Update on Current Activities

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with
Andrew Azman, Elizabeth Lee, Sonia Hegde, Shirlee Wohl, Heather Mckay, Stephen Lauer and many others

GTFCC Annual Meeting :: 3 June 2019

CHOLERA DYNAMICS
TAXONOMY ~ BURDEN ~ MAPPING ~ MODELING
JOHNS HOPKINS BLOOMBERG SCHOOL of PUBLIC HEALTH
iddynamics.jhsph.edu/cholera

Outline

1 Mapping Cholera

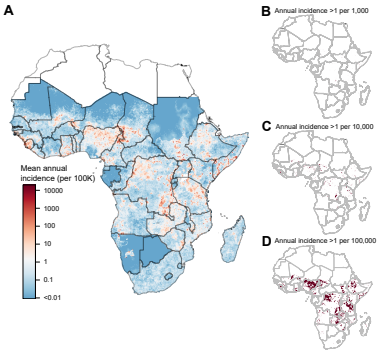
2 Cholera Genomics

3 Case Studies

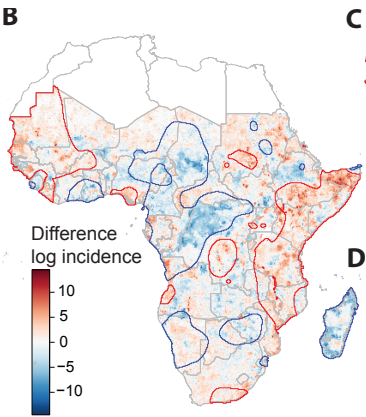
4 Using Cross-Sectional Serology to Track Transmission and to Identifying Priority Intervention Areas

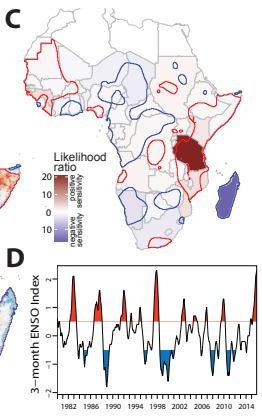
Cholera Mapping and Epidemiology

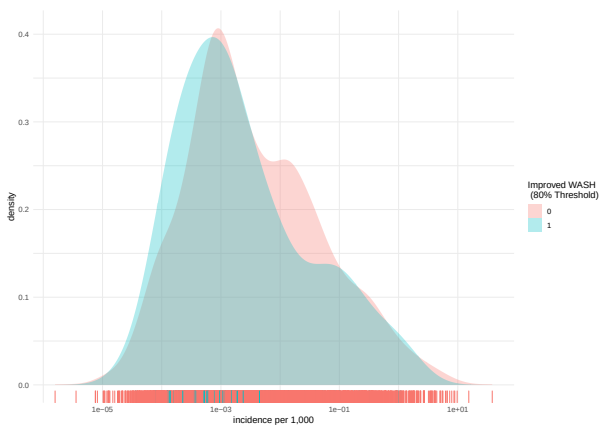
- Development and curation of global cholera data
- Updated estimates of global cholera
- Impact and cost-effectiveness of global OCV investments
- Maps of seasonality and inter-annual variability of transmission
- Leveraging different types of data
- Review and summarisation of cholera outbreak characteristics
- New interface for data access, entry and database



Risk Factors for Cholera Incidence: From Weather to WASH







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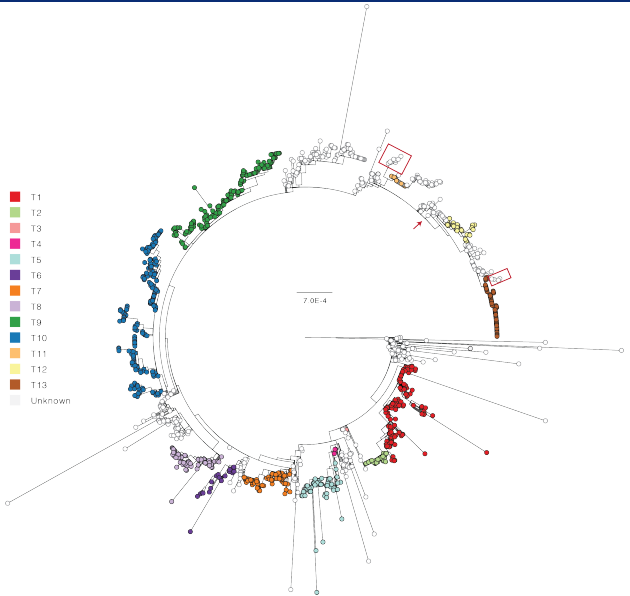
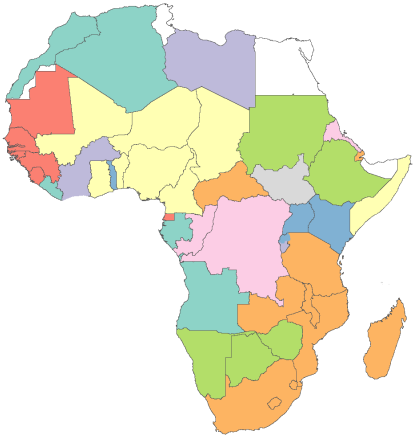
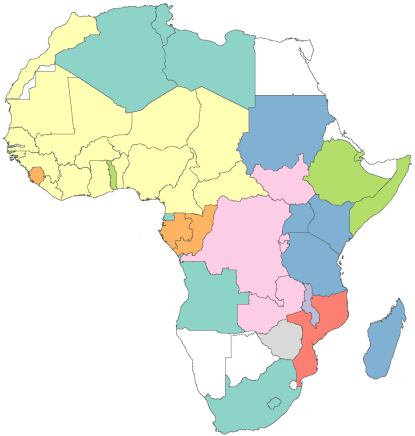

T1
T2
T3
T4
T5
T6
T7
T8
T9
T10
T11
T12
T13
Unknown
7.0E-4

Incidence–based Clusters



Lineage–based Clusters



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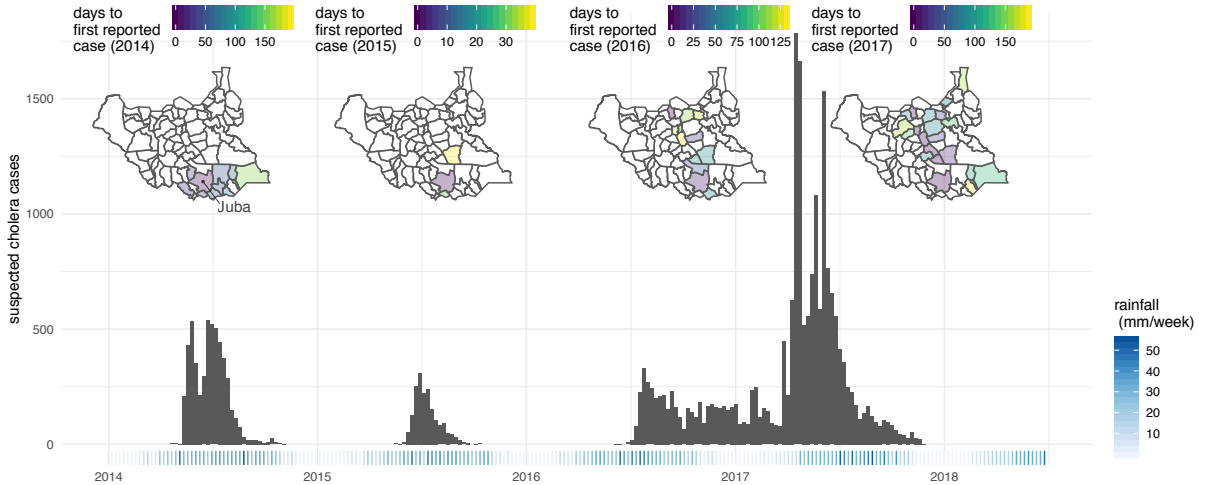
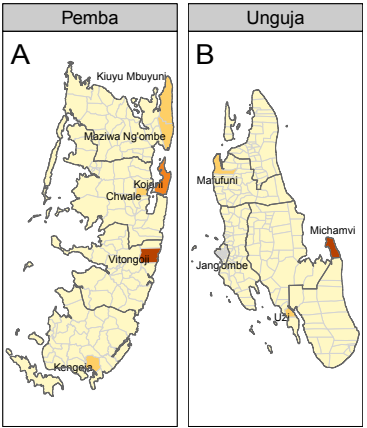
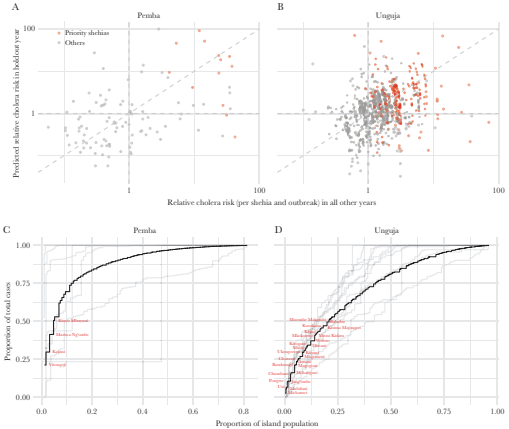
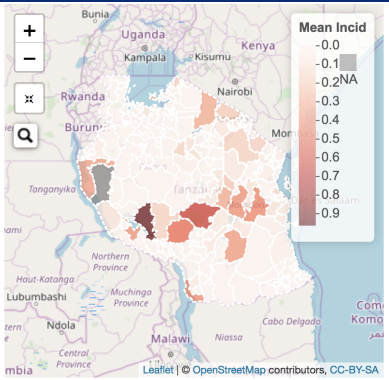

days to first reported case (2014)
0 50 100 150
days to first reported case (2015)
0 10 20 30
days to first reported case (2016)
0 25 50 75 100125
days to first reported case (2017)
0 50 100 150
Juba
suspected cholera cases
1500
1000
500
0
2014
2015
2016
2017
2018
rainfall (mm/week)
50
40
30
20
10

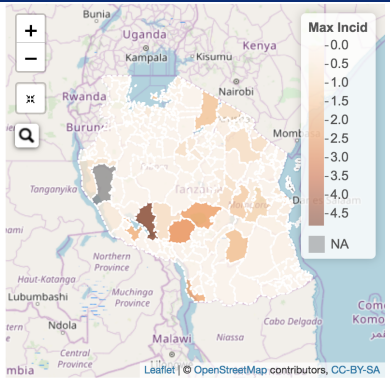


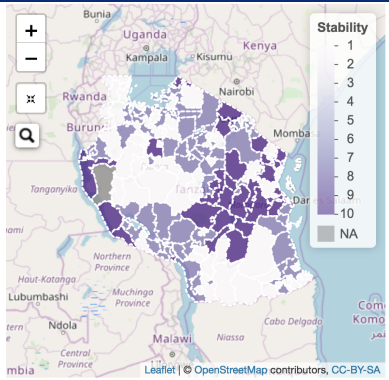


Bi et al, 2018, JID

Identifying Priority Areas in Tanzania







Set criteria for identifying priority intervention districts:

Choose the period of interest:

2010 — 2014 — 2018

2010 2011 2012 2013 2014 2015 2016 2017 2018

Set relative weights for the three criteria under consideration in this prioritization process:

Mean Annual Incidence:

0 — 50 — 100

0 10 20 30 40 50 60 70 80 90 100

Max. Annual Incidence:

0 — 50 — 100

0 10 20 30 40 50 60 70 80 90 100

Stability of Burden:

0 — 50 — 100

0 10 20 30 40 50 60 70 80 90 100

Define the Stability criterion:

At least one case

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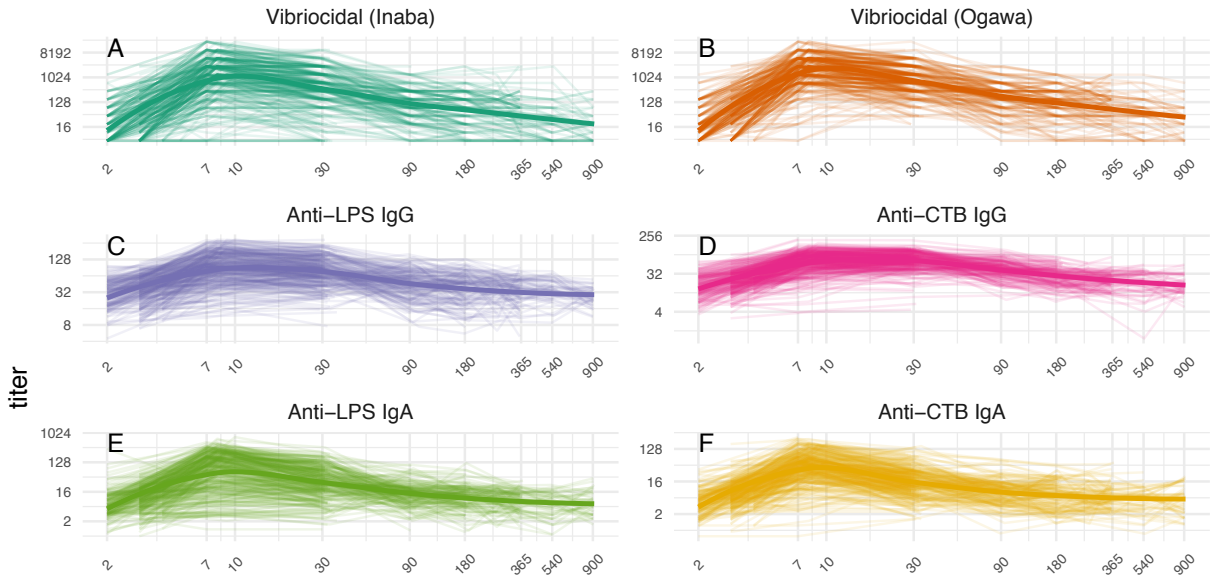
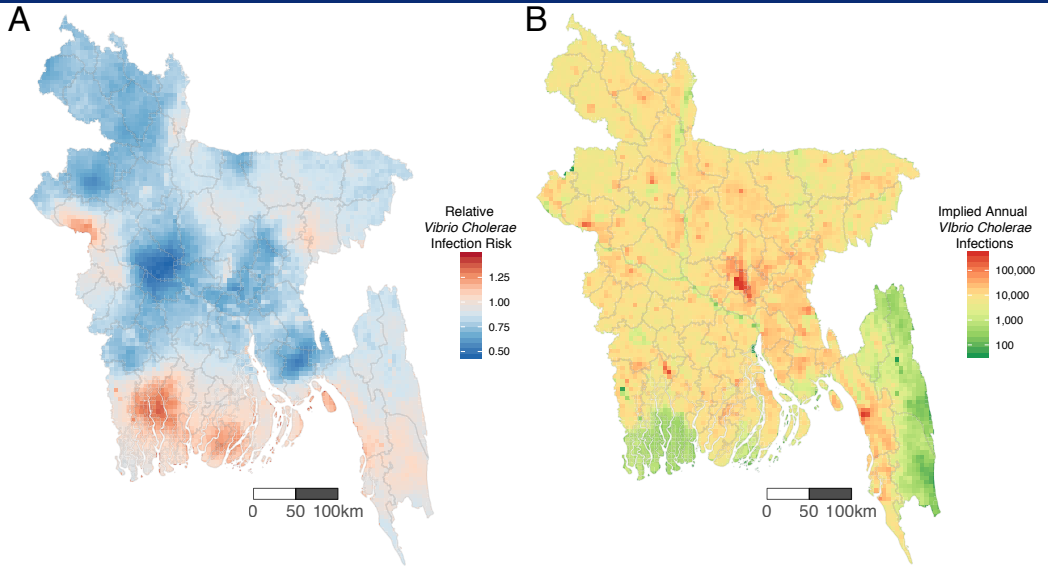

Vibriocidal (Inaba)
A
8192
1024
128
16
Vibriocidal (Ogawa)
B
8192
1024
128
16
Anti–LPS IgG
C
128
32
8
Anti–CTB IgG
D
256
32
4
Anti–LPS IgA
E
1024
128
16
2
Anti–CTB IgA
F
128
16
2
titer
2
7
10
30
90
180
365
540
900


A
Relative
Vibrio Cholerae
Infection Risk
1.25
1.00
0.75
0.50
0
50
100km
B
Implied Annual
VIbrio Cholerae
Infections
100,000
10,000
1,000
100
0
50
100km