Outbreak of viral gastroenteritis and an ill baker who should have known better: novel application of email for rapid investigation

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rivm

The Alert

◆ Wednesday morning,17 January 2001

- Health authority of large Dutch city notified of >80 cases of vomiting and diarrhoea in a government department

- All attended restaurant buffet lunch on 16 January, consisting of filled rolls and drinks

- No sickness in government staff not attending buffet

- Clinical picture suggestive of Norwalk-like virus (NLV)

- RIVM invited to help investigate outbreak

Norwalk-like virus (NLV)

◆ **Very common**
- ◆ Netherlands, 1996 - 70% of nonbacterial outbreaks of gastroenteritis

◆ **Group of related strains**
- ◆ Small round structured virus (SRSV)
- ◆ "winter vomiting disease" since 1929

◆ **Symptoms**
- ◆ Vomiting, diarrhoea, nausea, cramps
- ◆ Rapid recovery within 72h

Day 1

◆ Food list obtained - questionnaire designed

◆ Sick restaurant employees told not to work until 48 hours after recovery

◆ 20 ill departmental staff interviewed at home: stool samples taken

◆ Food Inspection Services notified

Day 2

- **Restaurant visit**
  - Staff interviews: food preparation and staff illness
  - Stool samples from food handlers and other restaurant employees
  - Food Inspection Service
    - General hygiene measures
    - Food samples (only ingredients left)
  - Water dispensers sent to RIVM

Microbiology

◆ All stool samples

- ◆ routine bacteriology (*Salmonella, Campylobacter, Shigella, Yersinia, Bacillus cereus*)

- ◆ Norwalk-like virus by RT-PCR

◆ All food samples

- ◆ routine bacteriology

◆ Water

- ◆ Norwalk-like virus by RT-PCR

Day 3

◆ Data collection via email

  ◆ Excel - questionnaire sent to all people
    with email address in department

  ◆ Requested to return by email within seven days

	Format	Wilt u in deze kolom de antwoorden invullen?
Sectie 1: **Algemeen**		
1. Op welke datum heeft u deze vragenlijst ingevuld?	*dd/mm/jj*	
2. Naam en voorletters		van Gogh, V
3. Wat is uw geboortedatum?	*dd/mm/jj*	30-3-1853
4. Wat is uw geslacht?	*man/vrouw*	man
Sectie 2: **Vragen over mogelijke klachten**		
5. Heeft u vanaf dinsdag 16 Januari 2001 last gehad diarree of braken? *(zo nee, ga naar sectie 3)*	*Ja / Nee*	nee
6. Heeft u vanaf dinsdag 16 januari 2001 last gehad van een of meer van de volgende klachten?		
Misselijkheid	*Ja / Nee*	
Overgeven / braken	*Ja / Nee*	
Koorts(>38C)	*Ja / Nee*	
Buikkramp	*Ja / Nee*	
Diarree (>2 keer ontlasting in 24 uur)	*Ja / Nee*	
Bloed in ontlasting	*Ja / Nee*	
Slijm in ontlasting	*Ja / Nee*	
Overige		
7. Welke van de bovenstaande klachten was de eerste?		
8. Op welke dag is de eerste klacht begonnen?	*dd/mm/jj*	
9. Hoe laat was dit?	*uur*	
10. Zijn de bovenstaande klachten over?	*Ja / Nee*	
11. Zo ja, sinds wanneer?	*dd/mm/jj*	
12. Zo nee welke klachten van de onderstaande klachten heeft u nog?		
Misselijkheid	*Ja / Nee*	
Overgeven / braken	*Ja / Nee*	
Koorts(>38C)	*Ja / Nee*	
Buikkramp	*Ja / Nee*	
Diarree (>2 keer ontlasting in 24 uur)	*Ja / Nee*	
Bloed in ontlasting	*Ja / Nee*	
Slijm in ontlasting	*Ja / Nee*	
Overige		
13. Zijn er nog andere mensen met diarree of braken in uw gezin of bij kennissen die na u ziek zijn geworden (niet werkende op het ministerie)	*Ja / Nee*	
14. Zo ja, hoeveel?	*aantal*	

Case-control study

◆ Case definition

    ◆ Buffet attendee with email address who developed vomiting or diarrhoea (>2 stools/24h) within 72 hours

◆ Control definition

    ◆ As case but not sick within 72h

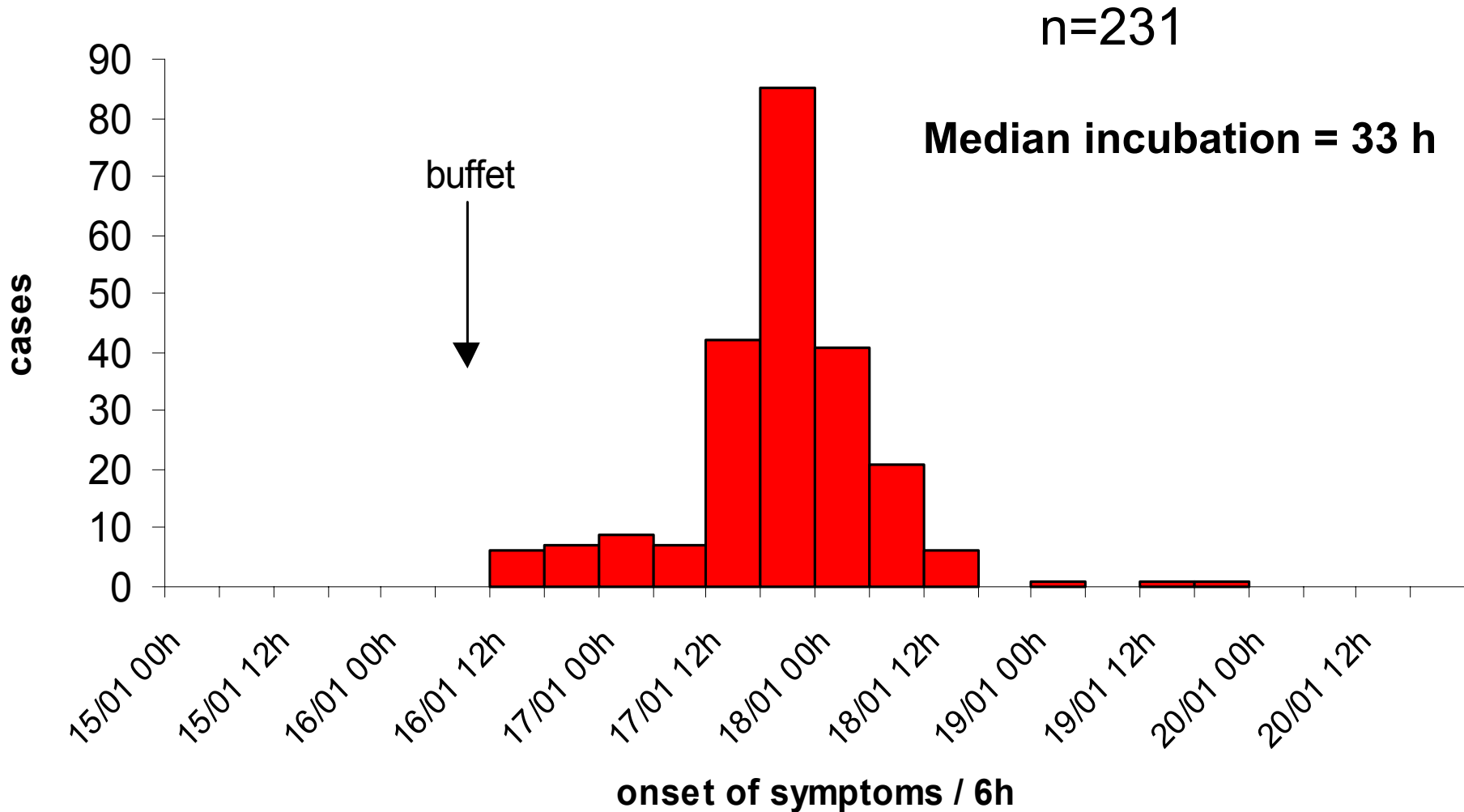◆ Analysis

    ◆ Univariate

    ◆ Multiple logistic regression

Results - *descriptive*

◆ 5 of 8 foodhandlers ill after buffet

◆ Occupational physician:

    ◆ ≈ 240 ill of 850 staff   Attack rate ≈ 28%

◆ Email response:

    ◆ 550 of 850 staff replied   Response = 65%

    ◆ 231 cases of 550 respondents   Attack rate = 42%

Results - *descriptive*

◆ % cases vomiting and diarrhoea = **76%**

◆ Faecal samples positive NLV   = **24 / 27**

  ◆ Foodhandlers and staff positive

  ◆ Single strain, not previously detected

Cases of gastroenteritis in department staff by 6-hourly time period, the Netherlands, January 2001

Results - *analytical*

◆ **First clues, 6h after sending (150 replies)**

    ◆ All cases (39) and 103 / 111 controls
              ate at least one roll ($p = 0.11$)

    ◆ No one type of roll implicated

◆ **Analysis after 1 week (550 replies)**

Crude and adjusted odds ratios for different types and numbers of rolls eaten

	Cases (n=231)	Controls (n=274)	Crude OR	95% CI	Adj OR (95% CI)	95% CI
Cheese roll	110	110	**1.5**	**1.1 to 2.2**	1.4	(0.9 to 2.1)
Ham roll	80	76	**1.5**	**1.0 to 2.2**	1.1	(0.7 to 1.9)
Tuna roll	89	80	**1.6**	**1.1 to 2.4**	1.3	(0.8 to 2.2)
Salmon roll	20	12	**2.2**	**1.0 to 4.5**	1.5	(0.6 to 3.4)
Raisin roll	77	101	0.9	0.6 to 1.3	0.6	(0.4 to 1.0)
No. rolls 0	0 *	19	**1.0**			
1	25	55	**8.6**		**1.7$**	**(1.5 to 2.5)**
2	89	109	**15.5**			
3	67	67	**19.0**			
4+	21	11	**36.3 #**			

\# Chi-squared for trend, p<0.001
* 1 used for odds ratio calculation
$ Fitted as a continuous variable

Dénouement

◆ Baker visited after first data assessment:

 ◆ sick on morning he baked rolls buffet

 ◆ vomited in bakery sink during roll preparation

 ◆ rolls pre-sliced by baker before delivery

◆ Baker stool sample 15d post illness onset

 ◆ positive for NLV

 ◆ outbreak genotype found

Conclusion

◆ Use of email can be very powerful

  ◆ Reach >800 people quickly - first analysis in 6 hours

  ◆ Fewer transcription errors

◆ Lack of awareness of NLV

  ◆ Among food handlers

  ◆ Among food safety authorities

◆ Appearance of new strain

  ◆ Where does it come from?

  ◆ **Seeding event**: 10 outbreaks in subsequent 6 months
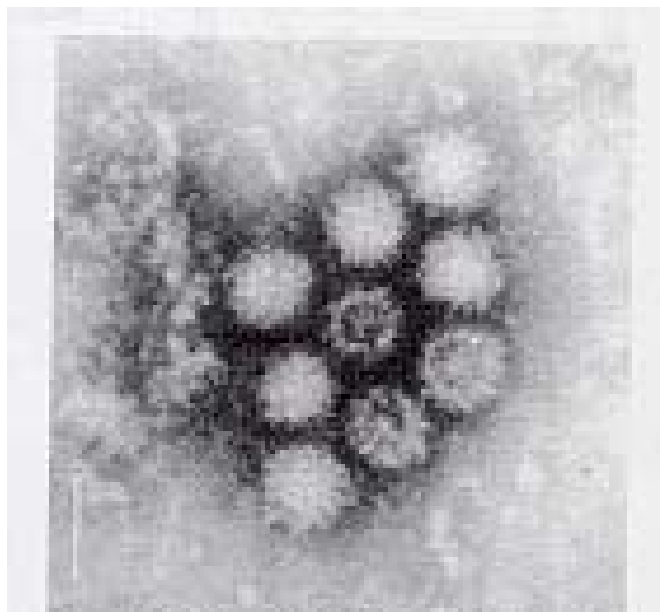
Recommendation

Take NLV seriously

◆ Education

◆ Change of regulations…?

Electronmicrograph of
Norwalk virus, showing
calyices around capsid,
hence name "calicivirus"

Courtesy of Dr Jan Vinje