

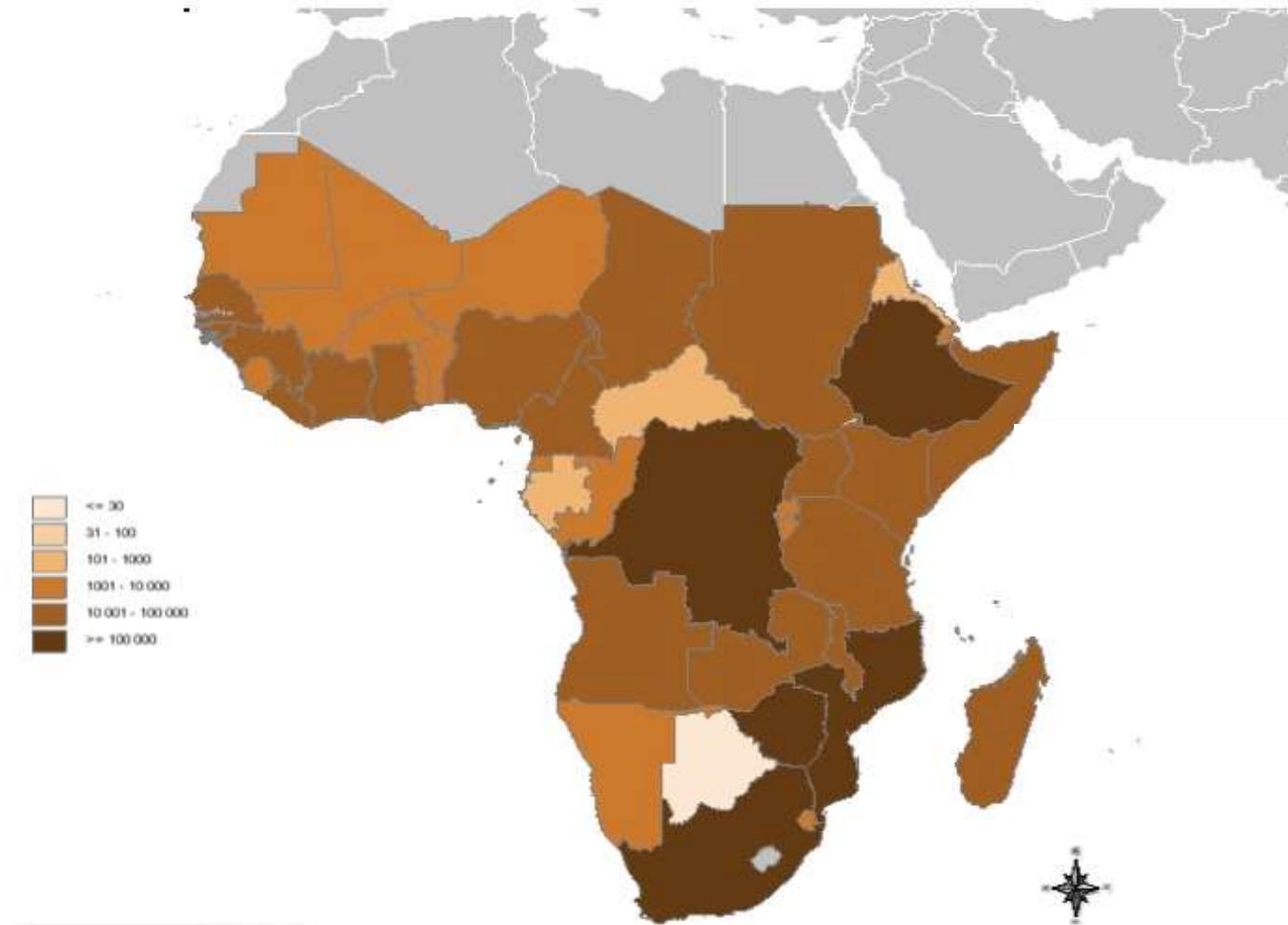


Generating evidence through cholera surveillance and using it for prevention and control

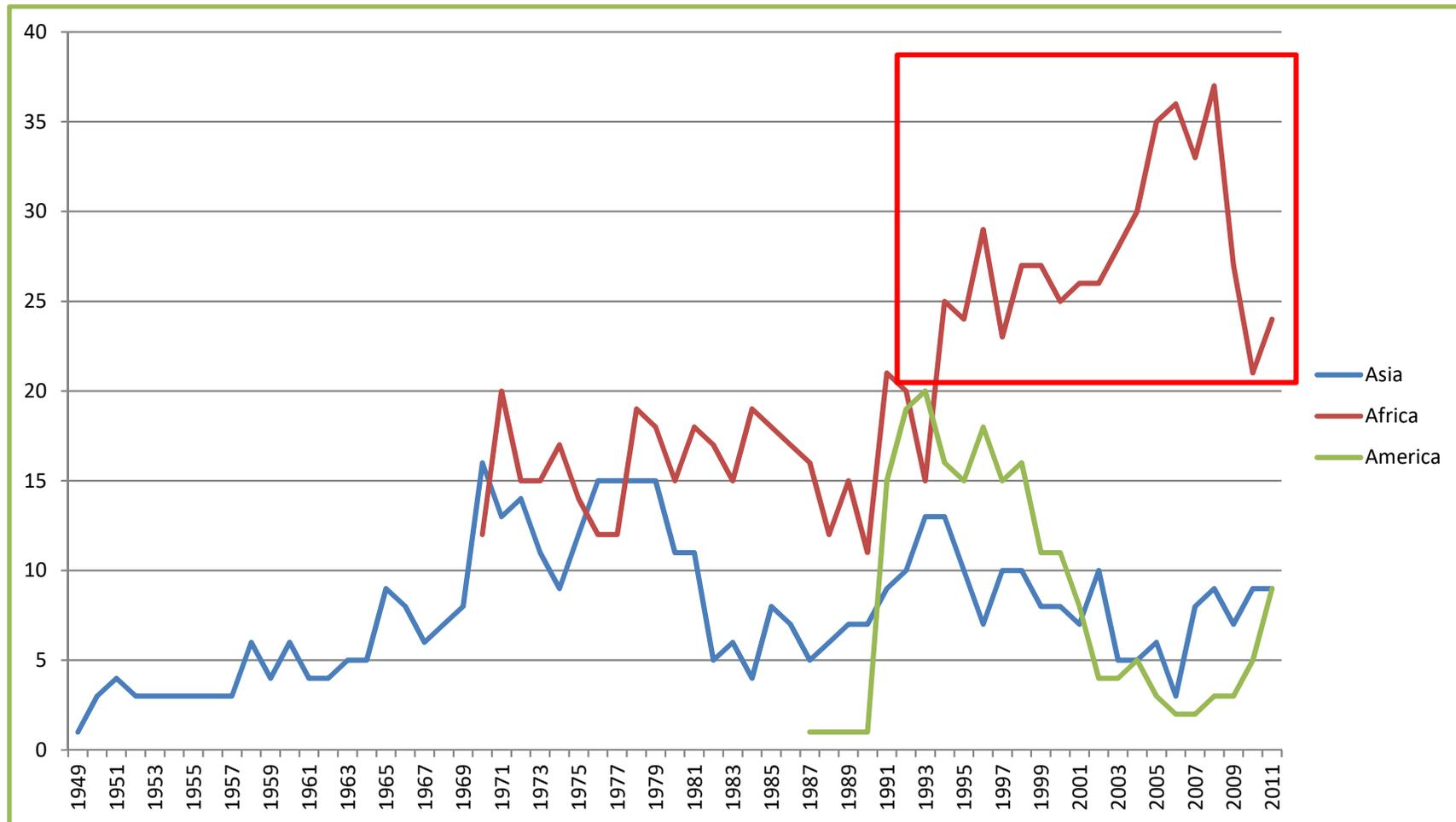
**Martin Mengel for the enteric diseases team,
Agence de Médecine Préventive (AMP), Paris, France**

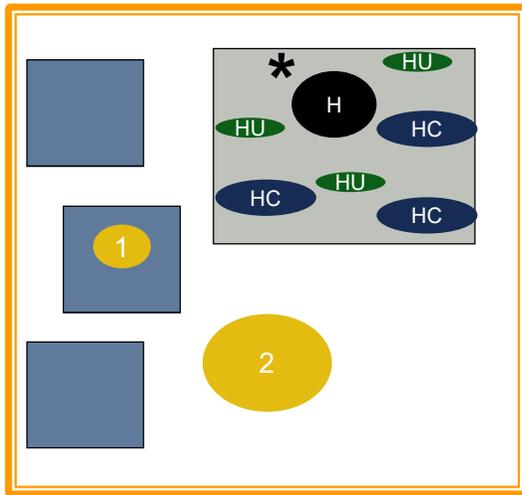
Initiative Against Diarrheal & Enteric Disease in Asia,
07 March 2017, Hanoi, Vietnam

Cases of cholera reported to WHO by country within the AFRO region, 2000-9



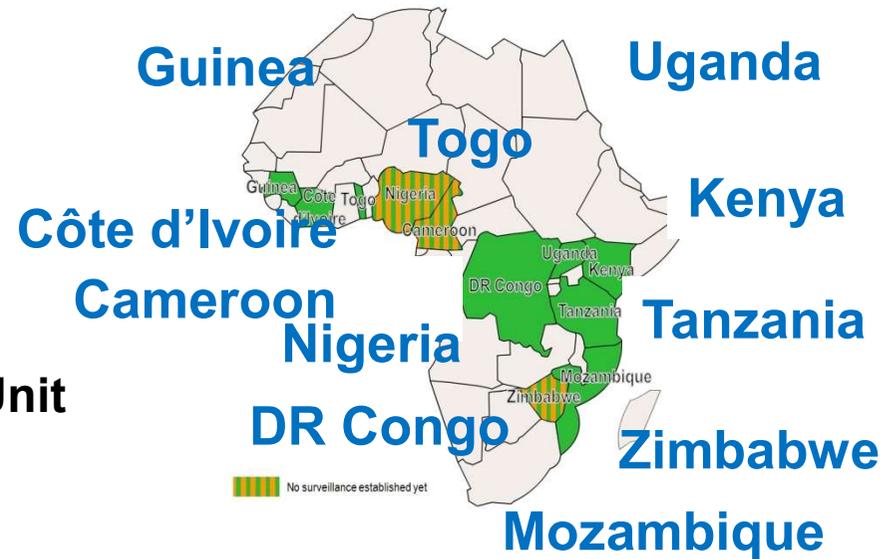
Number of Countries Reporting Cholera to WHO by Region, 1949 - 2011





Country

*H = Hospital
 HC = Health Centre
 HU = Health Unit

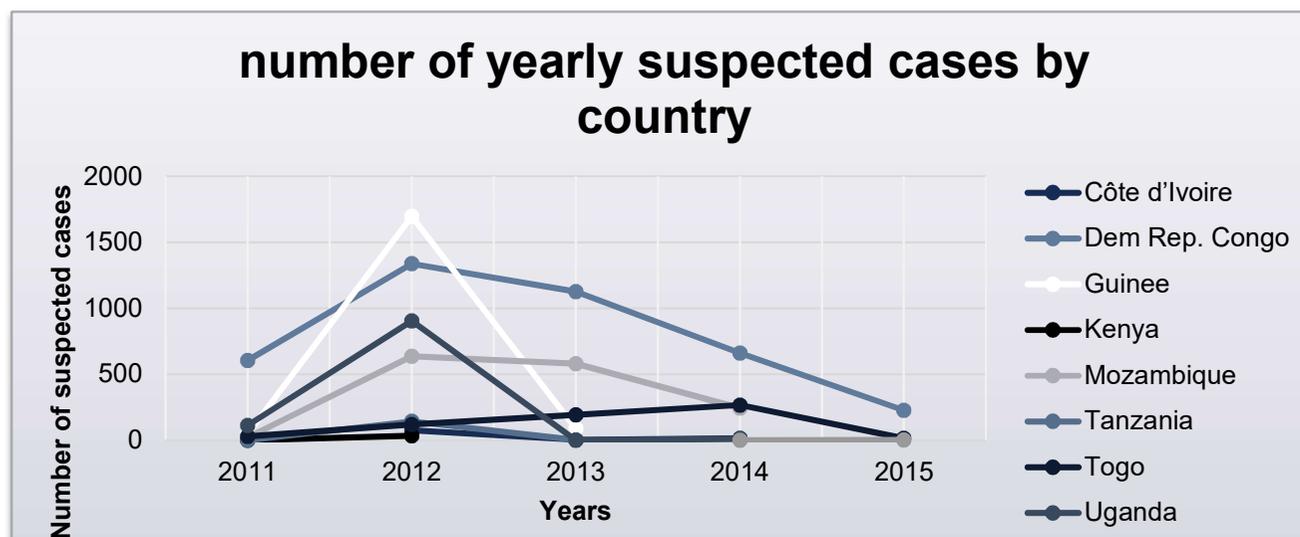


- Surveillance zone
→ ongoing monitoring
- Other affected zones –
Not actively monitored
- Additional Outbreak
Investigations

Methods

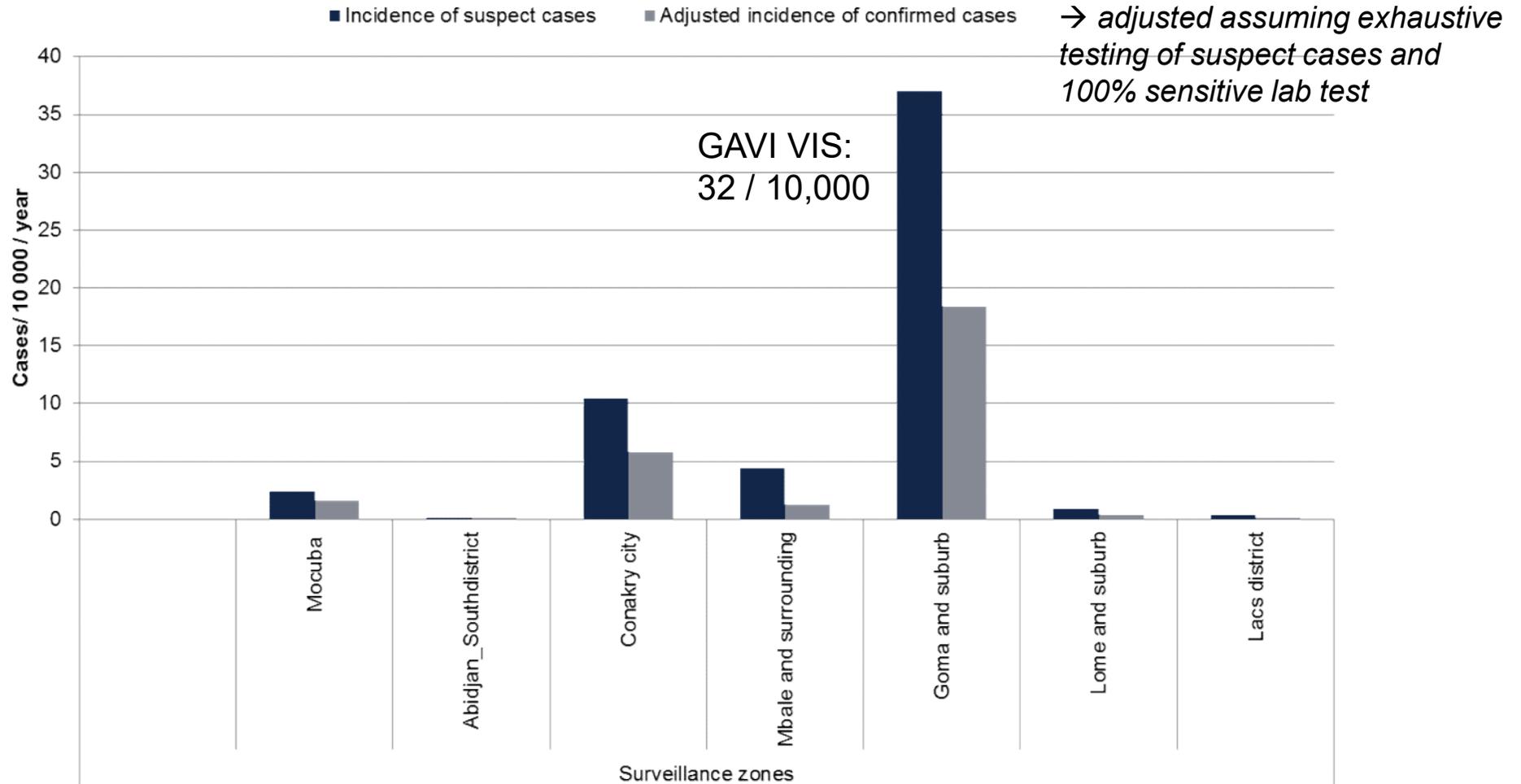
- Standard operating procedures
- Standard laboratory diagnostics
- Investigations in Case's Household
- Cases are culture confirmed
- Standard Environmental Forms

Data collected to date

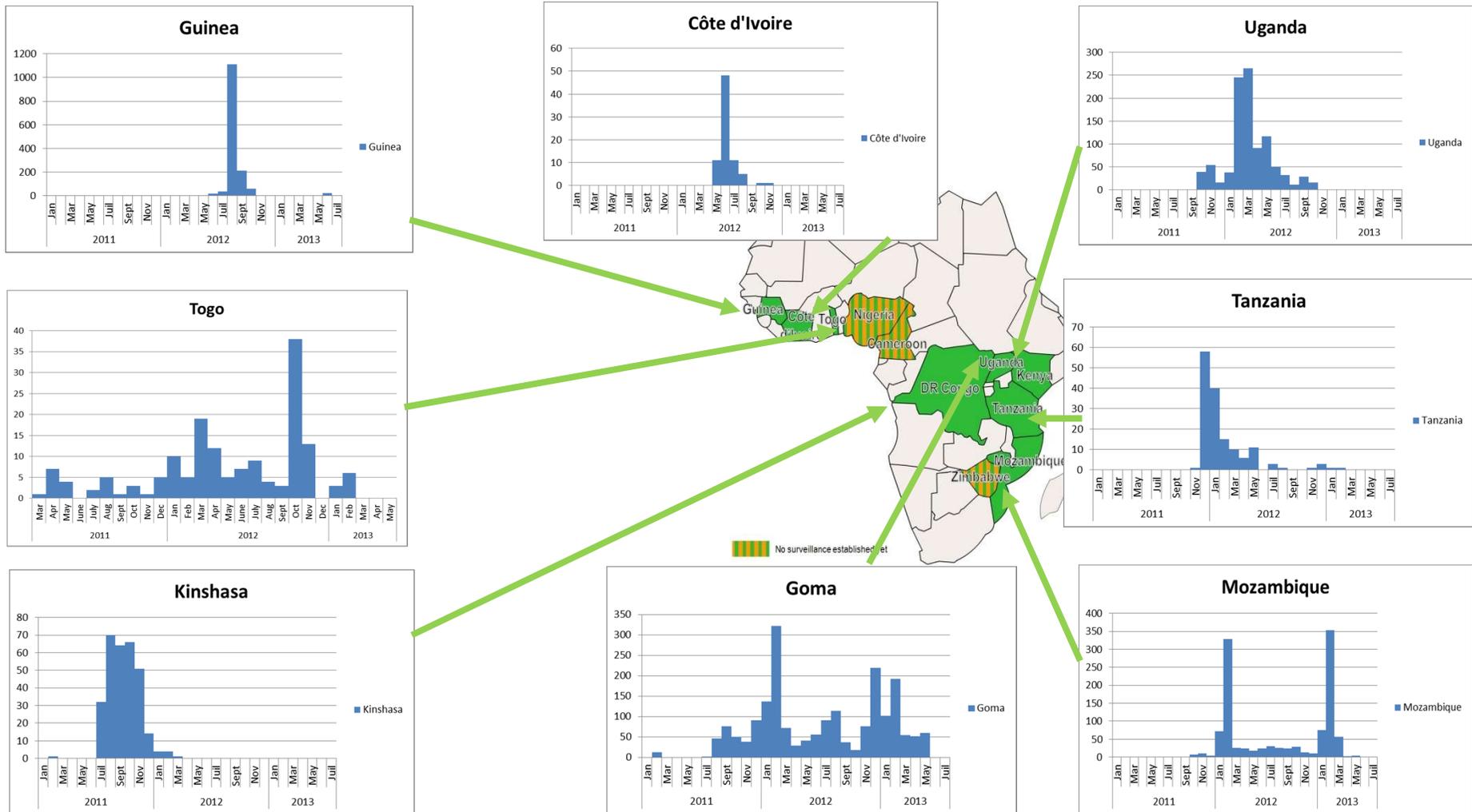


Country	Cases suspected	Cases tested	% Cases tested	Cases positive	% Cases positive	Deaths
Côte d'Ivoire	4470	3545	79	1316	37	10
Dem Rep. Congo	193	137	71	47	34	16
Guinee	1869	265	14	104	39	18
Kenya	39	10	26	2	20	0
Mozambique	1863	936	50	255	27	22
Tanzania	151	61	40	40	66	1
Togo	630	574	91	299	52	14
Uganda	1143	429	38	128	30	28
Zimbabwe	6	5	83	5	100	0
Total	10408	5962	58	2196	37	105

Cholera Incidence across 7 countries

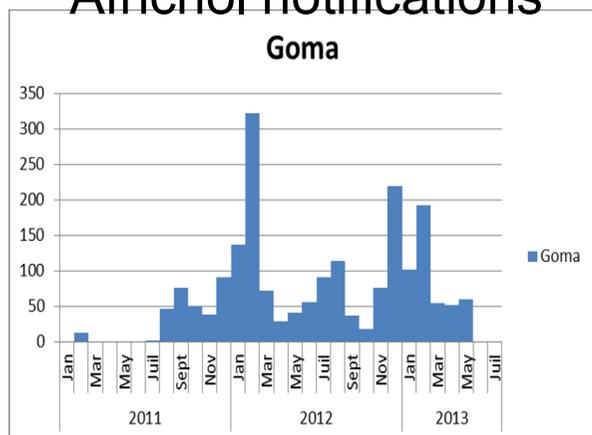


Comparing Epidemiological Patterns Across Countries



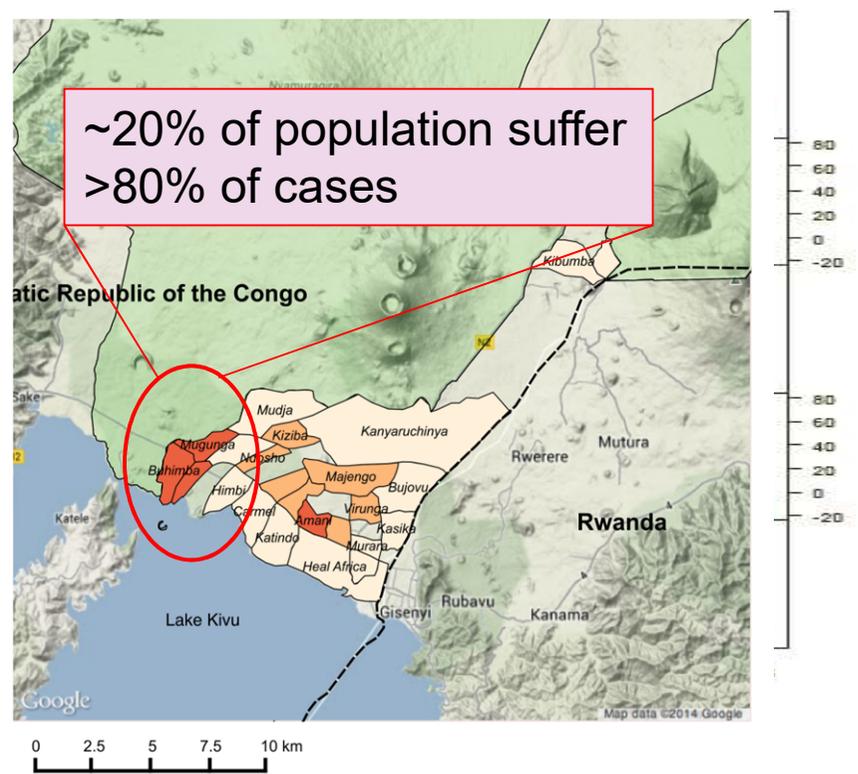
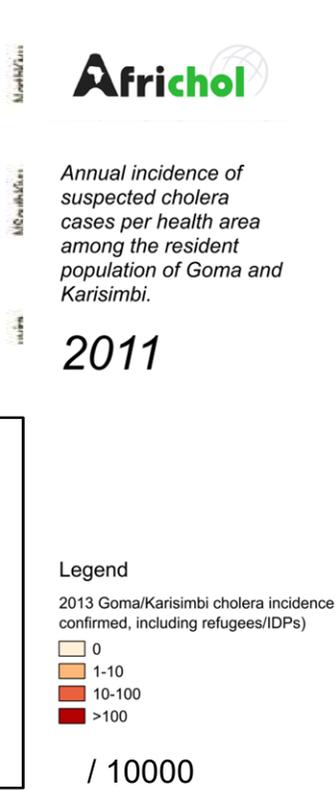
Endemic Cholera: Even in the Urban Hotspot of Goma, DRC Cholera is Highly Clustered

Africhol notifications

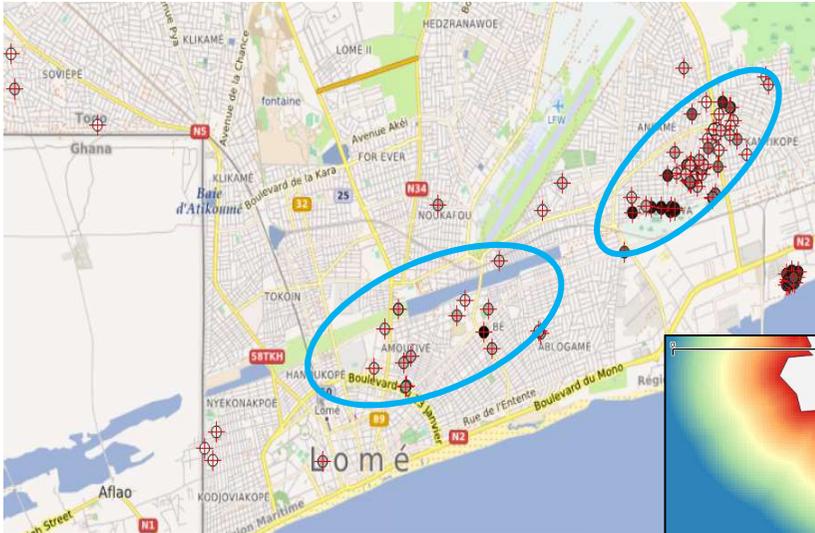


- According to the GAVI-VIS 80-100% should be considered at risk.
 - Here only ~20-30% at risk.
 → OCV supply can achieve more than estimated?

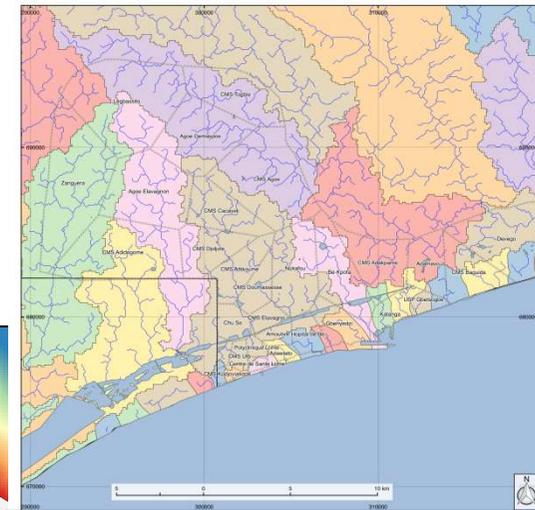
Cholera incidence from 5 by neighbourhood, Goma, DRC



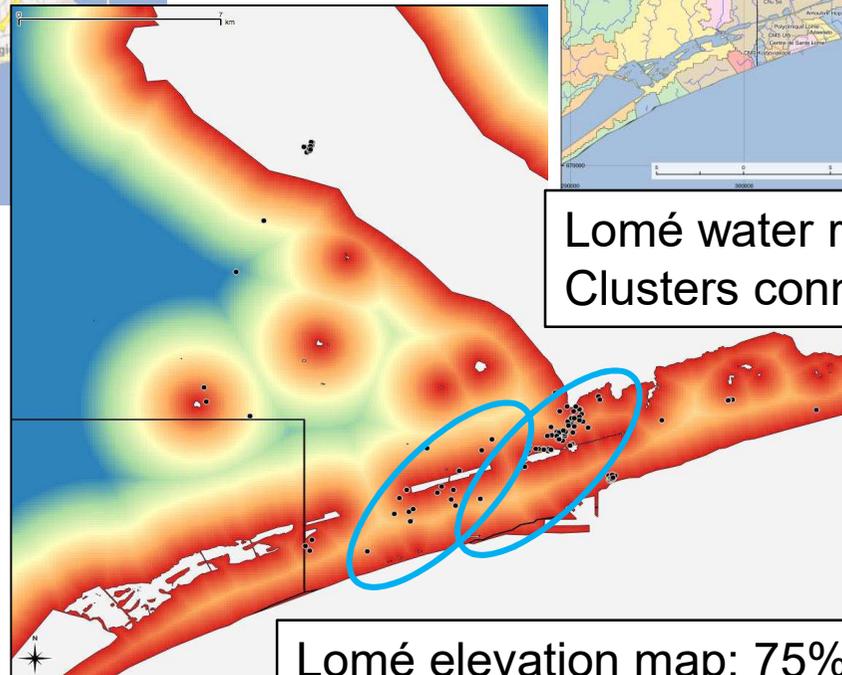
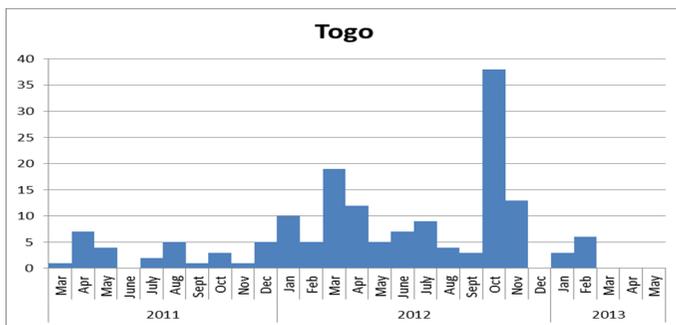
Ideally, cholera-affected communities would collect point location of cholera cases → and relate them to contextual variables (Example: Lomé, Togo)



Household GPS points:
Shows clusters



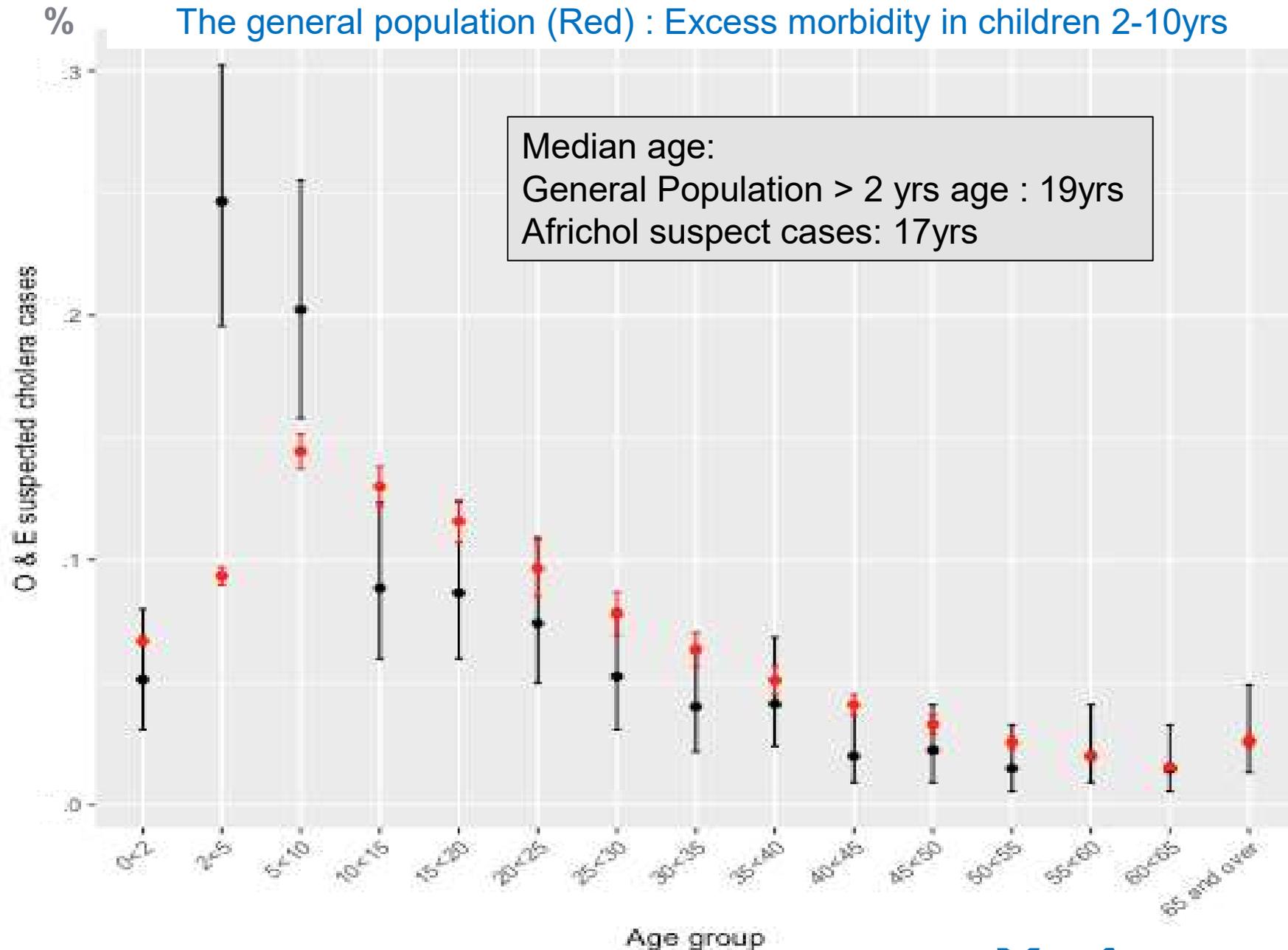
Lomé water runoff:
Clusters connected?



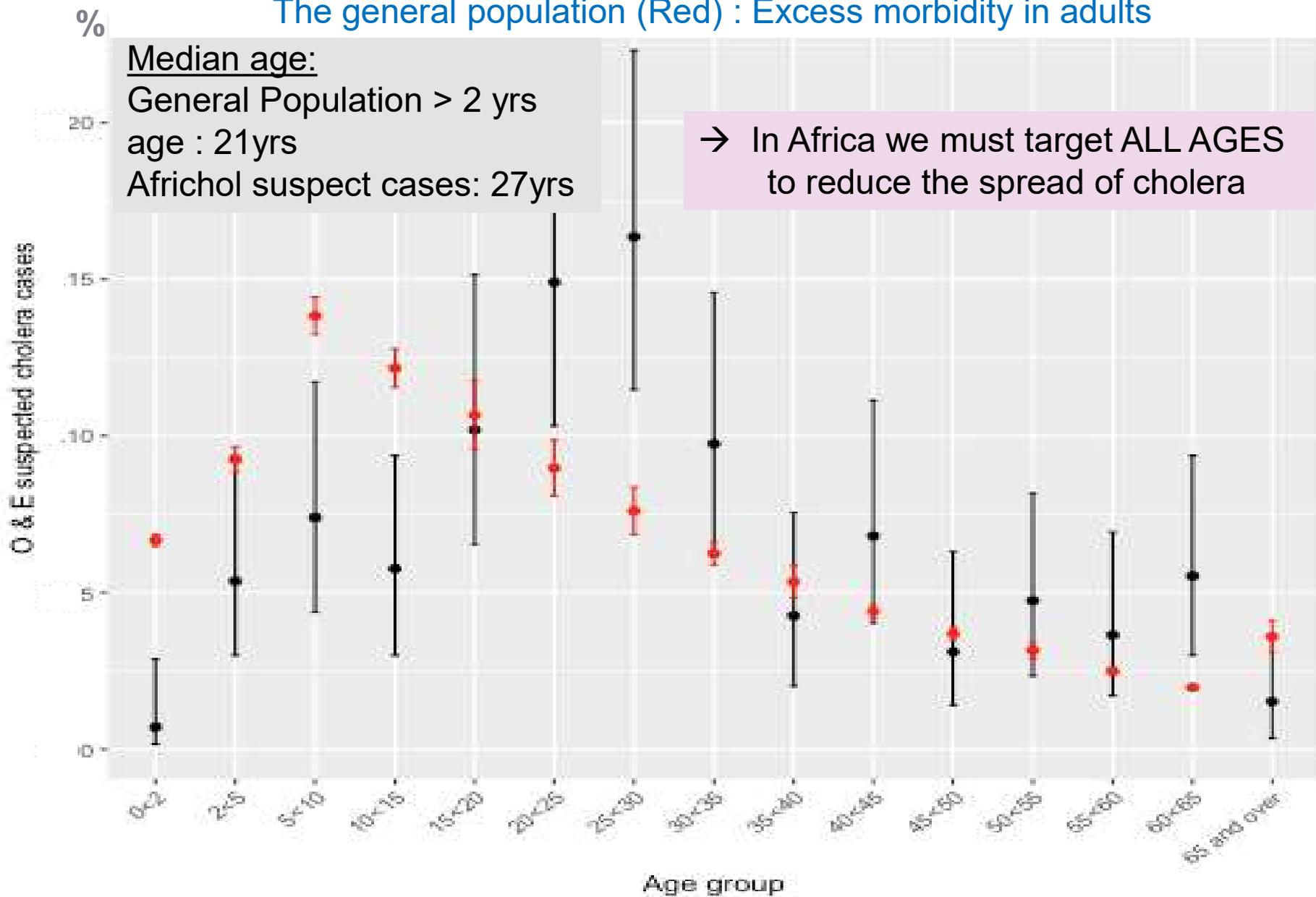
Lomé elevation map: 75% of cases within 1km of water

- 0 – 10 m
- 10 – 50 m
- >100 m

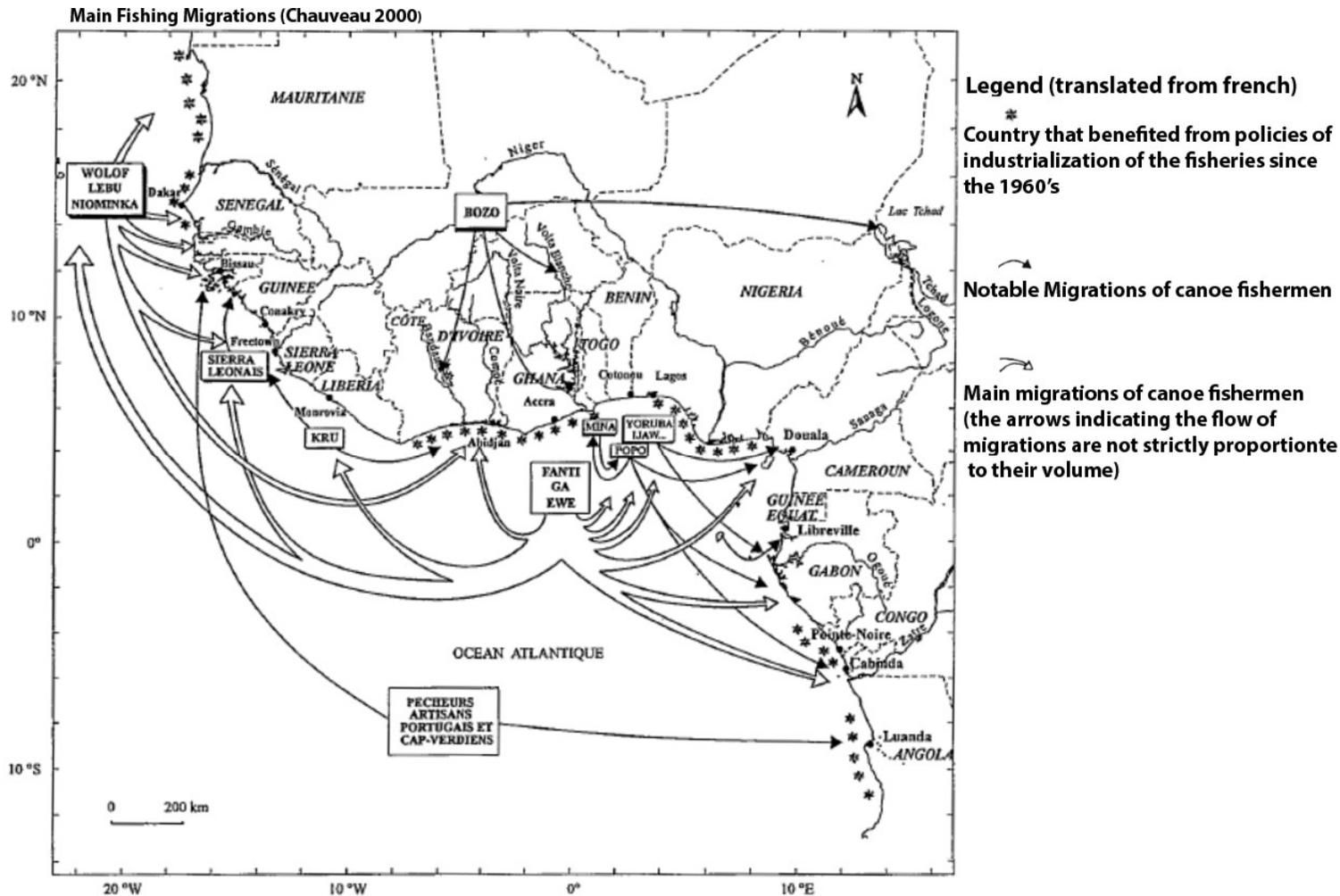
DR Congo: Age distribution of suspect cholera cases (black) vs. The general population (Red) : Excess morbidity in children 2-10yrs



Guinea – Conakry: Age distribution of suspect cholera cases (black) vs. The general population (Red) : Excess morbidity in adults



Migrant Fishermen may Spread Cholera along Fishing Routes in West Africa



Innovative OCV Delivery Strategies

1. A self-administered second dose for the fishermen in "floating homes" on Lake Chilwa

- Second dose given together with first dose,
- Home-based self-administration (2 weeks apart)
- ~6,000 pop., MSF



2. A Community-led self-administered second dose on the 6 islands of Lake Chilwa

- Second doses given to community leaders at the end of the first round, and kept in large cool boxes
- ~7000 pop., AMP



Monitoring and Evaluation of OCV

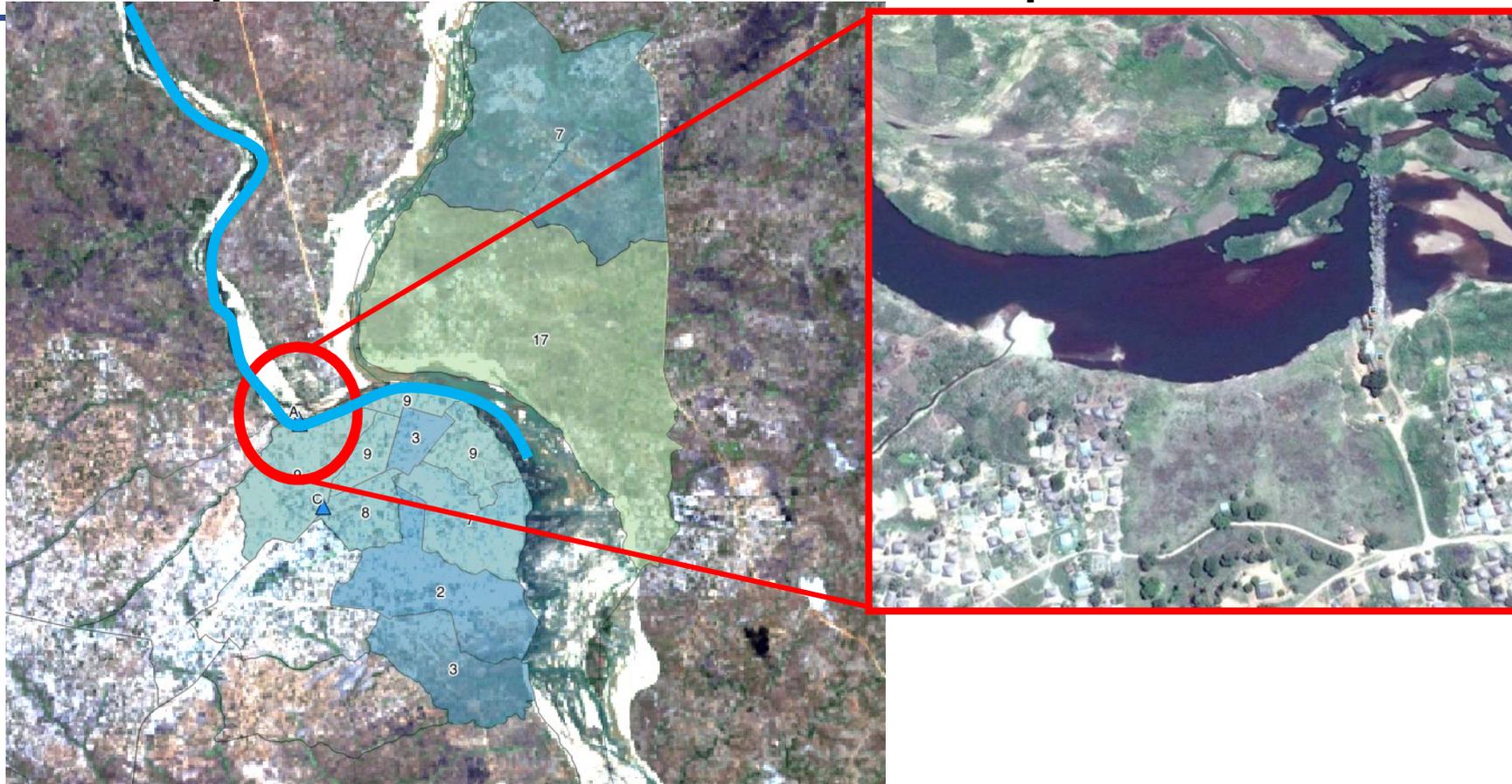
Campaigns :

- Mapping Cholera Burden
- M&E activities
 - Vaccine coverage surveys
 - Monitoring of adverse events following immunization
 - Economic analysis: programatic cost → cost of illness and cost effectiveness analyses
 - Anthropological assessment: vaccine acceptability → pre-campaign assessment, high risk groups
- Impact studies
- Evaluation of campaign (logistics, supplies, etc.)

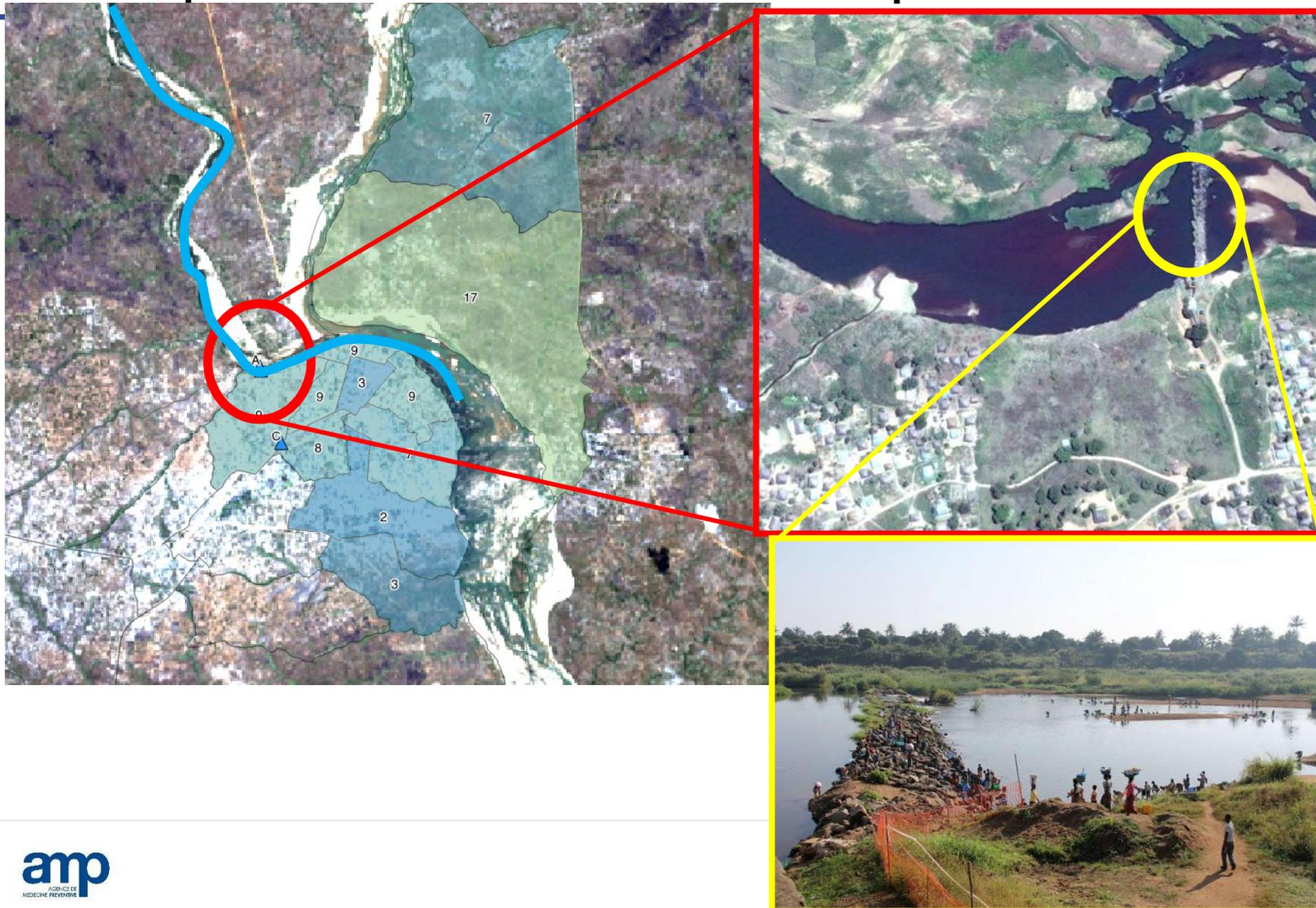
VaxiChol: Economic Analyses – Overview

Country	Cost of illness of Cholera	Cost of OCV use (focus on operational costs)	Cost-Effectiveness Analysis
Malawi (Lake Chilwa, 2016)	Households Health system (Data collected)	Three strategies (classic, self admin, community admin)	i) strategy, ii) OCV vs. No OCV ➤ <i>Savings due to OCV, efficiency</i>
Mozambique (Nampula, 11-2016)	Households Health system (Data collected)	Projected costing and actual costing with CholTool (single door to door strategy)	OCV vs. No OCV ➤ <i>Comparison to identify underestimation in budgeting /unforeseen costs</i>
Zambia (Lusaka, 2016)	Households Health system	First round (MSF) vs. 'Second' round – (Gavi/WHO funded, MOH implementation): <i>cost drivers, unit costs</i>	OCV vs No OCV

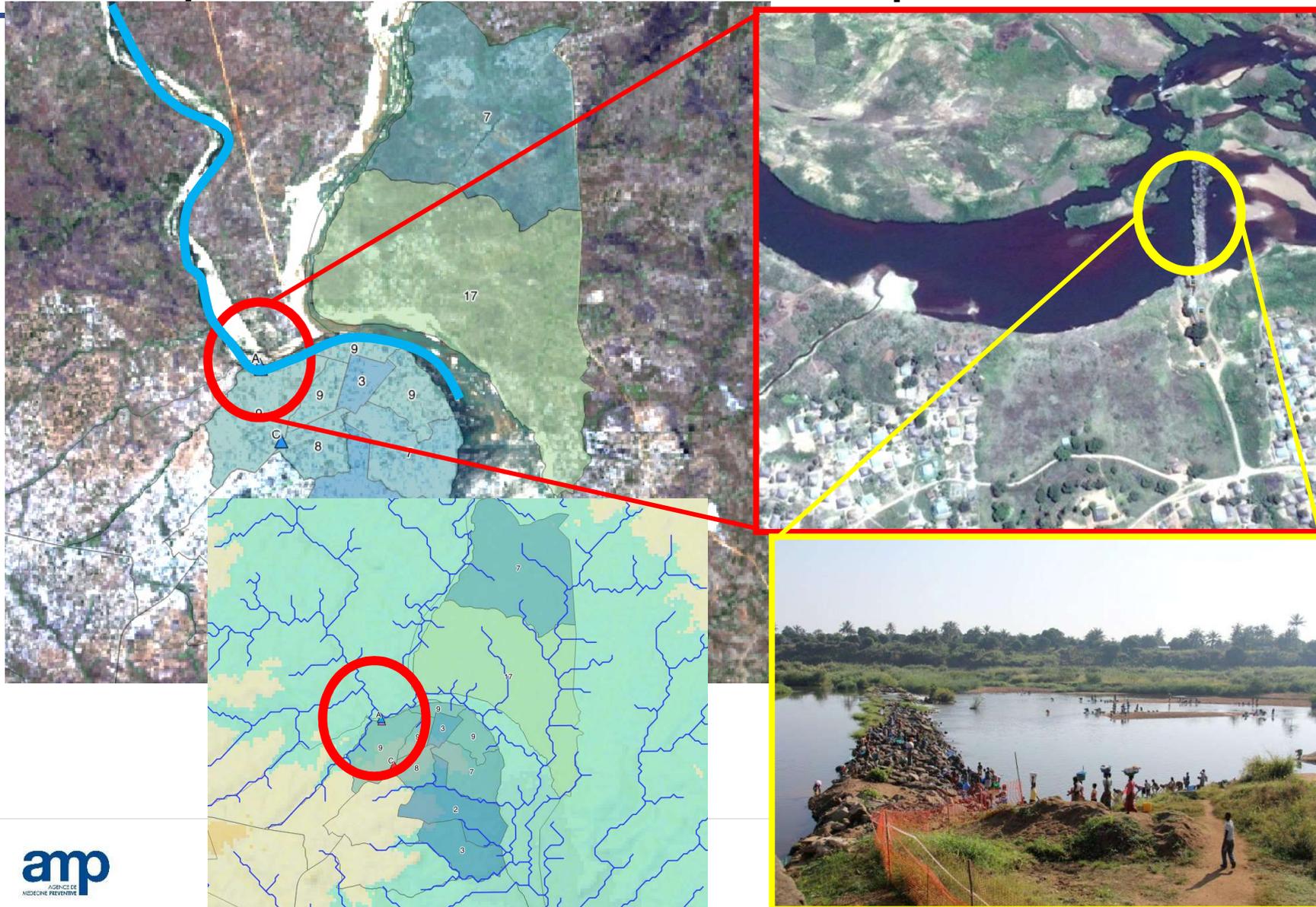
USE OF REMOTE SENSING FOR INTERVENTION planning: Example – Mocuba, Mozambique



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Summary

- New evidence on cholera in Africa:
Burden, duration of outbreaks, sub-district / point localization of cases and identification of risk groups
→ *Preventive* OCV campaigns should target high-incidence endemic areas and entire population to reduce circulation
 - Understanding of risk groups and their behavior and living conditions through various methods is important to reach target groups:
→ anthropology, delivery-cost modelling, environment geographical context
 - Evaluating vaccine impact requires long-term follow up and commitment
→ Sustained and enhanced impact: national / municipal control plans
- Adapt OCV investment case for Africa
→ Adjust estimates of GAVI VIS: reduce risk population and OCV need, Focus on high-incidence areas, but not limit to certain age groups

And now?...



Support countries (MOH) in OCV use, monitoring and evaluation:

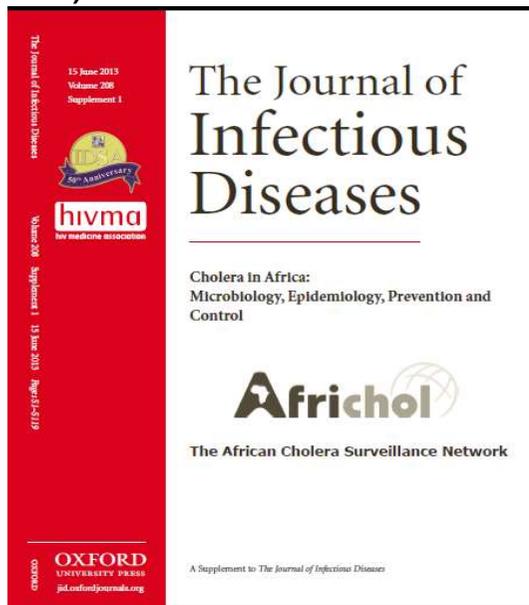
- Facilitated request / access to OCV stockpile in Mozambique
- Planning, communications & logistics of OCV campaigns:
 - Moz: 425,486 doses; Oct. 3–10 / 24-31 (door-to-door)
 - Mal: 190,000 doses: Nov. 14-20 / Dec. 5-9 (adapted strategies)
- M&E activities completed: Coverage / Acceptability / AEFI
 - Moz. : Nov 2-10; Mal.: Dec 2-16
- National cholera prevention and control plan, Malawi → 03 – 2017
- VE and Impact studies – start late February 2017
- Further campaigns in intervention countries?
- One-dose campaign?

THANK YOU !



Further reading:
www.Africhol.org, www.aamp.org

1.) 18 articles in



2.) articles in various journals:

1. **“Cholera Incidence and Mortality in Sub-Saharan Africa...”** ; Sauvageot D, Njanpop-Lafourcade B-M et al. PLoS Negl Trop Dis 10(5): e0004679.
2. **“Cholera Outbreaks in Africa”** Current Topics in Microbiology and Immunology; DOI: 10.1007/82_2014_369; Springer 2014
3. **“Comparative Characterization of African Vibrio cholerae O1 using PFGE”** Smith AM, Njanpop-Lafourcade B, et al. PLoSONE
4. **“Sensitivity, Specificity and Public-Health Utility of Clinical Case Definitions ... in Africa”**; Nadri J, Sauvageot D. et al. , *under review*, AJTMH
5. **“High Incidence Neighborhoods ...in Goma...”**; Wood R, Mutombo G, et al. *under review* Journal of Urban Health
6. **“Temporo-spatial dynamics and behavioral patterns... 2012 ...Conakry, Guinea”** « Infectious Diseases of Poverty “
7. **Fishermen in Abidjan: Anthropological study of cholera vulnerability** Heyerdahl L., Guillermet E, et al. *review* in “Globalization and Health”

In the making:

- Fine-scale spatio-temporal distribution in Lome, Togo
- Risk groups in Mozambique, Uganda, C. d' Ivoire etc....