

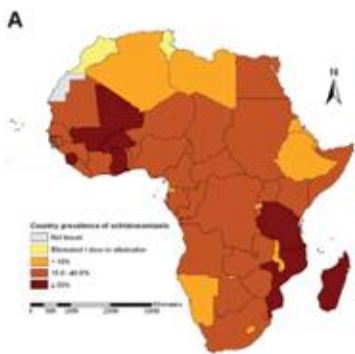
Multidisciplinary studies of African schistosomiasis: from preschool-aged children to women of child bearing age

Russell Stothard

Department of Parasitology

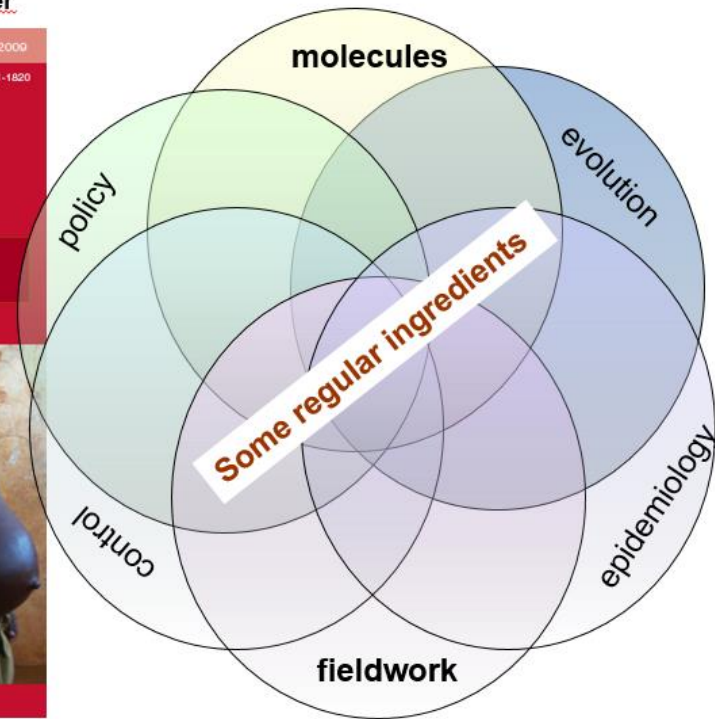
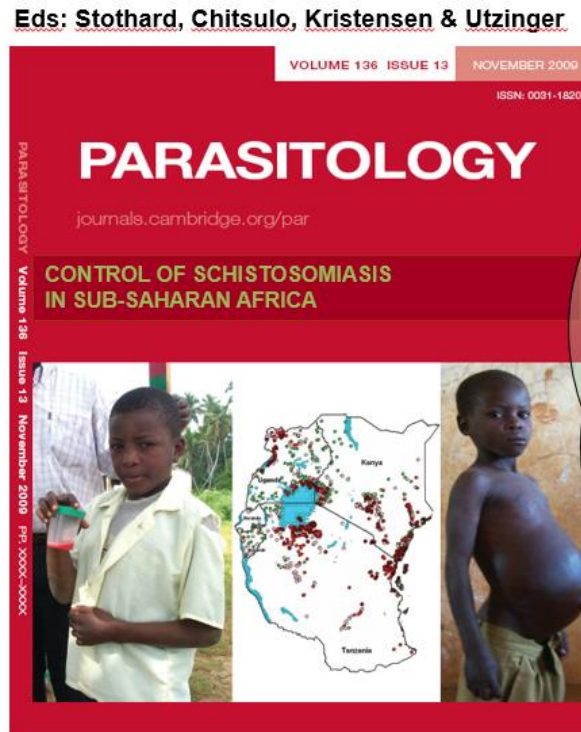
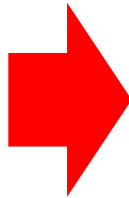
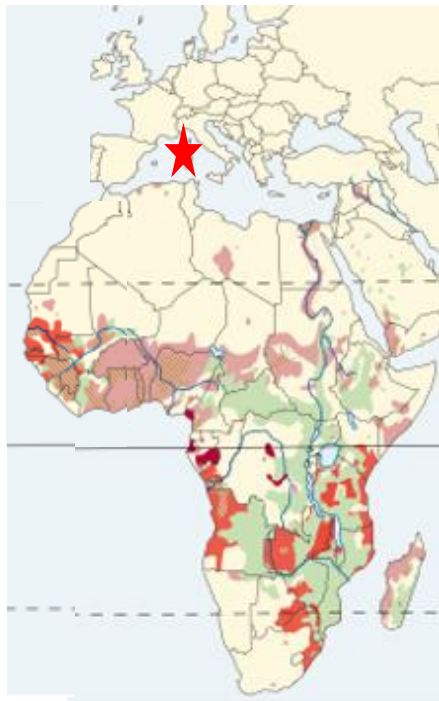
russell.stothard@lstm.ac.uk

@StothardRuss



Schistosomiasis (like ALL other tropical diseases)
needs multidisciplinary approaches and joined-up thinking

Corsica
noted in 4 yo child



Recent rise fostering cross-talk between research disciplines exploring
links between well-being, economic resources & environment

Large demand for PZQ for SAC by country, not fully serviced

Mean prevalence (*static*)

Tablet requirements (*annual*)



What about the treatment needs of PSAC – **totally ignored!**

Why?...we are simply too busy to have 360 vision &

Merck 250M tablet donation 'ring-fenced' for SAC

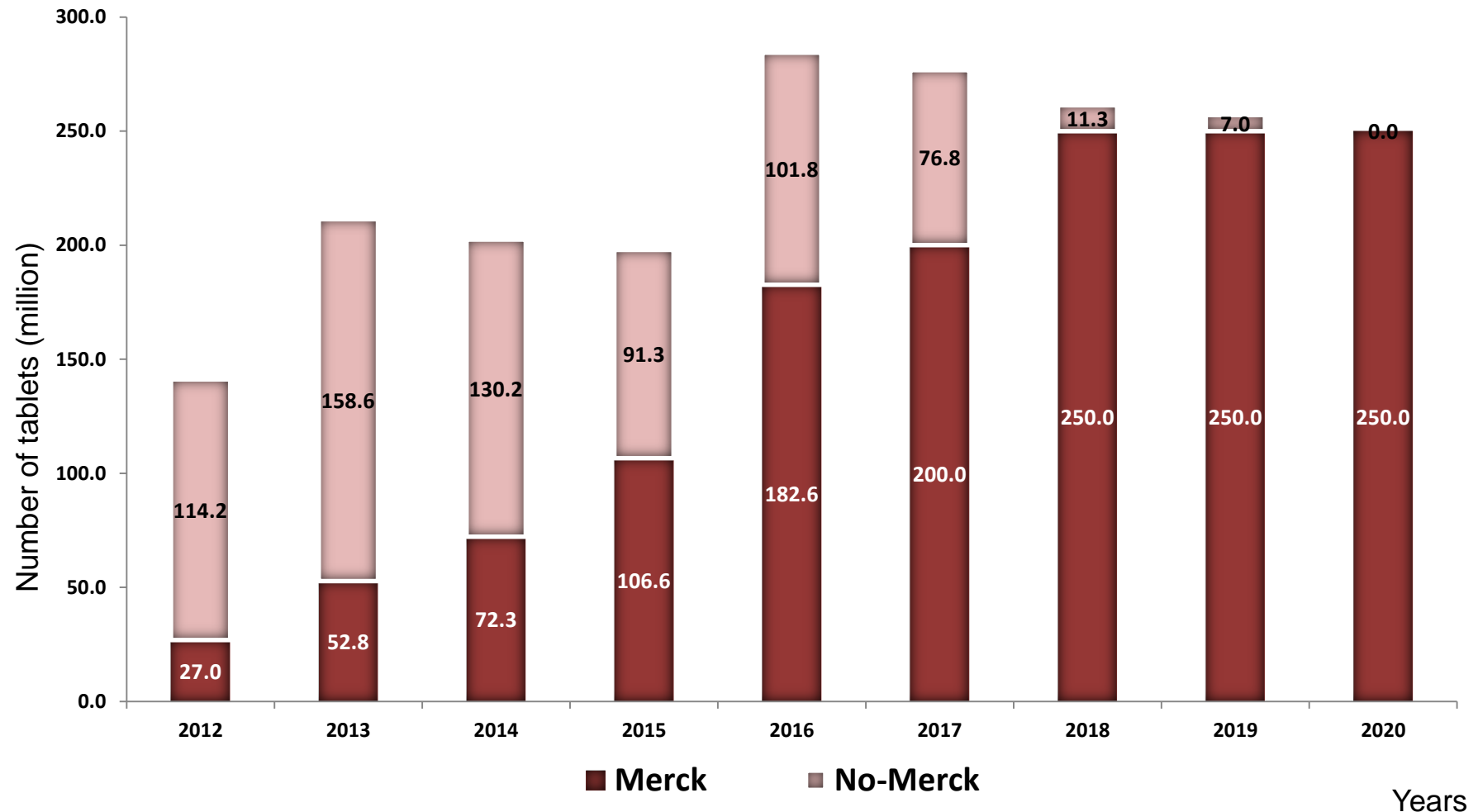
sadly we create our own inequities from our best intentions

The global PZQ supply

- **optimism** *or* **pessimism** -

slides from Dr Amadou Garba (WHO)

Annual amount of PZQ donated / pledged up to 2020

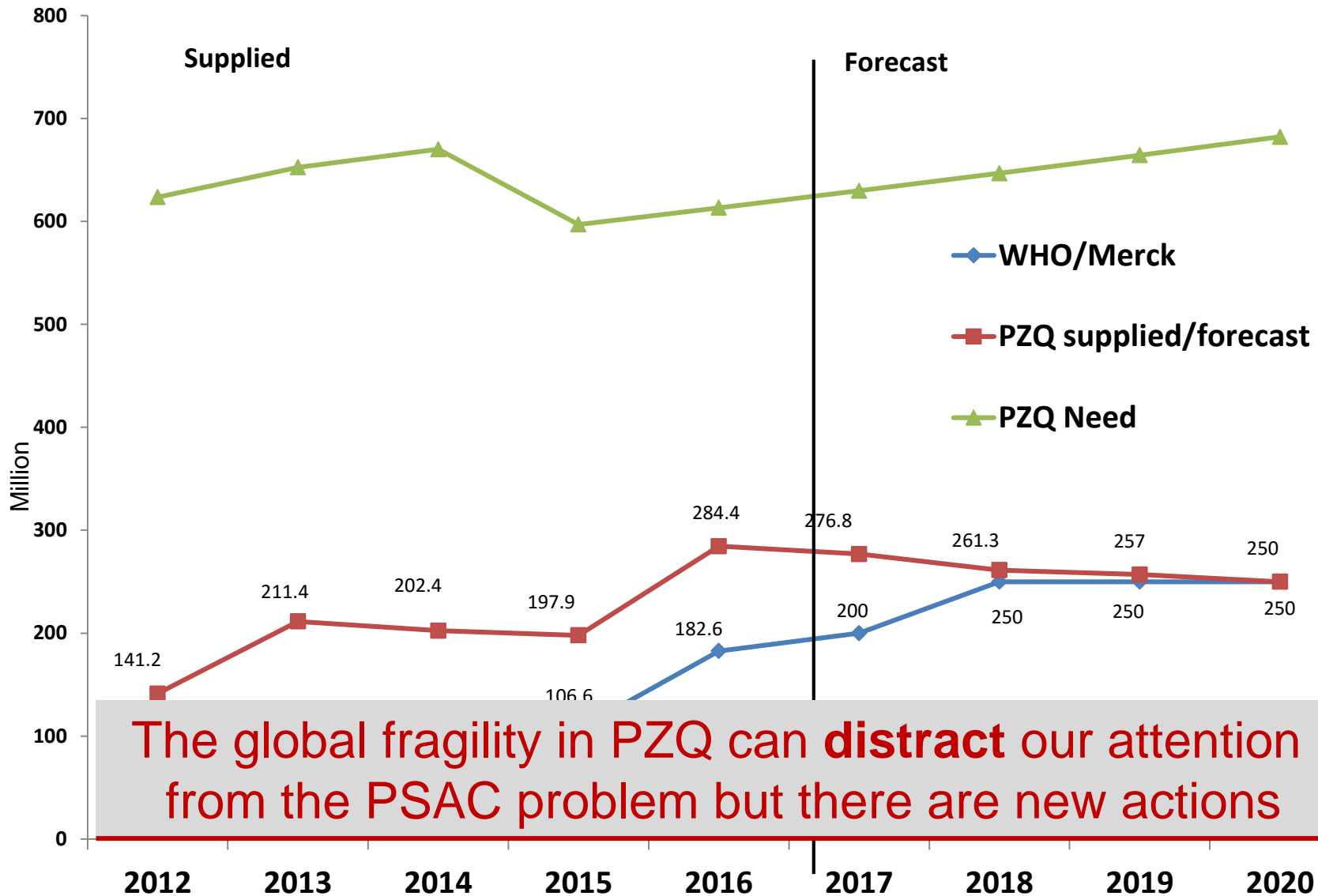


218.8 Million people require PC for schistosomiasis (in 2015)

597 Million PZQ tablets needed per year to treat all the people in need for treatment globally in 2015

296.3 Million for SAC (267 for Africa) and 300.9 Million for Adults

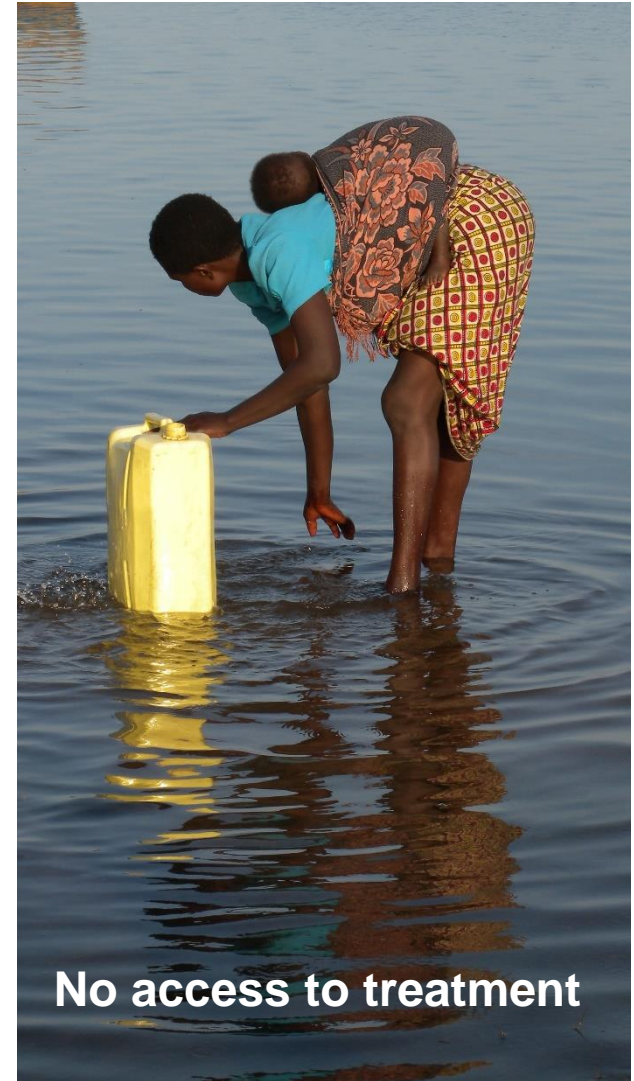
PZQ supply and need to treat (?)ALL individuals in need



Early infection and universal disease in some places



Access to some treatment



No access to treatment

A 'health system' success needing improvement? A health system failure?

COUNTDOWN

- Working in Liberia, Ghana, Nigeria & Cameroon
- Active research uptake/communications & 5 main research themes

COUNTDOWN

Calling time on Neglected Tropical Diseases



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COUNTDOWN at Swiss TPH Winter Symposium - 7-8 December 2017 - Basel, Switzerland

07 December 2017

The Swiss TPH Winter Symposium 2017 on Helminth Infection - from transmission to Control.



The 2017 British Society for Parasitology Autumn Symposium on 28th September

28 September 2017

The Multidisciplinary of Parasitology: Host-Parasite Evolution and Control in an Ever Changing World



Don't Miss COUNTDOWN at the Keystone Symposia Conference in Durban, South Africa 10 - 14 Sept. 2017

10 September 2017

'Understanding the epidemiological and social factors of Lymphatic Filariasis persistence ten years into the MDA program: towards a successful and sus...

Tweets by @NTDCOUNTDOWN

COUNTDOWNNonNTDS Retweeted
Russell Stothard @StothardRuss
@NTDCOUNTDOWN important to sustain progress for elimination of STH

13 Jul

COUNTDOWNNonNTDS Retweeted
Sally Theobald @sallytheobald
Can't wait to see you in Liverpool Oct 2018! see new website & our welcome blog - @RinGsRPC @REACHOUT_Tweet @NTDCOUNTDOWN @ReBUILDRPC

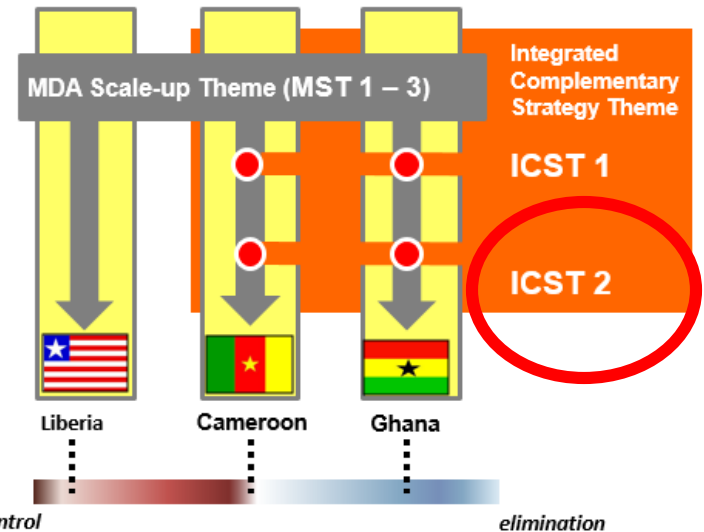
14 Jul

COUNTDOWNNonNTDS Retweeted



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Calling time on Neglected Tropical Diseases



scale-up in Nigeria & responsive research

Background

Paediatric schistosomiasis in Africa

- an 'old' overlooked topic in schistosomiasis

Activities on female genital schistosomiasis

- building awareness and clinical studies

Estimating water contact risk in PSAC and mothers

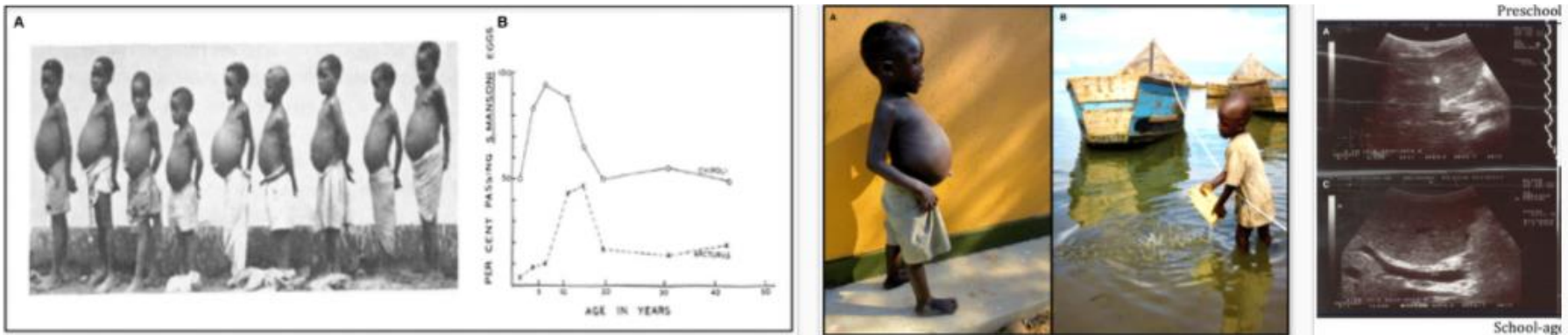
- Mapping, surveillance and GPS datalogging in Cameroon

Importance of PSAC and disease progression

Parasitology

One hundred years of neglect in paediatric schistosomiasis

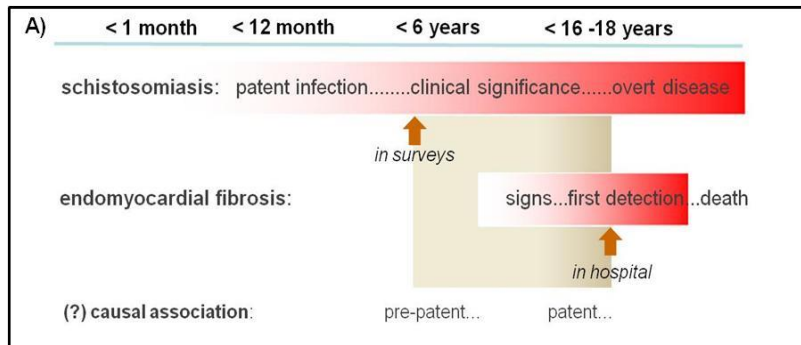
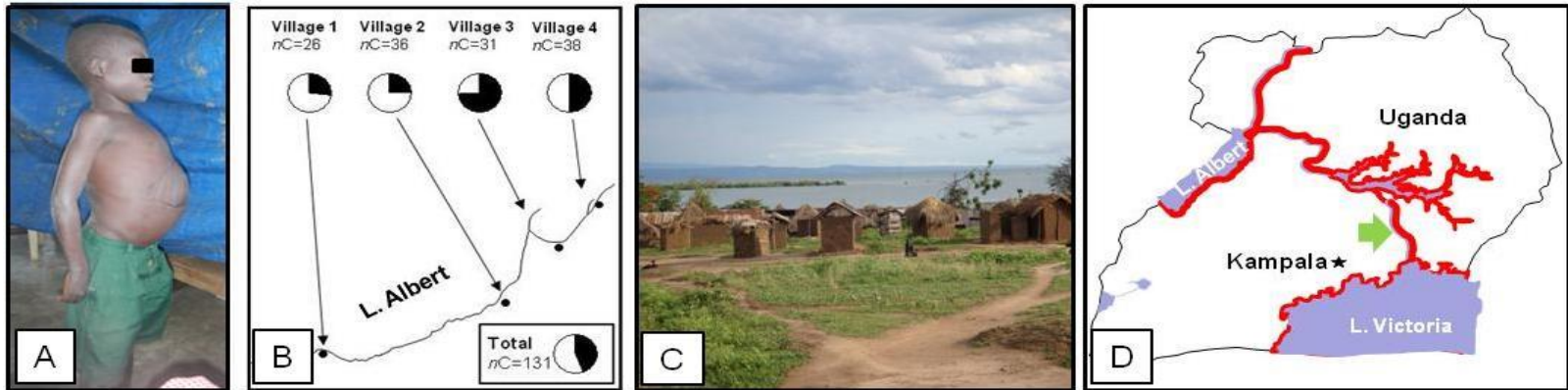
AMAYA L. BUSTINDUY ^{id} (a1), STEPHEN WRIGHT (a2), ELIZABETH C. JOEKES (a3), NARCIS B. KABATEREINE (a4), JUTTA REINHARD-RUPP (a5), CHARLES H. KING (a6) and J. RUSSELL STOTHARD (a7) 



Early infection likely leads to quicker overt morbidity in adolescence, some morbidity can be extreme in certain children (EMF case in Uganda)

ASTM&H CASE NOTE:

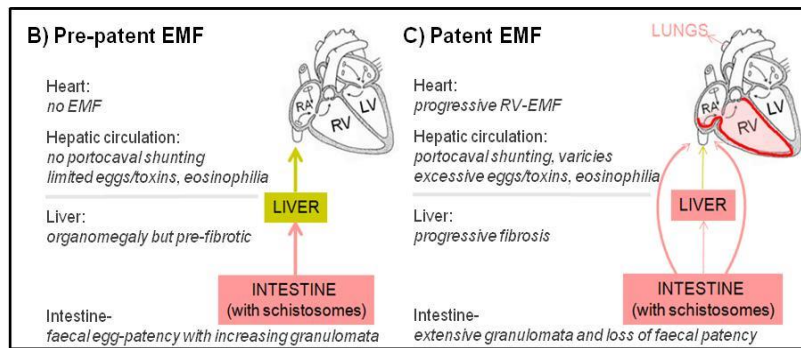
ASSESSING AN EPIDEMIOLOGICAL CONNECTION BETWEEN INTESTINAL SCHISTOSOMIASIS AND ENDOMYOCARDIAL FIBROSIS (EMF) IN UGANDA



New investigations needed

1. Poor surveillance
2. Limited primary literature
3. Plausible causality
4. Slow temporal associations

Case reports future 'RCT' not ethical



Background

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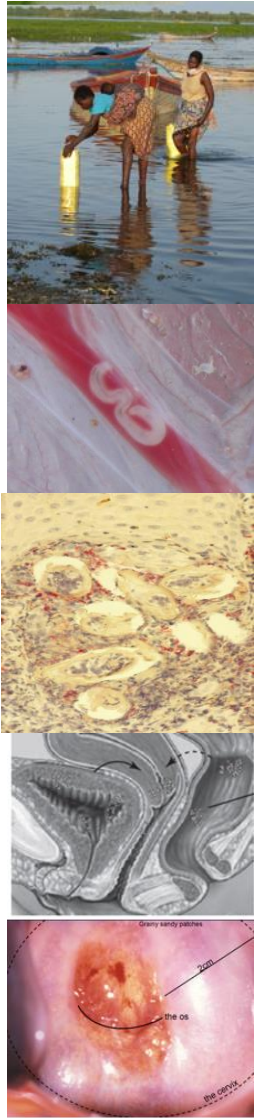
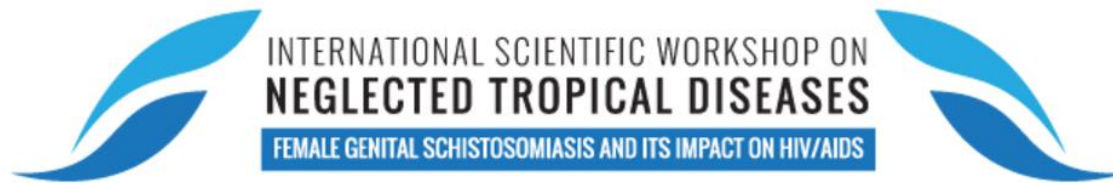
- building awareness and clinical studies

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COUNTDOWN implementation research

Connecting HIV/HPV/sub-fertility (www.fgsworkshop.org)



Systematic review: FGS widespread but under-reported



Invited Review

Female genital schistosomiasis (FGS): from case reports to a call for concerted action against this neglected gynaecological disease

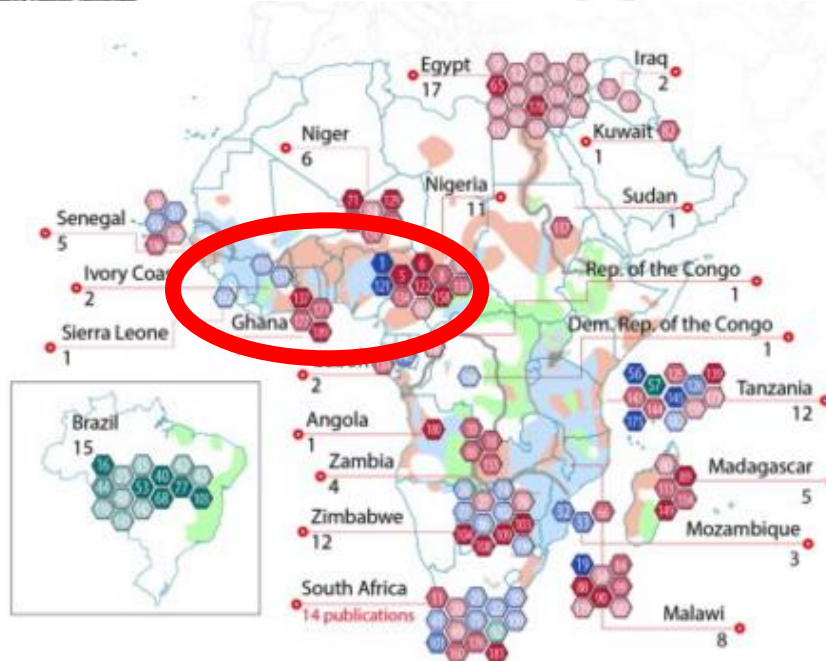
Vanessa Christinet^a, Janis K. Lazdins-Helds^b, J. Russell Stothard^c, Jutta Reinhard-Rupp^{d,*}

^aCentre International de Recherches d'Enseignement et de Santé en Milieu Tropical (CIREST), Akoumanga, Cameroon

^bGeneva, Switzerland

^cDepartment of Parasitology, Liverpool School of Tropical Medicine, Liverpool L3 5QA, UK

^dMünster, Germany, Switzerland



CALLING TIME ON UROGENITAL SCHISTOSOMIASIS

January 19, 2015

[Leave a comment](#)

Sally Theobald, COUNTDOWN Consortium & *Research in Gender and Ethics: Building stronger health systems (RinGs)*

I spent many of my teenage years living in Malawi, enjoying swimming in beautiful Lake Malawi. Wind on to age 30, and I was struggling to get pregnant. Eventually, following illness, I was diagnosed with schistosomiasis by a consultant and colleague at the Liverpool School of Tropical Medicine. I was told that I had probably been infected for a while and that it might be affecting my fertility. So I took praziquantel, the only available drug against the parasite, and soon after I was pregnant. Today my first born daughter is 10 years old. Whilst the links between urogenital schistosomiasis, sub-fertility and HIV have become increasingly well-established over my first born daughter's life time, a combined and robust health systems action that brings together neglected tropical disease, sexual and reproductive health and HIV communities to address and scale up treatment for urogenital schistosomiasis is sadly lacking.

Revising policy through time – where's the gap?



At-risk groups outside of SAC

Access to PZQ

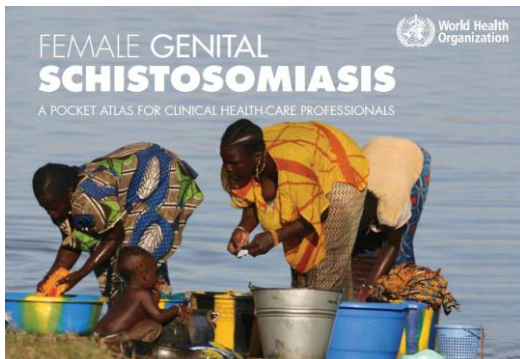
- *adult women (WCBA) / men* insufficient

- *pre-school-aged children* none

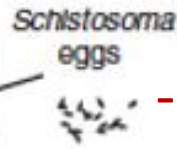
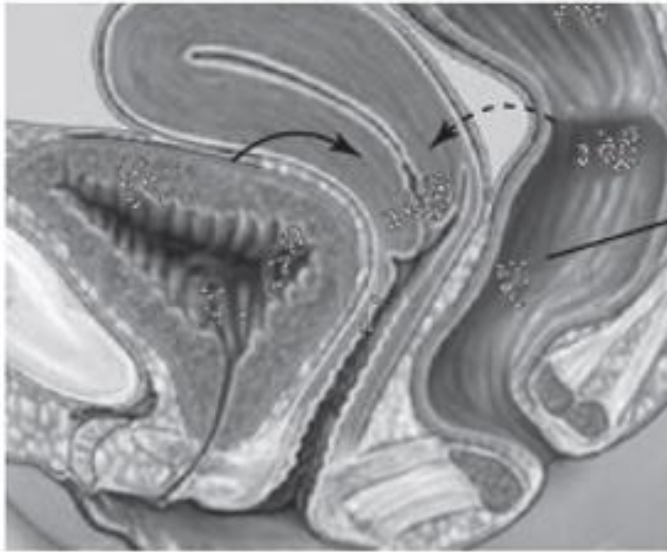


Awareness/surveillance in health system to genital aspects of *S. haematobium*

- *access to colposcopy / questionnaire*



Tackling genital schistosomiasis



Female genital schistosomiasis

- *often ignored (everywhere)*
- *not reported in West Africa*

How can we improve this

- *social context*
- *women's daily behaviours*
- *capacity for health system change*

FEMALE GENITAL SCHISTOSOMIASIS



For women and girls who present with urogenital symptoms and who have had contact with fresh water in countries endemic for schistosomiasis, the diagnosis of female genital schistosomiasis (FGS) must be considered.

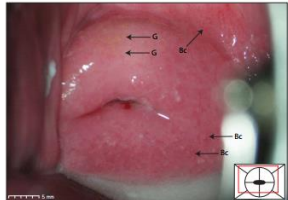
FGS is diagnosed by visual inspection of characteristic lesions on the cervix and vaginal wall. Visualization can be improved by using a digital camera or a colposcope. Current laboratory techniques are inadequate for diagnosing FGS. If one FGS case is seen, there are probably many others in the same area. All who have used the same source of water are at risk. It is especially important to identify children who may have early schistosomiasis.

The WHO-recommended treatment for schistosomiasis is PRAZIQUANTEL 40 MG/KG AS A SINGLE DOSE.

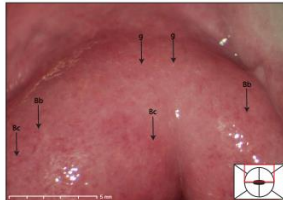
Regular treatment with praziquantel during preventive chemotherapy activities (mass drug administration) to communities and schools in endemic areas is an important public health intervention against FGS. Dosage is determined by measuring height using a dose pole.

Treatment kills the adult worms and prevents new FGS lesions.

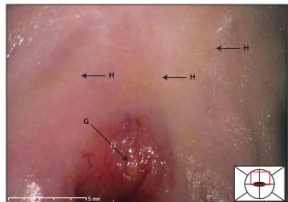
For further information and examples on FGS, please refer to the WHO Female Genital Schistosomiasis Pocket Atlas (2015).



Gravid sandy patches (G). Vidioposited abnormal blood vessels, circular (Bc). The discharge shown is candidiasis.



Sandy patch appearing as single grains (G). Vidioposited abnormal blood vessels, circular (Bc) and branched (Bb).



Homogeneous yellow sandy patches (H). Gravid sandy patches (G).



Homogeneous yellow sandy patches (H). Gravid sandy patches (G).

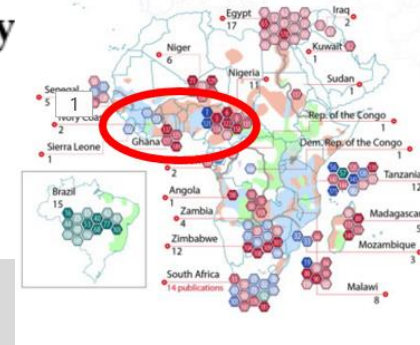


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Calling time on Neglected Tropical Diseases

COUNTDOWN implementation research

Female genital schistosomiasis (FGS) in Ogun State, Nigeria: A pilot survey on genital symptoms and clinical findings

U.F. Ekpo¹, M. Odeyemi¹, S.O. Sam-Wobo¹, O.B. Onunkwor¹, H.O. Mogaji^{1,2}, A.S. Oluwole¹, H.O. Abdussalam³ and J.R. Stothard⁴



SUMMARY In Nigeria (like elsewhere)

a lot of women likely have FGS but sadly don't know it

- *a very cryptic health burden*
- *better diagnostics needed (rtPCR)*
- *a PC disease needing an IDM approach*
- *economic forecasting for future resourcing*

Our study confirms FGS in Ogun State and calls for further action. FGS and toxomiasis is endemic. The Nigerian NCP should be encouraged to detect it, but also to prevent it.

Colour chart



Fig. 1. Standardize symptomologies a vaginal discharge colour chart (Hegertun *et al.* 2013).

FGS pathology

Sandy patches on homogenous yellow area	6 (30.0)
Grainy sandy patches	10 (50.0)
Nabothian cysts	1 (5.0)
Cervical polyps only	1 (5.0)
Rubbery papules	1 (5.0) ^a
Abnormal blood vessels	3 (15.0)
Suspected cancerous growth	1(5.0)

^a This is the first time this condition has been reported outside of Madagascar (Randrianasolo *et al.* 2015).

COUNTDOWN implementation research

In Ghana

1. Gendered experiences of living in affected communities have often been ignored in policies and interventions for schistosomiasis
2. Health workers lacked the capacity to effectively diagnosis and treat female genital schistosomiasis (*lack of awareness*)
3. Qualitative studies have given voice to women and explored their broader environment to assess ways to reduce transmission (*revealed stigma*)
4. New strategies and interventions are needed that reflect women and girls lived experiences with this disease (*encourage cross-sector dialogue*)
5. Key intervention areas include:
 - bespoke training and educational interventions
 - gender sensitive WASH interventions
 - integration into gynaecological screening (*HPV/cancers*)

Background

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Intensification of multisector actions for better impact

1) Precision mapping to better tailor treatment

2) Mapping snail distribution for control

3) Pinpointing key water contact sites

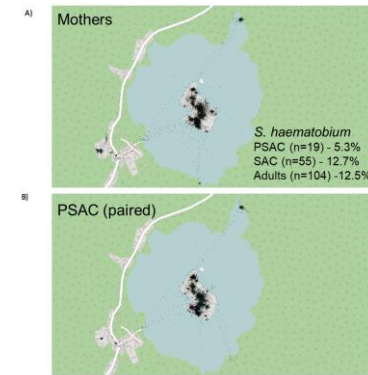
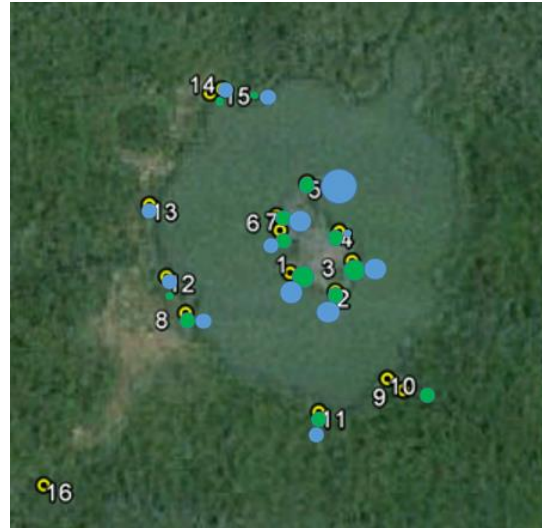
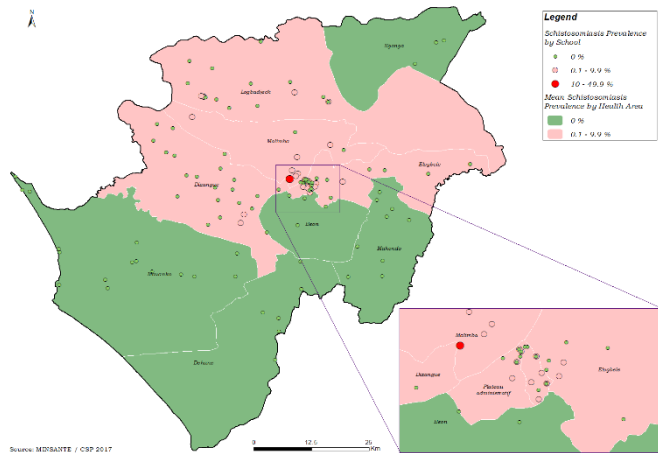


Figure 9: Visualisation of GPS co-ordinates at Barombi Kotto, Cameroon for A) mothers (n=12) and B) PSAC (n=12).



Precision mapping: An innovative tool and way forward to shrink the map, better target interventions, and accelerate toward the elimination of schistosomiasis

Louis-Albert Tchuem Tchuente, J. Russell Stothard, David Rollinson, Jutta Reinhard-Rupp



Calling time on Neglected Tropical Diseases

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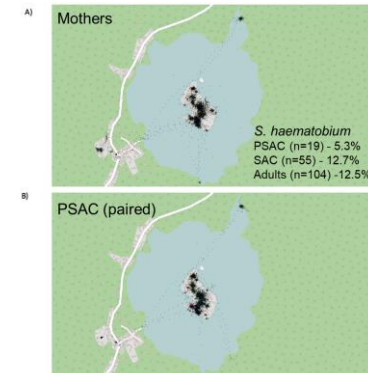
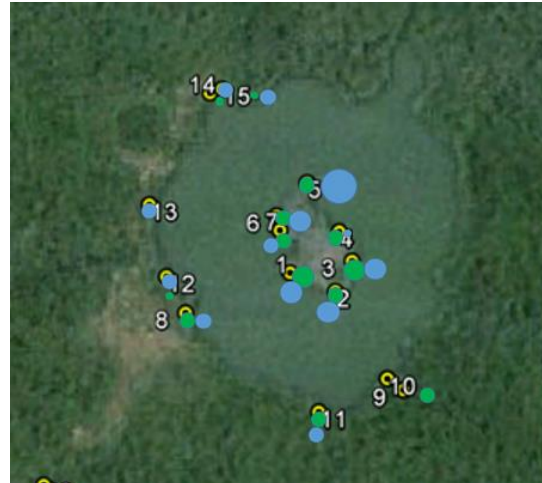
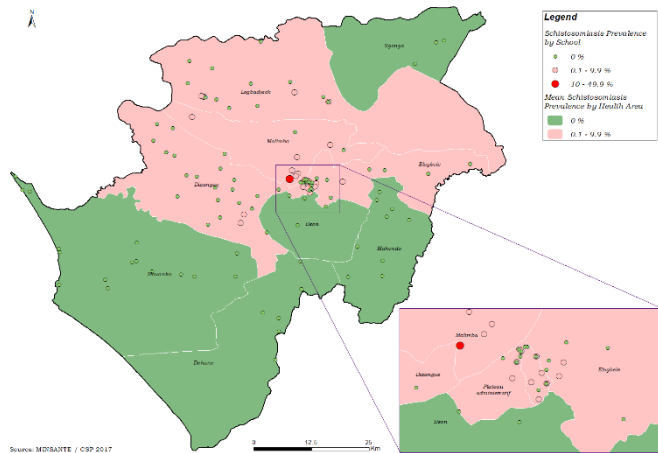


Figure 9: Visualisation of GPS co-ordinates at Barombi Kotto, Cameroon for A) mothers (n=12) and B) PSAC (n=12).

Infectious Diseases of Poverty

RESEARCH ARTICLE

Open Access



Urogenital schistosomiasis and soil-transmitted helminthiasis (STH) in Cameroon: An epidemiological update at Barombi Mbo and Barombi Kotto crater lakes assessing prospects for intensified control interventions



Suzy J. Campbell¹, J. Russell Stothard^{1*}, Faye O'Halloran¹, Deborah Sankey¹, Timothy Durant¹, Dieudonné Eloundou Ombede², Gwladys Djomkam Chuinteu², Bonnie L. Webster^{3,6}, Lucas Cunningham¹, E. James LaCourse¹ and Louis-Albert Tchuem-Tchuente^{2,4,5}

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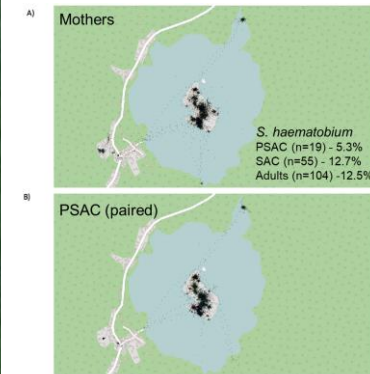
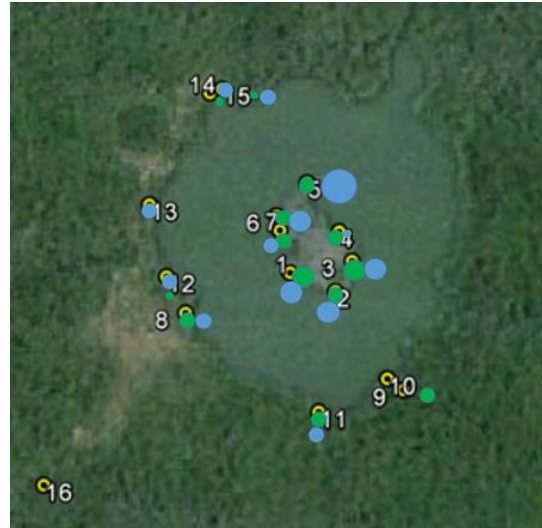
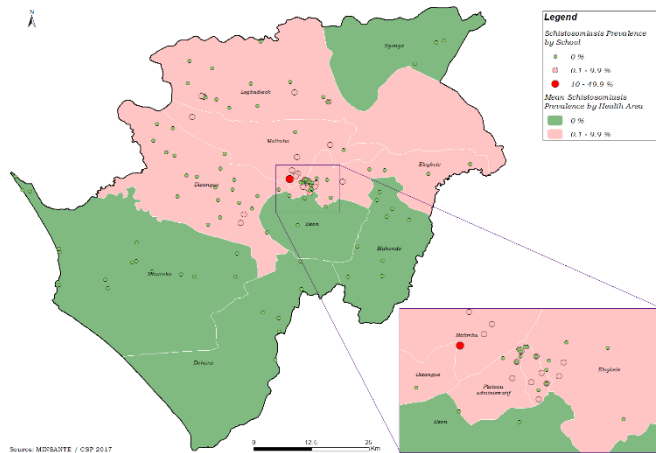


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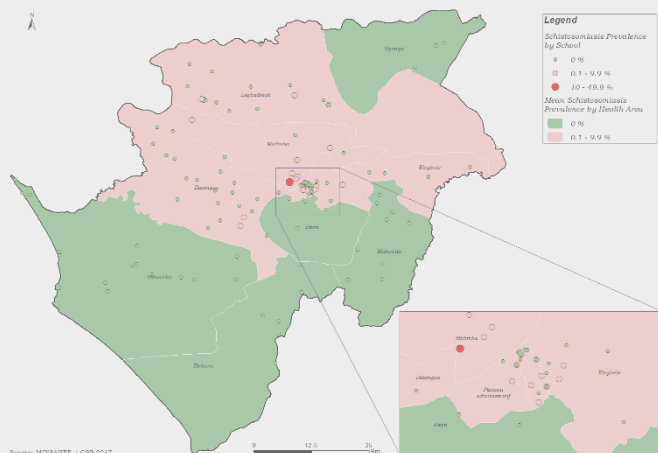
Transactions of the Royal Society of Tropical Medicine & Hygiene

A pilot study using wearable global positioning system data loggers to compare water contact levels: *Schistosoma haematobium* infection in pre-school-age children (PSAC) and their mothers at Barombi Kotto, Cameroon

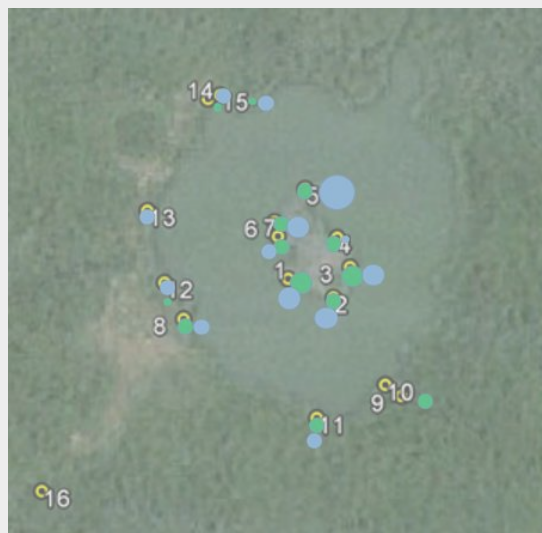
Grace Macklin, Michelle C Stanton, Louis Albert Tchuem-Tchuente, J Russell Stothard

Intensification of multisector actions for better impact

1) Precision mapping to better tailor treatment



2) Mapping snail distribution for control



3) Pinpointing key water contact sites



Figure 9: Visualization of GPS co-ordinates at Barombi Kotto, Cameroon for A) mothers (n=12) and B) PSAC (n=12).

Trends in Parasitology

Opinion

Tailoring Water, Sanitation, and Hygiene (WASH) Targets for Soil-Transmitted Helminthiasis and Schistosomiasis Control

Suzy J. Campbell,^{1,6,*} Nana-Kwadwo Biritwum,² Geordie Woods,³ Yael Velleman,⁴ Fiona Fleming,⁵ and J. Russell Stothard¹

Sanitation*	Safety for soil-transmitted helminthiasis (STH) and schistosomiasis	Drinking water*	Safety for STH and schistosomiasis	Handwashing*	Safety for STH and schistosomiasis
Safety managed Use of an improved sanitation facility with no direct contact with other humans and no direct contact with the environment. The facility is used for all human excreta and is not used for other purposes.	Safe if clean and maintained, otherwise unsafe Improved sanitation risk depends on the quality of the facility and the level of maintenance. If the facility is not maintained, it can become a source of contamination. If the facility is maintained, it can be a source of contamination. If the facility is not maintained, it can become a source of contamination. If the facility is maintained, it can be a source of contamination.	Safety managed Drinking water from a protected source (e.g., borehole, piped water, or bottled water) that is not used for other purposes.	Safe depending on source Protected water supply is generally safe, but also depends on the quality of the water supply and the level of maintenance. If the water supply is not maintained, it can become a source of contamination. If the water supply is maintained, it can be a source of contamination.	Handwashing* Handwashing with soap and water is the most effective way to reduce the risk of infection. If the facility is not maintained, it can become a source of contamination. If the facility is maintained, it can be a source of contamination.	Safe Handwashing with soap and water is the most effective way to reduce the risk of infection. If the facility is not maintained, it can become a source of contamination. If the facility is maintained, it can be a source of contamination.
Basic Use of an improved sanitation facility with direct contact with other humans and/or the environment. The facility is used for all human excreta and is not used for other purposes.	Safe if clean, maintained, and leaves sludge disposed off otherwise unsafe Basic sanitation risk depends on the quality of the facility and the level of maintenance. If the facility is not maintained, it can become a source of contamination. If the facility is maintained, it can be a source of contamination.	Basic Drinking water from an unprotected source (e.g., open well, surface water, or bottled water) that is not used for other purposes.	Safe depending on source and 'run off' Protected water supply is generally safe, but also depends on the quality of the water supply and the level of maintenance. If the water supply is not maintained, it can become a source of contamination. If the water supply is maintained, it can be a source of contamination.	Handwashing* Handwashing with soap and water is the most effective way to reduce the risk of infection. If the facility is not maintained, it can become a source of contamination. If the facility is maintained, it can be a source of contamination.	Safe Handwashing with soap and water is the most effective way to reduce the risk of infection. If the facility is not maintained, it can become a source of contamination. If the facility is maintained, it can be a source of contamination.
Unimproved Use of an unimproved sanitation facility with direct contact with other humans and/or the environment. The facility is used for all human excreta and is not used for other purposes.	Unsafe Unimproved sanitation risk depends on the quality of the facility and the level of maintenance. If the facility is not maintained, it can become a source of contamination. If the facility is maintained, it can be a source of contamination.	Unimproved Drinking water from an unprotected source (e.g., open well, surface water, or bottled water) that is not used for other purposes.	Unimproved Drinking water from an unprotected source (e.g., open well, surface water, or bottled water) that is not used for other purposes.	Unimproved Handwashing facility without soap or water.	Unsafe Handwashing without soap or water is not sufficiently effective to reduce the risk of infection. If the facility is not maintained, it can become a source of contamination. If the facility is maintained, it can be a source of contamination.
Open defecation Defecation in fields, forests, or open areas.	Unsafe Open defecation and urination is considered the highest risk of contamination. If the facility is not maintained, it can become a source of contamination. If the facility is maintained, it can be a source of contamination.	Surface water Drinking water directly from a stream, lake, or other surface water source.	Unsafe Drinking water directly from a stream, lake, or other surface water source is not safe. If the facility is not maintained, it can become a source of contamination. If the facility is maintained, it can be a source of contamination.	No facility No handwashing facility.	Unsafe No handwashing facility reduces the opportunity to provide safe hand hygiene at any time and handwashing is unlikely to be removed.

Discussion and Future Outlook

FGS present in a sub-set of those with *S. haematobium* infection

- Infection > disease >...detection NB: annual treatment too late

	< 6 months	< 6 years	< 14 years	adulthood (reproduction and senescence)
Schistosomiasis	first infection	... egg accumulation in tissues		... chronic inflammation/organ fibrosis
		increasing clinical significance		overt disease and disability ... death
PZQ treatment		first PZQ treatment(s) ... MDA ... (?) prevention/reversion of morbidity		
		Current window of regular treatment		
Genital disease	epidemiological suspicion		... clinical confirmation (i.e. ultrasonography/colposcopy)	
Reproduction			... sexual debut	... prima gravidae
(Sub)infertility				... epidemiological suspicion ... confirmation

Current MDA approach is an insufficient clinical intervention

- treat the PSAC now and expand access for WCBA!

Acknowledgements

ICOPA 2018 – organising committee

Supporting the
COUNTDOWN Consortium

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Calling time on Neglected Tropical Diseases



NHM David Rollinson Bonnie Webster

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Lieden University Medical Centre Lisette van Leishout, Govert van Dam

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Zikmund Bartoníček

James LaCourse

Martyn Stewart

Emily Adams



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