



Out of Sight, Out of Mind - Typhoid Fever Surveillance and Response in Africa

8th Symposium on Invasive Salmonellosis , March 2, 2013 , Eric Mintz, MD, MPH

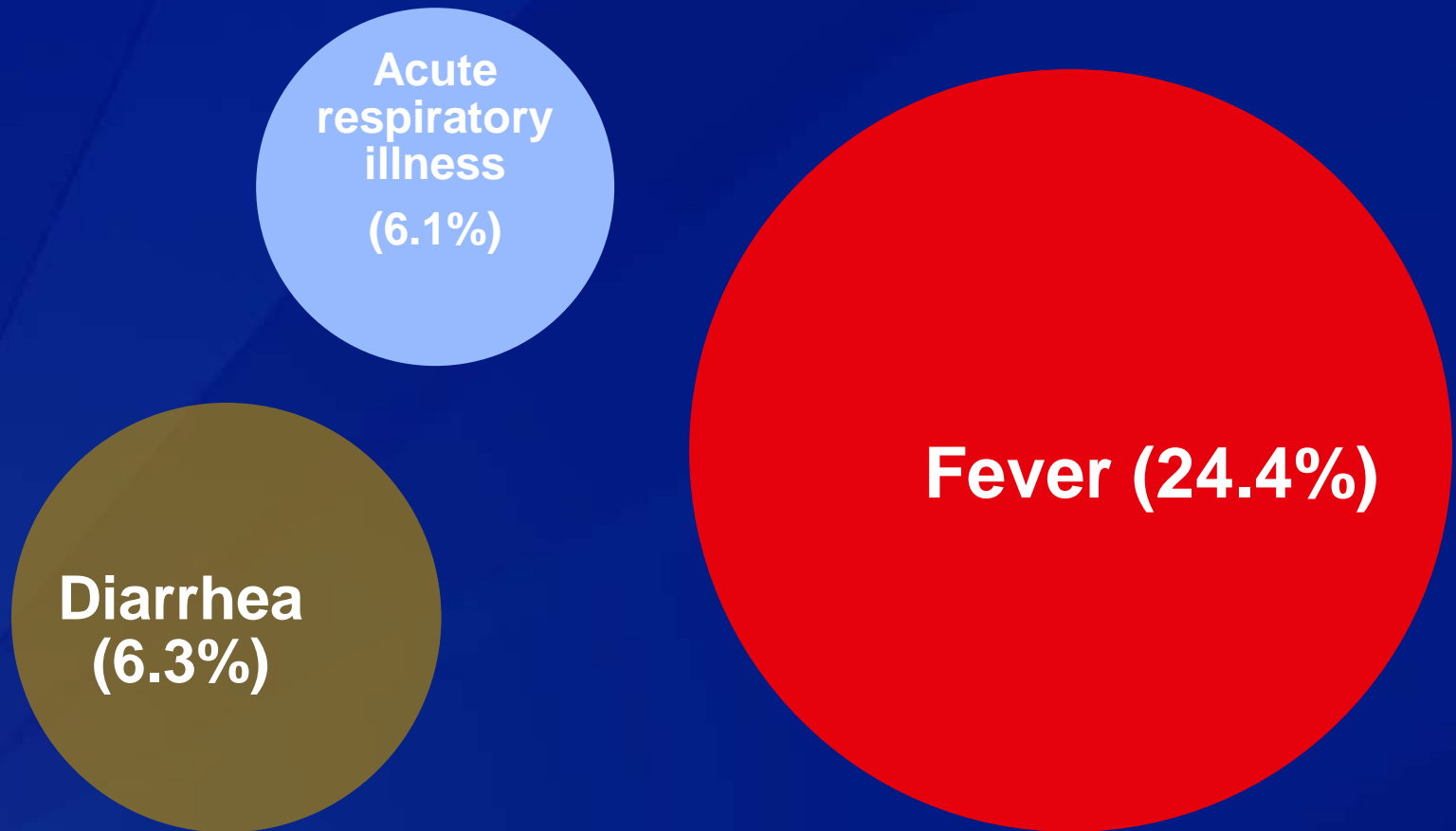
National Center for Emerging and Zoonotic Infectious Diseases
Division of Foodborne, Waterborne and Environmental Diseases



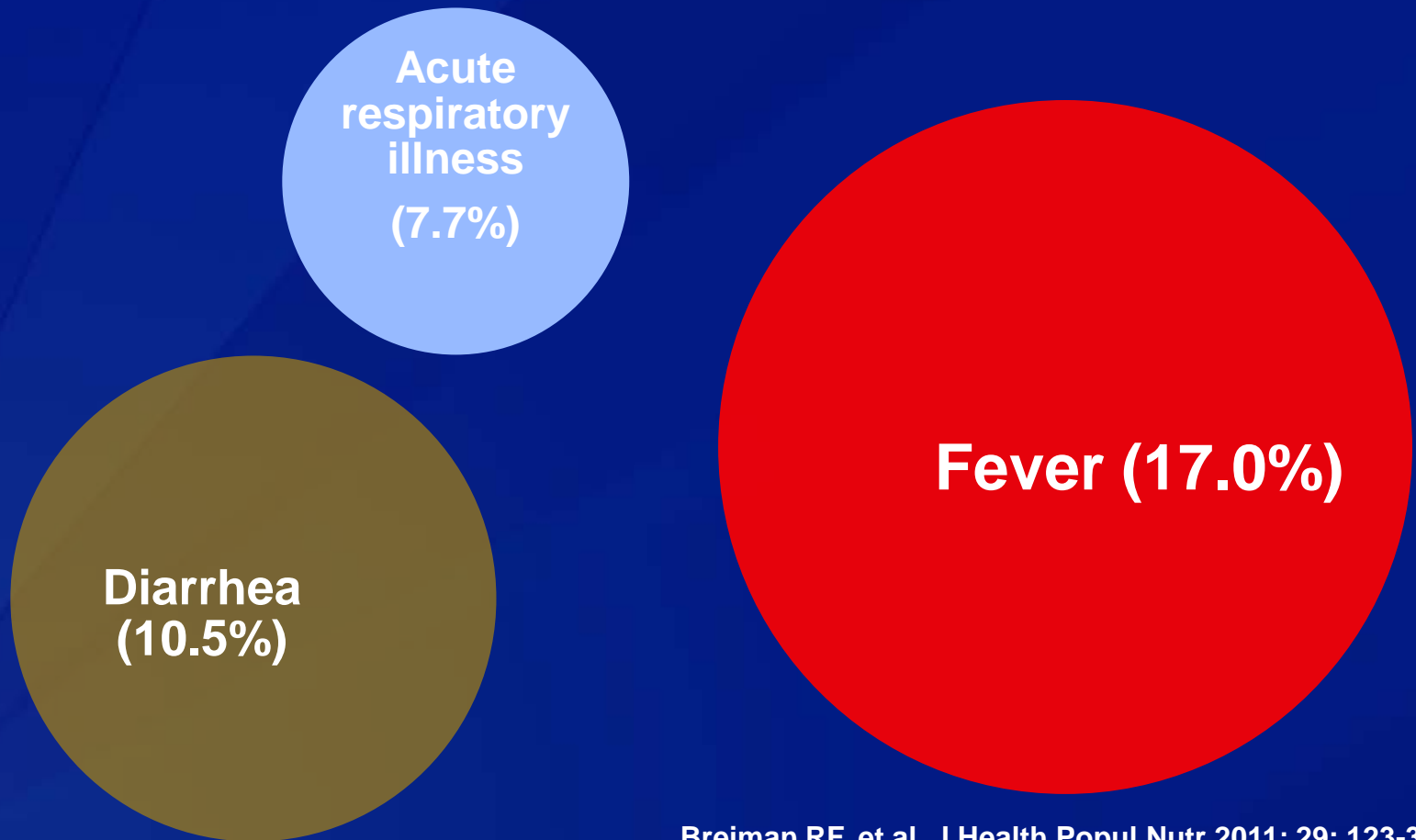
Outline

- Prevalence of fever in Africa
- Prevalence of typhoid fever in Africa
- Enteric fever among visitors to Africa
- Outbreaks of typhoid fever in Africa
- Antimicrobial susceptibility of *S. Typhi* in Africa

Acute respiratory illness, diarrhea, and fever in the past 2 weeks, western Kenya, 2005 (n=6,223)



Acute respiratory illness, diarrhea, and fever in the past 2 weeks, Nairobi, Kenya, 2005 (n=8,580)



Typhoid Fever in Kibera Settlement, Nairobi, Kenya, 2007 - 2009

- *Salmonella* Typhi isolated by blood culture from
 - 10.4% of patients presenting with fever
 - 7.7% of patients presenting with ARI
- Crude rate = 247 cases per 1000,000 person years
- Highest rates in children
 - 5-9 years old (596 per 100,000 pyo)
 - 2-4 years old (521 cases per 100,000 pyo)
- Crude rate in Lwak only 29 per 100,000 pyo

Estimated Burden of Typhoid Fever, 2000



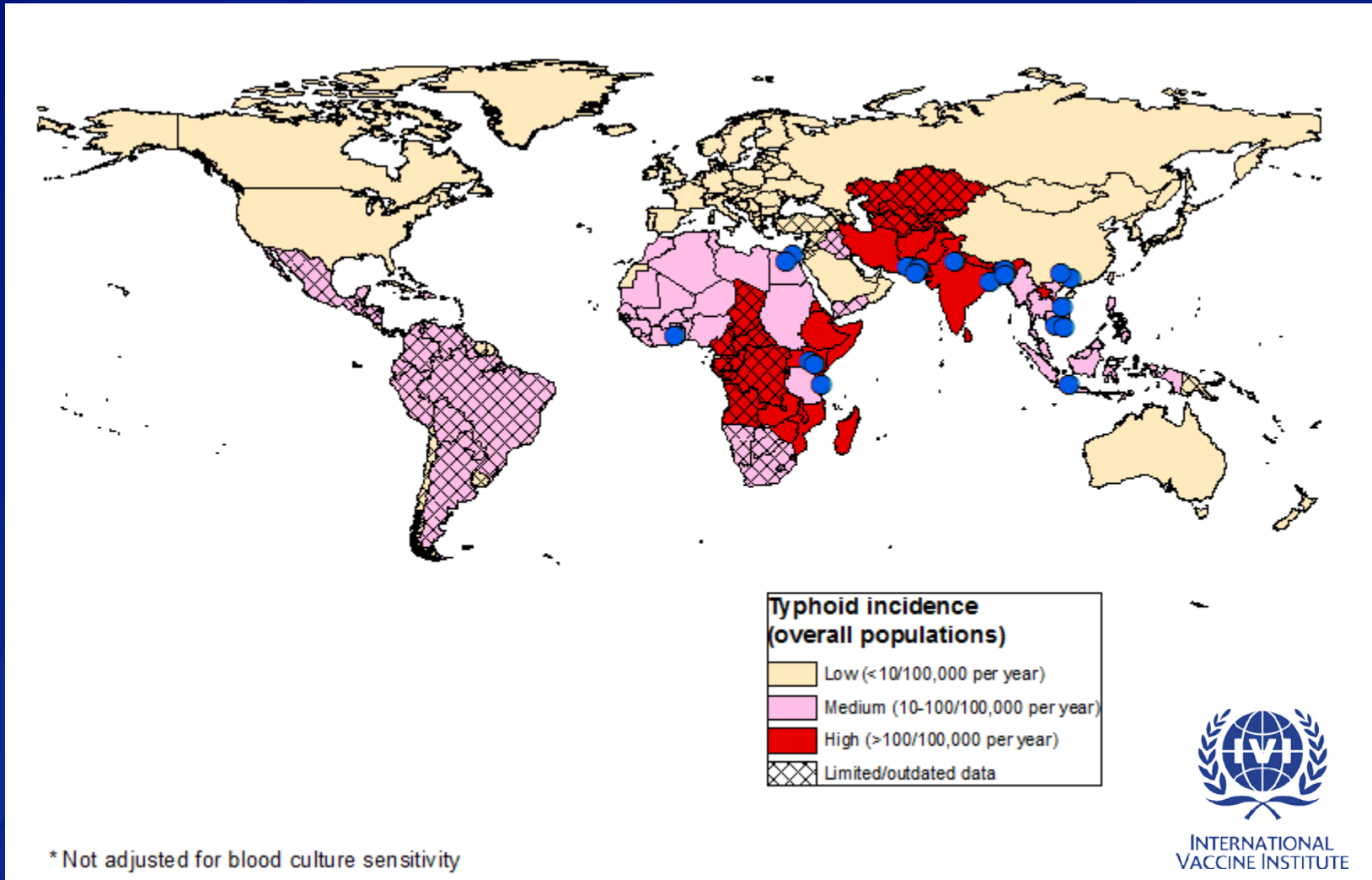
Crude incidence in Africa:
50 cases per 100,000 people per year

Global adjusted total:
21.5 million illnesses
200,000 deaths

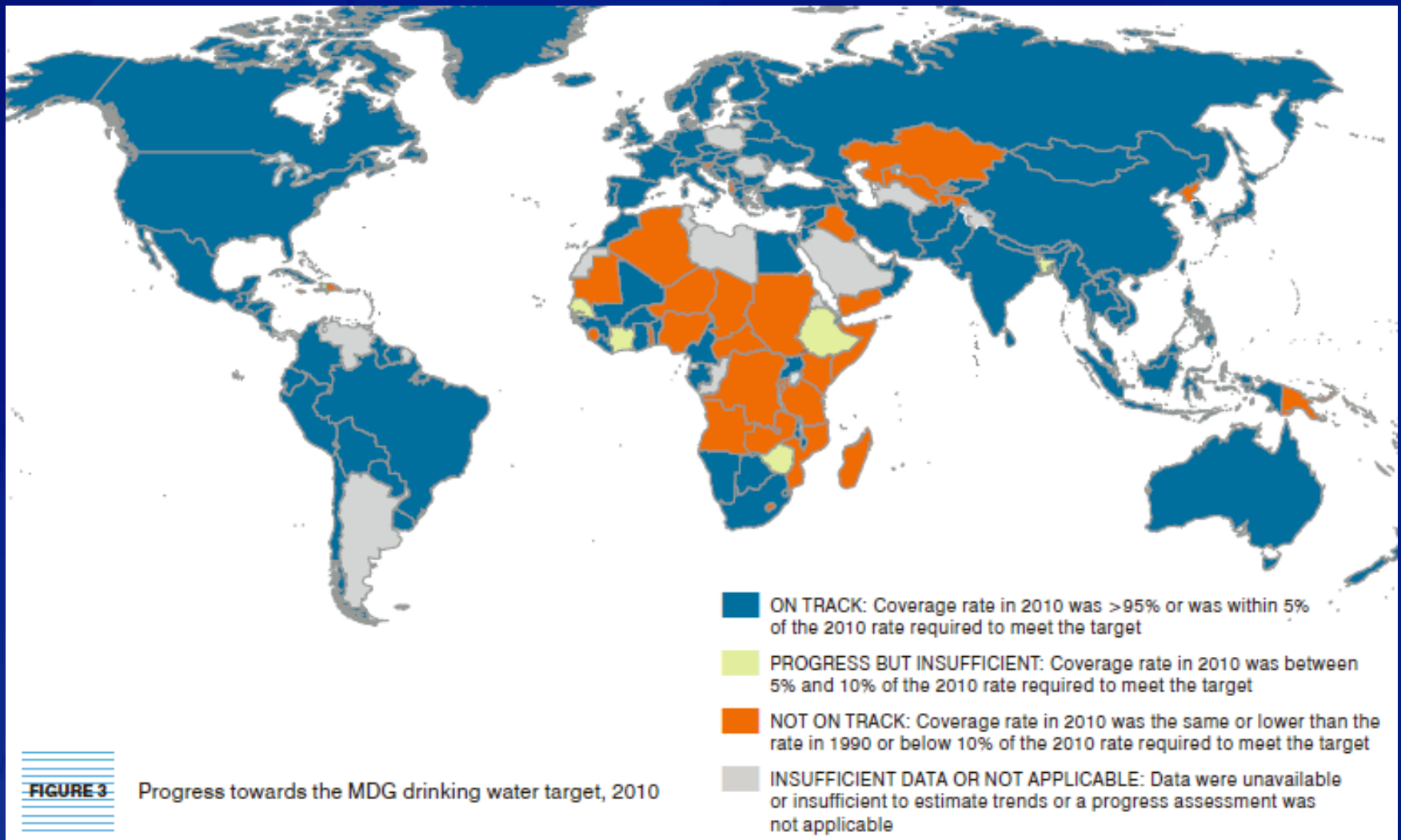
Estimated Burden of Typhoid Fever, 2010

- Global adjusted total
 - 26.9 million episodes of typhoid fever
- Africa
 - Crude incidence of 362 cases per 100,000 persons per year

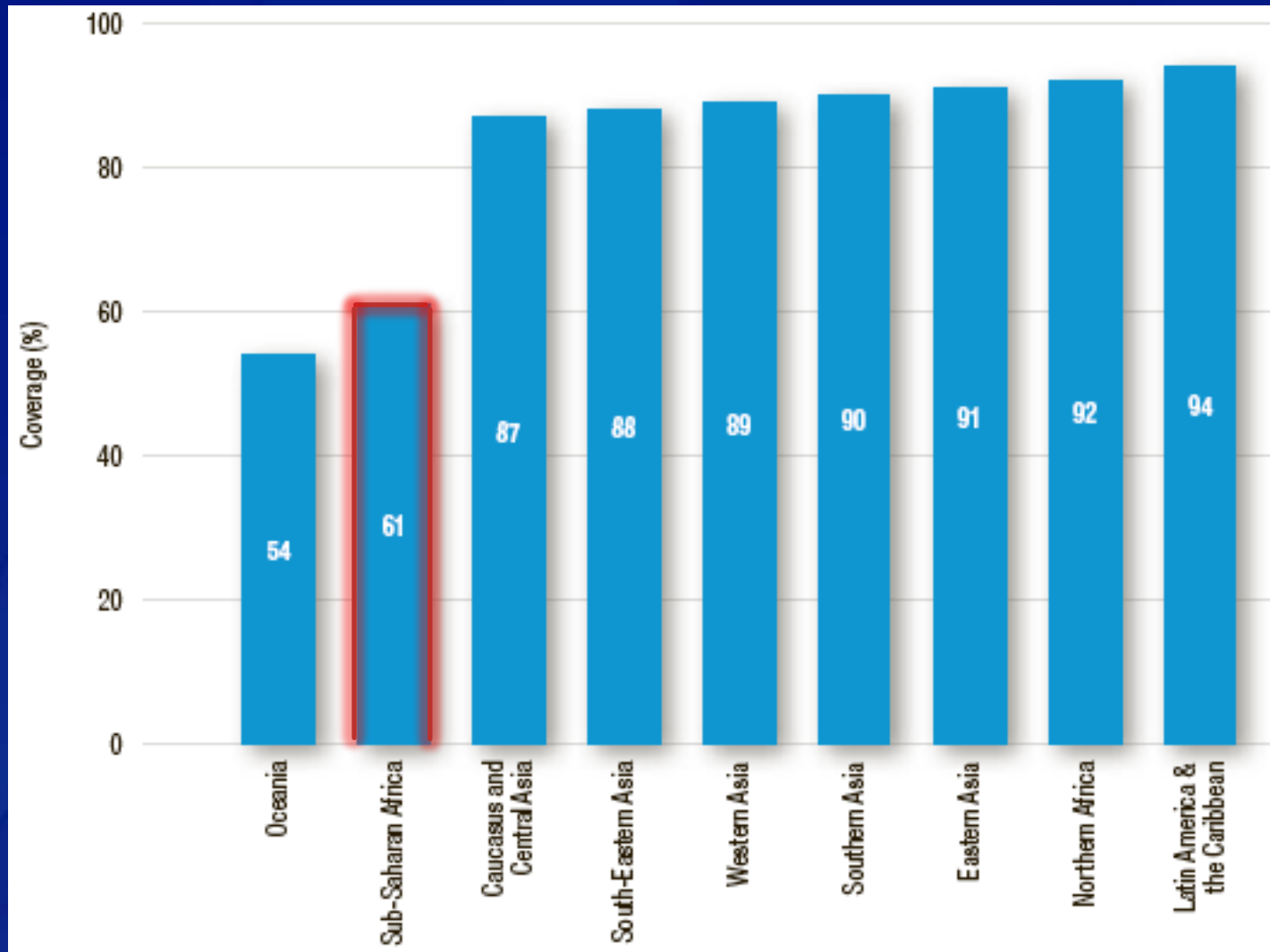
Revised Map of Typhoid Fever Incidence, 2010



Progress towards MDG for Water by Country, 2010

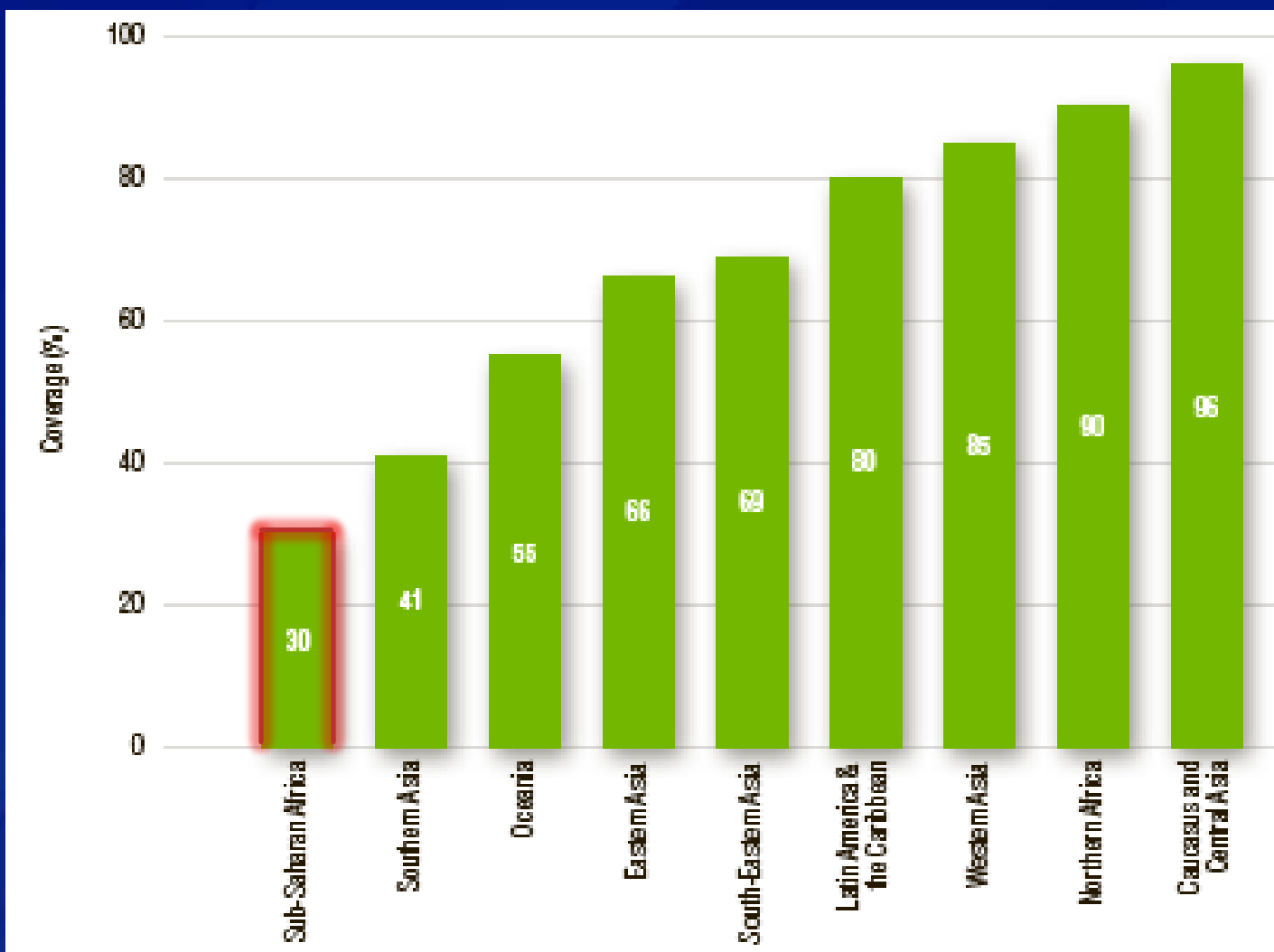


Coverage with Improved Water Sources by Region, 2010



Progress on drinking water and sanitation: 2012 update (WHO/UNICEF Joint Monitoring Program)

Coverage with Improved Sanitation by Region, 2010

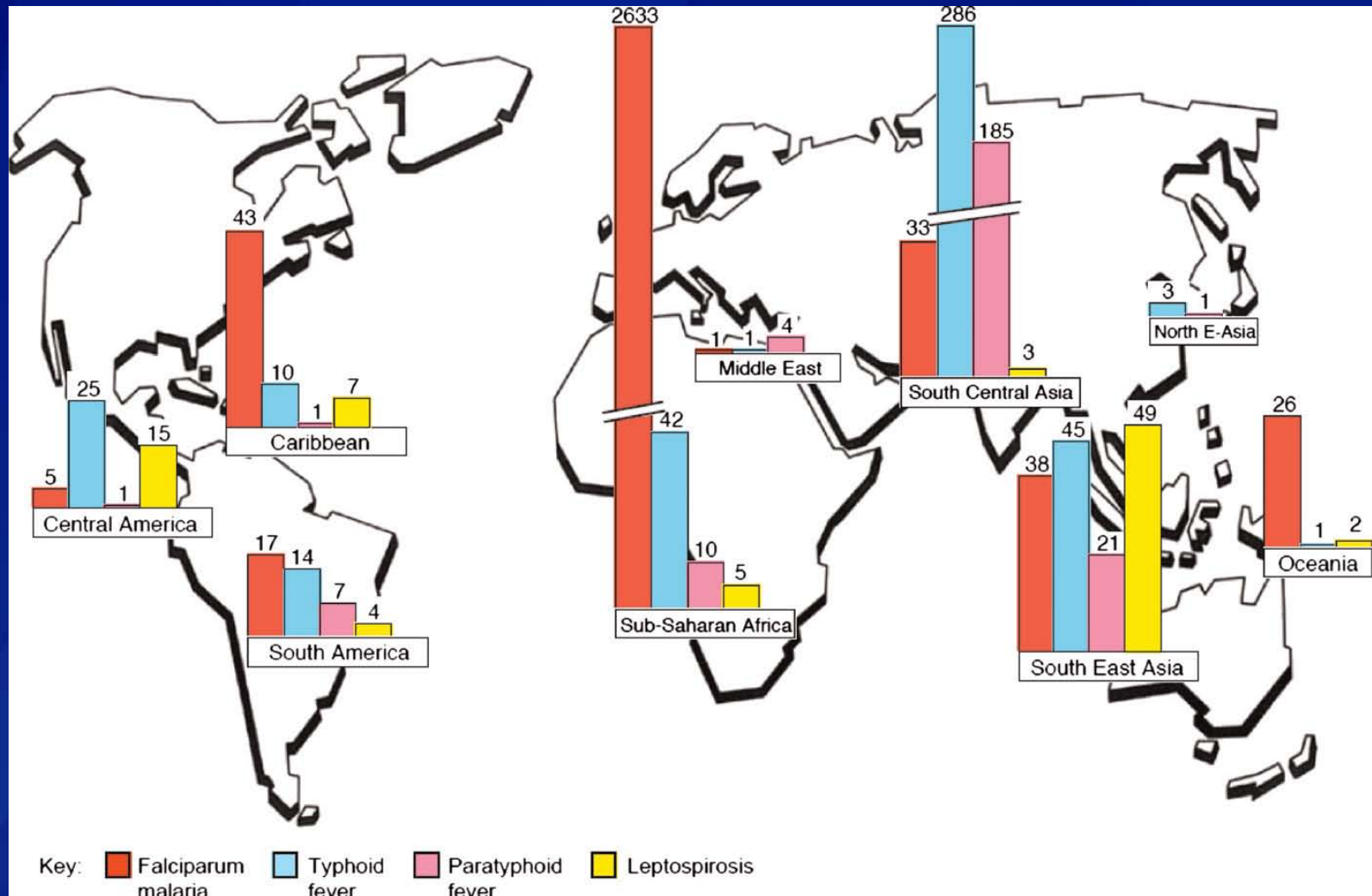


Progress on drinking water and sanitation: 2012 update (WHO/UNICEF Joint Monitoring Program)

Typhoid Fever in Travelers, 1996 -2011


- GeoSentinel network of 57 travel and tropical medicine clinics in 26 countries
- Identified 3,655 patients with acute, life-threatening febrile illnesses
 - 428 (11.7%) had typhoid fever
 - 233 (6.4%) had paratyphoid fever
- About half of all patients with enteric fever were hospitalized; none died

Cases of selected acute life-threatening diseases by exposure region among travelers to the tropics, 1996-2011 (n=82,825)



Jensenijs, M. et al. *Am J Trop Med Hyg* 88 (2), 2013, pps. 397-404

Typhoid Fever Outbreaks in ProMED, 1994 - 2013

- Search yielded 223 matches  106 events
- 38 (36%) reported typhoid outbreaks in Africa
 - 1994-2000 = 1 (1 country)
 - 2001-2007 = 23 (10 countries)
 - 2008-2013 = 13 (8 countries)
- Reported cases ranged from 1 to 42,564
- Reported deaths ranged from 0 – 50
- Recent outbreaks occurred in urban settings (Lusaka, Zambia and Harare, Zimbabwe)

Typhoid Fever Outbreaks in ProMED, 1994 - 2013



Characteristics of Selected Outbreaks of Typhoid Fever in Africa

Country	Dates	Cases	Severity
DRC	10/2004 - 1/2005	42,564 (ProMED)	Int. Perf. 4.6% CFR 1% (WHO)
Malawi	3/2009 - 11/2009	303 (46 confirmed)	Neurologic symptoms in 13%
Uganda	12/2007 - 7/2009	577 - 24,900	Int. Perf. ~ 5% - 8% Outbreak is ongoing

An outbreak of peritonitis caused by multidrug resistant *Salmonella* Typhi in Kinshasa, Democratic Republic of Congo. Muyembe-Tamfum J, et al. 2009. *Travel Medicine and Infect Dis*;7:40-43

Multidrug-Resistant Typhoid Fever With Neurologic Findings on the Malawi-Mozambique Border. Lutterloh E, et al. 2012 *CID*; 54:1100-6 and also Neurologic Manifestations Associated with an Outbreak of Typhoid Fever, Malawi - Mozambique, 2009. Sejvar J, et al. 2012. *PLoS ONE*; Vol 7 (12): e46099

A Large Outbreak of Typhoid Fever Associated With a High Rate of Intestinal Perforation in Kasese District, Uganda, 2008–2009. Neil K, et al. 2012. *CID*; 54:1091-9

Global Burden of Typhoid Resistance

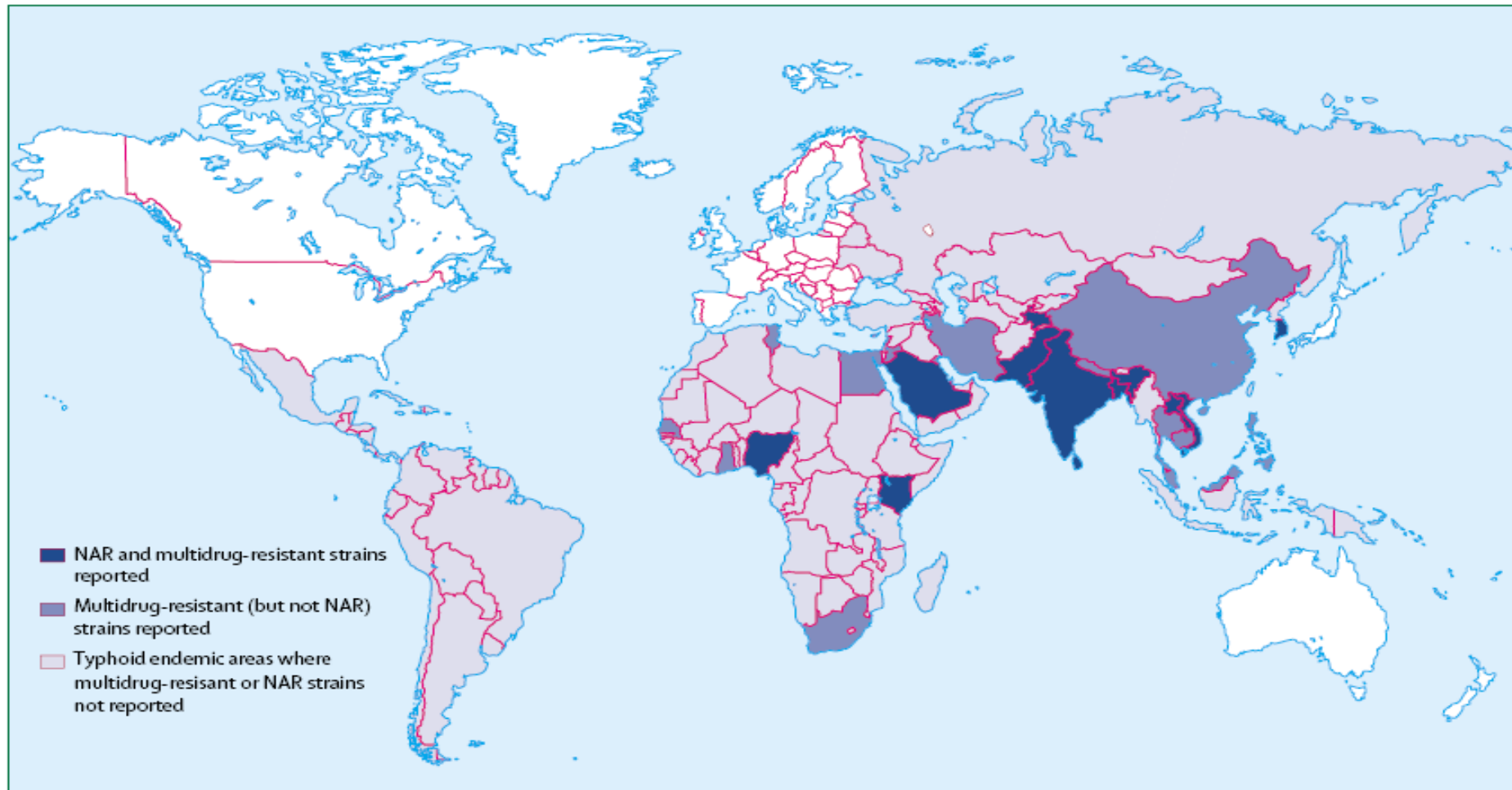


Figure: Global distribution of antimicrobial resistance in *Styphi* (1990–2004)

Adapted from Parry and colleagues⁹⁶ and updated on basis of data from past 3 years.

Evolution of Antimicrobial Resistance among *S. Typhi* Strains in Uganda

Dates	Number	% Pan Suscept	% MDR	% Nal R & Cip I
March-April, 2009	21	19	76	0
Oct – Dec, 2011	18	11	83	6
Aug – Oct, 2012	7	14	71	86

Evolution of Antimicrobial Resistance among *S. Typhi* Strains in Africa

- No systematically collected data available
- Some data from individual sites
 - Nalidixic acid resistance and DCS in DRC
 - NAR and DCS in Kibera, Kenya
 - Abuja, Nigeria ~ 2-3% NAR
 - Agogo, Ghana NAR strains detected.
- Widespread FQ-resistance likely to follow

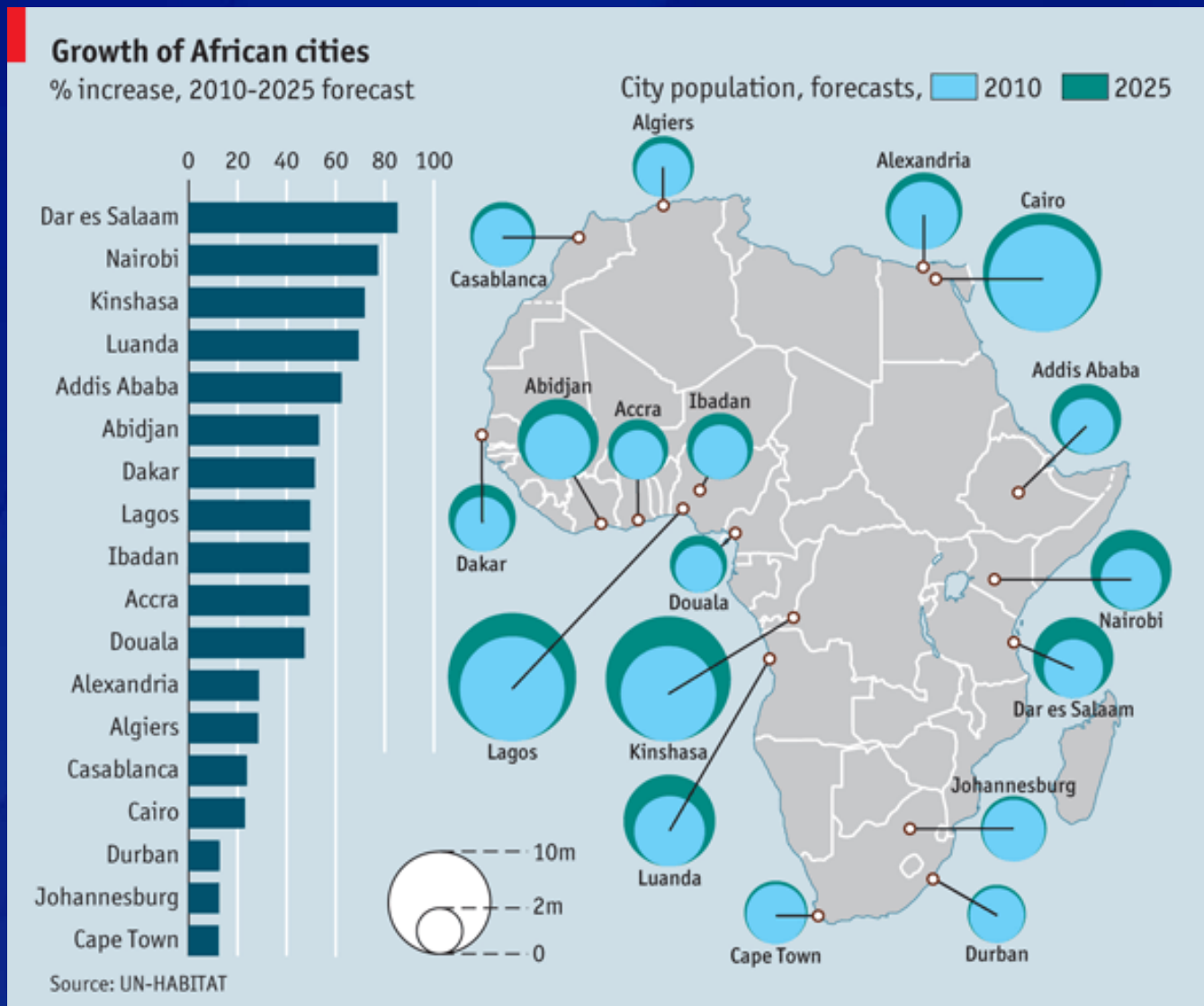
Thank you

The findings and conclusions in this presentation are those of the author and do not necessarily represent the views of the Centers for Disease Control and Prevention

National Center for Emerging Zoonotic and Infectious Diseases
Division of Foodborne, Waterborne and Environmental Diseases



Projected Urbanization in Africa, 2010 - 2025



The urbanization of Africa: growth areas. Graphic Detail, The Economist, December 13, 2010