

An outbreak of hepatitis E in three villages of Bhimtal block, Uttarakhand, India, 2005



FETP India

Steps of an outbreak investigation

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2. Confirm the diagnosis
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4. Search for cases
5. Generate hypotheses using descriptive findings
6. Test hypotheses based upon an analytical study
7. Draw conclusions
8. Compare the hypothesis with established facts
9. Communicate findings
10. Execute prevention measures

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Counting cases

Determining that there is an outbreak of acute hepatitis in Bhimtal block, Uttaranchal, India, July 2005

- Community leaders alerted FETP scholar
- 50 cases of jaundice in the primary health centre in July 2005
 - Normally, 1 or 2 cases per month
- Most patients resided in three villages
 - Mehragaon
 - Dov
 - Chauriagaon
- No change in surveillance
- No population movements



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Confirming the diagnosis of hepatitis E in Bhimtal block, Uttarakhand, India, July 2005

- Clinical picture
 - Typical of acute hepatitis
- Laboratory
 - Serum samples sent to the National Institute of Virology (NIV), Pune, India
 - Presence of hepatitis E virus (HEV) IgM in 21 of 23 serum samples

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Case definition for the Bhimtal hepatitis E outbreak, Uttarakhand, India, July 2005

Acute jaundice (yellow sclera/skin), dark urine, loss of appetite, pain abdomen and fatigue in a person from any of the three villages since May 2005

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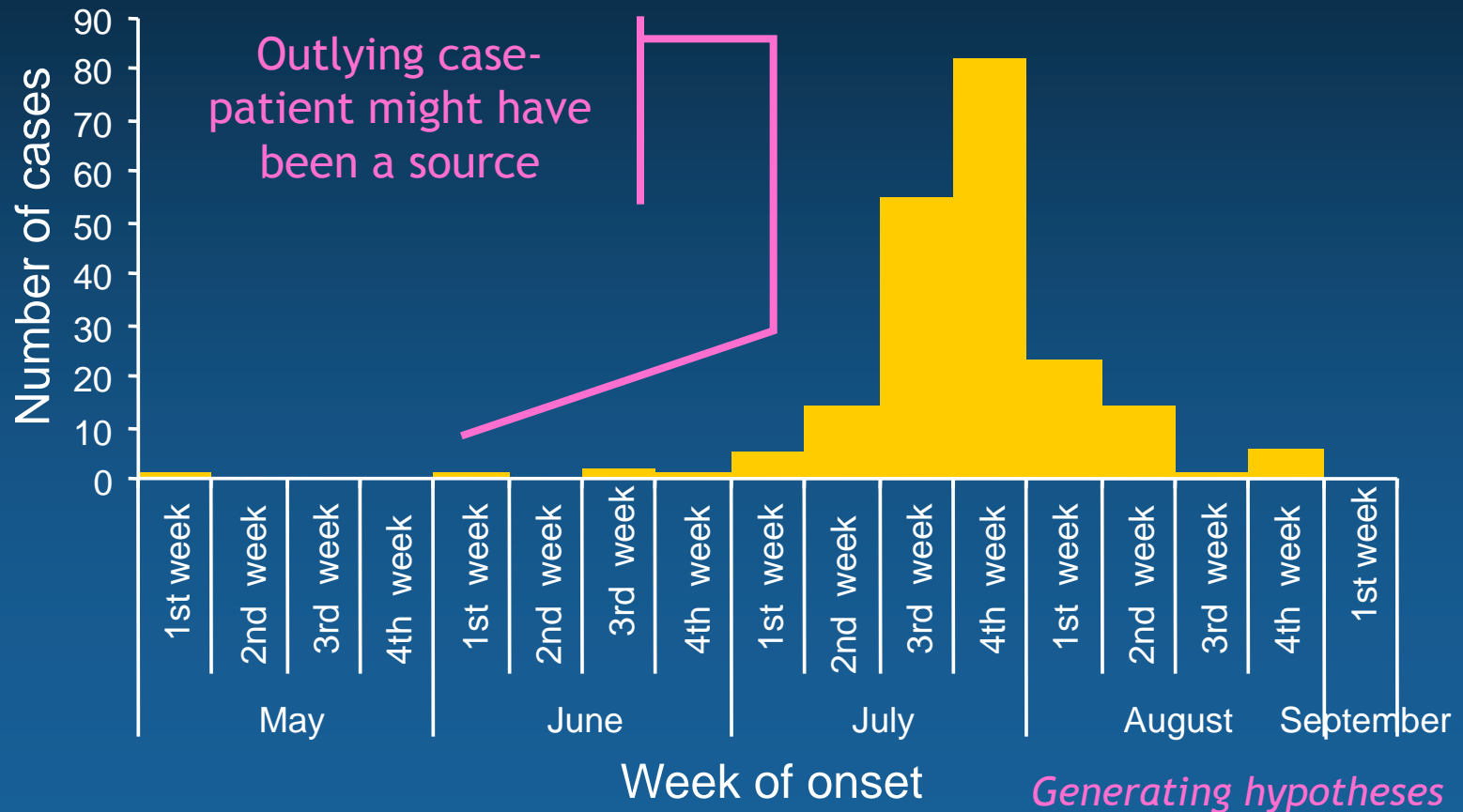
Searching for cases of acute hepatitis in 3 villages of Bhimtal block, Uttarakhand, India, July 2005

- Methods:
 - Active case search in the villages
- Results:
 - 205 cases among 1,238 population
 - Attack rate 16%
 - No death

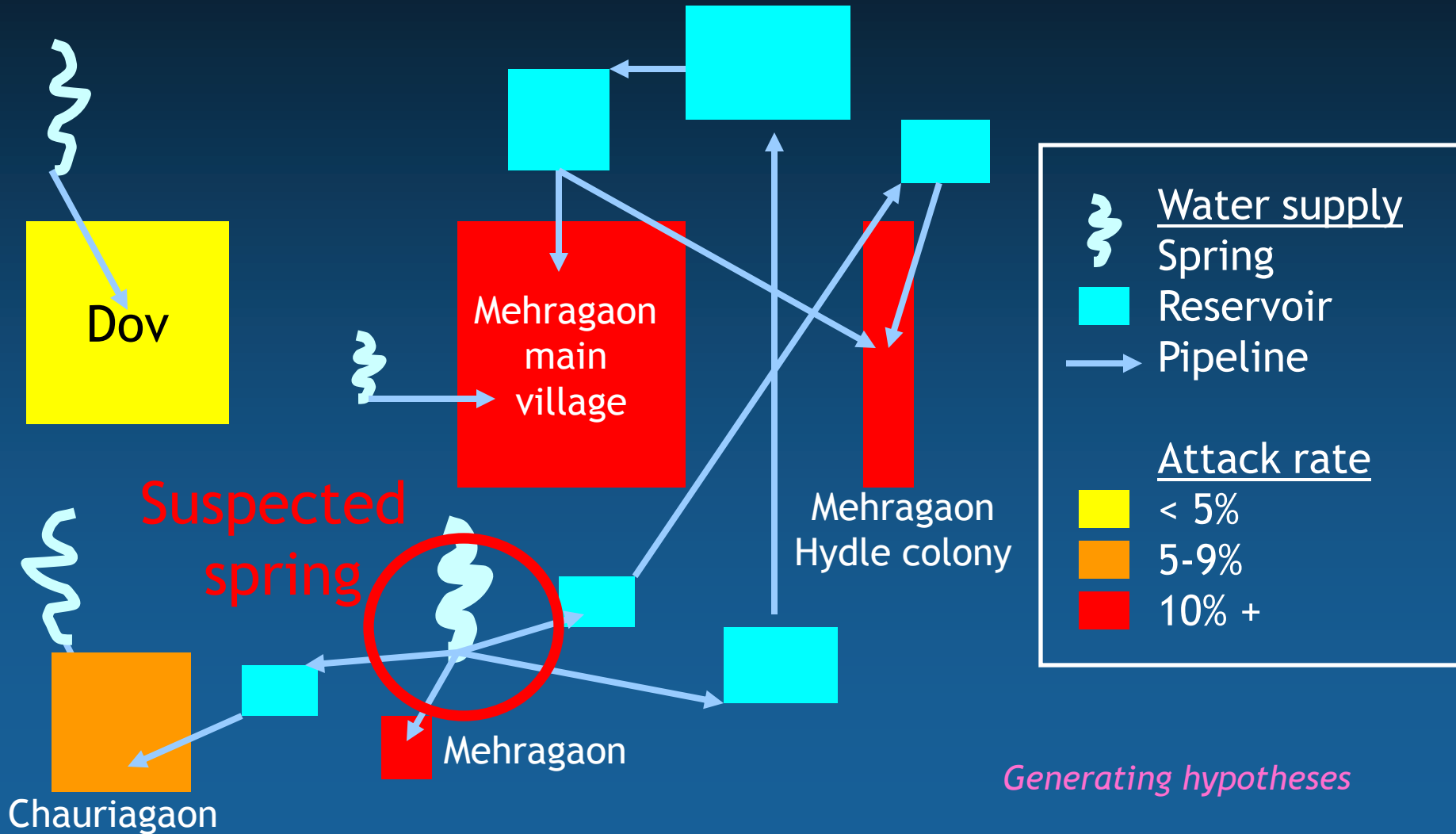
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TIME: Acute hepatitis by week of onset in 3 villages, Bhimtal block, Uttaranchal, India, July 2005



PLACE: Incidence of acute hepatitis by source of water supply, Bhimtal block, Uttarakhand, India, July 2005



Step 5: PERSON: Incidence of acute hepatitis by age and sex in 3 villages, Bhimtal block, Uttaranchal, India, July 2005

		Population	Cases	Attack rate
Age (Years)	0-4	105	2	2%
	5-9	110	4	4%
	10-14	134	23	17%
	15-44	729	139	19%
	45+	261	37	14%
Sex	Male	724	115	16%
	Female	514	90	17%
Total		1238	205	16%

Generating hypotheses

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Cohort to estimate the risk of hepatitis by water supply, Mehragaon village, Uttaranchal, India, July 2005

		Cases	Total	Incidence	Relative risk (95% C. I.)
Use of water from suspected spring to drink	No	12	143	9.2%	Reference
	Partially	13	94	13.8%	1.6 (0.8-3.4)
	Exclusively	152	529	28.7%	3.4 (2.0-6.0)

C.I.: Confidence interval

Testing hypotheses

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Conclusions of acute hepatitis outbreak investigation, Bhimtal block, Uttaranchal, India, July 2005

- An outbreak of hepatitis E affecting three villages in Bhimtal block was reported directly by the public
- A spring may have been the source of infection

Removing the pump handle

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Investigation of the implicated spring, Mehrugaon, Uttarakhand, India, July 2005

Non-covered spring

Unprotected area



- Unprotected area
- Spring not covered
- Stone bed filtration
- No chlorination
- Index case-patient lived and defecated in the area of the spring
- Open water tanks

Stone filtration bed

Capture of the spring

Removing the pump handle

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Recommendations following hepatitis outbreak investigation, Bhimtal block, Uttarakhand, India, July 2005

- Strengthen surveillance for outbreaks
- Enforce treatment standards for spring water used as source of water supply:
 - Protect catchment areas
 - Cover springs
 - Ensure proper sand filtration
 - Chlorinate supply before distribution
- Promote adequate sanitation in the areas located next to springs used as water supply

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Actions taken following hepatitis outbreak investigation, Bhimtal block, Uttarakhand, India, July 2005

- Management of case-patients
- Coordination with water supply department to ensure safe water supply
- Chlorination of the water supply
- Cleaning of the spring area
- Closure of open water tanks, repair of leaks

Removing the pump handle