An outbreak of Cholera caused by an unprotected well, Parbatia, Orissa, India, 2003

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How common is El tor cholera in the state of Orissa, India?

- El-tor Cholera less severe than classical cholera
- Clusters of diarrhea common in Orissa
- No laboratory investigation for most clusters of diarrhea
- El-tor Cholera may be unrecognized in Orissa

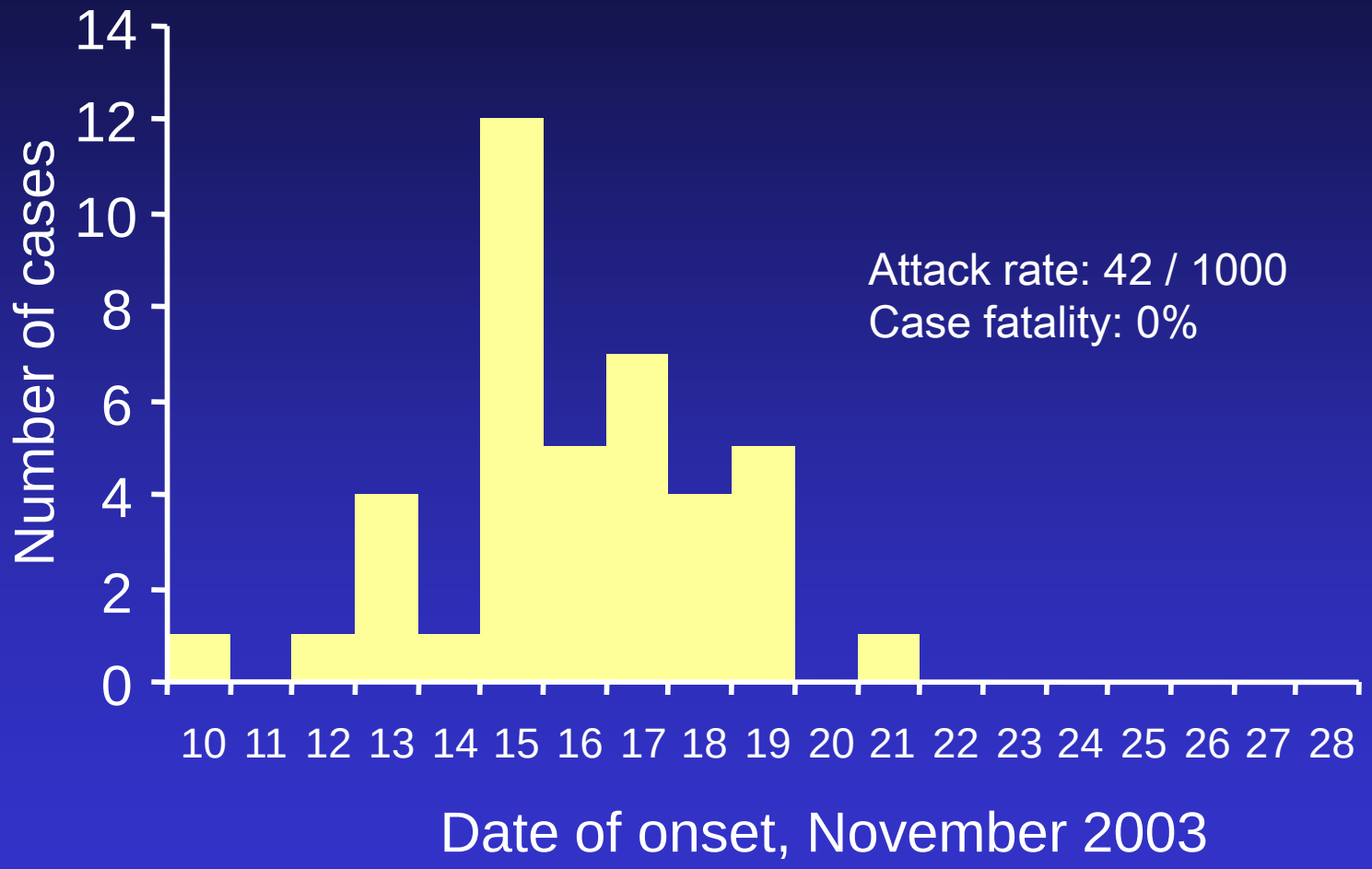
A cluster of diarrhea, Parbatia, Orissa, India, November 2003

- 14 November 2003:
  - Report of a cluster of diarrhea by a primary care center
- 15 November 2003:
  - Investigation initiated
  - Team in the village in the morning

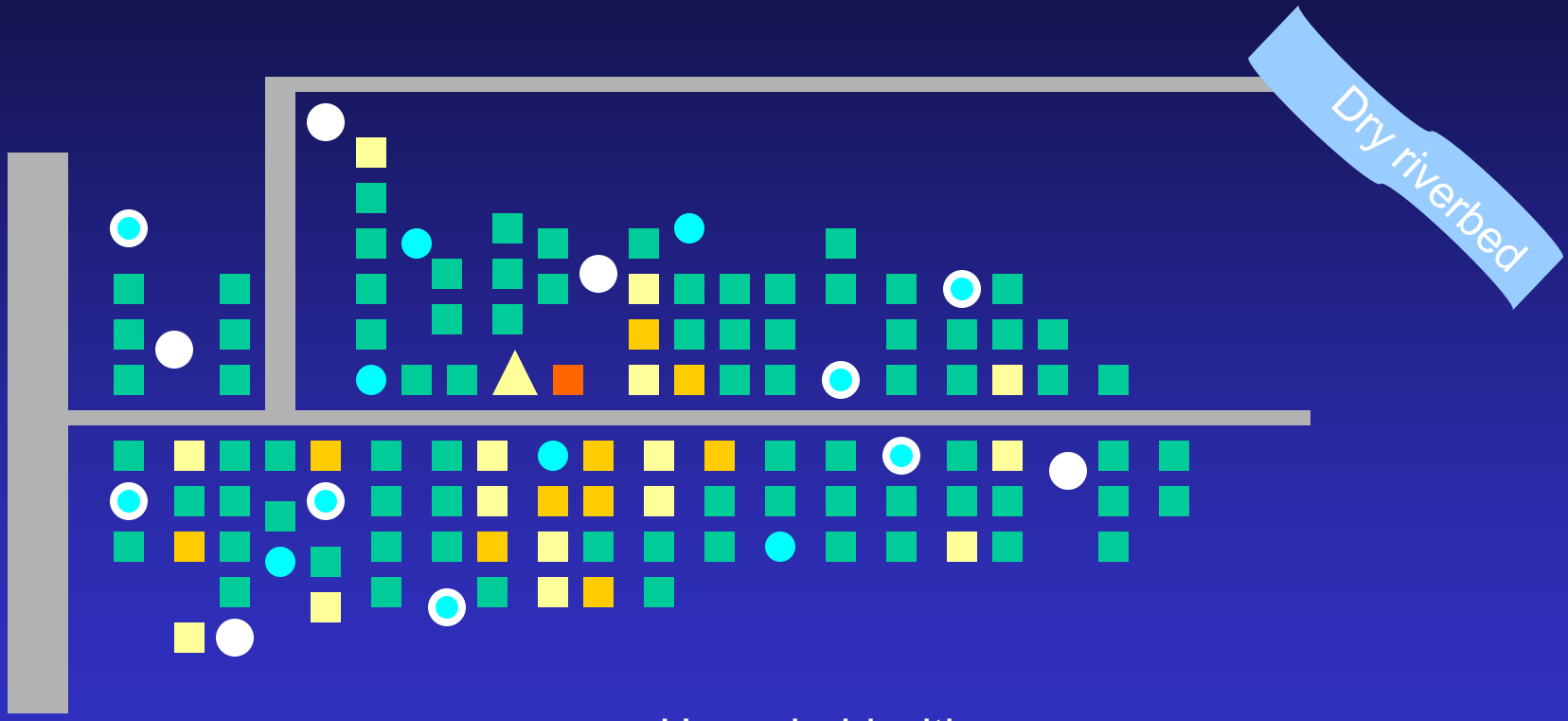
Initial investigations, diarrhea outbreak, Parbatia, Orissa, India, November 2003

- Descriptive epidemiology
  - Case search using adapted WHO definition for cholera
  - Preparation of epidemic curve and spot map
  - Calculation of attack rates
- Laboratory investigations
  - Collection of rectal swabs
  - Cultures
    (Regional Medical Research Center, State capital)

Cases of diarrhea by date of onset, Parbatia, Orissa, India, November 2003



Distribution of diarrhea cases by households, Parbatia, Orissa, India, 2003



Case control study methods, diarrhea outbreak, Parbatia, Orissa, India, 2003

- Generation of hypothesis
  - Unprotected well as potential source of the outbreak
- Case-control study
  - 40 cases and 80 matched controls
- Matching criteria
  - Neighborhoods
  - Age (+/-2 years)
  - Sex
  - Socio economical condition

Number of sets according to cases and controls exposure status, diarrhea outbreak, Parbatia, Orissa, India, 2003

Case	# exposed controls	# of sets	# of discordant pairs per set	# of discordant pairs	Total # of discordant pairs	Odds ratio
Exposed	1	4	1	4	36	36 / 3 =12 (95% CI: 1.2-44)
	0	16	2	32		
Non Exposed	2	1	2	2	3	
	1	1	1	1		
Concordant sets		18	0	0	0	-

Well suspected to have caused the diarrhea outbreak, Parbatia, Orissa, India, 2003

Absence of brims

Absence of platform

Laboratory investigations, rectal swabs, diarrhea outbreak, Parbatia, Orissa, India

- Absence of transport media at the district
- One day delay to obtain transport media from state capital
- Four samples out of six positive for Vibrio cholerae El-tor 01 Ogawa
- Response from the laboratory after one month

Conclusion

- An unprotected well spread cholera in Parbatia
- The lack of transport media in the district laboratory lead to delay in the diagnosis
- Other similar outbreaks may occur unrecognized because of a failure to seek laboratory diagnosis during diarrhea outbreaks that are common in Orissa

Recommendations

- Protect wells used for drinking water
  - Brims
  - Platform
- Make transport media available in district laboratories
- Seek laboratory diagnosis for all clusters of watery diarrhea

The well that caused the cholera outbreak in Parbatia, April 2004

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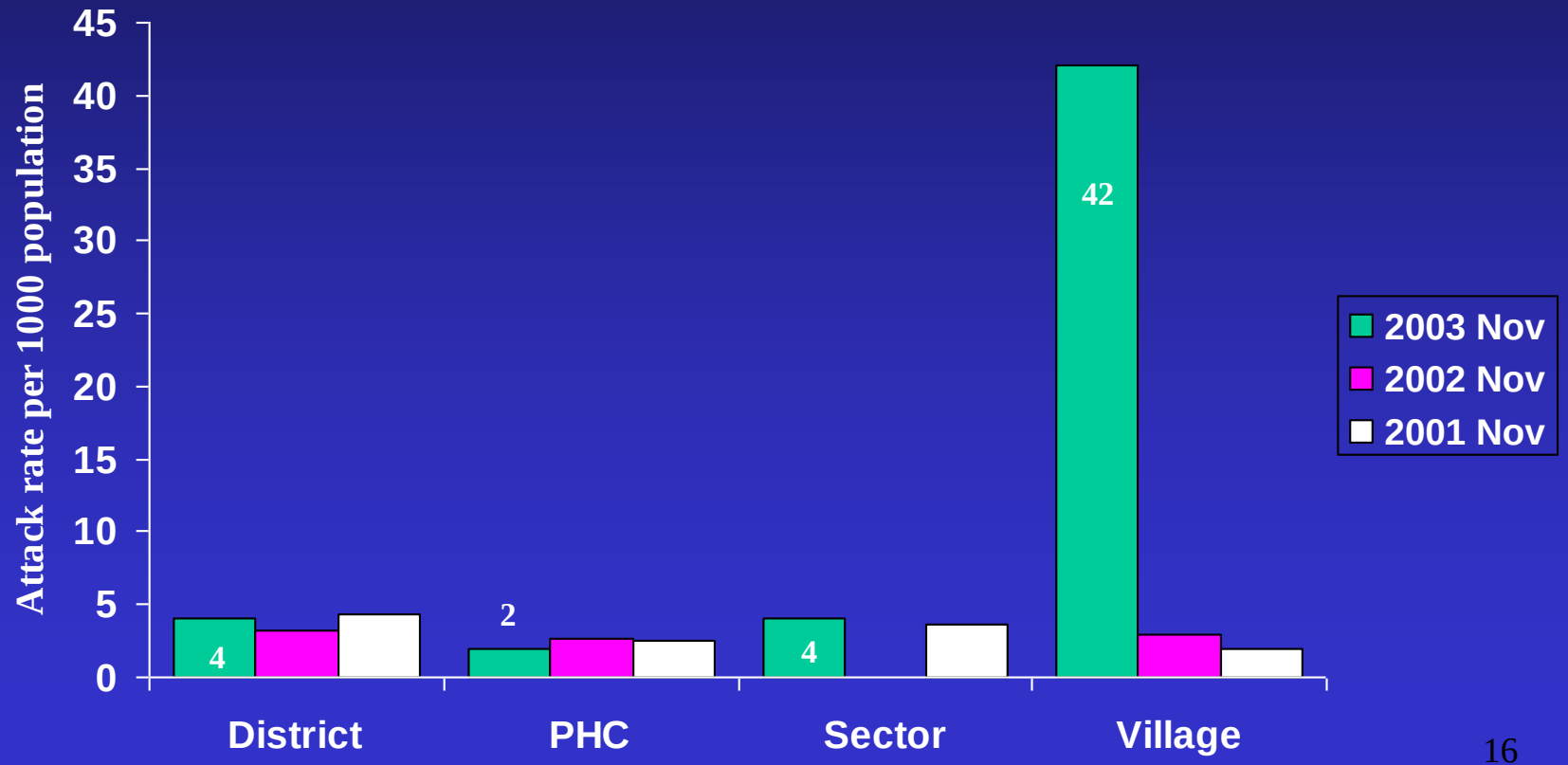
- Staffs of Shankarpur Primary Health Centre

Thank you

Conformation of the Outbreak in the village Parbatia, Orissa State, November 2003

Attack Rates of diarrhea in the District, PHC, Sector and Village Parbatia during the month of November 2001, 2002 & 2003



Matched Case-Control study of Cholera in Parbatia village, in detail.

	1		2		3	
	Case	Control	Case	Control	Case	Control
Exposure						
+	1	2	1	1	1	0
-	0	0	0	1	0	2
	Outcome (+ + +) Frequency (n_0) = 8		Outcome (+ + -) Frequency (n_1+n_2) =4		Outcome (+ - -) Frequency (n_3)= 16	

	4		5		6	
	Case	Control	Case	Control	Case	Control
Exposure						
+	0	2	0	1	0	0
-	1	0	1	1	1	2
	Outcome (- + +) Frequency (n_4) = 1		Outcome (- - +) Frequency (n_5+n_6) =1		Outcome (- - -) Frequency (n_7)= 10	

Frequency of the different Outcome sets

Outcome	Frequency	Outcome	Frequency
+ + +	8 (n_0)	- + +	1 (n_4)
+ + - + - +	4 ($n_1 + n_2$)	- + - - - +	1 ($n_5 + n_6$)
+ - -	16 (n_3)	- - -	10 (n_7)

Calculation of M H Odds Ratio

- MH Odds Ratio = $(n_1 + n_2 + 2n_3) / (2n_4 + n_5 + n_6)$
- MH Odds Ratio = (4 + 32) / (2 + 1) = 12

- $N_1 = (n_1 + n_2 + 2(n_3 - n_4) - (n_5 + n_6)) / 3$
- $N_2 = 2 (n_1 + n_2 + n_3 + n_4 + n_5 + n_6) / 9$
- $X^2_{mh} = (|N_1| - ½)^2 / N_2$

Other public wells, Platform constructed after the Outbreak

Platform of a tube well constructed after the outbreak