



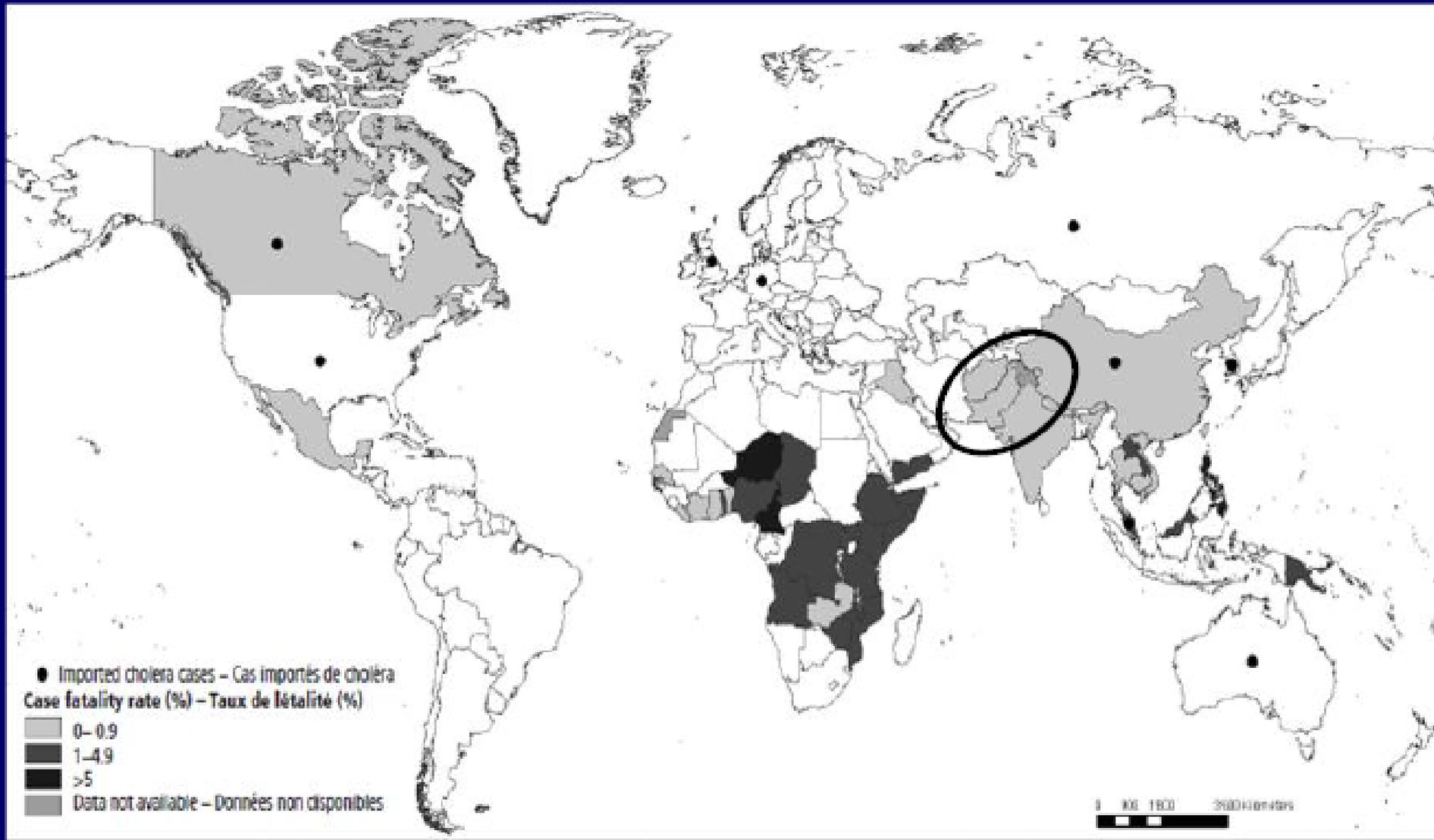
Cholera Outbreak at an Internally Displaced Persons Camp in District Muzaffargarh- Pakistan 2010

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Cholera; a Public Health concern

- ❑ Acute Watery Diarrhea (AWD) caused by Vibrio Cholera, may have high CFR
- ❑ Waterborne disease
- ❑ Contributing factors
 - Limited access to safe drinking water
 - Poor sanitation system

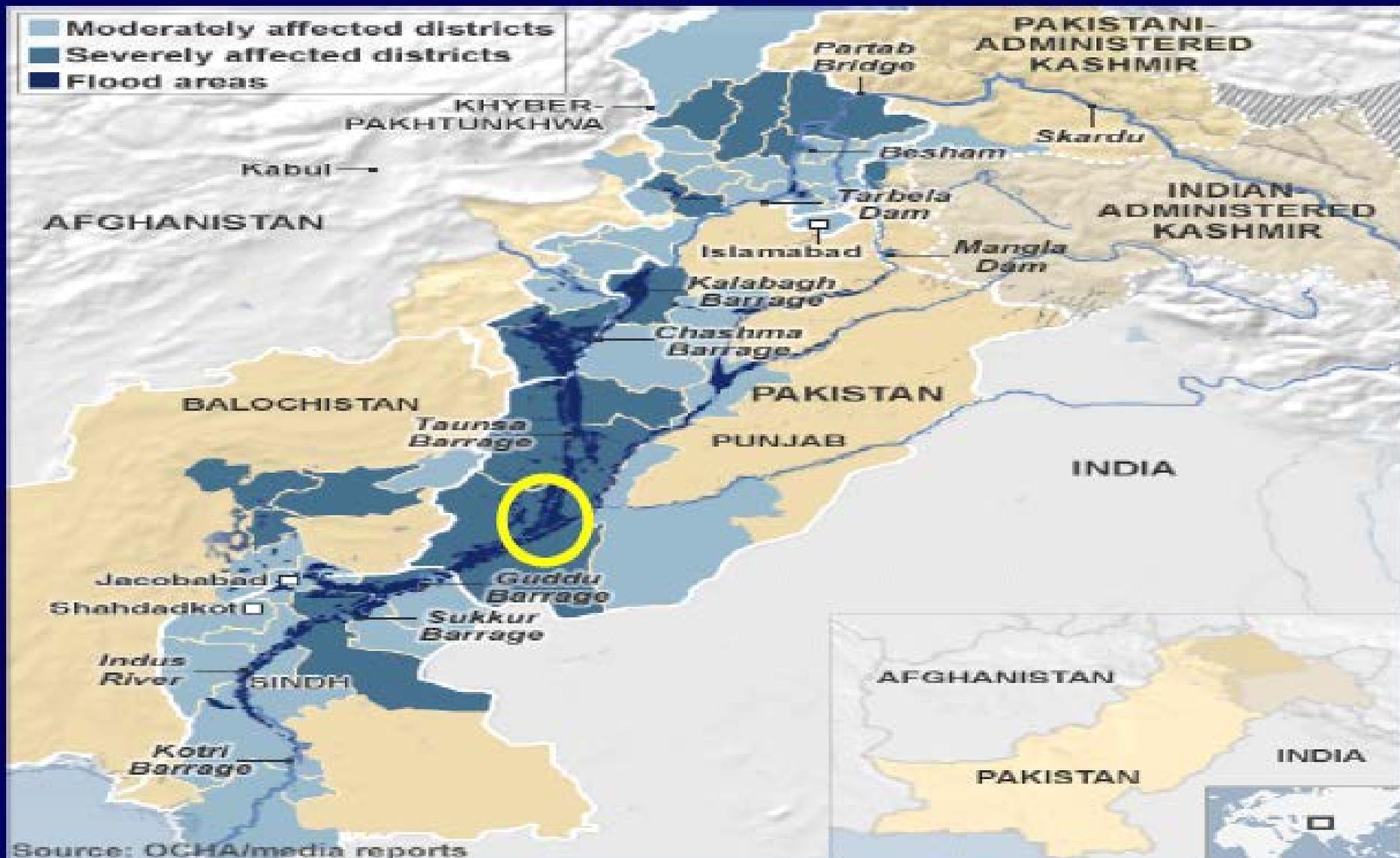
Global Cholera reporting- 2010



Diarrheal disease concerns in Pakistan- 2010

- ❑ **Weak Public Health infrastructure**
 - **Over 100 million lack safe water supply**
 - **Around 50 million lack proper sanitation**
- ❑ **Leading cause of morbidity in children < 5 year**
- ❑ **Lab confirmed Cholera cases; 164**

Historic Floods in Pakistan Aug-2010



The Setting: Muzaffargarh District- Aug-2010

- ❑ 130,000 houses damaged
- ❑ 70% population affected
- ❑ Shelter camps for displaced
- ❑ 25% water samples contaminated
- ❑ Disease Early Warning System established



The Outbreak

- ❑ 7th August 2010, three AWD cases reported
- ❑ Cases from an IDP camp
- ❑ Outbreak investigating team departed on 8th August 2010
 - Pediatrician
 - Epidemiologist (FELTP- Fellow)
 - WHO Surveillance officer
 - Local supporting staff

Objectives

- ❑ **Control the outbreak**
- ❑ **Identify and assess associated risk factors**
- ❑ **Make recommendations to prevent future outbreaks**

Methodology

- Investigation between Aug 8-18, 2010
- Health facility data review & active case finding
- Laboratory and environmental samples
- Case-control study
- Structured questionnaire
- Controls from the same area (1:2)

Case Definition

“ Persons aged five years or above resident of IDP camp Tehsil Ali Pur with two or more watery stools in 24 hours, from August 4 to 18th 2010 ”

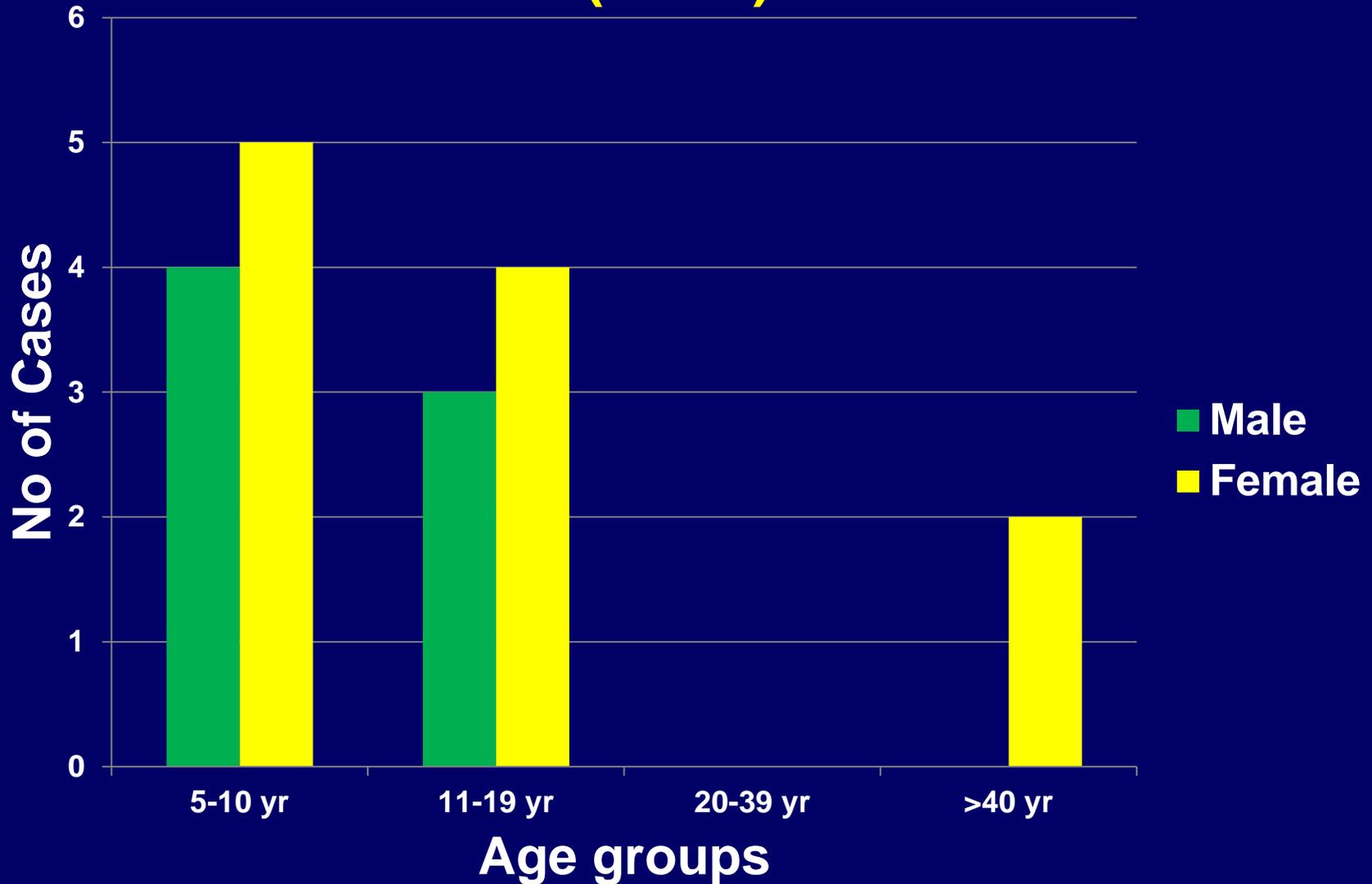
Results

Case Characteristics

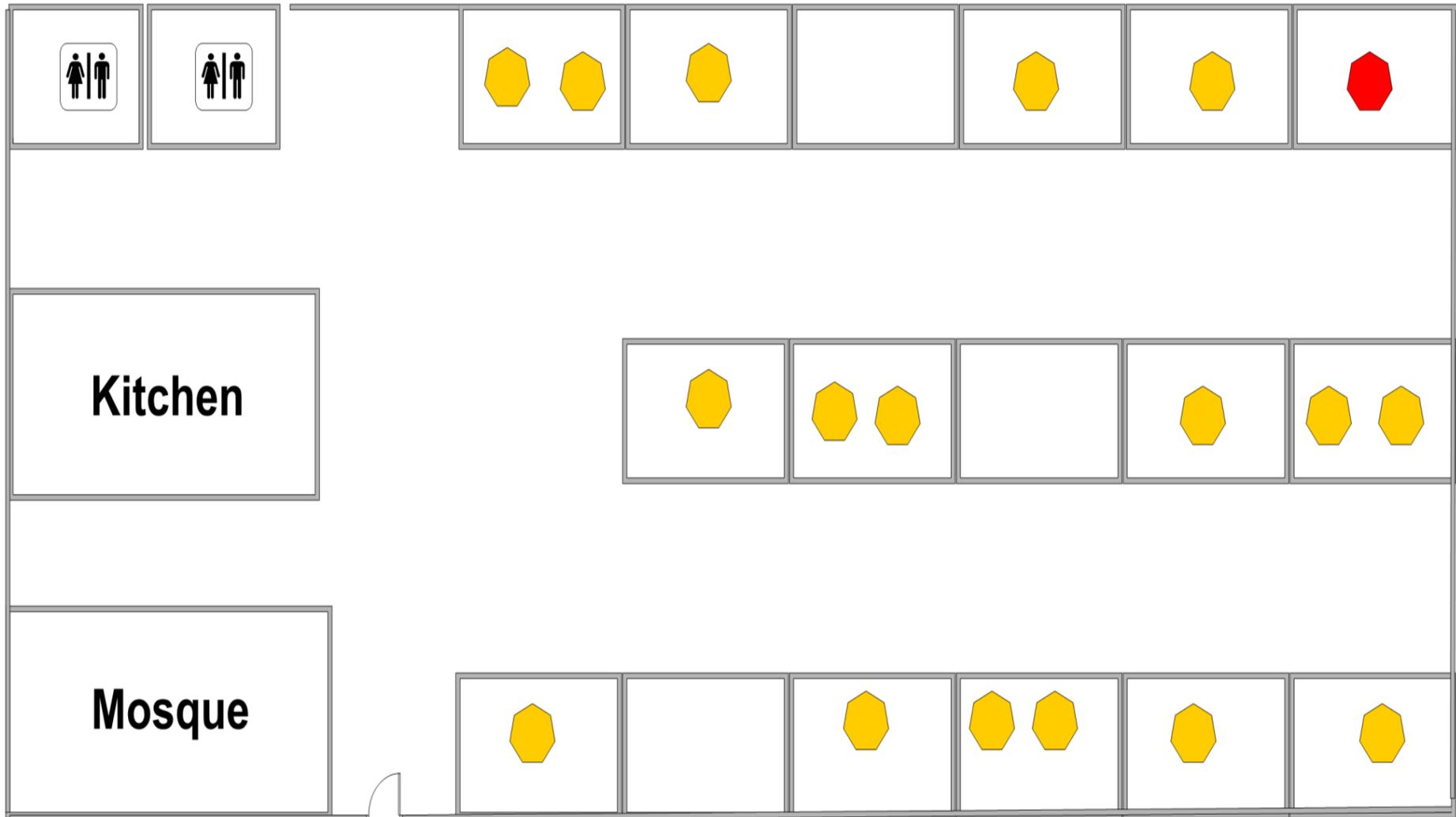
(N=18)

Median age (range)	9 year (5-50)
Male: Female	1:1.5
Severe Dehydration	6 (33%)
Case Fatality Rate (CFR)	1 (5.5%)

Age Distribution of Cases (N=18)



Spot Map of IDP camp



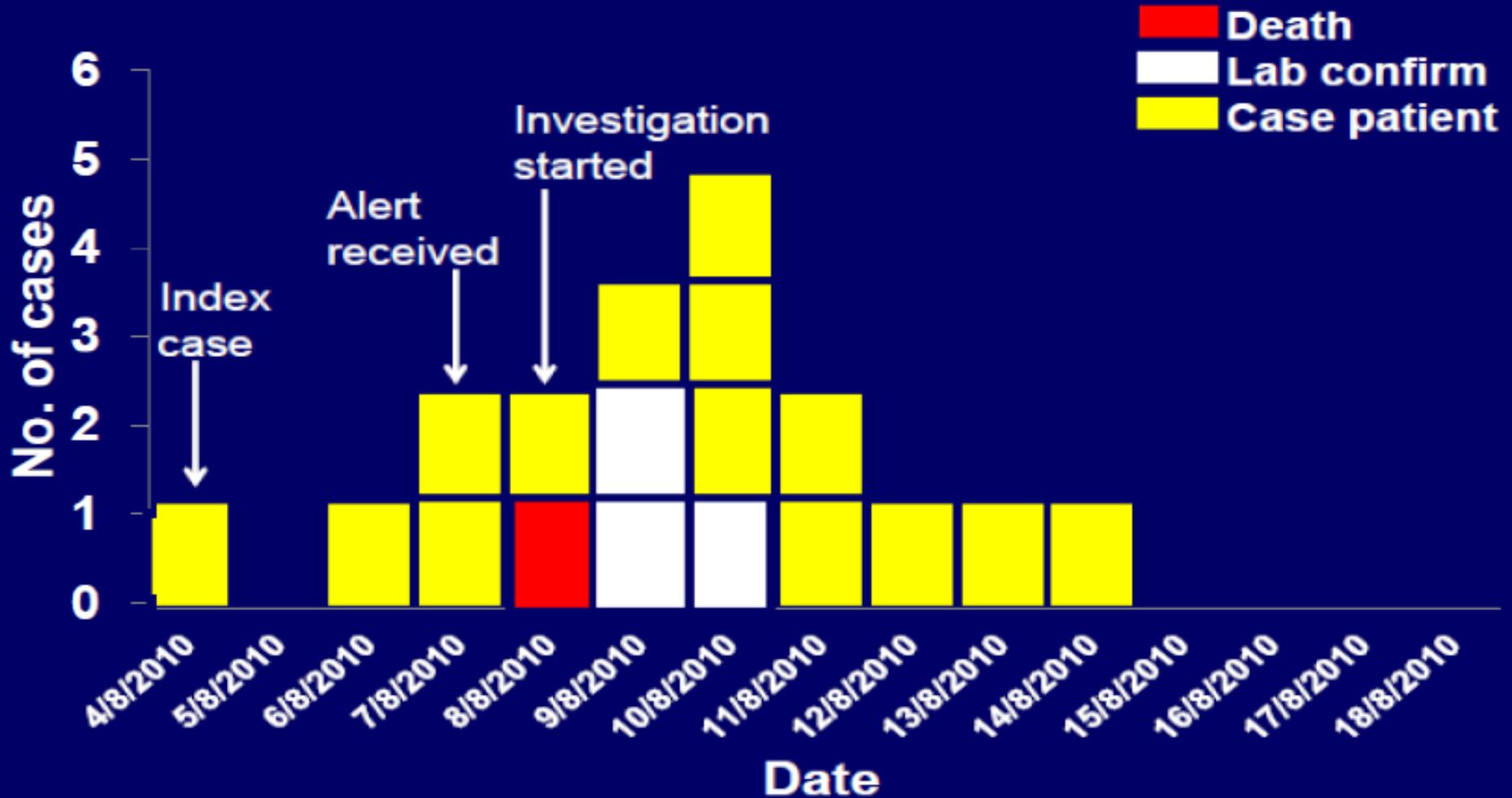
Risk Factors' Association

Attributes	Cases (18)	Controls (36)	Odds Ratio	95% CI
Bread	11	14	10.18	2.08-56.67
Rice	10	21	0.95	0.29-3.1
Milk	4	14	0.45	0.10-1.6
Tap water	6	20	0.4	0.12-1.3

Risk Factors' Association

- Bread consumption showed significant association with the disease (*OR 10.18; 95% CI 2.08-56.67; $p < 0.05$*)
- Poor hand washing practices among bread handlers showed independent statistical association with the disease (*OR 31.5; 95% CI 1.7-1364; $p < 0.05$*)

Epi Curve



Laboratory results & Environmental aspects

- 3 stool samples positive for *Vibrio cholerae* O1, biotype *ElTor*, serotype *Ogawa*
- Drinking water samples found satisfactory for human consumption

Study Limitations

- IDP's high turn over rate may be a cause of underestimation of cases
- Poor resources and area under water limited study scope to IDP camp
- Potential information bias could not be ruled out

Recommendations

- **Education sessions for safe food handling and hand washing practice**
- **Distribution of ORS and Aquatabs**
- **Referral of severely dehydrated cases**
- **Diarrhea treatment center establishment at the health facility**

Study Impact

- Provincial health department Punjab and WHO established a Diarrhea Treatment Center (DTC) at this health facility
- Hygiene-care education campaigns started
- Drinking water checked periodically





THANKS

Acknowledgments

- District and Provincial WHO staff
- Local and District Health Department
- National Institute of Health (NIH) Islamabad
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- Executive District Officer Health, Muzafar Garh
- Dr. Mirza Amir Baig
- Dr. Jamil Ansari
- Dr. Tamkeen
- Dr. Rana Safdar
- Dr. Salman Ahmad
- Dr. Rana Jawad Asghar
- Dr. Bargees Mazhar Kazi

Laboratory Test

- Stool samples in wide mouth screw cap bottle
- Samples transported in Cary-Blair transport medium to laboratory
- Stool samples analyzed for *salmonella*, *Shigella* and *Vibrio cholera*
- Samples processed through conventional culture methods
- Antimicrobial susceptibility checked through disc diffusion method