

The drivers of the Cholera epidemic in North-East Nigeria

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Introduction

- Cholera is an acute diarrhoeal disease
 - Toxigenic vibrio cholerae produces an enterotoxin, cholera toxin (CT)
 - Two serogroup, O1 and O139
- Humans are the only known natural hosts, transmitted faeco-orally
- Characterized by sudden onset of profuse painless watery diarrhoea and occasional nausea and vomiting
- Incubation period is usually 2 to 5 days
- Endemic in areas of inadequate sanitation and food hygiene practices
- Over 50% of the most severe cases die within a few hours
- Cholera causes an estimated 3–5 million morbidities and 100 000–120 000 mortalities annually

Outbreak Notification



- Bauchi State Ministry of Health alerted Federal Ministry of Health (FMOH) and Nigeria Field Epidemiology and Laboratory Training Programme (NFELTP) of an ongoing outbreak of cholera on 19th February 2014
- More than 1000 suspected cases had been reported between 6th January and 19th February (CFR 0.65)
- Index case : 14year old boy (AA) from Kandahar in Dan Amar B Ward of Bauchi LGA
 - Presented to the Kandahar health centre on 8th of January 2014
 - Sudden onset of watery stool and vomiting on 6th January 2014
- Team of NFELTP residents and an FMOH staff commenced investigation February 26th, 2014

Objectives

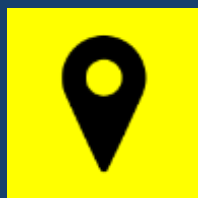


- Assess the magnitude of the outbreak
- Characterize the outbreak in time, place and person
- Identify risk factors for transmission
- Institute public health control measures

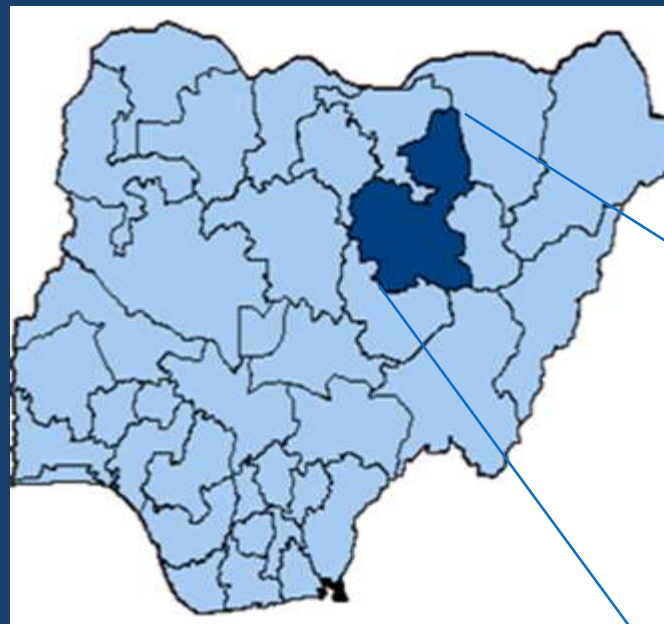
Methods



Study Area



- Population of 4.5 million
- Twenty (20) Local Government Areas (LGAs) with 323 Political Ward
- The State has experienced several outbreaks of cholera
 - The 2010 outbreak recording one of the highest case burdens



Descriptive study

- Visited cholera camp at the Teaching Hospital Bauchi to identify cases
 - Managed by Medicine Sans Frontiers (MSF)
- Visited other designated cholera camps
- Active case search by reviewing medical records
- Interviewed a random sample of case-patients
 - Generate hypotheses about potential exposures that would be common to all cases
- We described the outbreak in time, person and place
 - Generated epidemic curve

Analytical study



- **Case definition:** any person ≥ 5 years who develops severe dehydration or dies from acute watery diarrhea with or without vomiting OR any patient above the age of 2 years with acute watery diarrhea and resident in Bauchi state at least one month prior to onset of the outbreak
- **Study design:** unmatched case control study
- **Sample size:** 124 cases to 124 controls
- **Data collection:** interviewer - administered structured questionnaire
- **Data analysis:** bivariate
 - Odds Ratio and 95% Confidence Intervals to identify associated factors

Results

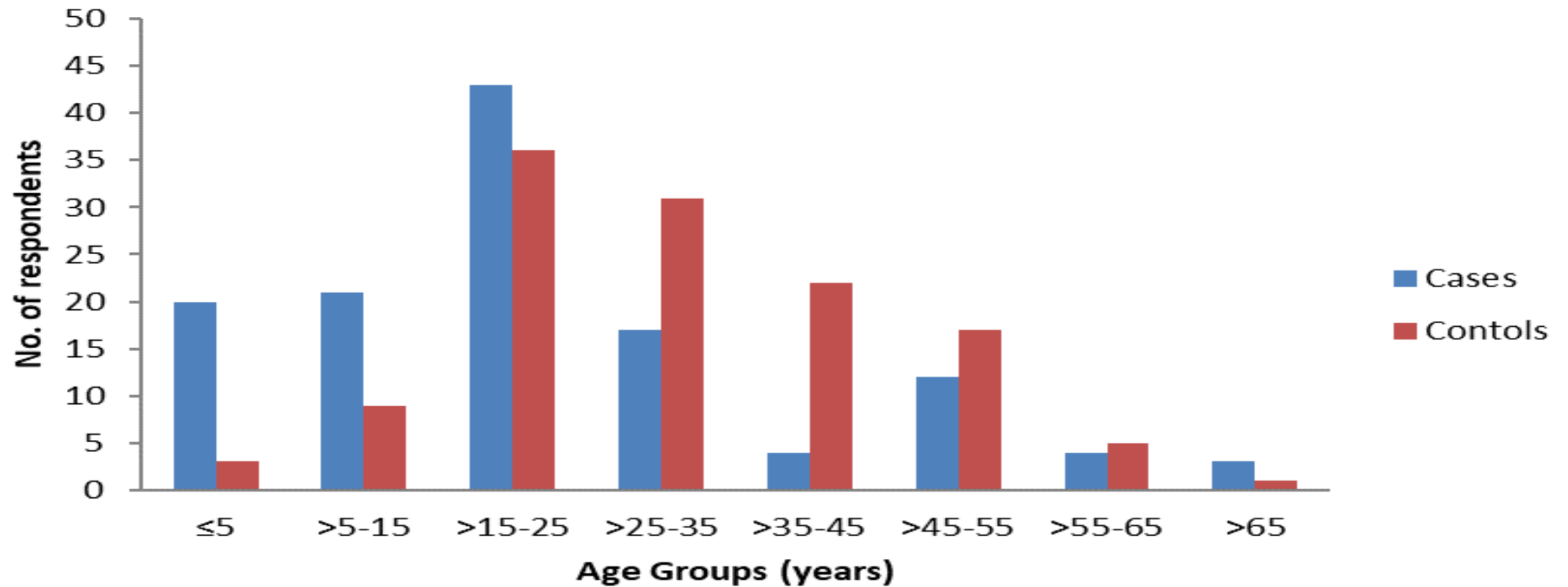


Results



- Total number of cases: 2998 in four LGAs
- Of these, 1782 (59.4%) were males
- Attack rate - highest among persons 15 to 24 years of age (30.6%)
 - Among 5 to 14 years of age (23.1%)
 - Among 45 years and above (3.8%)
- Median age of participants
 - Cases 21 (2-80) years
 - Controls 30 (4-80) years
- Total number of deaths: 23 deaths
- Case Fatality Rate : 0.77%

Age Distribution of Suspected Cholera Cases in Bauchi state



Sex distribution of respondents : Cholera Outbreak in Bauchi state

Sex of respondents	Cases (%)	Controls (%)	Total (%)
Male	73 (58.9)	62 (50.0)	135 (54.4)
Female	51 (41.1)	62 (50.0)	113 (45.6)
Total	124 (100)	124(100)	248(100)

Occupation of respondents : Cholera Outbreak in Bauchi state

Occupation	Cases (%)	Controls	Total (%)
<i>Almajiri</i>	26 (21.0)	6 (4.8)	32(12.9)
Artisan	2 (1.6)	6 (4.8)	8(3.2)
Civil servant	4(3.2)	11 (8.9)	15(6.0)
Farmer	9 (7.3)	7 (5.6)	16(6.5)
Housewife	19(15.3)	38 (30.6)	57(23.0)
Student	17(13.7)	12(9.7)	29(11.7)
Trader	20 (16.1)	27 (21.8)	47(19.0)
Others	27 (21.8)	17 (13.7)	44 (17.7)

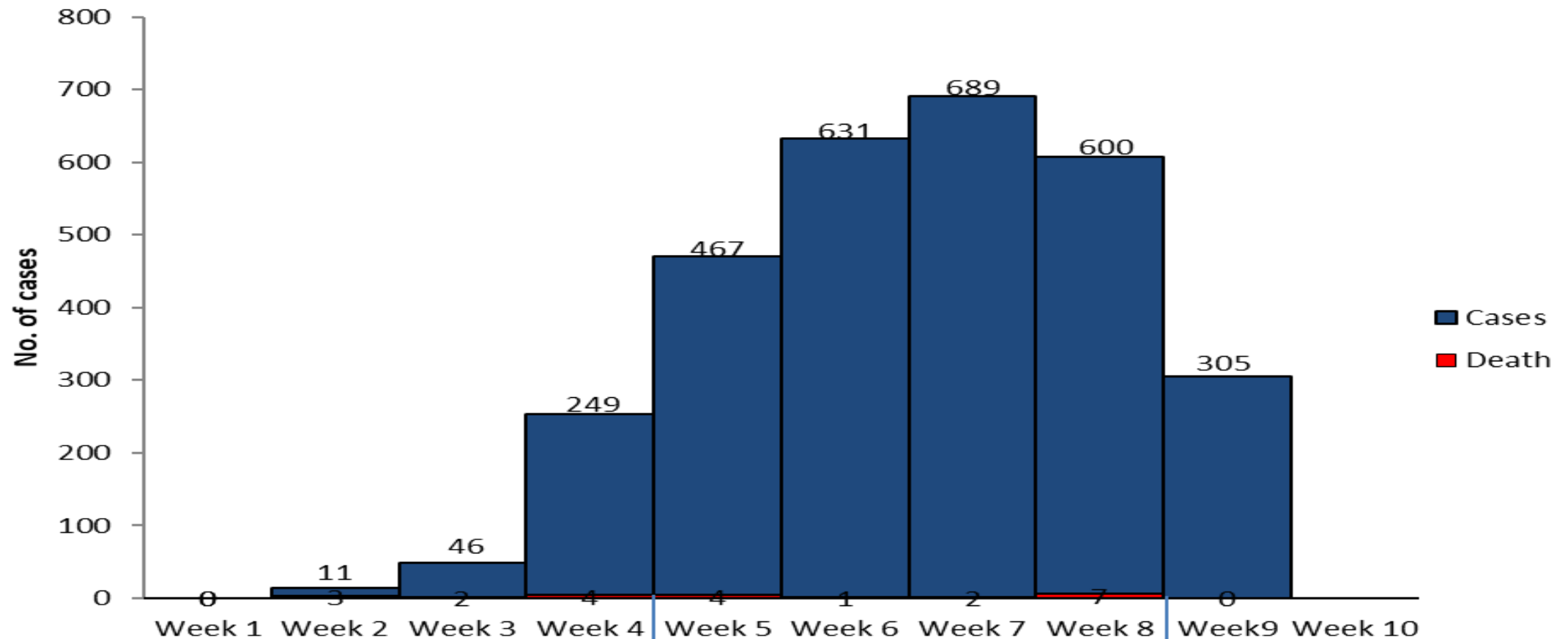
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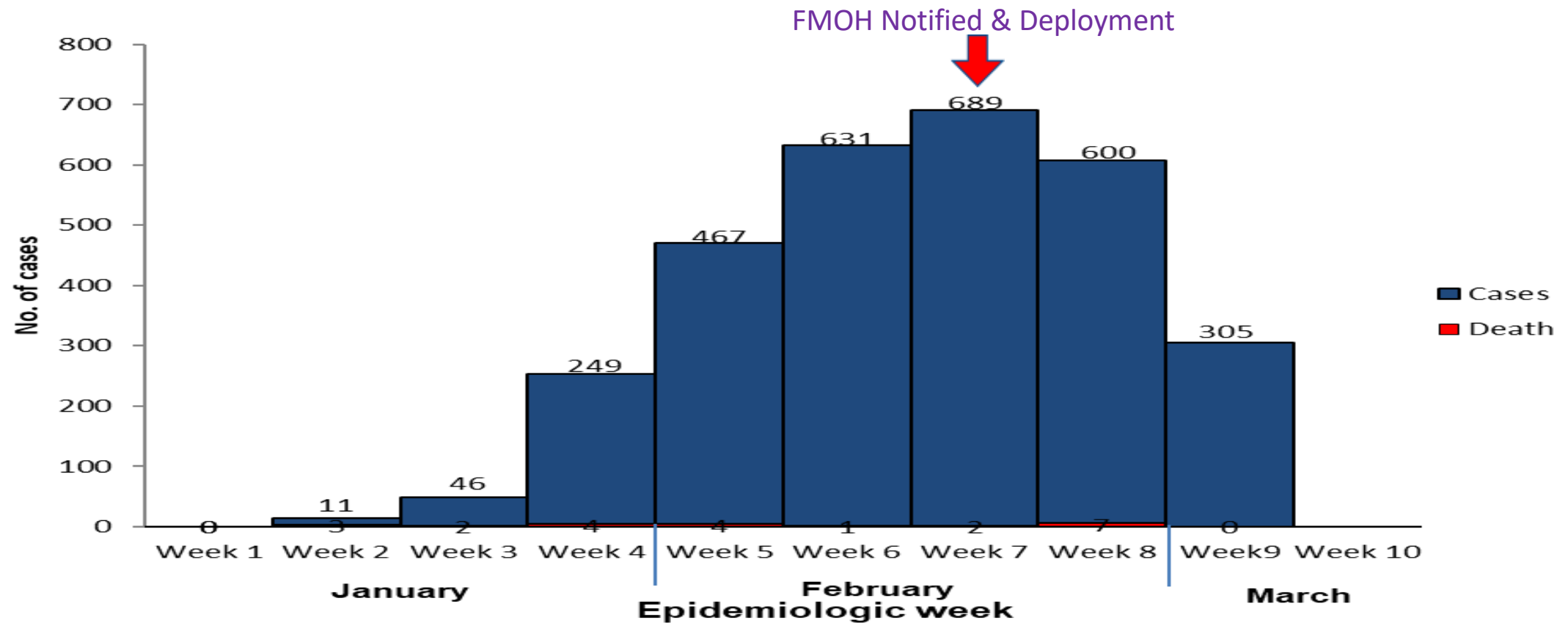
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Epicurve of Cholera Outbreak in Bauchi state, February 2014



Epicurve of Cholera Outbreak in Bauchi state, February 2014



Socio-demographic factors associated with Cholera disease in Bauchi State

Variables	Cases (%)	Controls (%)	OR	95% CI
Age of respondents				
≤25years	84 (63.6)	48 (36.4)	1.43	0.84 – 2.44
>25years	40 (34.5)	76 (65.5)		
Occupation of respondents				
Almajiri	26 (21.0)	6 (4.8)	5.22	1.94 – 14.78
Others	98 (79.0)	118 (95.2)		
Education level of respondents				
<Secondary education	96 (77.4)	88 (71.0)	1.40	0.76 – 2.59
≥Secondary education	28 (22.6)	36 (29.0)		

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Factors associated with cholera disease in Bauchi State, March-2014

Variable	Cases (%)	Controls (%)	OR	95% CI
Well water as source of drinking water				
Yes	48 (50.5)	47 (49.5)	1.03	0.62 – 1.72
No	76 (49.7)	77 (50.3)		
Boil water before drinking				
No	115 (92.7))	112(90.3)	1.37	0.51 – 3.69
Yes	9 (7.3)	12(8.7)		
Eat/drink outside the home				
Yes	55 (45.5)	43(35.8)	1.49	0.89 – 2.50
No	66 (54.5)	77(64.2)		
Contact with diarrhoea case				
Yes	91 (73.4)	36 (29.0)	6.74	3.87 – 11.75
No	33 (26.6)	88 (71.0)		

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Hand washing practices associated with Cholera disease in Bauchi State

Variables	Cases (%)	Controls (%)	OR	95% CI
Wash hands before eating				
No	14 (11.3)	4 (3.2)	3.82	1.13 – 14.20
Yes	110 (88.7)	120 (96.8)		
Wash hands after toileting				
No	7 (11.3)	2 (3.2)		0.68 – 26.20
Yes	116 (88.7)	122 (96.8)	3.68	
Wash hands with soap after toileting				
Yes	29 (26.1)	75 (62.5)	0.21	0.12 – 0.39
No	82 (73.9)	45 (37.5)		

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Wash hands after toileting				
No	7 (11.3)	2 (3.2)		0.68 – 26.20
Yes	116 (88.7)	122 (96.8)	3.68	
Wash hands with soap after toileting				
Yes	29 (26.1)	75 (62.5)	0.21	0.12 – 0.39
No	82 (73.9)	45 (37.5)		

Laboratory Results



- The 10 stool samples we collected from cholera case patients all tested positive for *Vibrio cholerae*



Environmental Assessment



- Majority of the respondents 93/248(37.5%) source their water from the tap
- In Bauchi LGA, 36% of respondents source their drinking water from well
- In the other LGAs like most rural LGAs in the state, community wells and shallow ponds are the main sources of drinking water
- Characterized by poor environmental sanitation
- Latrine coverage among the respondents was high (91.1%)
 - Pits were shallow, most were close to the well
 - Superstructures of low standard and not kept clean
- The area housed several Islamic schools where students reside in very unhygienic environment and overcrowded rooms
- Refuse disposal was poor with rubbish heaps near dwellings
- Channels of stagnant water were common around residential buildings

Challenges

- Inability to characterize the serotype of the cholera
- Information bias on the risk factors for cholera (recall bias) is a potential limitation of the study

Conclusion

- Contact with a diarrhoea case, being an 'Almajiri' and unhygienic behaviors are major risks factors for the spread of the disease

Public Health Actions



- Communities and Almajiri schools educated on personal and environmental hygiene especially washing of hands
 - Before eating
 - After toilet use
 - After touching or visiting a case
- Communities educated on the treatment of water before drinking
 - Boiling
 - Application of chlorine

Recommendations



- The government of Bauchi state should provide portable water for the communities
- The Health Department should utilize the services of the sanitary inspection officers (Environmental Health Officers)
 - Mobilize the communities to undertake and maintain clean environment including food hygiene
- Hawkers of foods on the street should be trained on personal and food hygiene by the health departments



Acknowledgements

- Nigeria Field Epidemiology and Laboratory Training Programme
- Bauchi State Ministry of Health
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Thank you



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