GLOBAL TASK FORCE ON
CHOLERA CONTROL

GTFCC TOOL: CHOLERA HOTSPOT MAPPING

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ZIMBABWE EXPERIENCE

Background: Surveillance and Reporting System in Zimbabwe

◆ The country implements Integrated Disease Surveillance and Response (IDSR) through two mechanisms:

  ◇ Indicator Based Surveillance (IBS)
    - **17 diseases** and conditions including **Cholera**

  ◇ Event Based Surveillance mechanisms (EBS)

◆ Both mechanisms were used for detection and response e.g. Cholera outbreak 2018-2019

◆ For IBS every health facility is expected to report every week via mobile based platform into the DHIS2

◆ A weekly bulletin is produced by the Health Information and Surveillance Unit, in the Epidemiology and Disease Control Department of the Ministry of Health Child Care (MOHCC).
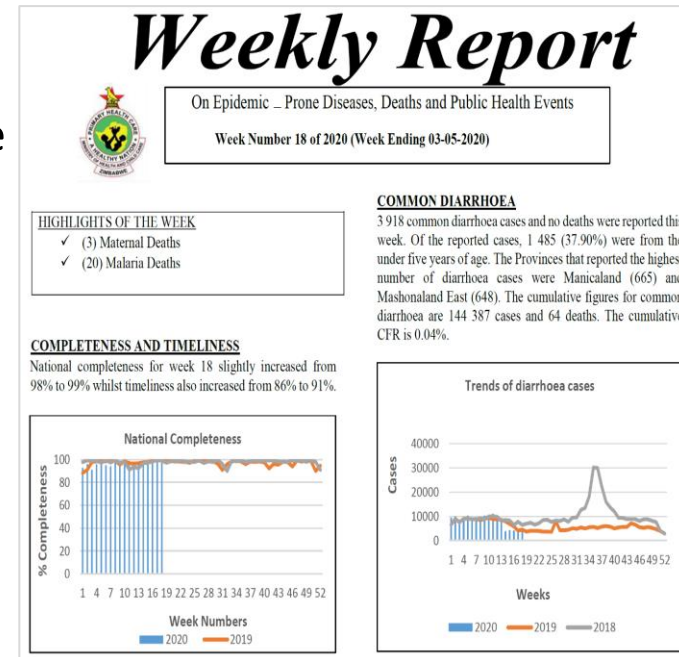
Cholera Epidemiological Situation in Zimbabwe

- The first outbreak was reported in 1972, in Mudzi, Mashonaland East.

- The largest outbreak occurred in 2008-2009.
  - 98,592 cases, 4,288 deaths, CFR 4.3%.

- Seasonality: November-December.

- The most recent massive outbreak was in 2018-2019.
  - 10,671 cases, 68 deaths, CFR 0.63%.
  - Harare province city was most affected, (96.9% of all cases and 83.6% of deaths)

Historical Patterns of Cholera Outbreaks in Zimbabwe, 2003 - 2018
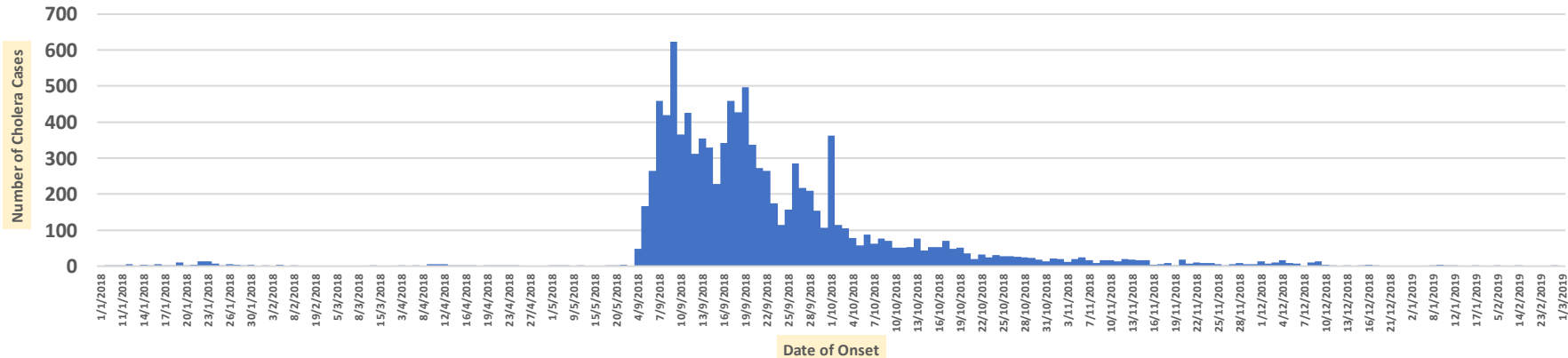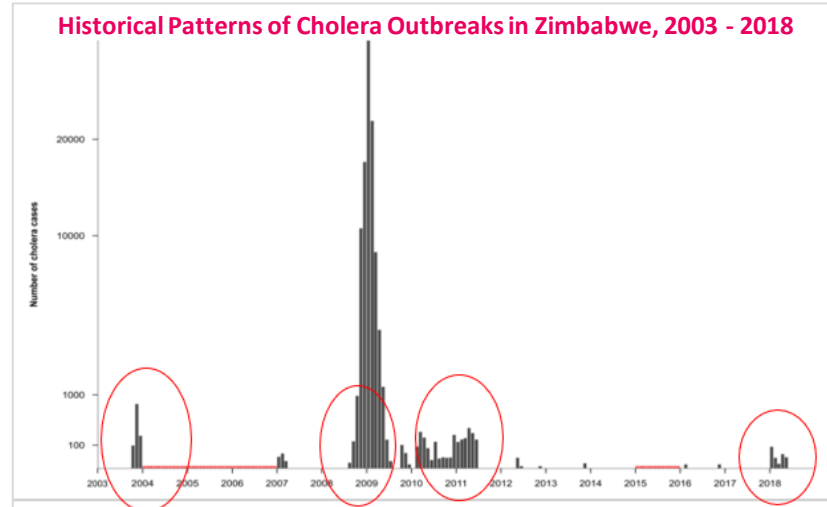
GTFCC Cholera Hotspot and Mapping Tool

◆ The government of Zimbabwe is dedicated to eliminating Cholera.

◆ Accordingly; MoHCC conducted a hotspot mapping exercise to serve as a basis for development of a National Cholera Elimination Plan (NCP) and Roadmap.

◆ For Hotspot Mapping; Global Task (GTFCC) Tool was adapted and used.

◆ The tool depends on population at risk and cholera cases by administration level and for a period of not less than 5 years.

PROVINCE	DISTRICT	WARD	Area	Population					Number of reported cholera cases				
				2015	2016	2017	2018	2019	2015	2016	2017	2018	2019
Midlands	Gokwe North	31	Kaduku Village	5,906	5,965	6,024	6,085	6,145				2	
Midlands	Gokwe North	16	Mutandwa Village	12,108	12,229	12,351	12,475	12,600				4	
Midlands	Gokwe North	13	Muzenda Village	6,357	6,421	6,485	6,550	6,615				4	
Midlands	Gokwe North	22	Chiwashira,Village	8,541	8,627	8,713	8,800	8,888				1	
Masvingo	Mwenezi	18	Village 8,10,11	1,219	1,231	1,243	1,256	1,268		3			
Masvingo	Chiredzi	11	Chilonga	4,058	4,098	4,139	4,180	4,222		3			
Masvingo	Masvingo	8	Masvingo	5,337	5,390	5,444	5,499	5,554				1	
Matabeleland South	Beitbridge Urba	4	Chapfuche	7,781	7,859	7,937	8,017	8,097				1	
Mashonaland West	Chegutu	28	Borden Farm	3,644	3,681	3,717	3,755	3,792				4	
Mashonaland West	Chegutu	4	Chegutu T/Ship	8,052	8,132	8,214	8,296	8,379				29	
Mashonaland West	Chegutu	21	Claremont	1,265	1,278	11,291	1,304	1,317				3	
Mashonaland West	Chegutu	23	Fopajena Farm	6,023	6,083	6,144	6,206	6,268				1	
Mashonaland West	Chegutu	12	Forit	5,493	5,547	5,603	5,659	5,716				14	
Mashonaland West	Chegutu	22	Gadzema	9,886	9,985	1,084	10,185	10,287				11	
Mashonaland West	Chegutu	2	Hintonvile	8,766	8,853	8,942	9,031	9,122				2	
Mashonaland West	Chegutu	13	Hope Farm	4,020	4,060	4,101	4,142	4,183				10	
Mashonaland West	Chegutu	1	Town	4,551	4,596	4,642	4,689	4,736				1	
Mashonaland West	Chegutu	11	Paarl Farm	8,388	8,472	8,556	8,642	8,726				2	
Mashonaland West	Chegutu	25	Kataw	5,711	5,768	5,826	5,884	5,943				1	
Mashonaland West	Chegutu	8	Pfupajena	5,704	8,791	8,879	8,968	9,057				33	
Mashonaland West	Chegutu	10	ZMDC	10,137	10,239	10,341	10,444	10,549				9	
Mashonaland East	Seke	2	Makomo	3,564	3,599	3,635	3,672	3,709				77	
Mashonaland East	Wedza	15	Wedza	3,743	3,781	3,818	3,857	3,895				7	
Mashonaland East	Mutoko	29	Village 40	10,657	10,764	10,817	10,980	11,090				1	
Mashonaland East	Mutoko	5	Farm 46	4,080	4,323	4,366	4,410	4,454				1	
Mashonaland East	Mutoko	25	Mhira Village Mutawatawa	9,666	9,763	9,861	9,959	10,059				1	
Mashonaland East	Murehwa	29	Macheke t/ship	6,498	6,563	6,629	6,695	6,762				1	
Mashonaland East	Murehwa	12	Mushinga Village	9,874	9,971	10,071	10,171	10,273				2	
Mashonaland East	Murehwa	8	'Dapandove Sch,Shamu Sch	12,675	12,802	12,930	13,059	13,189				4	
Mashonaland East	Marondera	11	Samuriwo village,	13,004	13,135	13,266	13,399	13,532				2	
Mashonaland East	Marondera	9	Thompson Farm	6,295	6,358	6,422	6,486	6,551				8	
Mashonaland East	Marondera	10	Cherutombo	6,932	7,001	7,071	7,142	7,213				4	
Mashonaland East	Chikomba	9	Village Ndawana	4,295	4,338	4,382	4,425	4,470				4	
Mashonaland Central	Shamva	29	Wadzanai	6,285	6,348	6,411	6,540	6,605				4	

Cholera Hotspot and Mapping **Process** in Zimbabwe

## 1. Data Type and Sources for Cholera Cases and Population

1.1. Population and Epidemiological Surveillance Data

- **Administratively: 10 Provinces, 63 Districts, 1200 Wards** with **total population 13,061,239** (ZDHS, 2015). Urban 4,284,145 (33%), and Rural 8,777,094 (67%)

- Two data sources were considered i.e. IDSR by health facility (lowest level), by year and for accuracy Linelist data was used

- Population was obtained from the country's statistical agency ZIMSTAT.
  - ◇ The population projections were based on the 2012 population census.

1.2. WASH Data **(Not Used)**

- WASH Data is recommended to be used by the tool.

- In Zimbabwe WASH data from surveys MICS/DHS is available at secondary or higher administrative levels. So it was a challenge to disaggregate the coverage at ward level. **(WASH data used to identify the geographical risk areas during the cholera outbreak 2018).**

- **Rural WASH Information Management System** (RWIMS), an alternative data source, could not be used as data available was for rural provinces while most of the cases were reported from urban provinces.

Geographical Distribution of New Cases of Cholera, with Borehole & WASH Response in Harare, Zimbabwe, 19 – 25 October 2018

Legend
- Boreholes
- Cholera cases
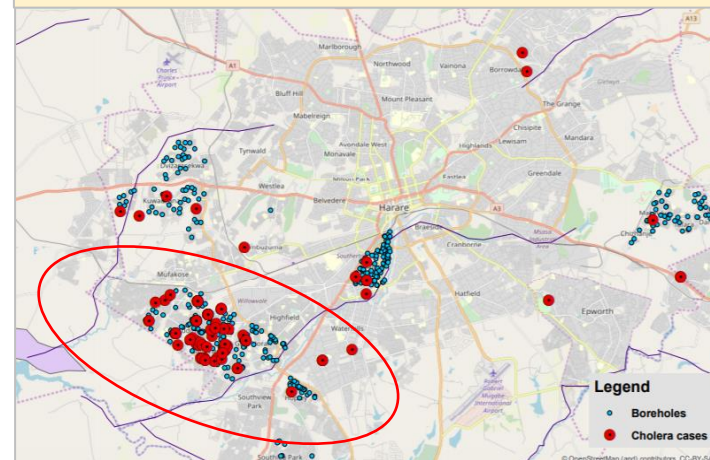
2. Data Entry and Analysis

◆ IBS Data was extracted from District Health Information System 2 (DHIS2) by facility and by week. However it was difficult to align the facility cases to the population at risk.

◆ The line list was therefore adopted. Cases were aggregated by village (extracted from the physical address) and these were aligned to the wards and population.

◆ Data was captured into the tool and cleaned thereafter.

◆ By use of the tool, data analysis was conducted.

◆ The process took 2 weeks with 6 people actively involved.

Cholera Hotspot and Mapping Process in Zimbabwe, Cont…

3. Data Interpretation

- ◆ Interpretation of results at a glance was difficult
    - ◇ The output assumed there was no problem of Cholera (considering **Mean Annual Incidence** (MAI))
    - ◇ The persistence was however accurate
    - ◇ Approximately 90% of the cases from 2015 – 2019 were reported in 2018
    - ◇ Seasonality of Cholera
- ◆ Risk profiling dating back to 10 years could have been used to support the interpretation

Cholera Hotspot and Mapping Process in Zimbabwe, Cont…

4. Results and Ranking Criteria

◆ By use of the GTFCC tool the wards were ranked into three categories; High, Medium and Low.

- ◆ High Priority: High MAI & High Persistence

- ◆ Medium: High MAI & Low Persistence or Low MAI & High Persistence

- ◆ Low: Low MAI & Low Persistence

◆ Of the total **106 wards** that reported **at least a case** during the period 2015 to 2019:

- ◇ **9 wards** (1 in Chegutu district and 8 in Harare district) were categorised as High priority
- ◇ **18 wards** (1 in Chegutu district, 4 in Mutare city, 5 in Chitungwiza city, 8 in Harare district) were categorised as medium priority
- ◇ The remainder were in Low priority category.

5. Hotspots Selection

◆ MAI and Persistence were used to classify the hotspots by use of the GTFCC tool.

◇ Mean annual incidence: Calculated as the mean annual cases per 100,000 population across the historical period of interest.

◇ Percentage persistence: The number of weeks in which cholera cases were reported out of the total weeks for the period 2015 to 2019 expressed as a percentage.

Cut-off points

- For classification purposes, the MAI cut-off was set at 60/100,000 population, and Persistence at 2%.

- The MAI minimum threshold was put at >=5/100,000 based on assessments by MOHCC in consultation with WHO referencing data from previous epidemics and cholera risk in the country.

- Wards with MAI <5/100,000 were excluded from further analysis remaining with 81.

- 95 of the total wards reported at least 1 case of cholera.

- MAI for wards that reported cholera ranged from 0.9 to 694.4 per 100,000 population.

Wards by Incidence and Persistence
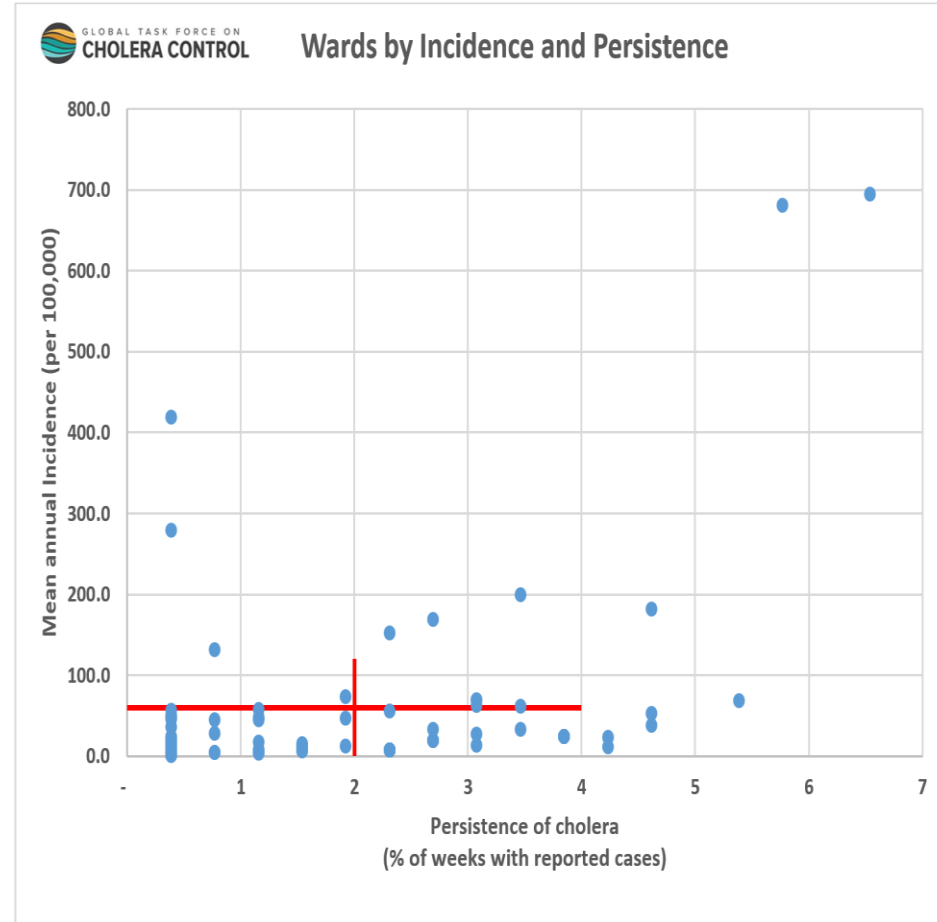
Categories of Hotspots

Categories	Mean annual incidence (80th percentile value)	Proportion of weeks reporting cholera (50th percentile value)	Interpretation
T1	>60/100,000 persons	>2%	High Mean Annual incidence and High Persistence
T2	≤60/100,000 persons	>2%	Low Mean Annual incidence and High Persistence
T3	>60/100,000 persons	≤2%	High Mean Annual incidence and Low Persistence
T4	≤60/100,000 persons	≤2%	Low Mean Annual incidence and Low Persistence

Number of Wards by Category

Province	District	T1	T2	T3	T4	Total
Harare	Harare, Chitungwiza	10	25		6	41
Manicaland	Buhera, Mutare City	2	2	1	13	18
Mashonaland West	Chegutu	1		1	6	8
Mashonaland East	Seke, Marondera, Chikomba, Murewa, Wedza			1	6	7
Midlands	Gokwe North				3	3
Masvingo	Mwenezi, Chiredzi				2	2
Mashonaland Central	Shamva, Mazowe				2	2

Systematic Hotspot Development Through WHO and GTFCC Guidelines

GLOBAL TASK FORCE ON CHOLERA CONTROL

World Health Organization

81 wards hotspots for cholera

Scale T1 – T4

Fitting into **16 Districts** of the **7** out of **10 Provinces** of Zimbabwe
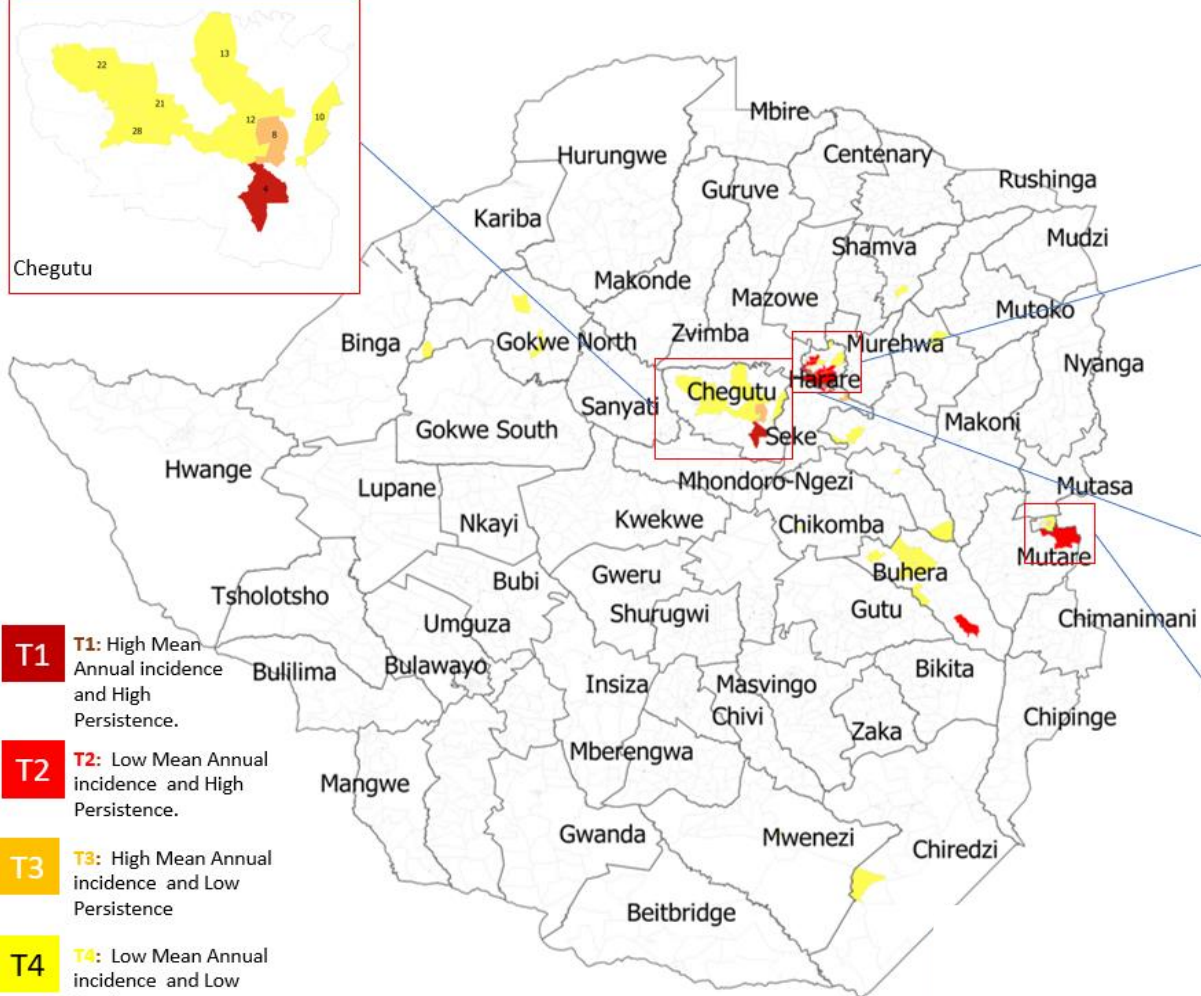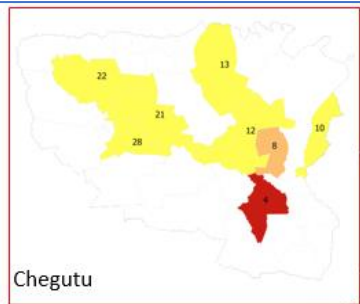
T1: **T1:** High Mean Annual incidence and High Persistence.

T2: **T2:** Low Mean Annual incidence and High Persistence.

T3: **T3:** High Mean Annual incidence and Low Persistence

T4: **T4:** Low Mean Annual incidence and Low Persistence.
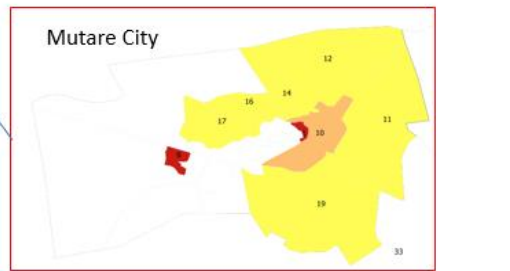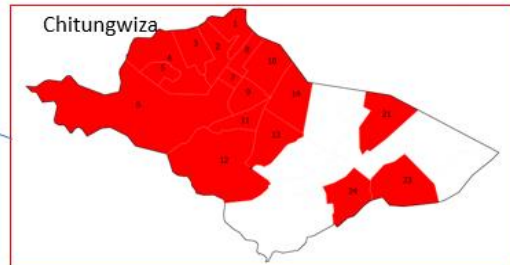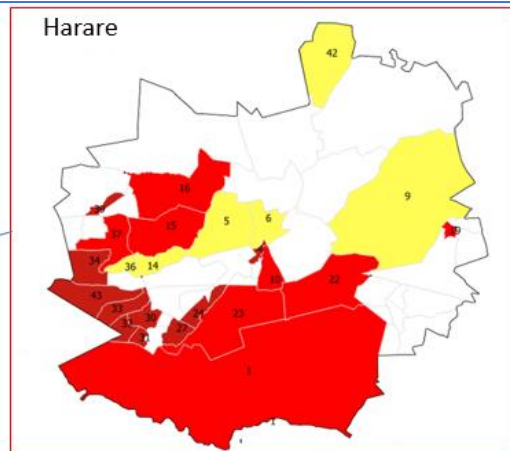
Discussion Points ???

- The tool is not universal given that Cholera in Zimbabwe is seasonal as compared to other countries
- After how long is the Hotspots mapping exercise supposed to conducted (frequency)
  - Propose that its done every 5 years to inform changes in strategy
- What effect does the absence of WASH data in the tool have to the final output
  - Not much of a difference in our context as Most affected areas were due to low WASH coverage
  - What alternative data can be used to complete insufficient data?
- In the prioritization criteria, MAI is considered over Persistence
  - It would be good to consider both to be equal and merger T2 and T3

ACKNOWLEDGEMENT

- WHO
- Cholera Secretariat, HigherLife Foundation
- UNICEF
- GTFCC
- Development and Technical Partners
- Government Departments
- Among Others…

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THANK YOU