

# Pertussis Outbreak Investigation in Rural Village, Madhya Pradesh, India, September 2022

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13 September 2023

# Background

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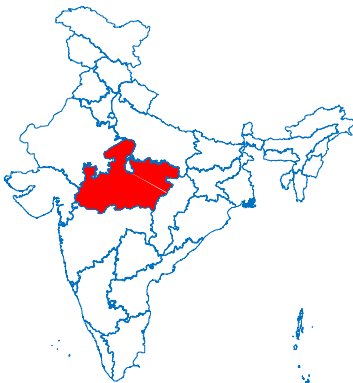
- **Pertussis: highly contagious bacterial respiratory disease**
- **Vaccine preventable**
- **Pertussis cases 2020\***
  - **Global** >69,000
  - **Southeast Asia region (SEAR)** 12,700 (18% of global)
  - **India** 12,500 (98% of SEAR)



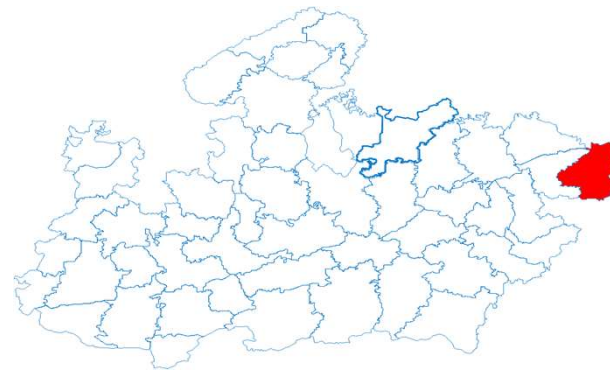
# Outbreak Detection and Response

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- **13 September 2022: suspect pertussis cases from tribal village of Singrauli district, Madhya Pradesh**
- **26 September 2022: Epidemic Response Team (ERT) activated, Field Epidemiology Training Programme (FETP) officer joined the investigation**



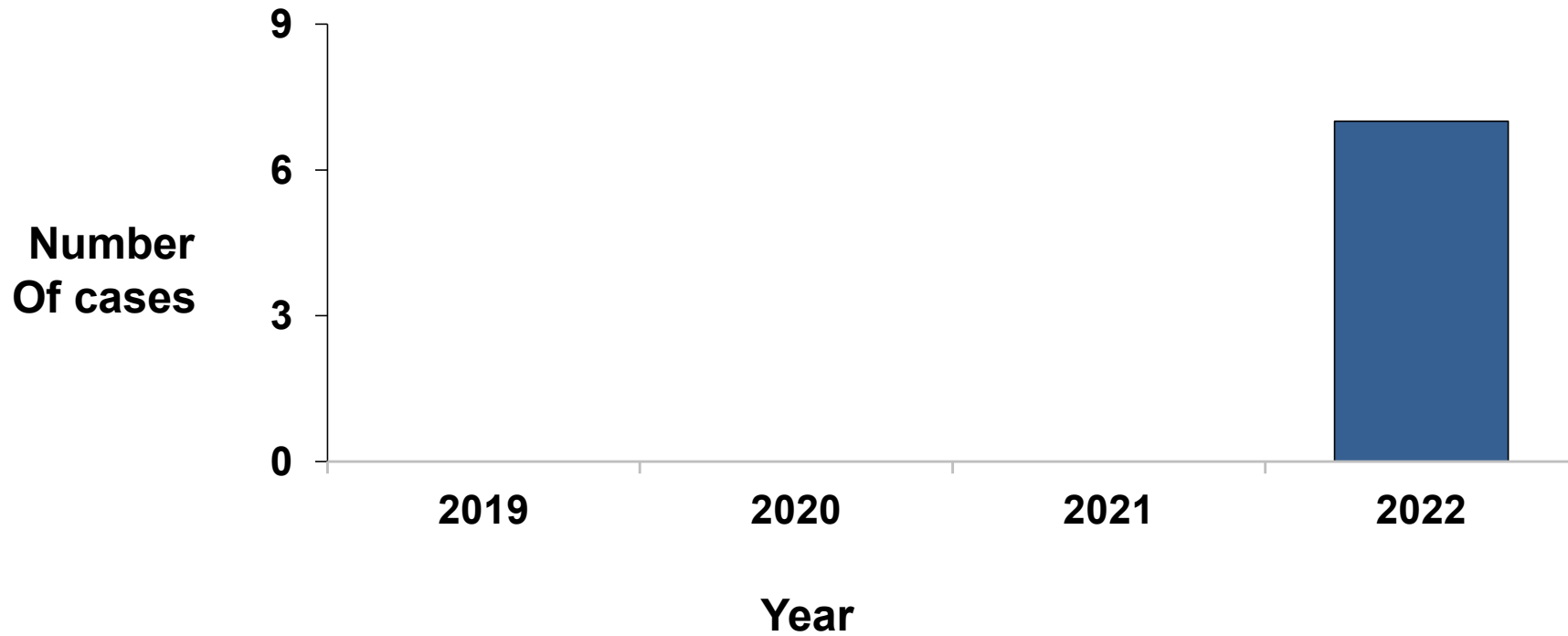
Madhya Pradesh, India



District Singrauli, Madhya Pradesh



# Outbreak Confirmation



## Objectives

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- Describe the epidemiology in terms of time, place and person
- Provide evidence-based recommendations for prevention and control



## Operational Definitions

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- **Suspect case:** cough of at least 2 weeks duration with paroxysm of coughing or inspiratory whooping or post tussive vomiting in a resident of Parihasi village, Singrauli district between 1 June–26 October 2022
- **Confirmed case:** suspect case with detection for *Bordetella pertussis* by polymerase chain reaction or IgG ELISA serology
- **Contact:** close exposure with a confirmed case, three weeks prior to cough onset



## Case Search

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- **Passive surveillance**
  - **Review of hospital records: outpatient and inpatient**
  - **Weekly surveillance report of vaccine preventable disease**
- **Active surveillance: house-to-house survey in the village**

- **Cases interviewed using case investigation form**
  - Demographics
  - Clinical presentation
  - Vaccination status
  
- **Rapid assessment of DPT3 coverage**
  - Survey questionnaire
  - Age: 1-15 years
  - Child selection: youngest child in the household



## Methods

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- **Data analysis: frequency, proportions**
- **Sample collected: nasopharyngeal swab and serum**



## Descriptive Epidemiology

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<b>Population of village</b>	<b>473</b>
<b>Suspect cases</b>	<b>22</b>
<b>Confirmed cases</b>	<b>2</b>
<b>Median age (range) years</b>	<b>6 (10 months–53 years)</b>
<b>Female (%)</b>	<b>13 (59)</b>
<b>Attack rate</b>	<b>4.6% (22/473)</b>
<b>Death (case fatality rate)</b>	<b>1 (4.5%)</b>
<b>Hospitalized</b>	<b>6 (27%)</b>
<b>Contacts identified</b>	<b>66</b>



## Age Distribution of Pertussis Cases, Parihasi Village, June–October 2022 (N=22)

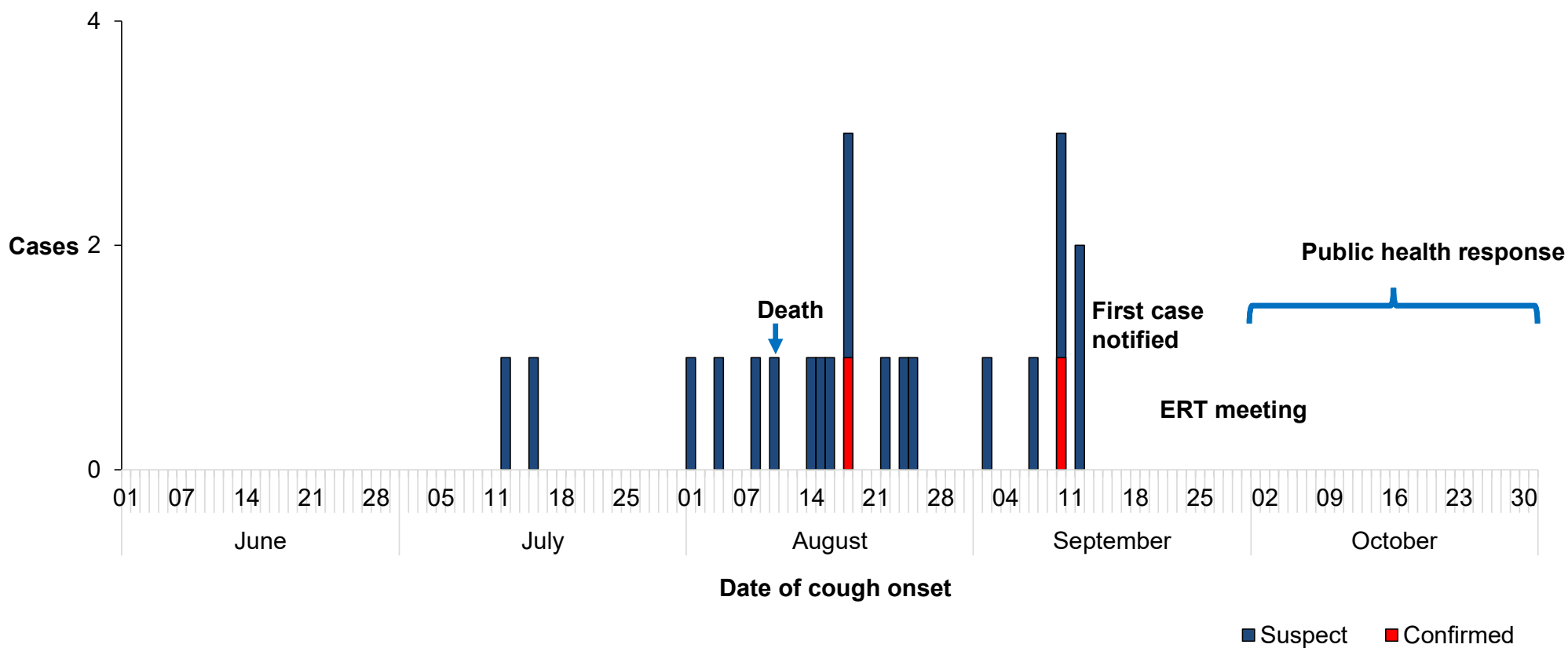
Age category, years	n	(%)
<1	1	(5)
1–4	9	(41)
5–9	7	(32)
10–15	2	(9)
>15	3	(14)

## Clinical Presentation of Pertussis Cases, Parihasi Village, June–October 2022 (N=22)

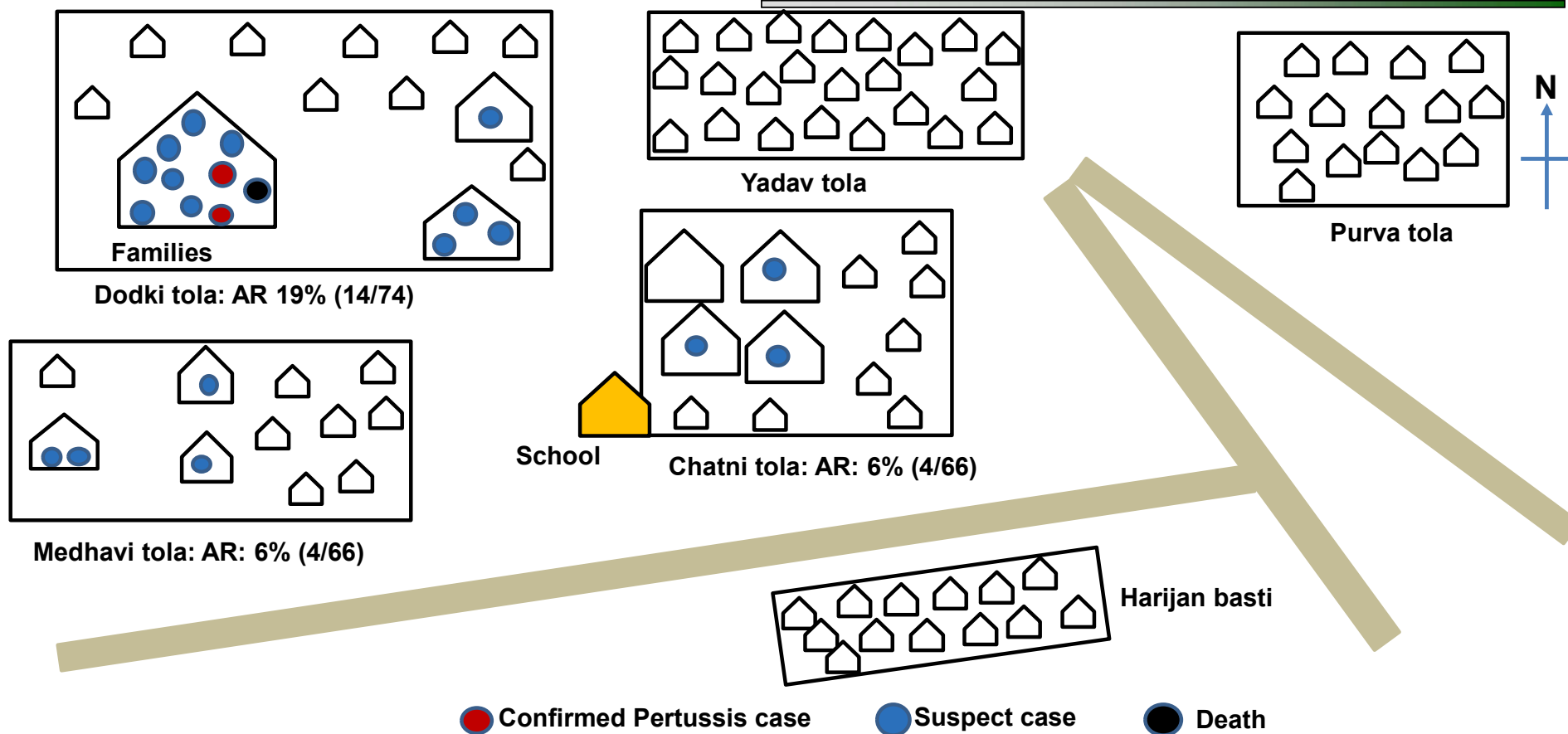
Variable		n	(%)
Symptom	Cough	22	(100)
	Paroxysms of cough	22	(100)
	Post-tussive vomiting	21	(95)
	Inspiratory whoop	10	(45)
Complication	Seizure	1	(5)
	Sub-conjunctival hemorrhage	1	(5)



# Distribution of Pertussis cases, Parihasi Village, June–October 2022 (N=22)



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## Vaccination status in Pertussis cases, Parihasi Village, June–October 2022 (N=22)

Variables	Category	n/N	(%)
Diphtheria, Pertussis, Tetanus containing vaccine	1 dose	9/22	(41)
	2 dose	8/22	(36)
	3 dose	8/22	(36)
	4 dose	4/20	(20)
	5 dose	0/12	(0)
Source of information	MCP <sup>#</sup> card	1/22	(5)
	Health worker record	6/22	(27)
	Recall	15/22	(68)



## Rapid Assessment of DPT 3 in Surveyed Houses, Parihasi Village (N=54)

Received 3 doses of DPT vaccine	Number	(%)
Yes	30	(56)
No	09	(16)
Unknown	15	(28)





## Conclusion

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- **A laboratory confirmed pertussis outbreak in a rural setting with poor vaccination coverage**
- **Delay in case identification and notification through existing surveillance system**
- **More than three quarter of the cases were under the age of 10 years**
- **Most affected part of the village was Dodki tola with likely transmission in family members**
- **Death in case who sought care from an unqualified practitioner**



## Public Health Action

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- **Catchup routine immunization sessions (5) conducted at the village**
- **Children vaccinated 19**
- **Contact traced (66) and antibiotic prophylaxis given**
- **Oriented the front-line worker for suspect identification**
- **Information, education and communication (IEC) for pertussis in the village and the school**
- **Community awareness for appropriate health seeking behavior**



## Recommendations

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- **District to ensure tracking of due children for vaccination**
- **District to continue training for health workers every 6 months for early case detection and reporting**
- **District to review the surveillance data for early outbreak flagging and response**



# Glimpse of Public Health Intervention



Active case search in the village



Prophylactic dose of antibiotics to close contacts



Catchup routine immunization sessions



Case management



# Acknowledgement

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- **All residents of Parihasi village who supported and participated in outbreak investigation**
- **Department of Health and Family welfare, District Singrauli, Madhya Pradesh**
- **Mentor**
- **Basic Epidemiology Training Program Team, WHO Country office for India, New Delhi and CDC India**



**Thank you**

