ROBERT KOCH INSTITUT

...WITHIN THE PORTFOLIO OF THE DEPT. OF HEALTH

Hepatitis A outbreak among European travelers returning from Egypt

by

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on behalf of

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Epidemiology of Hepatitis A in Germany

- Notifiable disease
  - Incidence 1.5 / 100.000 (2005/2006)
  - Highest incidence in children 5-9 years
  - Notifications peak after summer holidays

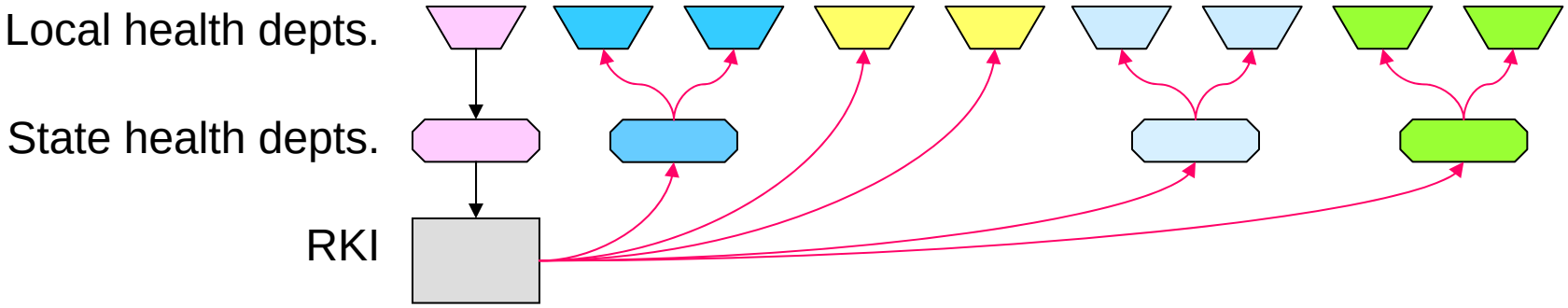
- 40% travel associated

  60% acquired in Germany

- Vaccination:
  - Not universally recommended, but for
    - Risk groups (e.g. contacts, occupational or individual risk)
    - Travelers to endemic areas
  - Travelers often not adequately informed and vaccinated

Identification of the outbreak

- Local health dept. noticed 4 cases, all guests of the same hotel in Hurghada, Egypt (Aug 13th, 2004)
- Hotel did not know – disease onsets after departure
- RKI => information of all local health depts.



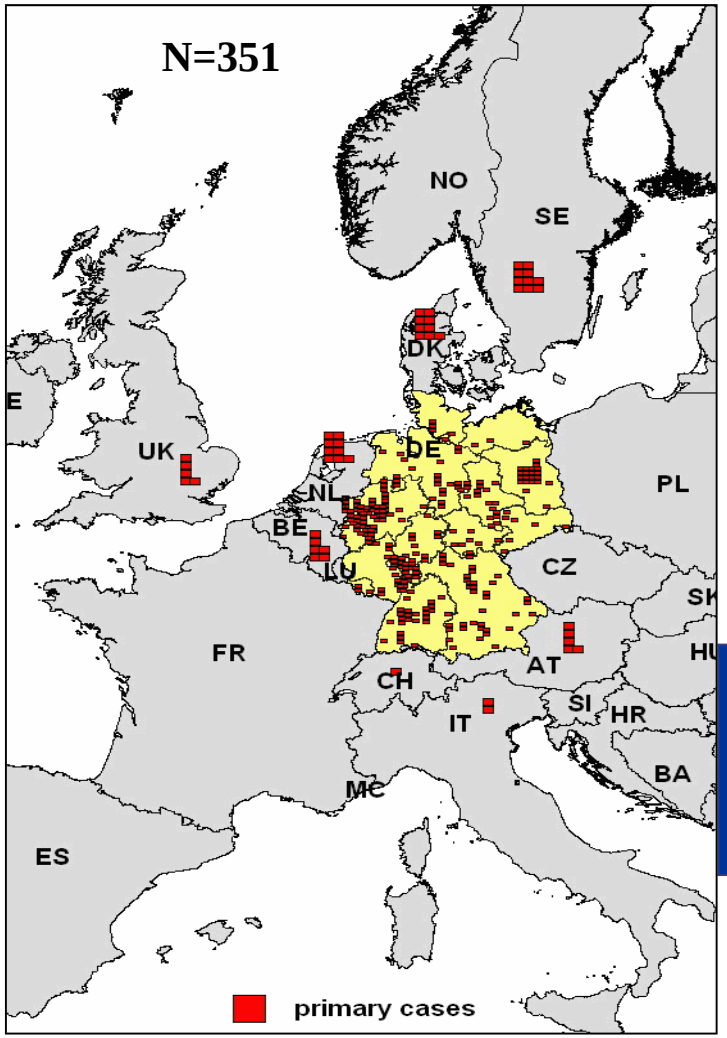
- Case numbers rose exponentially within days

Extent of the outbreak: 351 cases in 9 countries

- Germany:
  - 271 primary cases, guests of hotel X
    - age: 2-67 years, median 34 years
    - 54% male
  - 7 secondary cases, persons who had not traveled but were infected in Germany by guests of hotel X

- Elsewhere in Europe

  (A, S, DK, NL, B, I, CH, GB):
  - 60 primary cases
  - Secondary outbreak with 13 cases in Austria

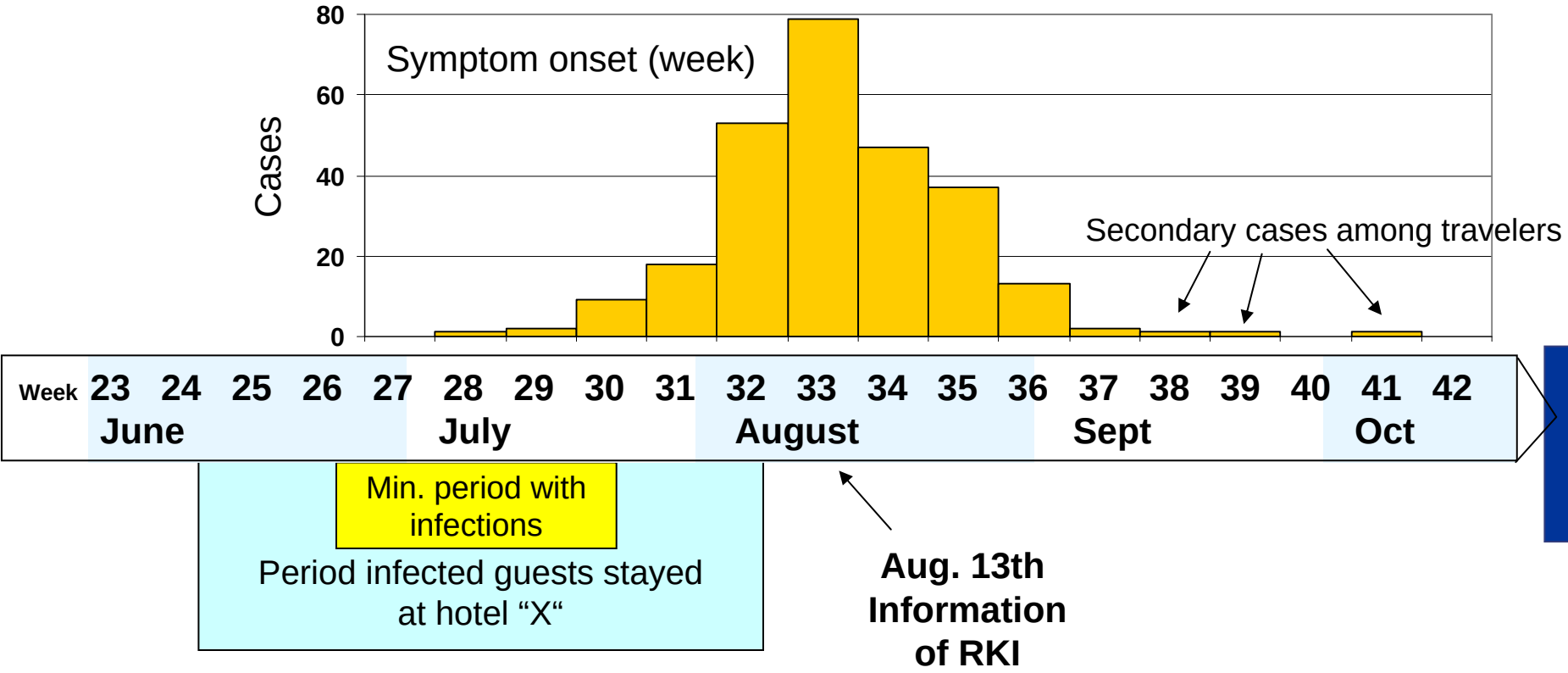


Outbreak setting

- Egypt highly endemic for hepatitis A
- Hurghada – Red Sea resort
  - Hotel employees from Nile valley
  - Supplies (foods etc.) basically all transported in
- Hotel X:
  - ‘all-inclusive’ hotel, 550 rooms
  - pools, beach access
  - 2 breakfast rooms, 3 restaurants, 5 bars
  - good reviews, many returning guests

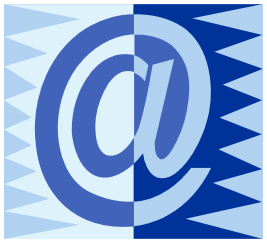
Timing of the outbreak

- Infected guests in hotel: June 9th to August 6th
- Min. period with infections: June 24th to July 23rd
- Symptom onset: July 10th to September 8th



Measures and investigation

- Information about the outbreak:
  - Hotel and Egyptian government
  - Other countries possibly affected
  - Hotel guests, the public



- Egypt:
  - Serological examination of the hotel‘s employees
  - Hepatitis A vaccination offered to current hotel guests
  - Hotel kitchen inspected (as to hygiene)
  - Change of some food suppliers
  - Investigation of suppliers
- Germany:
  - Travel agents offered alternative package holidays
  - Virological investigation (sequencing)
  - Case-control study regarding source(s) of infection

Hypotheses regarding source(s) of infection

- 3 Hypotheses:

Disease associated with the consumption of...

- **… ice cream** (served daily)
- **… orange juice** (breakfast)

} Supliers particular to this hotel

- **… salads, raw vegetables** (buffet)

- Also studied:
  - Consumption of **tap water** (ice cubes, using tap water for dental hygiene)
  - **bathing habits** (pool, ocean), **day trips**
  - **Other foods, drinks**

Case-control-study: Methods

- Participants:
  - Guests of hotel “X”, at least one day 6/24 through 7/23
  - >17 years of age, one person per household
- Cases: registered cases
- Controls: Healthy travelers who
  - were not vaccinated against hepatitis A and
  - did not recall previous hepatitis A infection
- Standardized telephone interviews, conducted by local and state health departments, RKI

Case-control-study: Results

No difference between groups regarding:

- age, sex
- consumption of ice cream, salads
- excursions, bathing habits, etc

But:

	Cases n=69	Controls n=36	OR	95% CI
Orange juice / breakfast	82.3%	63.9%	**2.6**	**1.1-6.6**
Days drinking orange juice				
0 days (Reference)	17.7	36.1	Ref.	-
1-6 days	13.2	30.5	0.9	0.3-2.9
7-13 days	32.4	16.7	**4**	**1.2-13.1**
14+ days	36.8	16.7	**4,5**	**1.4-14.8**

On-site investigations

- Hotel:
  - No employee with IgM-antibodies against hepatitis A
  - Little fluctuation of staff
  - Kitchen: no hygiene problems

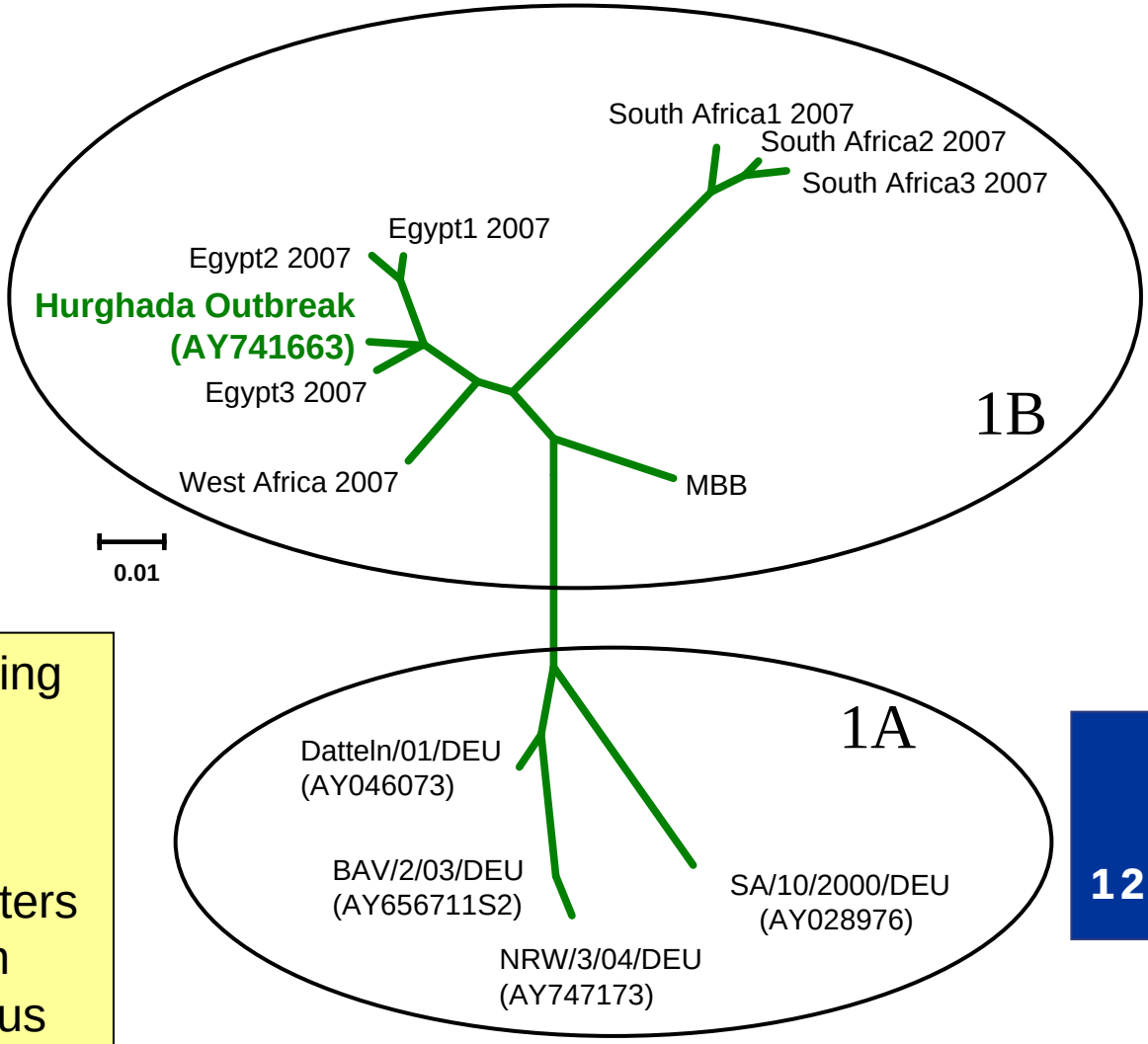
- Investigations of suppliers focused on juice producer
  - Hygiene problems at site of production
  - No employee IgM-positive at time of investigation, but substantial fluctuation
  - No license to supply international hotels
  - No other customers (hotels) in Hurghada
  - Juice not heat-treated (pasteurized etc.)

Virological investigation

42 serum samples
Nested PCR (VP1/2A, 340 bp)

n=22 PCR+ for HAV RNA

HAV sequences (n=13):
all identical
genotype 1B



(routine) monitoring of circulating HAV strains useful to:

- detect widely dispersed outbreaks and hidden clusters
- demonstrate links between imported and autochthonous cases

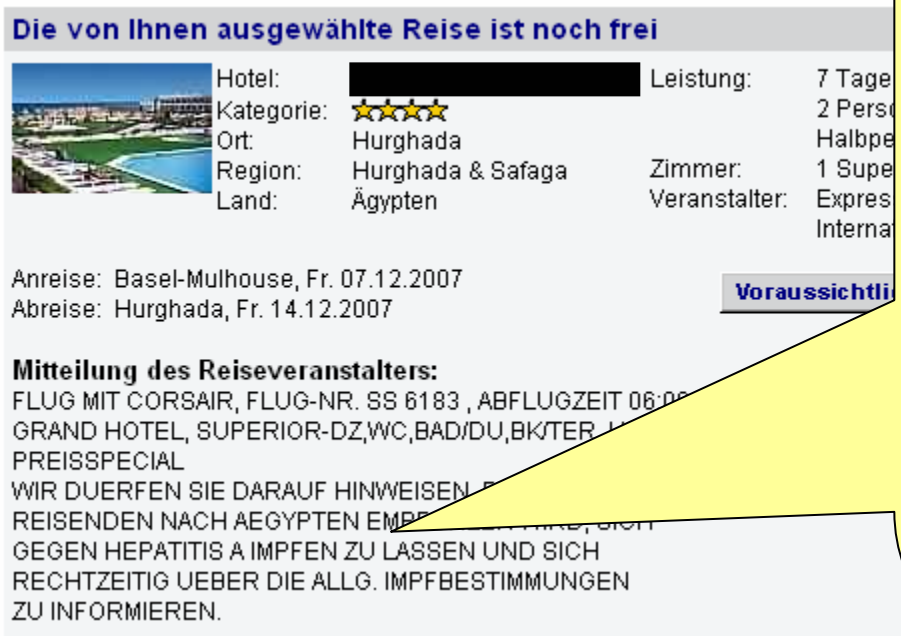
Discussion, conclusions

- Largest ever described hepatitis A outbreak among tourists / travelers
- Orange juice most likely vehicle of infection
  - Case-control-study
  - On-site investigation
- Outbreak investigation difficult
  - long incubation period (15-50 days)
  - large number of cases
  - almost impossible to test food or water for hepatitis A virus
- Many tourists to Egypt not vaccinated
  - travel operators should inform (catalogues)
  - tourists need to seek competent advice pre-travel

Update….

1. Since last year: increasing number of health plans cover Hepatitis A vaccination for travelers.

2. Lately, while booking online…



Tour operators notice:

…flight plan…
…double room, bathroom, balcony…

We would like to point out that travelers to Egypt are advised to be vaccinated against hepatitis A and to seek information on the general vaccination recommendations.

Many thanks to...

...all participants of the case-control-study,

...local and state health departments,

…collaborators in other affected countries,

...the Egyptian authorities,

...many colleagues in the Department for Infectious Disease Epidemiology of the RKI.

Reference: Frank et al.
Major outbreak of hepatitis A associated with orange juice among tourists, Egypt, 2004.
Emerg Infect Dis. 2007 Jan;13(1):156-8.