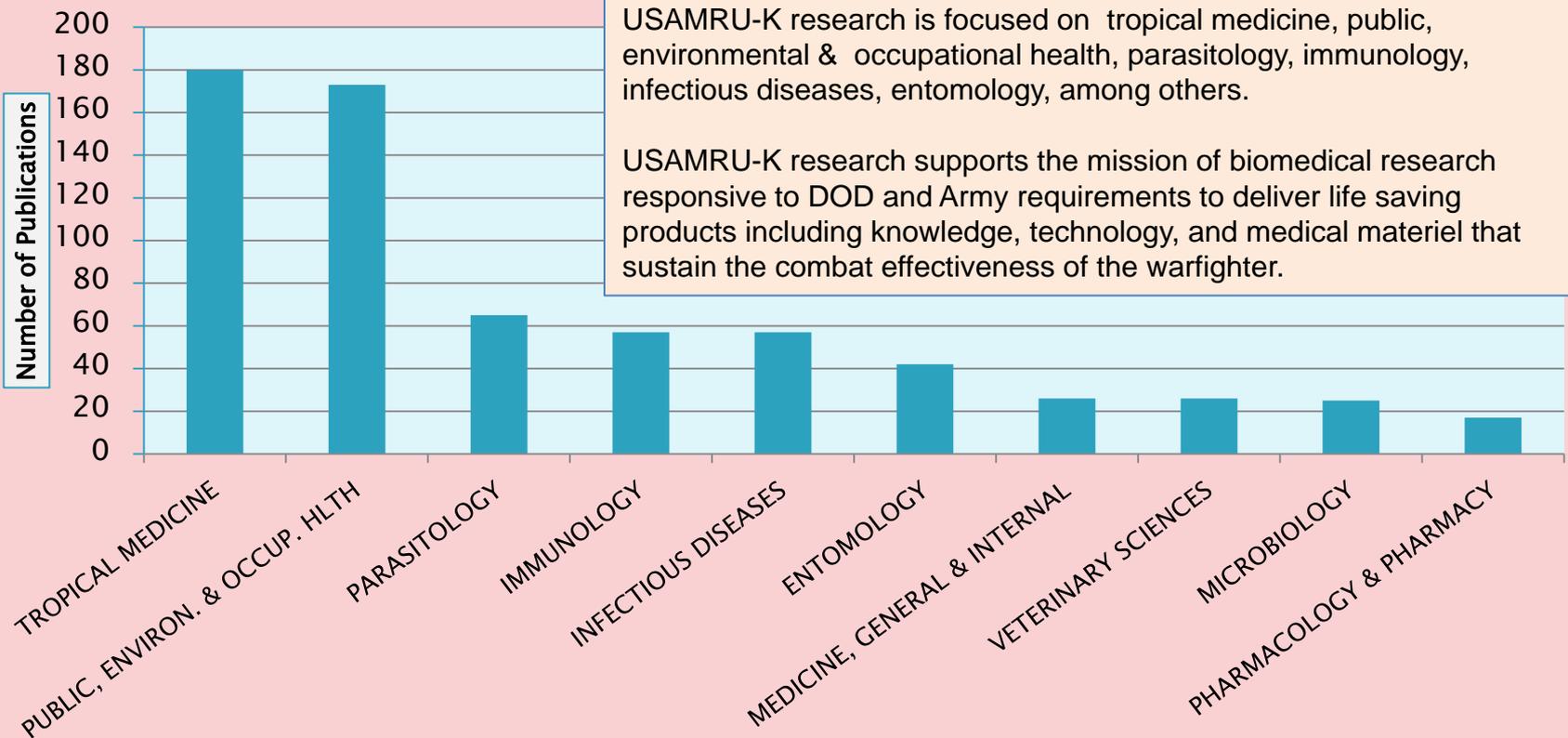
# USAMRU–Kenya 1969–2011

SUBJECT AREAS  
AND  
COLLABORATIONS

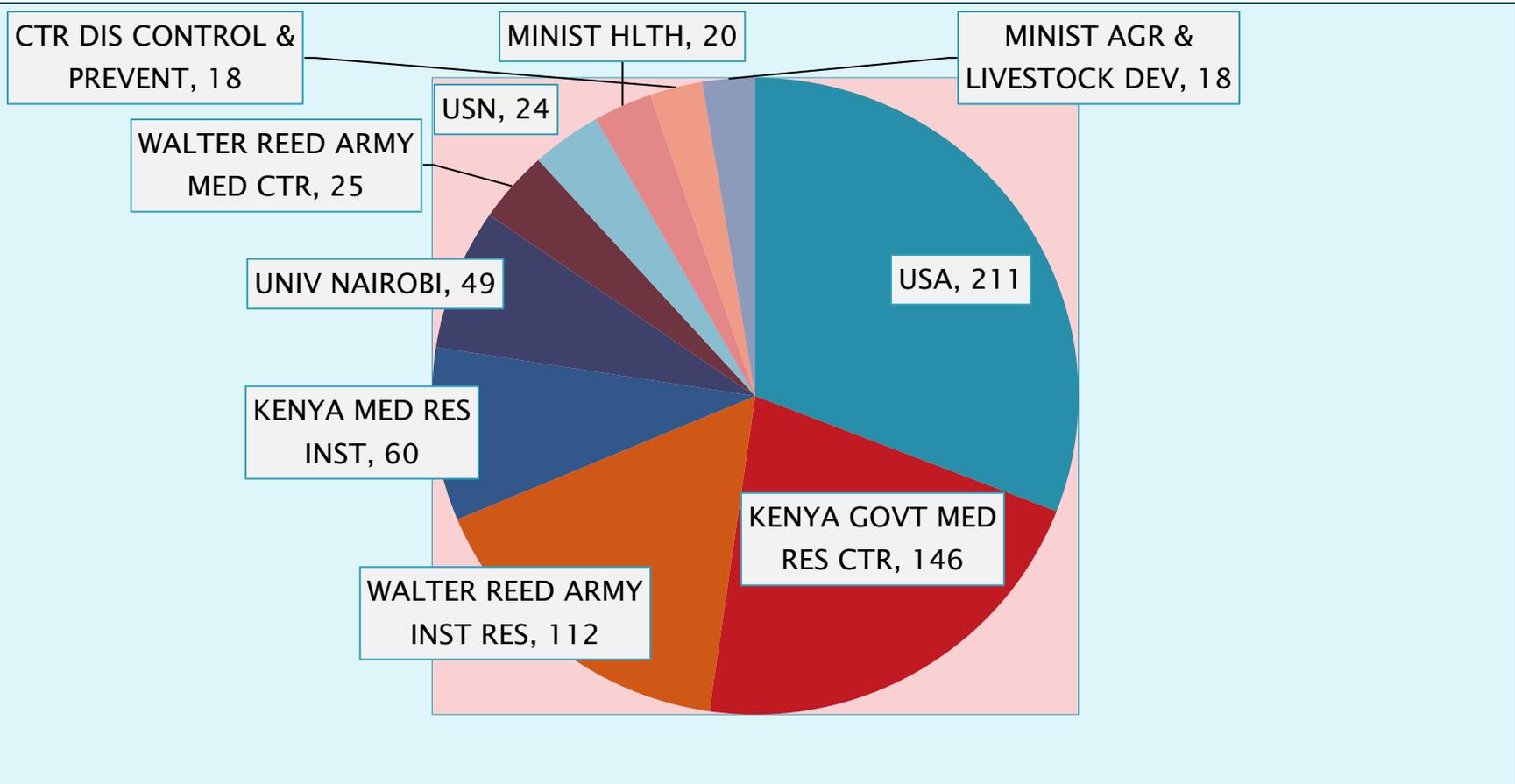
# USAMRU-Kenya Papers 1969-2011\*



## Top 10 Subject Areas



# USAMRU–Kenya Institutional Collaborations Top Ten



➤ USAMRU–K collaborates most commonly with other military organizations, including the US Army, US Navy, and its organizational base, the Walter Reed Army Institute of Research

# KEY COLLABORATORS

## USAMRU-KENYA



- ▶ Notably, Kenyan organizations, including KEMRI, the Kenya Ministry of Health, and the University of Nairobi are also frequent collaborators.

Sixty-seven percent (67%) of the time, USAMRU-K has worked with these organizations to conduct research on malaria, trypanosomiasis, leishmaniasis, entomology, HIV/AIDS and arboviruses,



**Ministry of Health**



**University of Nairobi**

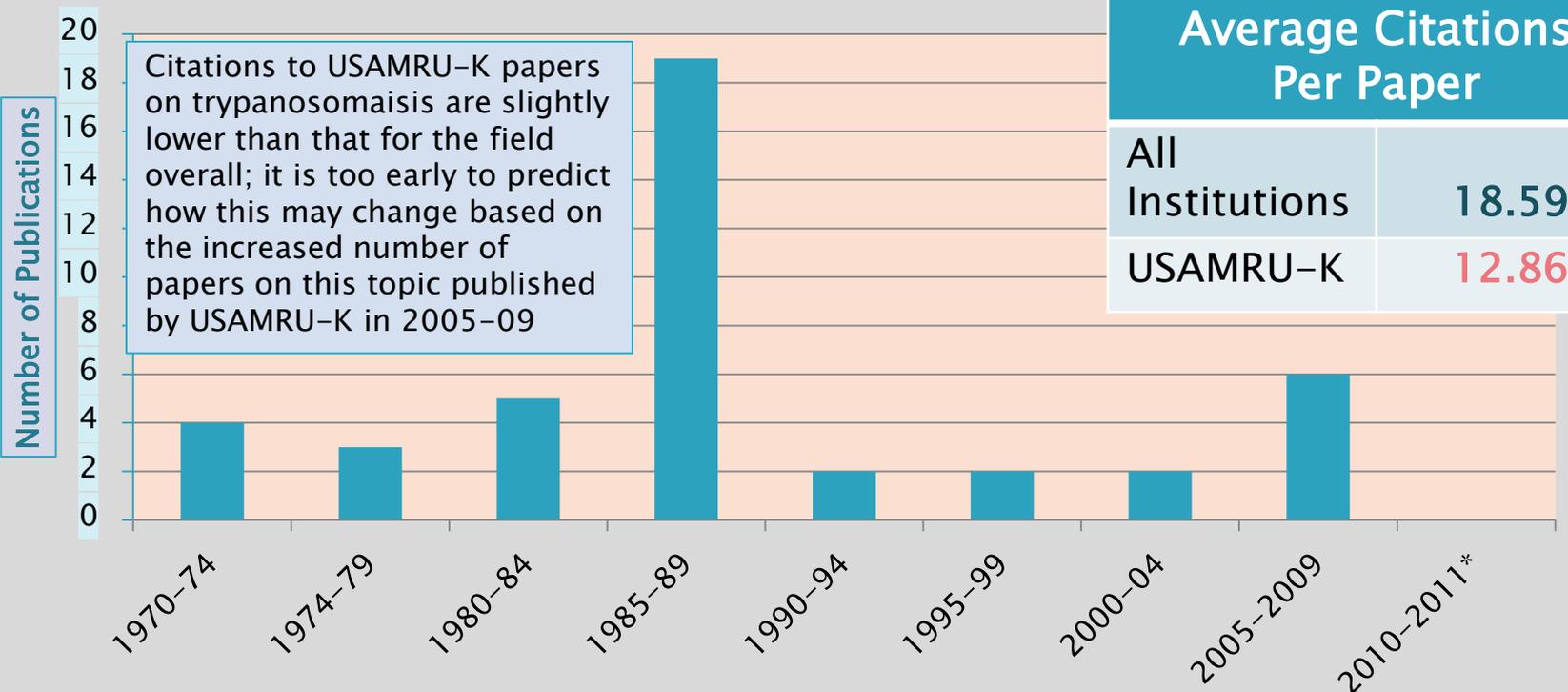
Towards World Class Excellence

# FOCUS ON TRYPANOSOMIASIS 1969–2011\*



## USAMRU-K Publications

n=43



- ▶ USAMRU-K research on trypanosomiasis has spanned its history and was particularly prolific in the mid-1980's
- ▶ There was an uptick on USAMRU-K publishing on trypanosomiasis in 2005-2009

\*2011 represents a partial period

# USAMRU-KENYA PROGRAM HIGHLIGHT: TRYPANOSOMIASIS



- ▶ In the late 1970's, USAMRU-K researchers were able to identify a new serodeme of *Trypanosoma brucei rhodesiense*. Trypanosomes of this serodeme, derived from a human isolate made in Kenya, were designated as Walter Reed Army Trypanozoon antigenic types (WRATat).
- ▶ The article below documenting the new serodeme was published in 1979 and has been cited 48 times in Web of Science.

Campbell GH, Esser KM, Welde BT, Diggs CL. Isolation and characterization of a new serodeme of *Trypanosoma-Rhodesiense*. *American Journal of Tropical Medicine and Hygiene* 1979;28(6):974-83.

# USAMRU-KENYA PROGRAM HIGHLIGHT: TRYPANOSOMIASIS



- ▶ USAMRU-K has continued to publish on this topic with the most recent publications appearing in the late 2000's and research continues today.
- ▶ The 2007 article noted below is a review of the roles of prostoglandins in parasite pathogenesis and physiology and the recent advances in understanding of the enzymology of PG production in various parasites, including trypanosoma; it has been cited 6 times in Web of Science.

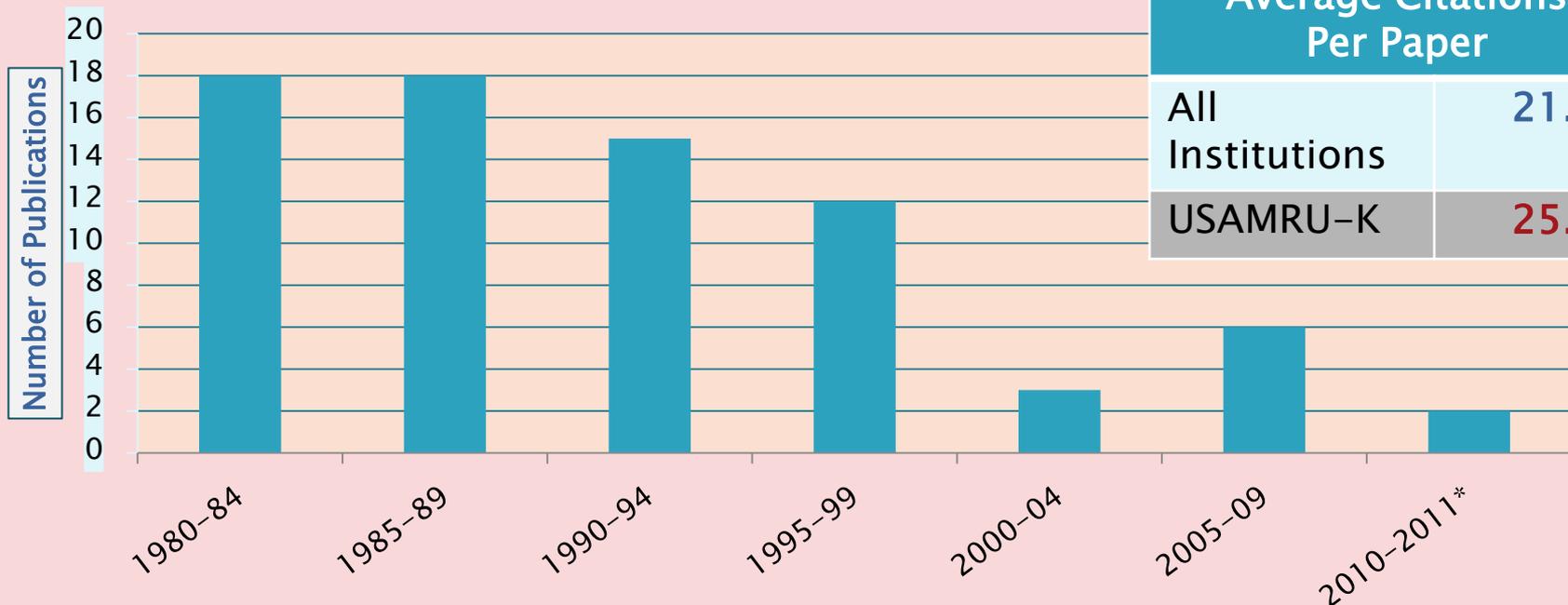
Kubata BK, Duszenko M, Martin S, Urade Y. Molecular basis for prostaglandin production in hosts and parasites. *Trends in Parasitology* 2007 Jul;23(7):325-31.

# Focus on Leishmaniasis 1969–2011\*



## USAMRU-K Publications

n=74



### Average Citations Per Paper

All Institutions	21.51
USAMRU-K	25.51

- ▶ Leishmaniasis was an early focus of USAMRU-K research
- ▶ Average citations to USAMRU-K papers on leishmaniasis have been somewhat greater than that of other papers in the field

# USAMRU-KENYA THERAPEUTIC PRODUCT HIGHLIGHT: LEISHMANIASIS



- ▶ USAMRU-K studied the use of sodium stibogluconate in the treatment of visceral leishmaniasis and the promising initial results of this study were published in an article that appeared in 1983.
- ▶ The first of three on this topic, the article below has been cited 61 times in Web of Science.

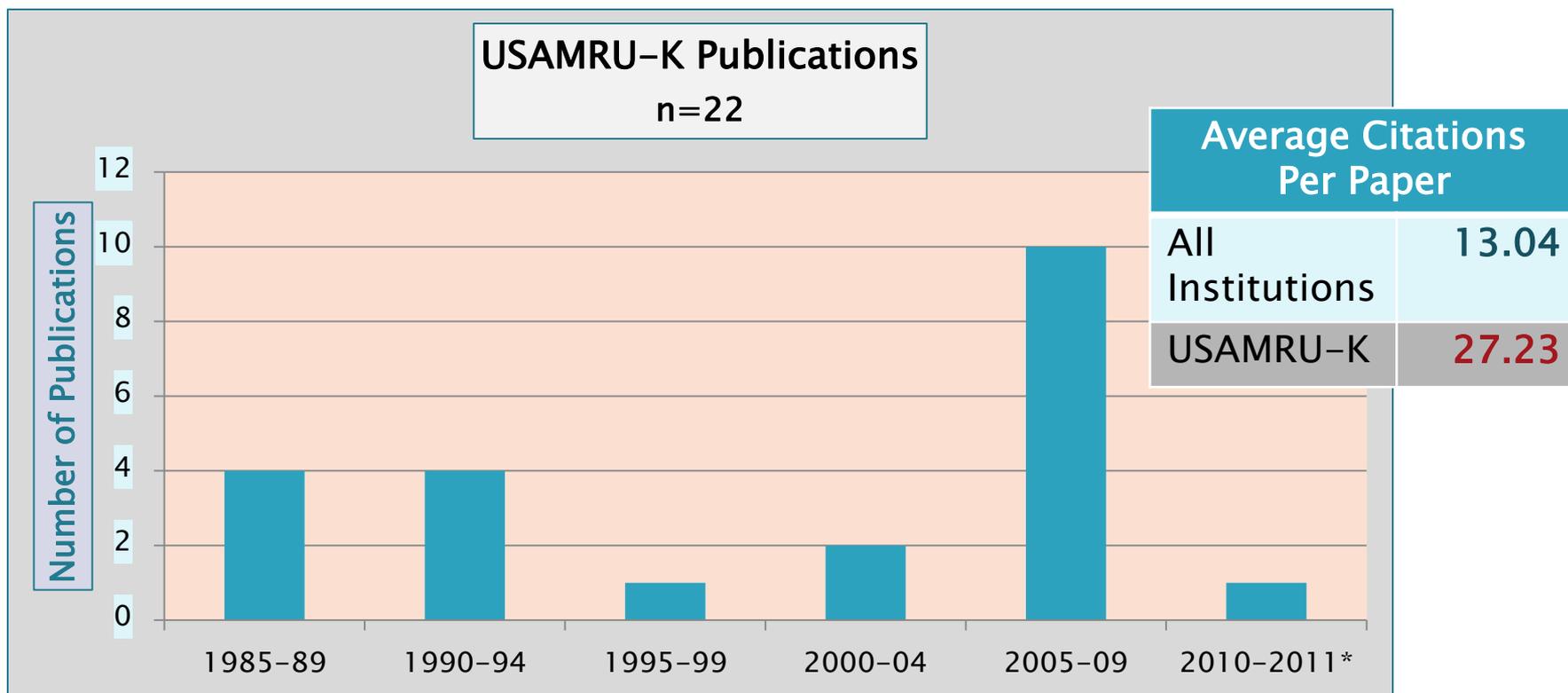
Chulay JD, Bhatt SM, Muigai R, Ho M, Gachihi G, Were JBO, Chunge C, Bryceson ADM. A Comparison of 3 dosage regimens of sodium stibogluconate in the treatment of visceral Leishmaniasis in Kenya. *Journal of Infectious Diseases* 1983;148(1):148-55.

# USAMRU-KENYA PROGRAM HIGHLIGHT: LEISHMANIASIS

- ▶ Leishmaniasis continues to be a focus of USAMRU-K research, now using genomics.
- ▶ One study examined the distribution of Prostaglandin F<sub>2</sub> $\alpha$  (PGF<sub>2</sub> $\alpha$ ) synthase in Leishmanias and determined that the PGF<sub>2</sub> $\alpha$  synthase gene was only detected in one of the New World species. Published in 2008, the abstract below details the study results as presented at the 13th International Congress on Infectious Diseases.

Majanja J, Kubata BK. Analysis of PGF<sub>2</sub> alpha Synthase in Old and New World Species of Leishmania. *International Journal of Infectious Diseases* 2008 Dec;12:E384-E.

# Focus on Rift Valley Fever Virus and Arboviruses 1969–2011\*



- ▶ Since the mid-1980's, Rift Valley Fever and arboviruses have been consistently a target of USAMRU-K research; a significant number of papers on this topic was published in the period 2005-09
- ▶ Average citations to USAMRU-K papers related to Rift Valley Fever and arboviruses have been proportionally more than double that of other papers in the field

# USAMRU–KENYA PROGRAM HIGHLIGHT: RVF



- ▶ USAMRU–K collaborated with GEIS and other agencies in the development of a satellite–based early warning tool for Rift Valley Fever in East Africa that has application to other climate–dependent epidemic diseases.
- ▶ The prediction of a RVF outbreak was documented in the article below that has been cited 172 times in Web of Science.

Linthicum KJ, Anyamba A, Tucker CJ, Kelley PW, Myers MF, Peters CJ. Climate and satellite indicators to forecast Rift Valley fever epidemics in Kenya. *Science* 1999 Jul;285(5426):397–400.

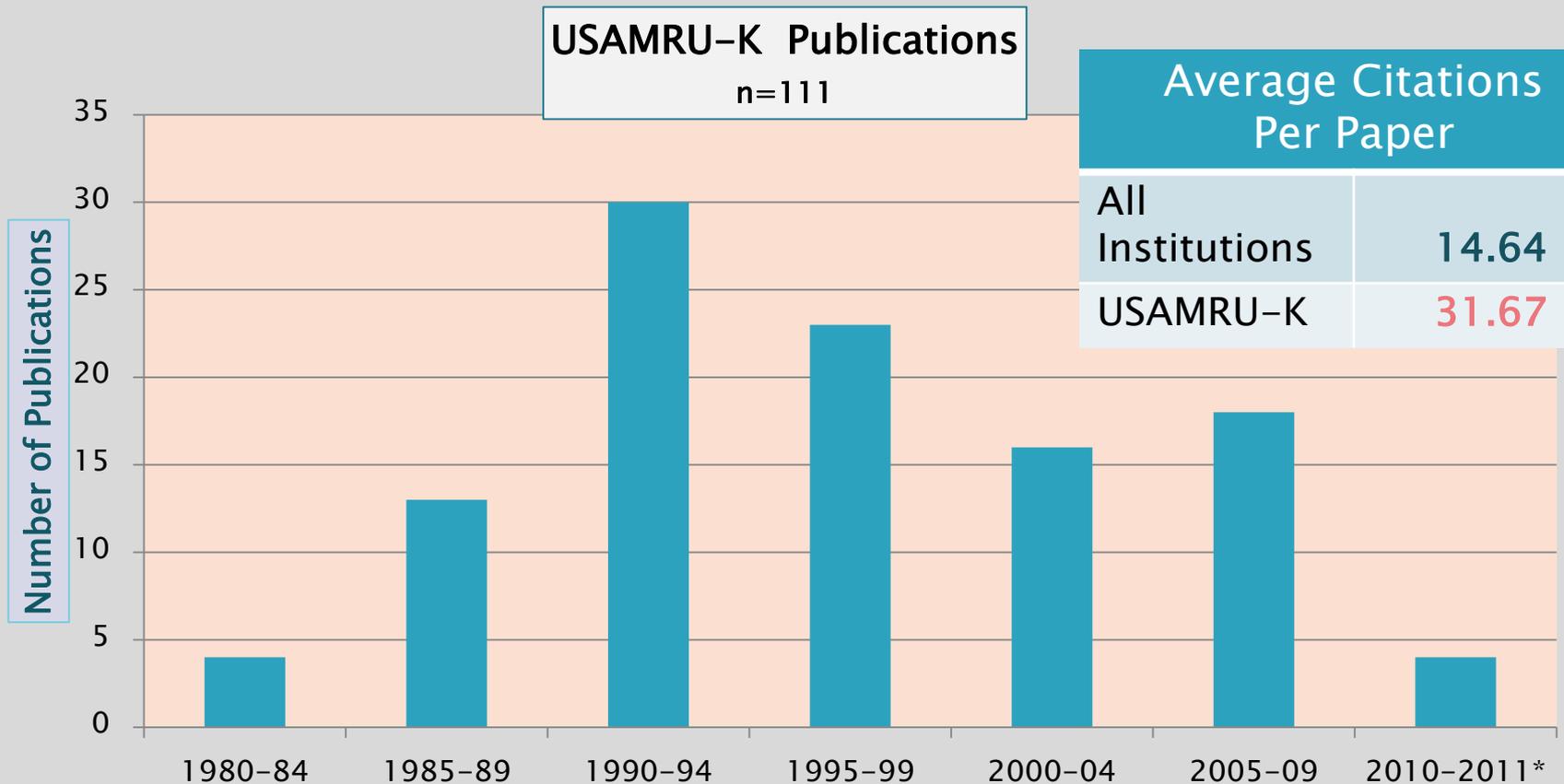
# USAMRU-KENYA PROGRAM HIGHLIGHT: RVF



- ▶ USAMRU-K continues its work on entomological surveillance to determine the epidemic/epizootic vectors of RVF virus (RVFV).
- ▶ A USAMRU-K article documenting the Rift Valley Fever epidemic in Kenya, 2006/2007 was published in 2010.

Sang R, Kioko E, Lutomiah J, Warigia M, Ochieng C, O'Guinn M, Lee JS, Koka H, Godsey M, Hoel D, Hanafi H, Miller B, Schnabel D, Breiman RE, Richardson J. Rift Valley Fever Virus Epidemic in Kenya, 2006/2007: The Entomologic Investigations. *American Journal of Tropical Medicine and Hygiene* 2010 Aug;83(2):28-37.

# Focus on Entomology 1969–2011\*



► Average citations to USAMRU-K research on entomology are more than double that of the field overall, indicating it is relied on as foundational research; USAMRU-K researchers self-cite 52% of the time

\*2011 represents a partial period

# USAMRU-KENYA PROGRAM HIGHLIGHT: ENTOMOLOGY



- ▶ USAMRU-K and WRAIR researchers discovered that the mosquito *Anopheles stephensi*, a natural vector of human malaria, limits parasite development with inducible synthesis of nitric oxide (NO).
- ▶ This discovery was documented in the article below that has been cited 194 times in Web of Science.

Luckhart S, Vodovotz Y, Cui LW, Rosenberg R. The mosquito *Anopheles stephensi* limits malaria parasite development with inducible synthesis of nitric oxide. *Proceedings of the National Academy of Sciences of the United States of America* 1998 May;95(10):5700-5.

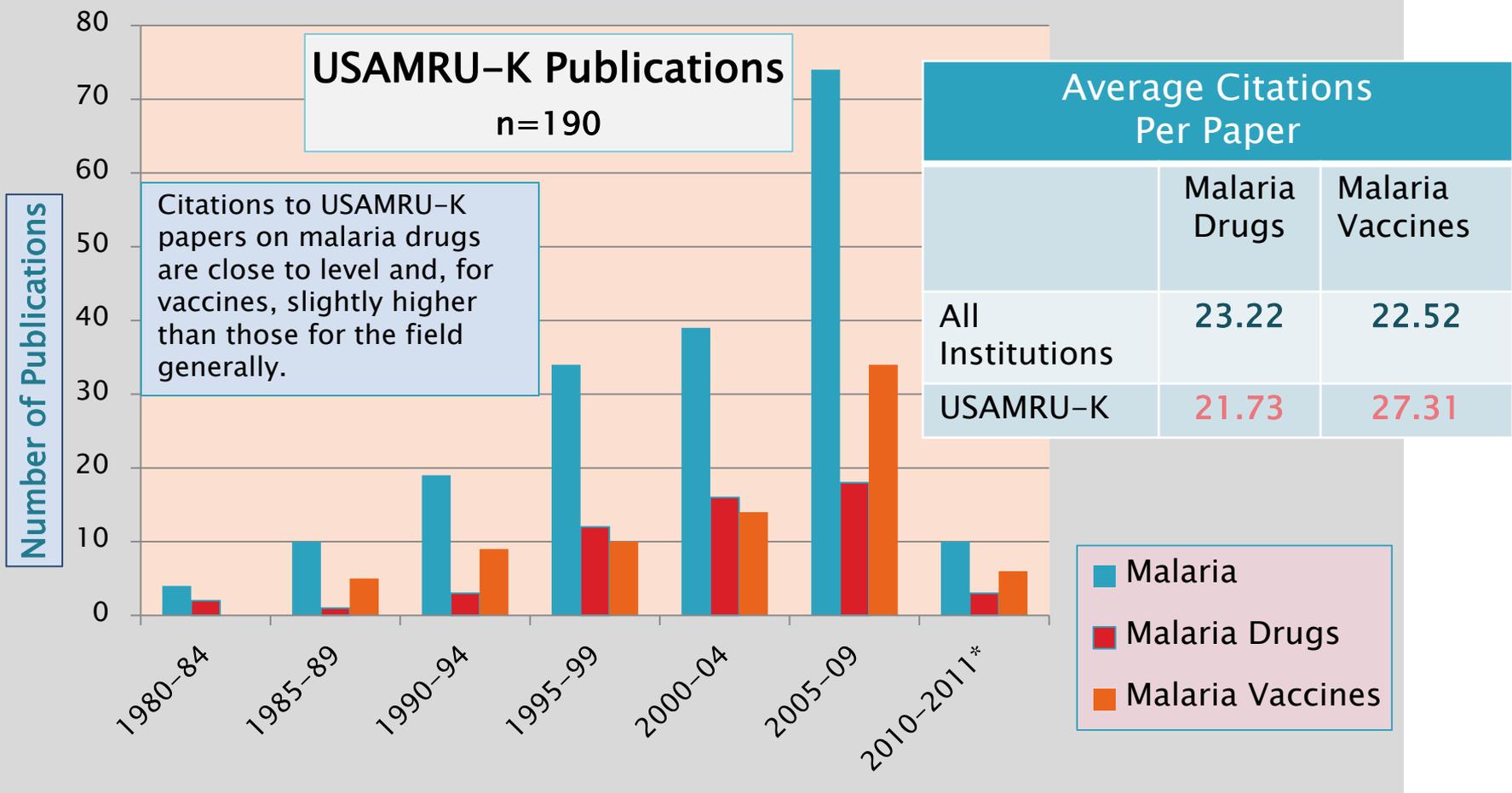
# USAMRU-KENYA PROGRAM HIGHLIGHT: ENTOMOLOGY



- ▶ Publishing as recently as March 2011 on this topic, USAMRU-K researchers document laboratory studies that provide proof of concept for the fluorescent tracer technique (FTT) as a tool to evaluate potential sand fly control methods.

Mascari TM, Clark J, Gordon S, Mitchell MA, Rowton ED, Stout R, Foil LD. Oral treatment of rodents with insecticides for control of sand flies (Diptera: Psychodidae) and the fluorescent tracer technique (FTT) as a tool to evaluate potential sand fly control methods. *Journal of Vector Ecology* 2011 Mar;36:S132-S7.

# FOCUS ON MALARIA 1969–2011\*



- ▶ Since the 1980's, USAMRU-K has published research on malaria with an emphasis on drug products
- ▶ USAMRU-K publishing on malaria vaccines began to match that on malaria drugs in the mid-2000's



- ▶ USAMRU-K researchers tested tafenoquine (WR 238605), a new long-acting 8-aminoquinoline, for its ability to prevent malaria.
- ▶ Results of preliminary clinical trials in Kenya, published in the 2001 article noted below, showed that prophylactic regimens of 200 mg or 400 mg of tafenoquine, taken weekly for less than or equal to 13 weeks, were highly efficacious in preventing falciparum malaria. More studies are needed to show that this improved derivative of primaquine and pamaquine can be utilized for malarial chemoprophylaxis in geographic areas with chloroquine-resistant *P. falciparum* and *P. vivax* malaria.

Shanks GD, Oloo AJ, Aleman GM, Ohrt C, Klotz FW, Braitman D, Horton J, Brueckner R. A new primaquine analogue, tafenoquine (WR 238605), for prophylaxis against Plasmodium falciparum malaria. *Clinical Infectious Diseases* 2001 Dec;33(12):1968-74.

# USAMRU-KENYA

## PROGRAM HIGHLIGHT: MALARIA DRUGS



- ▶ USAMRU-K researchers continue to do important research in anti-malarial drug resistance.
- ▶ A 2010 publication on this topic discusses two cross-sectional studies documenting the emergence of highly SP-resistant parasites, including isolates harboring pfdhps mutations not previously observed and recommending that its use as a first-line antimalarial should be discouraged, particularly for populations without acquired immunity to malaria.

Spalding MD, Eyase FL, Akala HM, Bedno SA, Prigge ST, Coldren RL, Moss WJ, Waters NC. Increased prevalence of the pfdhfr/phdhps quintuple mutant and rapid emergence of pfdhps resistance mutations at codons 581 and 613 in Kisumu, Kenya. *Malaria Journal* 2010 Nov;9.



- ▶ USAMRU-K sites west of Kisumu have hosted the earliest and most successful malaria vaccine clinical trials in East Africa.
- ▶ As an example, the malaria vaccine RTS,S was the focus of the highly cited paper below; this paper has been cited 148 times in Web of Science.

Stoute JA, Kester KE, Krzych U, Welde BT, Hall T, White K, Glenn G, Ockenhouse CF, Garcon N, Schwenk R, Lanar DE, Sun P, Momin P, Wirtz RA, Golenda C, Saloui M, Wortmann G, Holland C, Dowler M, Cohen J, Ballou WR. Long-term efficacy and immune responses following immunization with the RTS,S malaria vaccine. *Journal of Infectious Diseases* 1998 Oct;178(4):1139-44.

# USAMRU–KENYA PROGRAM HIGHLIGHT: MALARIA



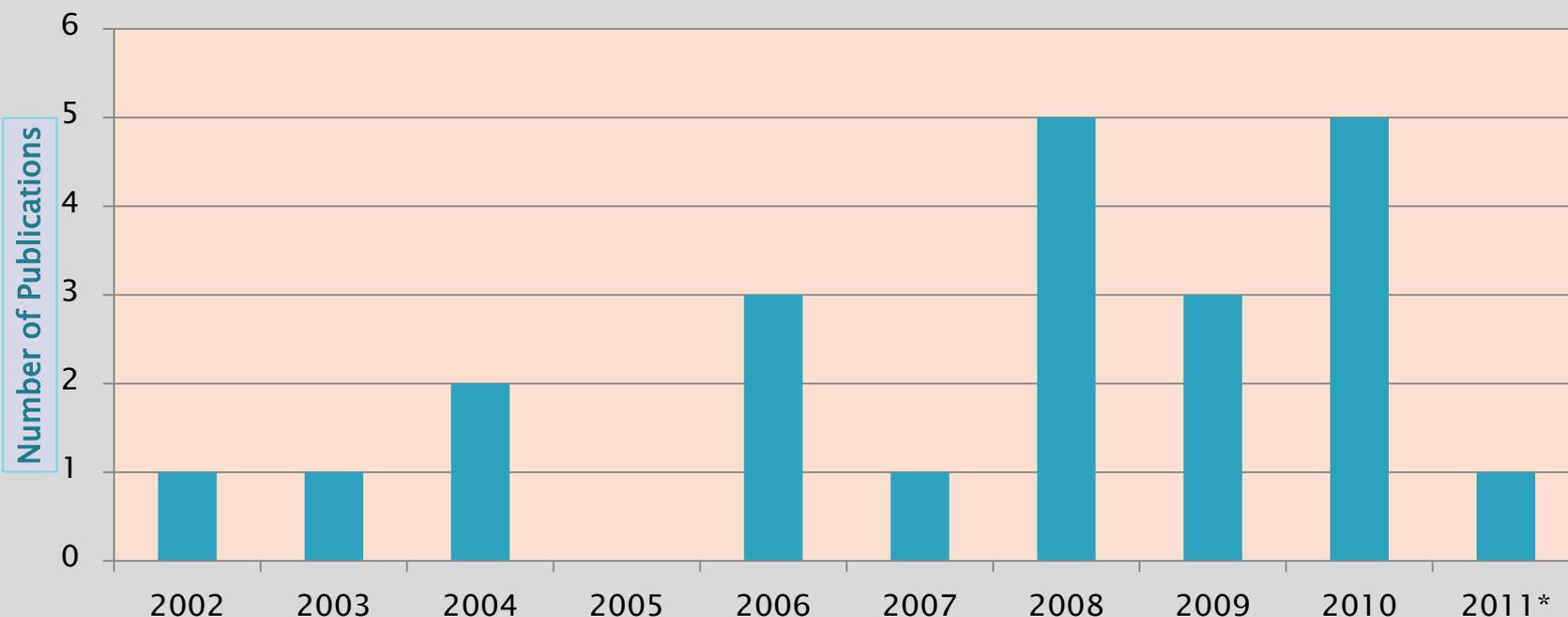
- ▶ USAMRU–K researchers continue to publish and present at meetings on malaria, including at the 5th Multilateral Initiative on Malaria Pan–African Malaria Conference in Nairobi, Kenya, Nov 02–06, 2009.
- ▶ The paper provided results of a study of the haematological changes in children infected with malaria and their impact on improved diagnosis and therapy of childhood malaria.

Maina RN, Walsh D, Gaddy C, Hongo G, Waitumbi J, Otieno L, Jones D, Ogutu BR. Impact of Plasmodium falciparum infection on haematological parameters in children living in Western Kenya. *Malaria Journal*. [Proceedings Paper]. 2010 Dec;9:11.

# Focus on HIV 1969–2011\*



USAMRU-K Publications  
n=22



- ▶ USAMRU-K began publishing on HIV/AIDS in 2002; after a break in 2005, USAMRU-K has been steadily publishing papers and presenting at meetings on this topic
- ▶ Because of the volume of publishing on HIV, it is not practicable to compare citations to USAMRU-K papers against the field overall

\*2011 represents a partial period

# USAMRU-KENYA PROGRAM HIGHLIGHT: HIV/AIDS



- ▶ USAMRU-K successfully conducted a study that defined the genetic diversity of HIV-1 in Kenya using approaches that clearly distinguished subtypes from inter-subtype recombinants.
- ▶ The study results appear in the most highly cited USAMRU-K paper on HIV/AIDS noted below; it has been cited 73 times in Web of Science since publication in 2002.

Dowling WE, Kim B, Mason CJ, Wasunna KM, Alam U, Elson L, Birx DL, Robb ML, McCutchan FE, Carr JK. Forty-one near full-length HIV-1 sequences from Kenya reveal an epidemic of subtype A and A-containing recombinants. *Aids* 2002 Sep;16(13):1809-20.

# USAMRU-KENYA PROGRAM HIGHLIGHT: HIV/AIDS



- ▶ USAMRU-K researchers continue research on HIV/AIDS today and presented a poster at AIDS Vaccine 2010 on the Early Capture HIV Cohort Study (ECHO).
- ▶ This study demonstrates that efficient detection of individuals with very early acute HIV infection is feasible in East Africa and provides a powerful tool to investigate host-HIV interactions with direct relevance to HIV vaccine development.

Rono K, Sanga E, Sekiziyivu A, Sinei S, Kroidl I, Kibuuka H, Shaffer D, Maganga L, Millard M, Khamadi S, Shikuku K, Eser A, Taylor A, Peel S, deSouza M, Michael N, Robb ML. RV 217: The Early Capture HIV Cohort Study (ECHO): A prospective study of acute HIV infection among high risk populations. *Aids Research and Human Retroviruses* 2010 Oct;26(10):A36-A.

# GLOBAL INFLUENCE OF USAMRU-KENYA RESEARCH





- ▶ The most highly cited USAMRU–K paper in Web of Science is a malaria–related article published in the journal, *Science*, in 1996; it has been cited 524 times since its publication.

Fried M, Duffy PE. Adherence of Plasmodium falciparum to chondroitin sulfate A in the human placenta. *Science* 1996 Jun;272(5267):1502–4.

# USAMRU-K RESEARCH IS USED INTERNATIONALLY



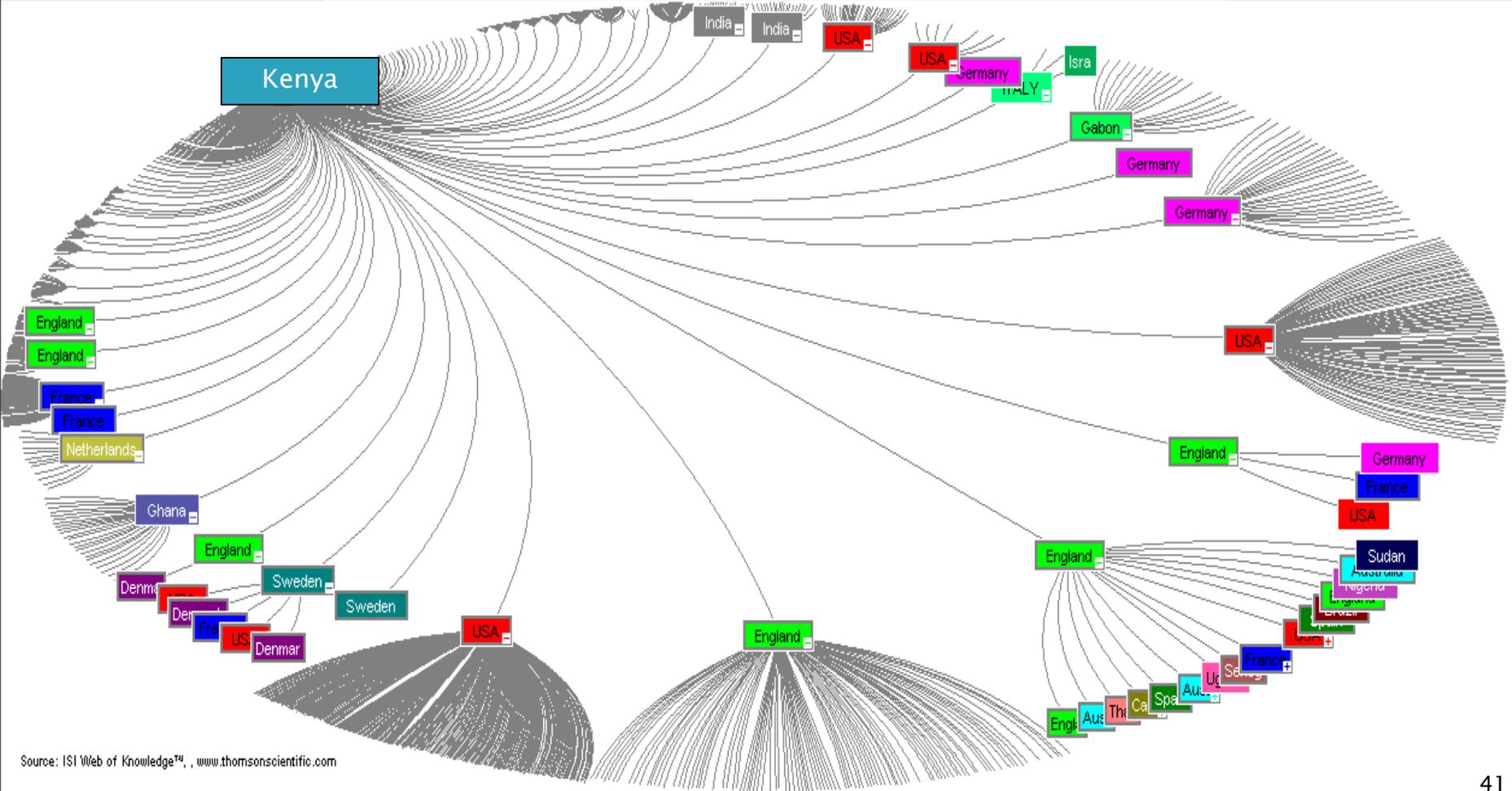
Adherence of *Plasmodium falciparum* to chondroitin sulfate A in the human placenta

Citation Mapping Help

Manage Edit... Appearance Print... 1898 1923 1948 1973 1996 1998 2011

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Re-create Map



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# USAMRU–KENYA RESEARCH SUMMARY



- USAMRU–K research has largely focused on tropical and infectious diseases, providing advanced development and onsite field testing of countermeasures and global surveillance and response systems for emerging infectious diseases
- USAMRU–K researchers have contributed significantly since 1969, sharing their research by publishing in journals and presenting at meetings
- USAMRU–K research on infectious disease therapeutics and prevention, particularly malaria and HIV/AIDS drug and vaccine development, has been particularly noteworthy in recent times