CHOLERA FACTSHEET **NIGERIA**

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CHOLERA OVERVIEW

Cholera was first reported in Nigeria in 1970. Since 1990, large-scale epidemics occurred in 1991, 1996, 1999, 2009-2011, 2014 and 2017[1]. Large-scale epidemics have been more frequent over the last ten years *(Fig. 1)*.

Between 2010 and 2017, epidemiological surveillance reported 122,239 cases with 3,713 deaths (case fatality rate ≈ 3%)[2].

The majority of cases were reported in the central north region of the country, where the states of **Bauchi**, **Kano**, **Kaduna**, and **Katsina** reported 51.7% of all cholera cases[2] *(Table 1)*.

Cross-border cholera outbreaks have occurred in the north, between Nigeria and other Lake Chad countries (Niger, Chad, and Cameroon), and the south along the Gulf of Guinea[3].

CHOLERA DISTRIBUTION

Between 2010 and 2017, the majority of cases were reported in the central north region of the country, where the states of **Bauchi**, **Kano**, **Kaduna**, and **Katsina** reported 51.7% of all cholera cases. **Bauchi** State alone reported 25% of all cases. These four states each reported between six to seven outbreaks. Average outbreak duration ranged from nine weeks in Katsina to 36 weeks in Kaduna[2] *(Fig. 2, Table I)*.

Borno State, located in the Lake Chad region in the northeast, reported 11.9% of cases. During the eight-year period, Borno State was affected by seven cholera outbreaks that last an average of 18 weeks[2] *(Fig. 2, Table I)*.

In the northwest, the states of **Zamfara** and **Kebbi** reported 5.5% and 3.9% of cholera cases, respectively. Zamfara was affected by eight outbreak events, which lasted on average nearly 13 weeks. Kebbi reported nine outbreaks, with an average duration of almost 10 weeks[2] *(Fig. 2, Table I)*.

In the northeast, the states of **Gombe** and **Taraba** reported a combined 6.7% of all cases. Outbreaks in these two states lasted an average of 19 and 36 weeks, respectively[2] *(Fig. 2, Table I)*.

Two onset periods were identified: 1) case numbers often started to increase between July and September and 2) between January and March. The seasonal pattern differed between the northern and southern parts of the country. Lulls in cholera case numbers often occurred in November and December *(Fig. 3)*.

Table I. Epidemiological parameters of cholera outbreaks in the most affected states in Nigeria, 2010-2017[2]

State	Cases / Deaths [1]	% of total cases	CFR %	Number of outbreaks	Outbreak duration (average in weeks)
Bauchi	30579 / 334	25	1.1	6	21.83
Borno	14491 / 414	11.9	2.9	7	18
Kano	13049 / 351	10.7	2.7	7	29.14
Kaduna	9964 / 247	8.2	2.5	6	36.33
Katsina	9528 / 420	7.8	4.4	7	8.86
Zamfara	6748 / 229	5.5	3.4	8	12.62
Kebbi	4810 / 281	3.9	5.8	9	9.78
Gombe	4592 / 166	3.8	3.6	5	19.4
Taraba	3575 / 127	2.9	3.6	3	35.67

Note: [1] Total cases = 122,239 and total deaths = 3,713 between 2010 and 2017.

Figure 1. Yearly number of cholera cases and case fatality rate (CFR) in Nigeria, 1990 – 2017[1]

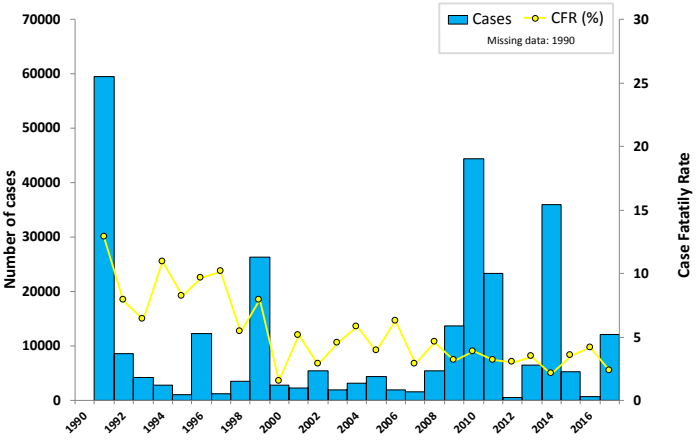


Figure 2. Cumulative incidence of cholera by local government area Nigeria, 2010-2017[2]

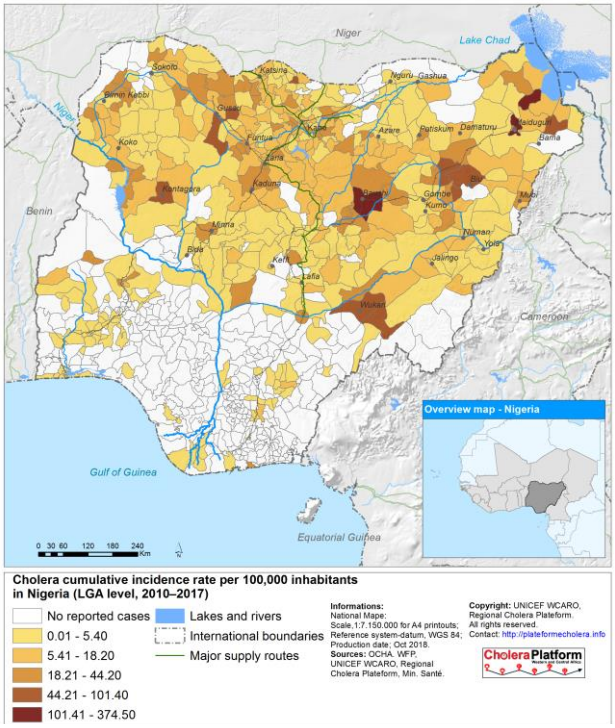
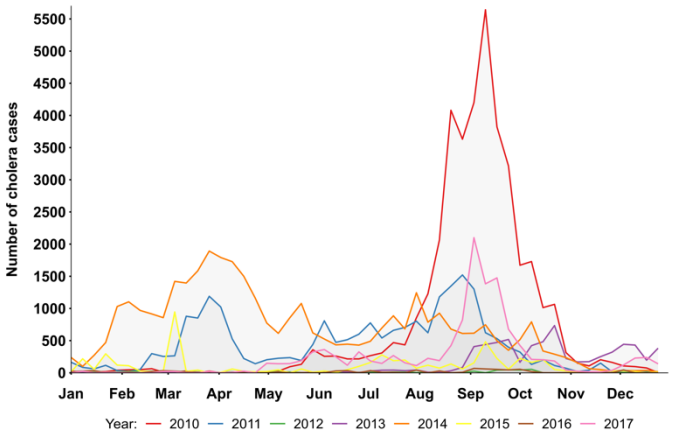


Figure 3. Weekly number of cholera cases in Nigeria, 2010 – 2017[2]



CHOLERA HOTSPOTS

At-risk populations were primarily located in *(Fig. 4, Table II, Table III)*:

- The central north: the states of **Kano**, **Kaduna**, **Bauchi**, **Katsina,** and **Plateau**
- The northeast Lake Chad region: local government areas **in Borno** State
- The northwest: local government areas in **Kebbi** and **Zamfara** States
- The **Lagos** area

STRATEGIC RECOMMANDATIONS

Cross-border outbreaks often occurred between Nigeria, Niger, Chad and Cameroon, involving northern Nigeria states (**Zamfara**, **Katsina**, **Kano**, **Kaduna**, **Bauchi, Borno** and **Adamawa**)[3] *(Table II and Table III)*, thus stressing the importance of a cross-border early warning system as well as coordinated control and prevention activities.

In regularly affected local government areas, preparedness and response plans should include (1) strengthened early warning and rapid response systems including community-based surveillance and cross-border alerts; (2) the establishment of cross-sectoral and cross-border coordination mechanisms; (3) epidemic management capacity building; (4) targeted supply prepositioning; and (5) communication plans and messages.

Sustainable access to water, sanitation and hygiene programs should be prioritized in Type 1 hotspots *(Fig. 5, Table II, Table III)*. Due to the high CFR in some local governments, outbreak management training and pre-positioning of supplies are highly recommended *(Table III)*.

A 2010 study showed that using water from open wells in the north was a cholera risk factor. The study proposed replacing open wells with boreholes or protected wells, developing household water treatment methods, expanding Community-Led Total Sanitation in rural areas, and monitoring free residual chlorine levels (i.e., public network water and water sold by street vendors) in northern cities such as Bauchi, Kastina, Kano, Maidugiri, Gombe, Gusau and Sokoto.[3]

Figure 4. Map of cholera hotspots in Nigeria, 2010-2017[2]

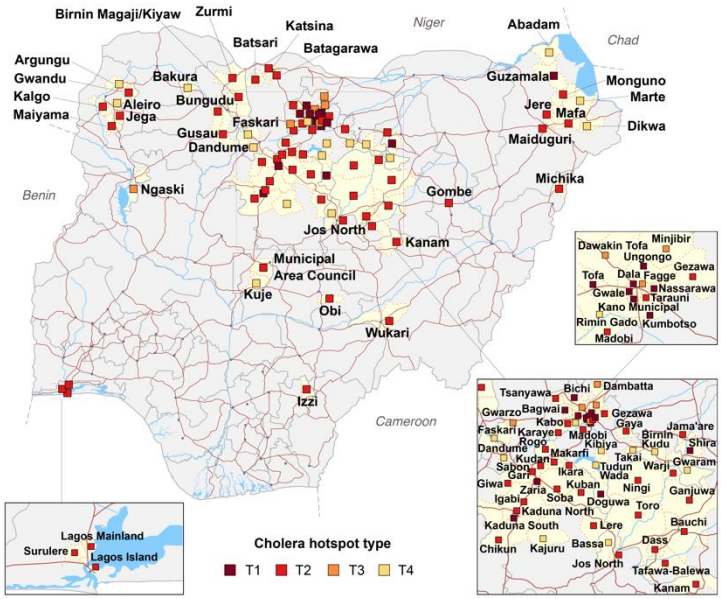
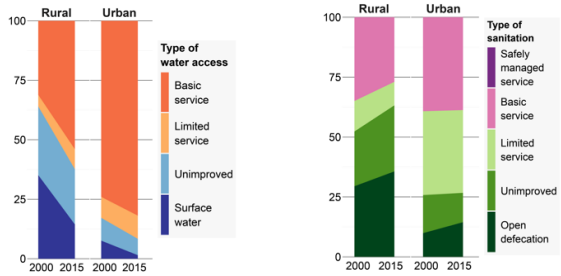


Figure 5. Water and sanitation estimates in Nigeria, 2000-2015[4]



High-risk populations and pratices[3,5]

- Informal traders, fishermen and nomadic communities around Lake Chad and the borders of Niger, Chad and Cameroon
- Tradesmen and bus drivers on the coastal Accra–Lagos road
- Funeral rituals, patient care and home visits (northern states)
- Formal and informal trade between major cities: Niger (Maradi, Zinder), Nigeria (Katsina, Sokoto, Kano, Kaduna, Bauchi) and the Lake Chad shores (Nguigmi, Maidugiri, Baga)
- Visiting markets along the borders of Niger and Cameroon

Table II. Summary of select cholera hotspots in Nigeria, 2010-2017[2]

HOTSPOT TYPE	STATE	LOCAL GOVERNMENT AREAS	% of total cases	Recurrence (no. outbreaks)	Outbreak duration (median in weeks)
Type 1	**BAUCHI**	SHIRA	0.4	≥ 5 outbreaks	≥ 6 weeks
	BORNO	GUZAMALA	0.2		
	KADUNA	KADUNA SOUTH, ZARIA	2.7		
	KANO	BAGWAI, BICHI, DALA, DOGUWA, GWALE, KANO MUNICIPAL, KUMBOTSO, NASARAWA, TOFA, UNGONGO	3.4		
Type 2	**BAUCHI**	BAUCHI, DASS, GANJUWA, JAMA'ARE, NINGI, TAFAWA-BALEWA, TORO, WARJI	22.9	3-4 outbreaks	≥ 6 weeks
	BORNO	JERE, MAFA, MAIDUGURI, MONGUNO	7		
	KADUNA	CHIKUN, GIWA, IGABI, IKARA, KADUNA NORTH, KUBAN, KUDAN, LERE, MAKARFI, SABON GARI, SOBA	4.8		
	KANO	GAYA, GEZAWA, KABO, KARAYE, MADOBI, ROGO, TARAUNI, TSANYAWA	2.1		
	KATSINA	BATAGARAWA, BATSARI, KATSINA	1.1		
	KEBBI	GWANDU, JEGA, KALGO, MAIYAMA	1.2		
	LAGOS	LAGOS ISLAND, LAGOS MAINLAND, SURULERE	0.3		
	ZAMFARA	BIRNIN MAGAJI-KIYAW, BUNGUDU, GUSAU, ZURMI	3.6		

Note: See Annex Table III for complete list of hotspots.

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1. Global Health Atlas. WHO: *http://apps.who.int/globalatlas*.
2. Ministry of health Nigeria, epidemiological surveillance data (2010–2017).
3. Oger P-Y, Sudre B, 2011. Water, Sanitation and Hygiene and Cholera Epidemiology: An Integrated Evaluation in the countries of the Lake Chad Basin. UNICEF.
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Table III. Classification of cholera hotspots in Nigeria, 2010-2017

STATE	LOCAL GOVERNMENT AREA	% of total cases	Recurrence (no. outbreaks)	Outbreak duration (median in weeks)	Emergence (median start week)	Weekly attack rate (median per 10,000 inhab.)	CFR%	Border zone	Hotspot type
ADAMAWA	MICHIKA	0.1	3	6	23 [17 - 33]	0.39	7.1	Yes	Type 2
BAUCHI	BAUCHI	19.3	4	31	16.5 [0 - 26]	2.74	0.5	No	Type 2
	DASS	0.4	3	14	31 [4 - 34]	1.68	0.6	No	Type 2
	GANJUWA	1.1	3	9	26 [11 - 27]	0.16	2.3	No	Type 2
	JAMA'ARE	0.3	3	16	29 [11 - 31]	0.7	0.0	No	Type 2
	NINGI	0.7	4	14	28 [10 - 30]	0.26	3.1	No	Type 2
	SHIRA	0.4	5	12	35 [26 - 37]	0.27	7.0	No	Type 1
	TAFAWA-BALEWA	0.5	4	12.5	28.5 [6 - 31]	0.25	3.4	No	Type 2
	TORO	0.5	4	10.5	29 [3 - 30]	0.21	3.0	No	Type 2
	WARJI	0.1	3	7	31 [13 - 34]	0.84	1.2	No	Type 2
BORNO	ABADAM	0	3	4	39 [5 - 39]	0.33	11.1	Yes	Type 4
	DIKWA	0.8	4	4	28 [21 - 34]	0.72	1.5	No	Type 4
	GUZAMALA	0.2	5	6	40 [20 - 42]	0.49	11.1	No	Type 1
	JERE	3.4	3	10	32 [30 - 34]	2.12	1.5	No	Type 2
	MAFA	0.1	3	6	38 [36 - 39]	0.21	2.7	No	Type 2
	MAIDUGURI	1.4	3	11	33 [30 - 36]	0.24	0.4	No	Type 2
	MARTE	0.1	4	3	28.5 [12 - 33]	0.48	10.6	Yes	Type 4
	MONGUNO	2.1	3	10	30 [20 - 34]	5.29	1.4	Yes	Type 2
EBONYI	IZZI	0.1	3	8	27 [16 - 51]	0.1	14.0	No	Type 2
FCT	KUJE	0.1	3	3	23 [11 - 23]	0.45	5.0	No	Type 4
	MUNICIPAL AREA COUNCIL	0.1	3	7	18 [9 - 30]	0.07	14.5	No	Type 2
GOMBE	GOMBE	1.6	3	25	24 [5 - 36]	0.06	3.8	No	Type 2
JIGAWA	BIRNIN KUDU	0.8	4	5	35.5 [25 - 49]	0.48	2.7	No	Type 4
	GWARAM	0.2	3	3	31 [25 - 48]	0.39	6.3	No	Type 4
KADUNA	CHIKUN	0.4	4	11.5	15.5 [6 - 33]	0.21	5.4	No	Type 2
	GIWA	0.3	4	10	31 [5 - 41]	0.18	3.5	No	Type 2
	IGABI	1.3	3	43	9 [8 - 35]	0.25	1.3	No	Type 2
	IKARA	0.2	4	15	15.5 [9 - 33]	0.22	4.8	No	Type 2
	KADUNA NORTH	0.7	4	12	19.5 [6 - 33]	0.34	0.8	No	Type 2
	KADUNA SOUTH	1.9	7	23	18 [3 - 35]	0.13	0.2	No	Type 1
	KAJURU	0.1	3	4	24 [1 - 43]	0.42	3.4	No	Type 4
	KUBAN	0.4	3	21	16 [15 - 40]	0.14	3.0	No	Type 2
	KUDAN	0.3	3	14	26 [9 - 32]	0.18	5.1	No	Type 2
	LERE	0.3	4	11.5	27.5 [13 - 32]	0.19	9.3	No	Type 2
	MAKARFI	0.4	4	16.5	21.5 [9 - 34]	0.32	1.6	No	Type 2
	SABON GARI	0.2	3	27	32 [10 - 45]	0.07	0.0	No	Type 2
	SOBA	0.3	3	10	26 [9 - 42]	0.23	1.5	No	Type 2
	ZARIA	0.8	7	6	32 [7 - 46]	0.18	5.2	No	Type 1
KANO	BAGWAI	0.3	5	11	34 [8 - 50]	0.23	4.9	No	Type 1
	BICHI	0.3	6	8.5	24 [15 - 43]	0.17	3.1	No	Type 1
	DALA	0.4	7	6	30 [1 - 48]	0.15	1.0	No	Type 1
	DAMBATTA	0.2	6	3.5	29.5 [17 - 50]	0.19	3.4	No	Type 3
	DAWAKIN TOFA	0.2	7	4	24 [11 - 49]	0.25	1.7	No	Type 3
	DOGUWA	0.3	5	7	24 [13 - 38]	0.29	8.8	No	Type 1

(cont. on next page)

Note: Type 1: High priority area with outbreaks of high frequency (≥ 5 outbreaks) and extended duration (≥ 6 weeks). Type 2: Medium-priority area with outbreaks of moderate frequency (3-4 outbreaks) and extended duration. Type 4: Low-priority area with outbreaks moderate frequency, short duration (<6 weeks), and high incidence.

Table III (continued). Classification of cholera hotspots in Nigeria, 2010-2017

STATE	LOCAL GOVERNMENT AREA	% of total cases	Recurrence (no. outbreaks)	Outbreak duration (median in weeks)	Emergence (median start week)	Weekly attack rate (median per 10,000 inhab.)	CFR%	Border zone	Hotspot type
KANO (cont.)	FAGGE	0.6	6	5	32.5 [1 - 48]	0.25	2.8	No	Type 3
	GAYA	0.6	4	12	17 [1 - 43]	0.34	3.2	No	Type 2
	GEZAWA	0.4	4	9.5	36.5 [8 - 48]	0.19	1.3	No	Type 2
	GWALE	0.3	5	11	43 [29 - 52]	0.2	1.2	No	Type 1
	GWARZO	0.6	6	4.5	29 [1 - 43]	0.25	2.5	No	Type 3
	KABO	0.2	3	9	28 [13 - 49]	0.55	2.4	No	Type 2
	KANO MUNICIPAL	0.5	5	8	34 [1 - 48]	0.33	3.6	No	Type 1
	KARAYE	0.2	4	8.5	26 [19 - 33]	0.14	1.6	No	Type 2
	KIBIYA	0.1	3	4	40 [28 - 44]	0.99	0.6	No	Type 4
	KUMBOTSO	0.3	6	10	28.5 [1 - 48]	0.12	1.2	No	Type 1
	MADOBI	0.2	3	7	11 [10 - 28]	0.16	5.0	No	Type 2
	MINJIBIR	0.1	5	3	23 [8 - 48]	0.2	0.7	No	Type 3
	NASARAWA	0.4	6	6	32.5 [2 - 47]	0.11	2.7	No	Type 1
	RIMIN GADO	0.2	4	3	20.5 [13 - 51]	0.44	1.4	No	Type 4
	ROGO	0.3	3	11	36 [17 - 47]	0.32	1.4	No	Type 2
	TAKAI	0.2	4	3	20.5 [4 - 26]	0.34	2.8	No	Type 4
	TARAUNI	0.1	3	11	45 [34 - 48]	0.16	3.4	No	Type 2
	TOFA	0.3	5	9	23 [9 - 26]	0.61	1.1	No	Type 1
	TSANYAWA	0.1	3	12	30 [17 - 33]	0.27	4.3	No	Type 2
	TUDUN WADA	0.3	3	3	25 [15 - 44]	0.52	1.8	No	Type 4
	UNGONGO	0.3	5	9	36 [26 - 47]	0.15	3.5	No	Type 1
KATSINA	BATAGARAWA	0.1	3	9	34 [24 - 35]	0.18	4.0	No	Type 2
	BATSARI	0.7	3	8	32 [10 - 33]	0.47	3.8	No	Type 2
	DANDUME	0.4	3	3	32 [8 - 33]	0.32	1.5	No	Type 4
	FASKARI	0.2	3	4	33 [26 - 40]	0.37	4.3	No	Type 4
	KATSINA	0.3	3	6	33 [24 - 46]	0.42	2.2	No	Type 2
KEBBI	ALEIRO	0.1	3	4	29 [3 - 35]	0.93	4.9	No	Type 4
	ARGUNGU	0.4	3	4	38 [34 - 47]	0.44	5.8	No	Type 4
	GWANDU	0.5	4	6	28.5 [5 - 38]	0.75	2.1	No	Type 2
	JEGA	0.3	3	8	34 [29 - 36]	0.57	3.0	No	Type 2
	KALGO	0.1	3	6	38 [29 - 42]	0.43	18.1	No	Type 2
	MAIYAMA	0.3	3	9	29 [26 - 37]	0.24	2.5	No	Type 2
	NGASKI	0.3	6	5	26.5 [1 - 40]	0.62	8.7	No	Type 3
LAGOS	LAGOS ISLAND	0.1	3	11	35 [25 - 52]	0.12	3.3	No	Type 2
	LAGOS MAINLAND	0	3	9	34 [24 - 38]	0.04	3.7	No	Type 2
	SURULERE	0.2	3	7	35 [25 - 39]	0.07	4.4	No	Type 2
NASARAWA	OBI	0.3	3	10	41 [26 - 46]	0.73	2.4	No	Type 2
PLATEAU	BASSA	0.1	3	3	22 [10 - 22]	0.57	6.5	No	Type 4
	JOS NORTH	0.6	4	6.5	20 [12 - 36]	0.46	3.3	No	Type 2
	KANAM	0.2	3	7	22 [15 - 37]	0.48	6.6	No	Type 2
TARABA	WUKARI	1.1	3	8	9 [1 - 33]	0.71	3.8	No	Type 2
ZAMFARA	BAKURA	0.6	3	5	33 [25 - 39]	0.53	2.6	No	Type 4
	BIRNIN MAGAJI-KIYAW	0.5	4	10.5	22.5 [22 - 35]	0.6	4.5	No	Type 2
	BUNGUDU	0.3	4	6	29.5 [24 - 35]	0.13	3.8	No	Type 2
	GUSAU	2.1	4	11	33 [19 - 47]	0.89	1.6	No	Type 2
	ZURMI	0.7	4	8	24.5 [12 - 32]	0.53	3.1	Yes	Type 2

Note: Type 1: Highest-priority area with outbreaks of high frequency (≥ 5 outbreaks) and extended duration (≥ 6 weeks). Type 2: High-priority area with outbreaks of moderate frequency (3-4 outbreaks) and extended duration. Type 3: Medium-priority area with outbreaks of high frequency and short duration (<6 weeks); Type 4: Low-priority area with outbreaks moderate frequency, short duration, and high incidence.