



Rijksinstituut voor Volksgezondheid  
en Milieu  
*Ministerie van Volksgezondheid,  
Welzijn en Sport*

# CRYPTO study 2013- 2016

stand tot nu toe



# Cryptosporidium: achtergrond informatie

- Verwekker waterdunne diarree
  - Verschil in chronische sequela tussen types: C.hominis meer extra intestinale klachten (oa. gewrichtsklachten; beide relapses na aanvankelijk opknappen.)
- Therapie : geen effectieve therapie
- Risicogroep: immuungestoorden : hiv/aids; transplantatie/prednison hoge dosis
- Seizoen: najaar en kleinere voorjaarspiek
- Leeftijd: vooral jonge kinderen: <5 jaar;

## Cryptosporidium: in NL

- In NIVEL en SENSOR studie: ca. 2% van de cases; bijna niets in controles ( populatie en GP patiënten 1996-1998; microscopie)
- Weinig in eXplosie studie en KIZSS (Kinderdagverblijf 2010-2013 ( PCR))
- In Geops (ziekenhuisopnames GE): opvallend vaak (>7 %) maar vaak dubbelinfecties (PCR)
- GCC studie (GP patienten 4 labs, case controle; PCR)

# Dutch case control study GP population

Bruijnesteijn van Coppenraet LE ea

Case-control comparison of bacterial and protozoan microorganisms associated with gastroenteritis: application of molecular detection. Clin Microbiol Infect. 2015 Jun;21(6):. 7 592.e9-592.e19. Epub 2015

Table 4: Positivity for all targets by age category

organism	Case					Control				
	< 5yr	5-20	21-50	>50		< 5yr	5-20	21-50	>50	
n=	152	313	557	493		104	200	445	428	
	Pos %	Pos %	Pos %	Pos %		Pos %	Pos %	Pos %	Pos %	Pos %
Giardia	14 9.2	24 7.7	24 4.3	23 4.7		4 3.8	15 7.2	10 2.2	4 0.9	
Crypto	<b>12 7.9</b>	<b>9 2.9</b>	<b>21 3.8</b>	<b>4 0.8</b>		<b>5 4.8</b>	<b>2 0.4</b>	<b>2 0.4</b>	<b>1 0.2</b>	

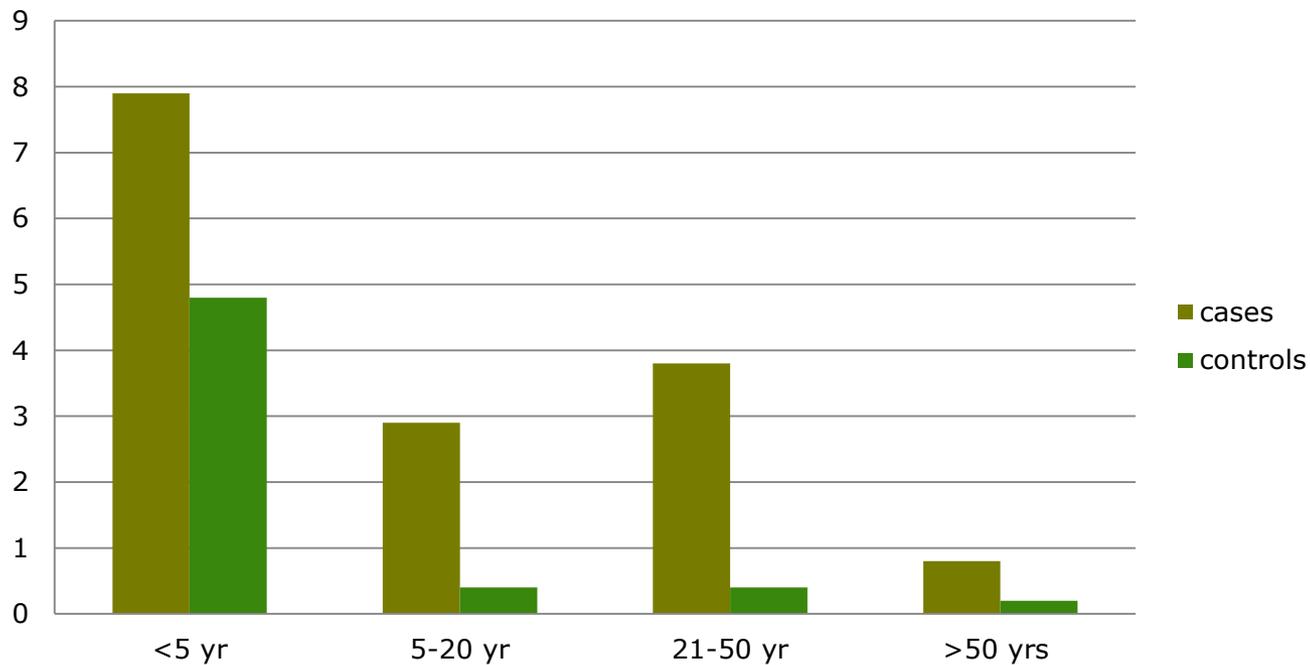
Age difference detection *Cryptosporidium* in controls ;

<5 yr old cases: 7.9 %; controls 4.8 %

>50 yrs cases : 0.8 %; controls 0.2%

# GCC study results parasites

**Cryptosporidium % pos per age group**



# Cryptosporidium: DALYs and Cost of illness

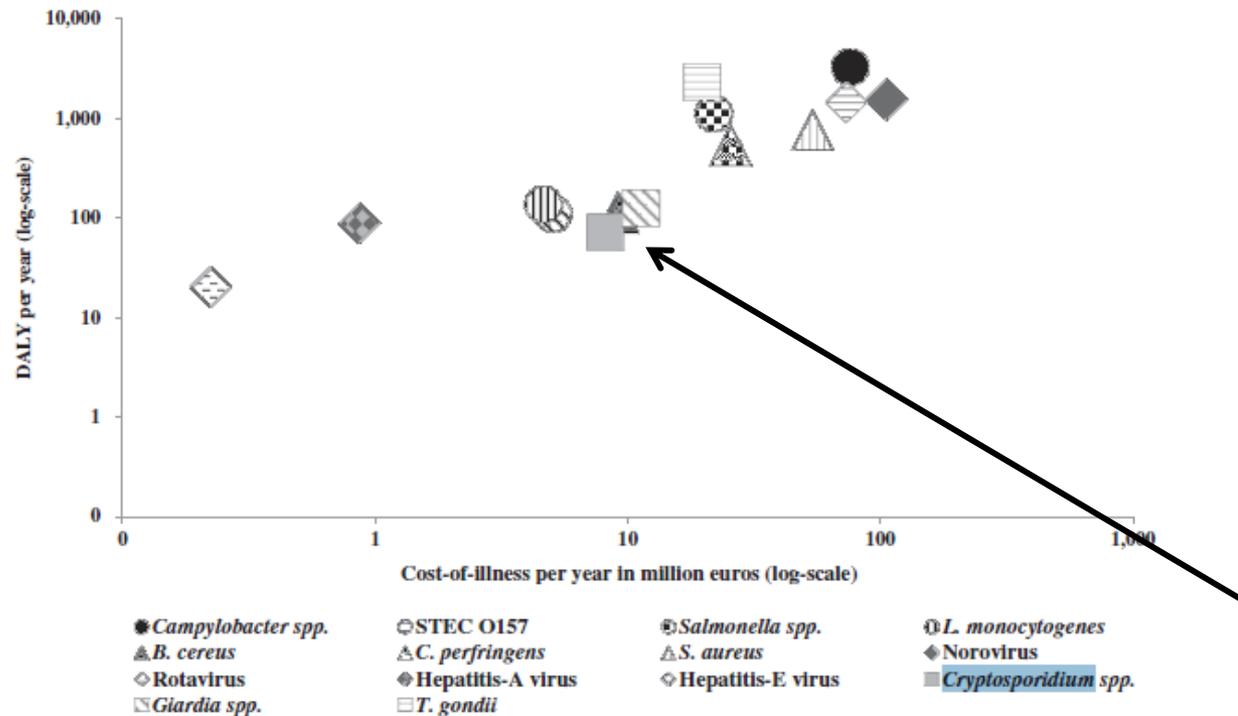


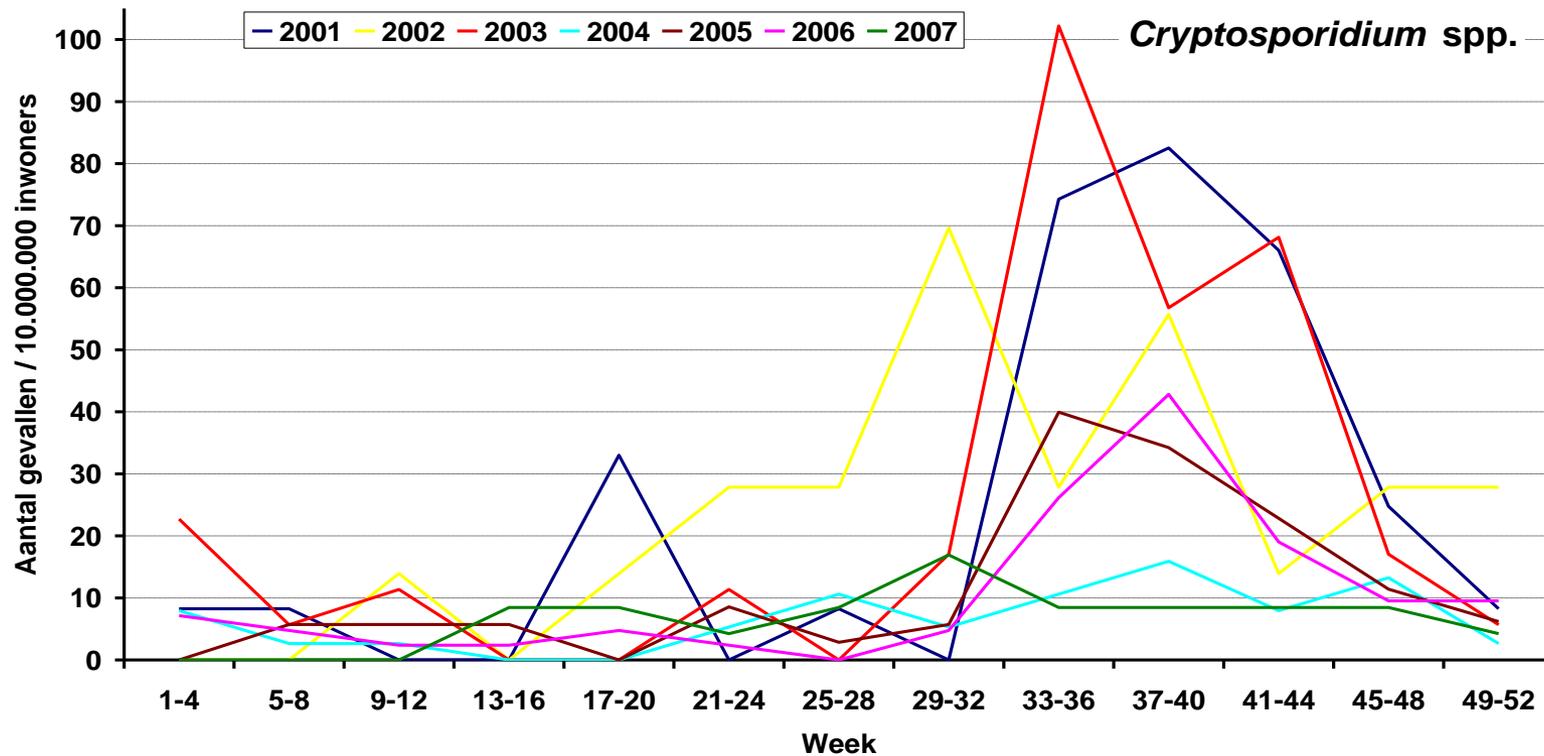
Fig. 3. Average DALY per year and average cost-of-illness per year (in million euros) for 14 foodborne pathogens in 2011. Costs and DALYs were discounted at 4% and 1.5%, respectively. Note: We used the following symbols: ● for bacteria-infections; ▲ for toxin-producing bacteria; ◇ for viruses and ■ for protozoa.

DALY's Crypto: 72 DALYS per jaar; 3.1 DALYS per 1000 cases  
( Giardia 127, Toxoplasma 3570, Campylobacter 3633)

M.-J.J. Mangen et al. Cost-of-illness and disease burden Ranking of food-related pathogens in the Netherlands in 2011. International Journal of Food Microbiology 196 (2015) 84-93



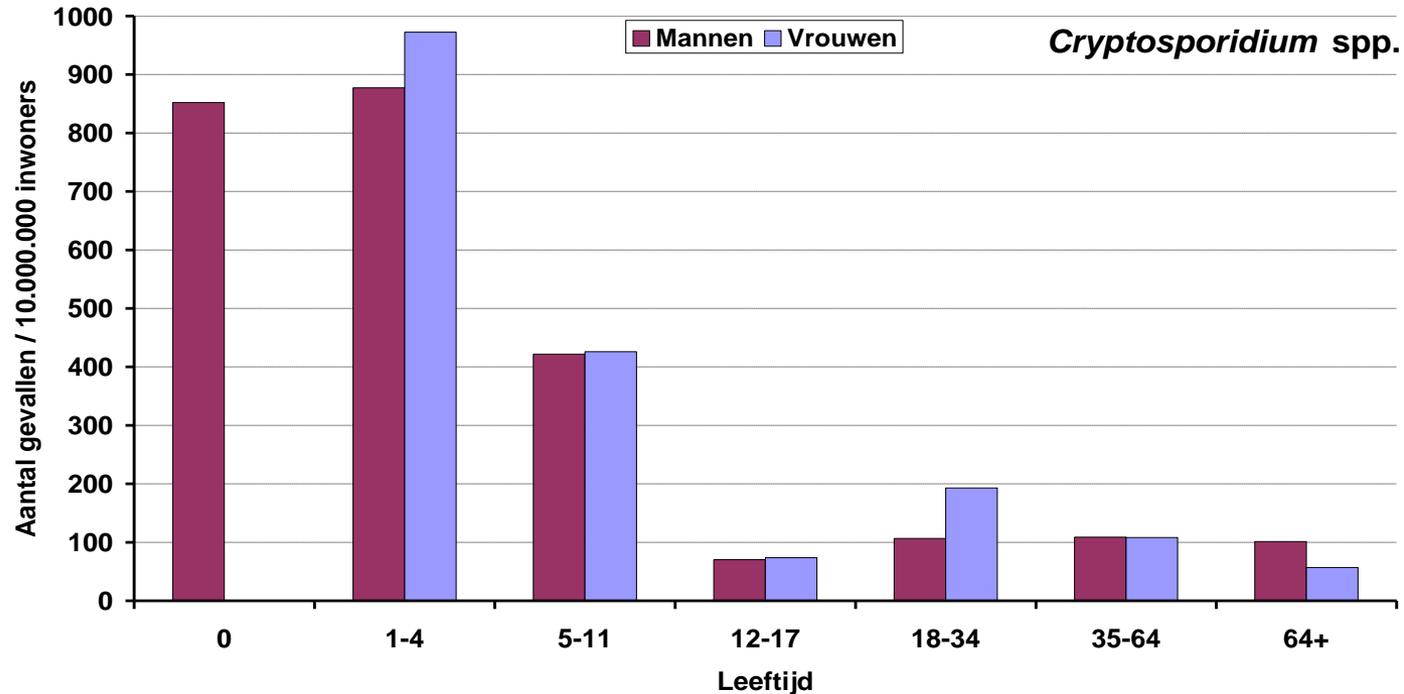
# ISIS lab surveillance 2001-2007



Incidentie van *Cryptosporidium* spp gerapporteerd door ISIS, 2001-2007.



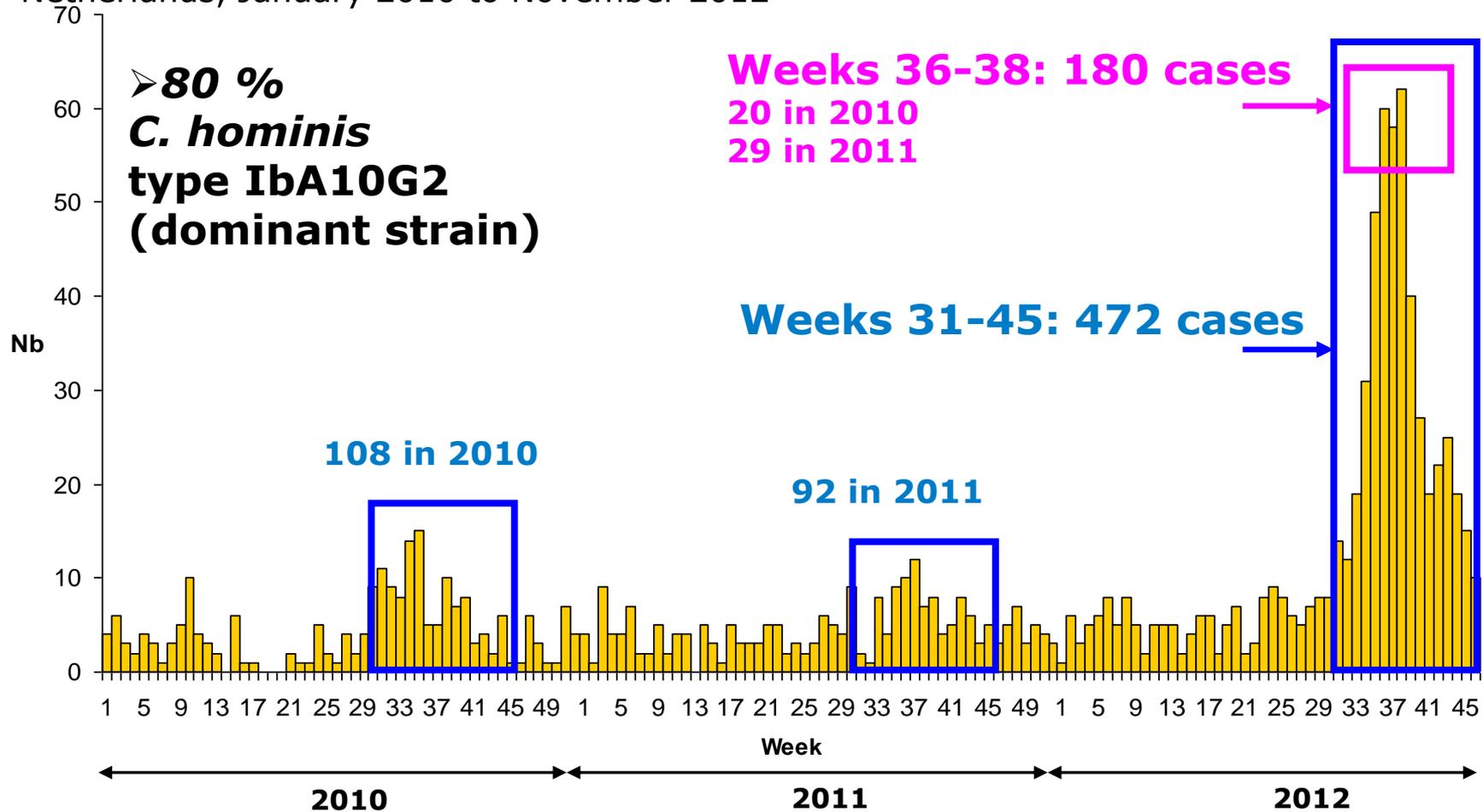
# ISIS lab surveillance 2001-2007



Leeftijds- en geslachts-specifieke incidenties voor *Cryptosporidium* spp gerapporteerd door ISIS, 2001-2007

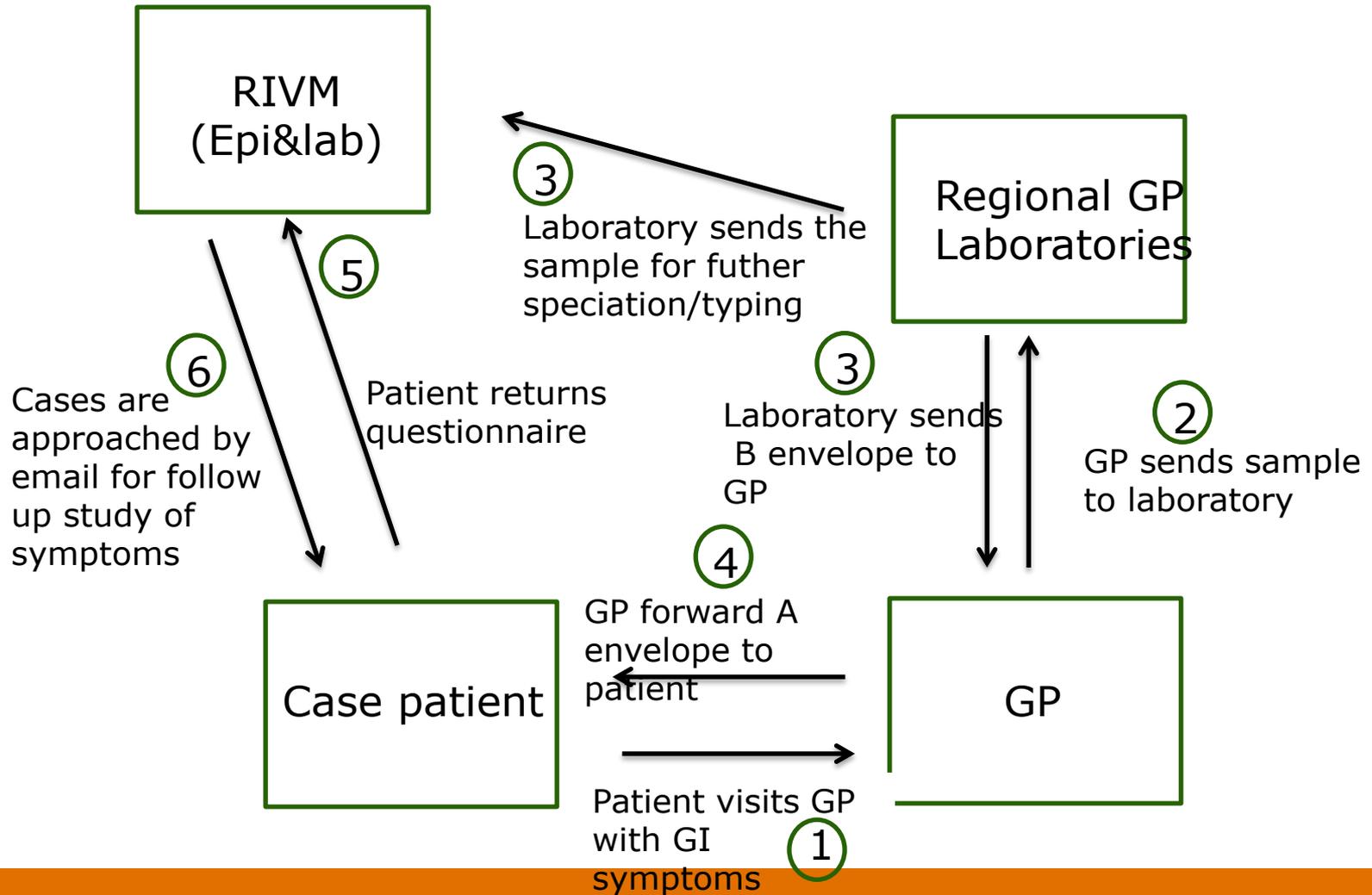


Number of *Cryptosporidium* positive faecal samples by week of confirmation in 4 laboratories\*, Netherlands, January 2010 to November 2012



\*CBSL (Hilversum), Haarlem, Saltro (Utrecht) and Labmicta (Enschede)

# Sporadic *Cryptosporidium* - study design





# Study objectives

- To describe the epidemiology of sporadic cryptosporidiosis in the Netherlands.
- To identify risk factors for sporadic cryptosporidiosis in the Netherlands in order to acquire information for control strategies.



# Case and control definitions

## Case definition

- Gastrointestinal illness between April 2 2013 to April 1 2016 and laboratory confirmation (*Cryptosporidium spp.*)

## Control recruitment

- 5 controls/ case prospectively selected from population register
- 'Frequency matched' according to age and area of residence of cases
- Excluded if diarrhoea 2-4 weeks before



# Data collection methods

## Questionnaire with 200 items

- Symptoms
- Personal hygiene
- Day care attendance
- Travel
- Housing conditions
- Swimming
- Water consumption
- Outdoor activities
- Food history
- Animal contact (pets, farm animals)



# Laboratory and statistical methods

## Microbiological

- *Cryptosporidium* specification by real-time PCR.

## Statistical analysis

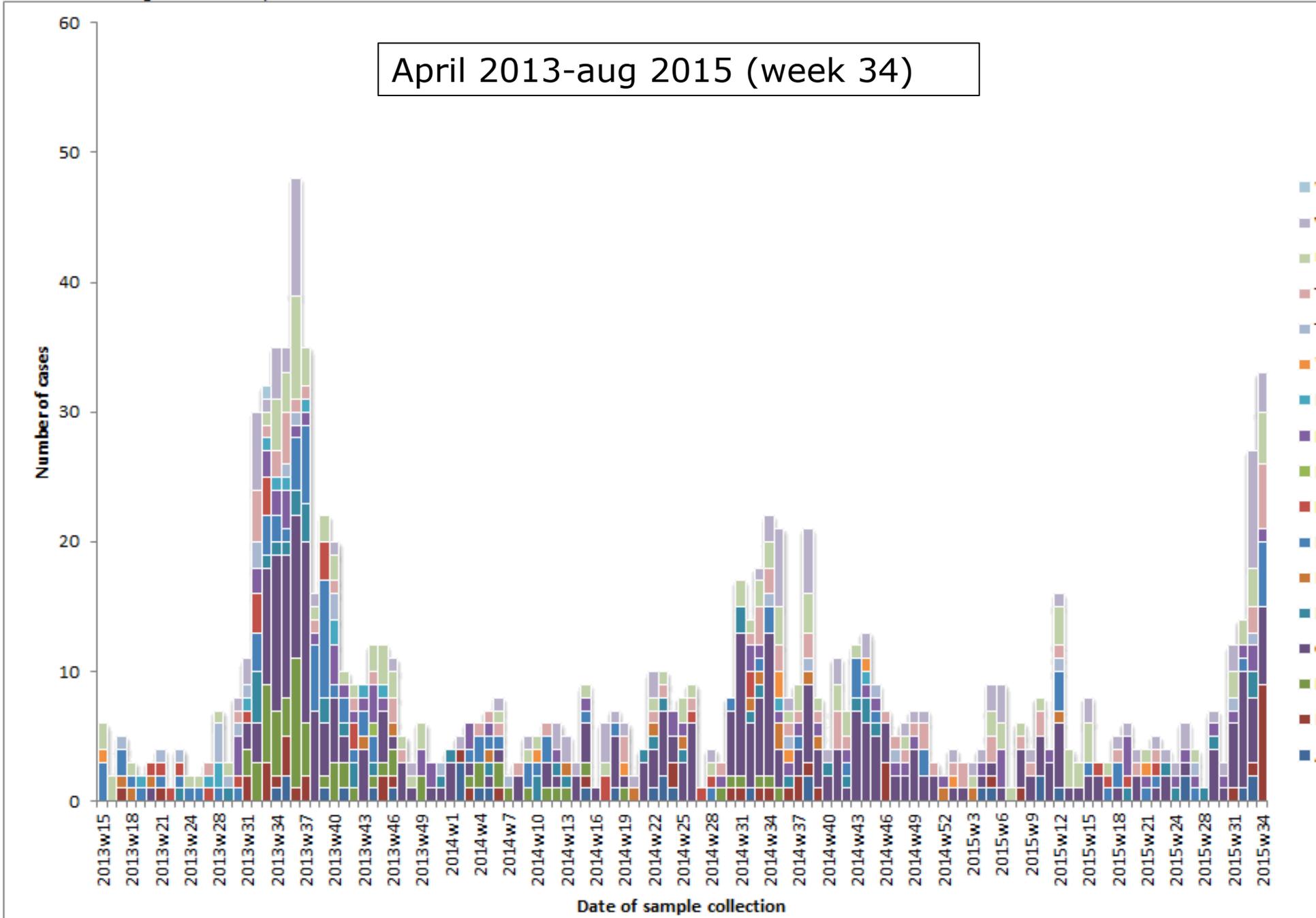
- Single variable and multivariable logistic regression
- Variables were included if P-value  $< 0.15$
- Likelihood ratio tests used to identify exposures independently associated with cryptosporidiosis infection

# Deelnemende laboratoria

## **In totaal 17 labs**

- 'S-GRAVENHAGE
- AMSTERDAM
- DELFT
- ENSCHEDE/HENGELO
- GRONINGEN
- HAARLEM
- HEERLEN
- HILVERSUM
- LEEUWARDEN
- MAASTRICHT
- NIJMEGEN
- ROTTERDAM
- TERNEUZEN
- TILBURG
- UTRECHT/SALTRO
- VELDHOVEN
- WOERDEN

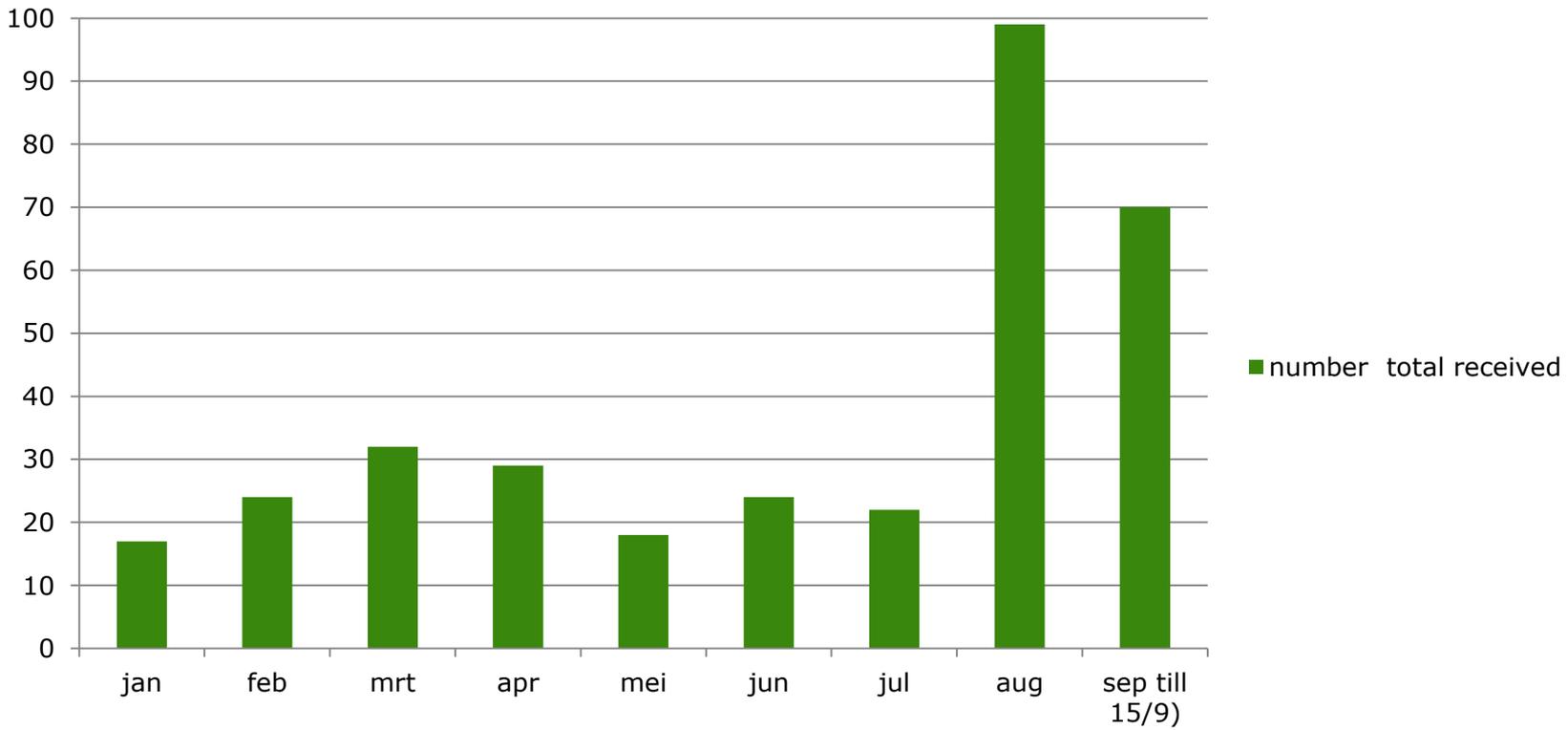
**Figure 1: Number of *Cryptosporidium* cases by date of sample collection and participating laboratory. IDS database (n=1218\*).**  
\*167 with missing date of sample collection





# Binnengekomen monsters 2015 bij RIVM-IDS (datum binnenkomst)

**number total received**





## Typering 2013 en 2014

	2013	2014
C. hominis	16 %	8 %
C. parvum	84 %	92 %

C.parvum IIaA15G2R1 meest voorkomend

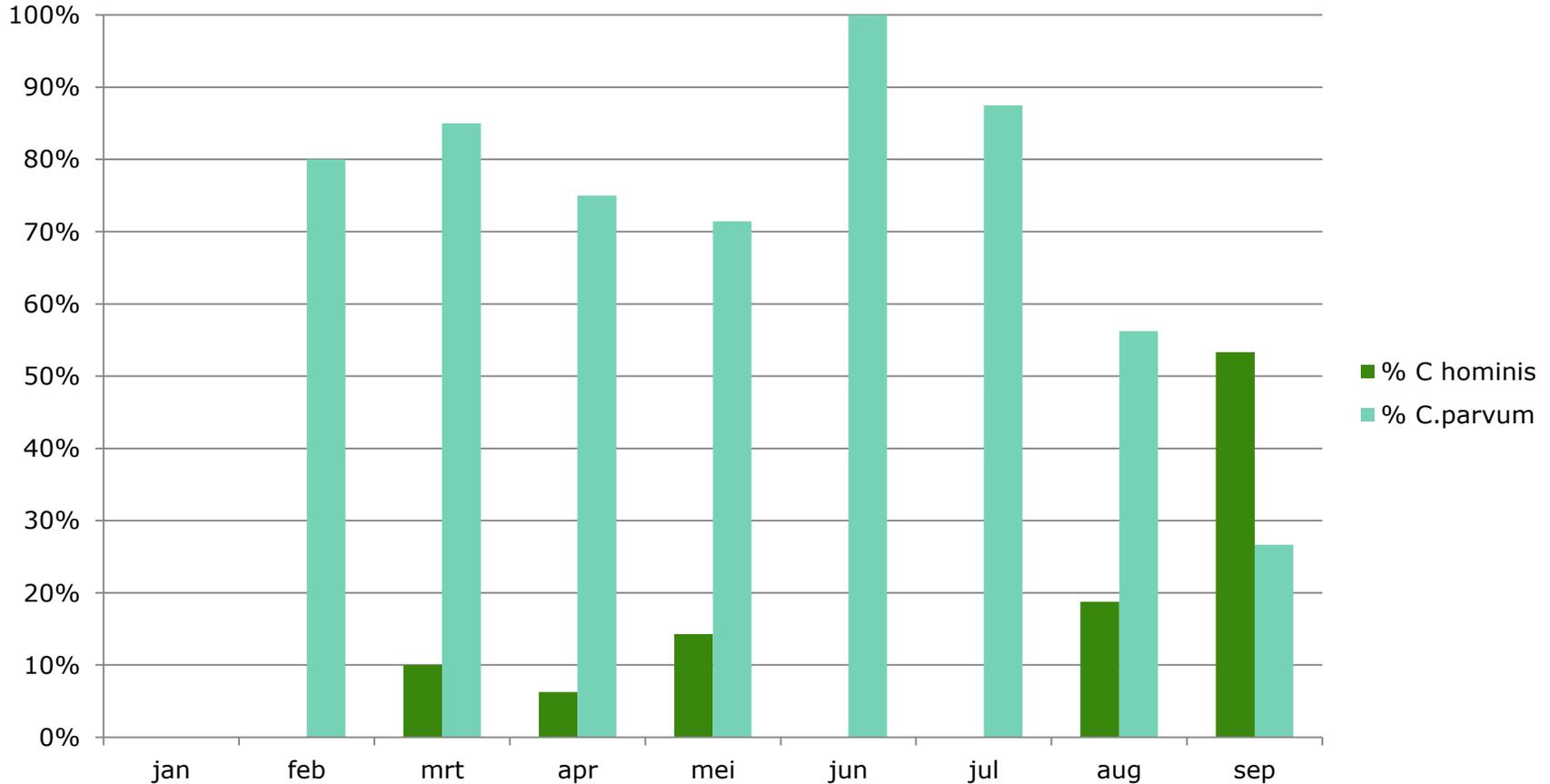
C.hominis IbA10G2 niet het meest voorkomend



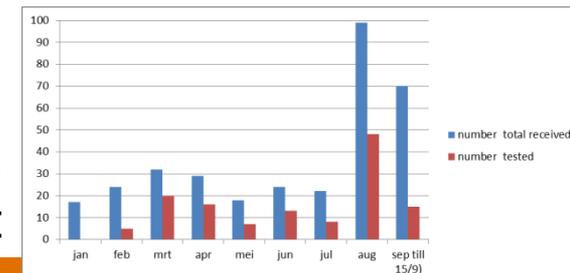
<i>C. parvum</i>	IIaA15G2R1	30	<i>C. hominis</i>	IbA9G3	11
<i>C. parvum</i>	IIaA17G1R1	5	<i>C. hominis</i>	IbA10G2	5
<i>C. parvum</i>	IIaA15G1R1	4	<i>C. hominis</i>	IaA14	3
<i>C. parvum</i>	IIaA16G3R1	4	<i>C. hominis</i>	IdA17	1
<i>C. parvum</i>	IIaA19G3R1	3	<i>C. hominis</i>	IdA25	1
<i>C. parvum</i>	IIaA19G1R1	2	<i>C. hominis</i>	IeA11G3T3	1
<i>C. parvum</i>	IIaA14G1R1	1			
<i>C. parvum</i>	IIaA14G2R1	1			
<i>C. parvum</i>	IIaA16G1R1	1			
<i>C. parvum</i>	IIaA16G2R1	1			
<i>C. parvum</i>	IIaA20G1R1	1			
<i>C. parvum</i>	IIaA20G2R1	1			
<i>C. parvum</i>	IIaA17G1	1			

Totaal 19 genotypes

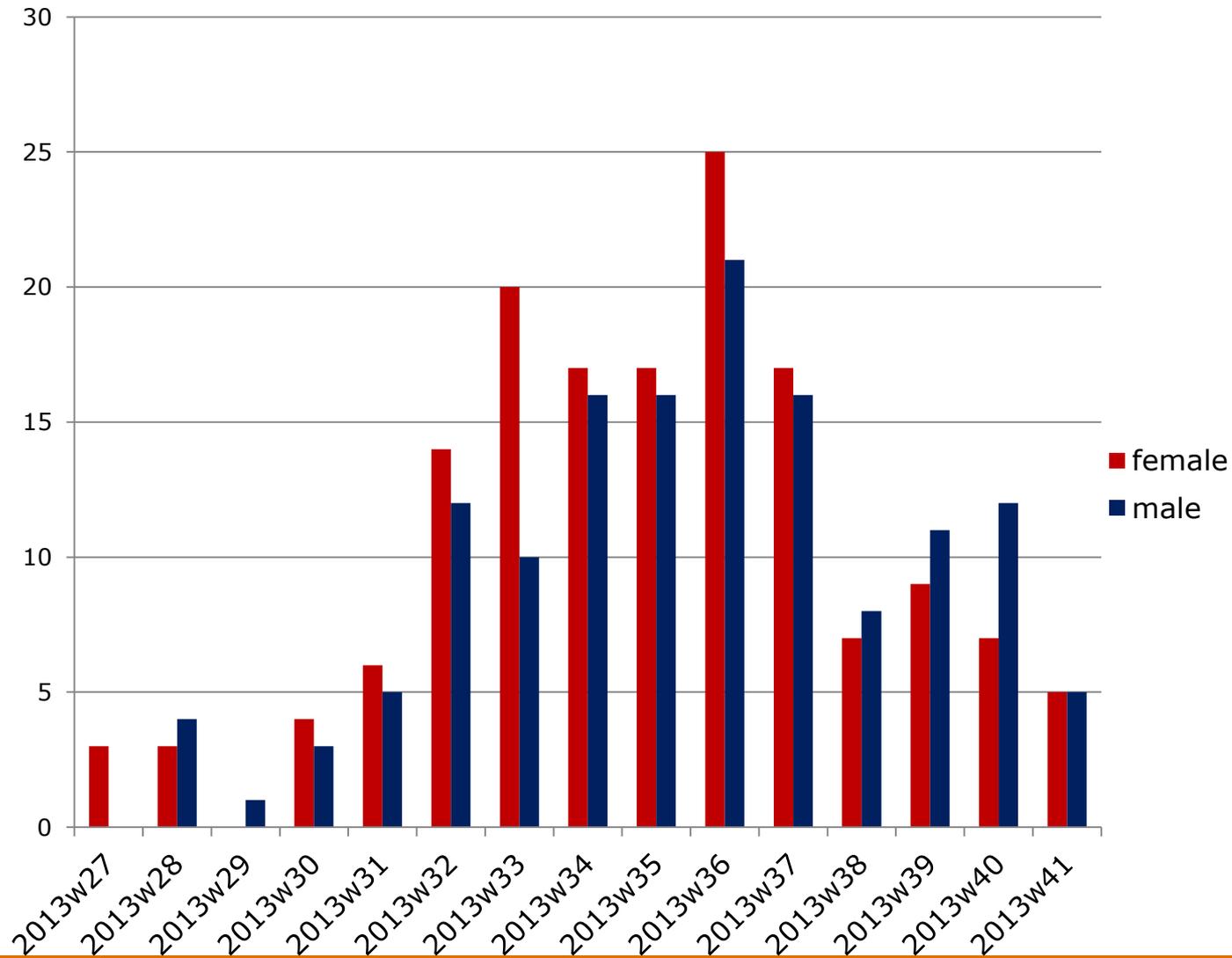
# Resultaten typering 132 samples 2015



Binnengekomen  
/getest

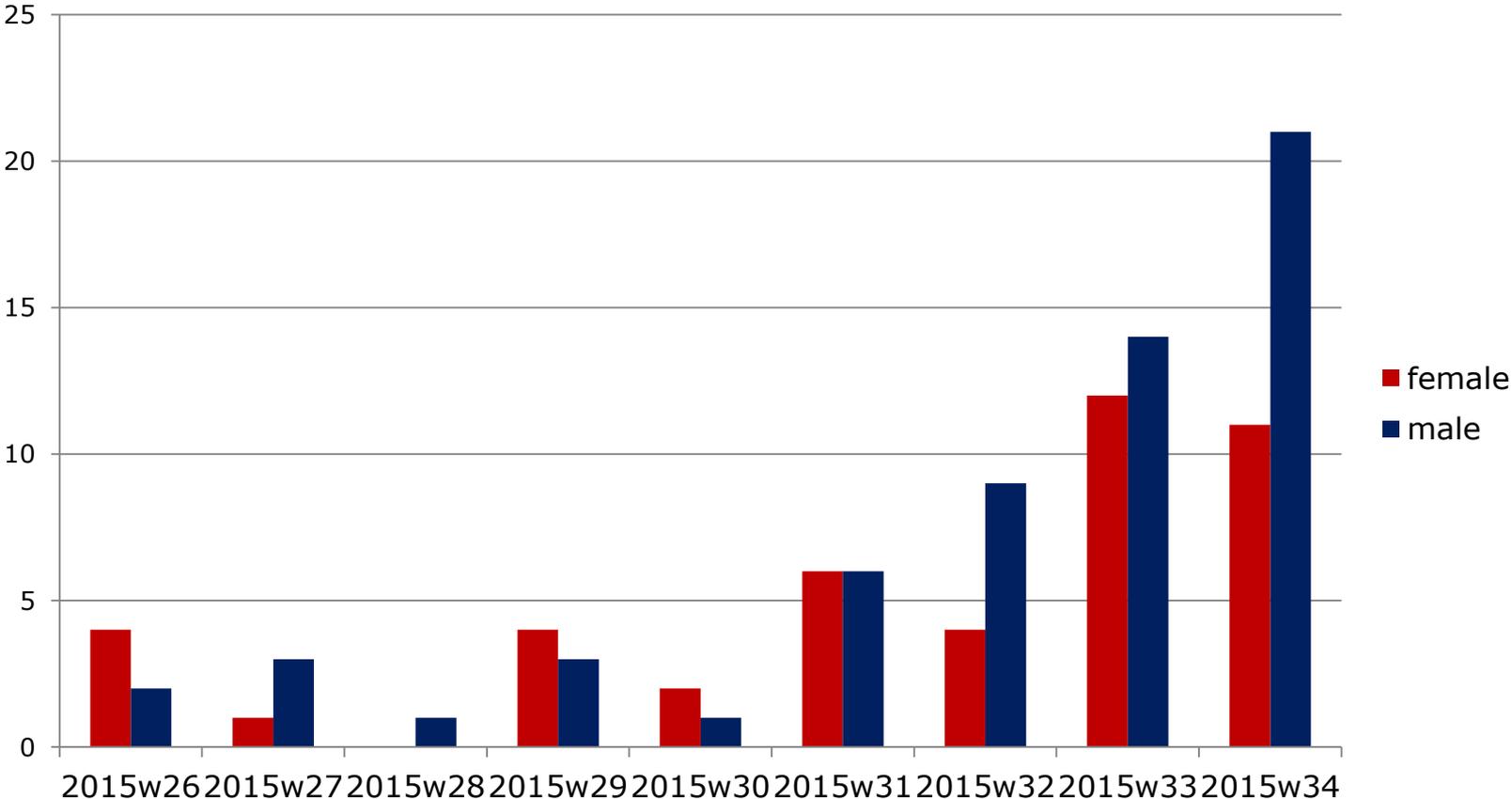


# Cryptosporidium study 2013 : by gender





# Cryptosporidium study 2015 : by gender





National Institute for Public Health  
and the Environment  
*Ministry of Health, Welfare and Sport*



# Risk factors for sporadic cryptosporidiosis in the Netherlands: a mid-term analysis of an ongoing case-control study

**Laura Nic Lochlainn**

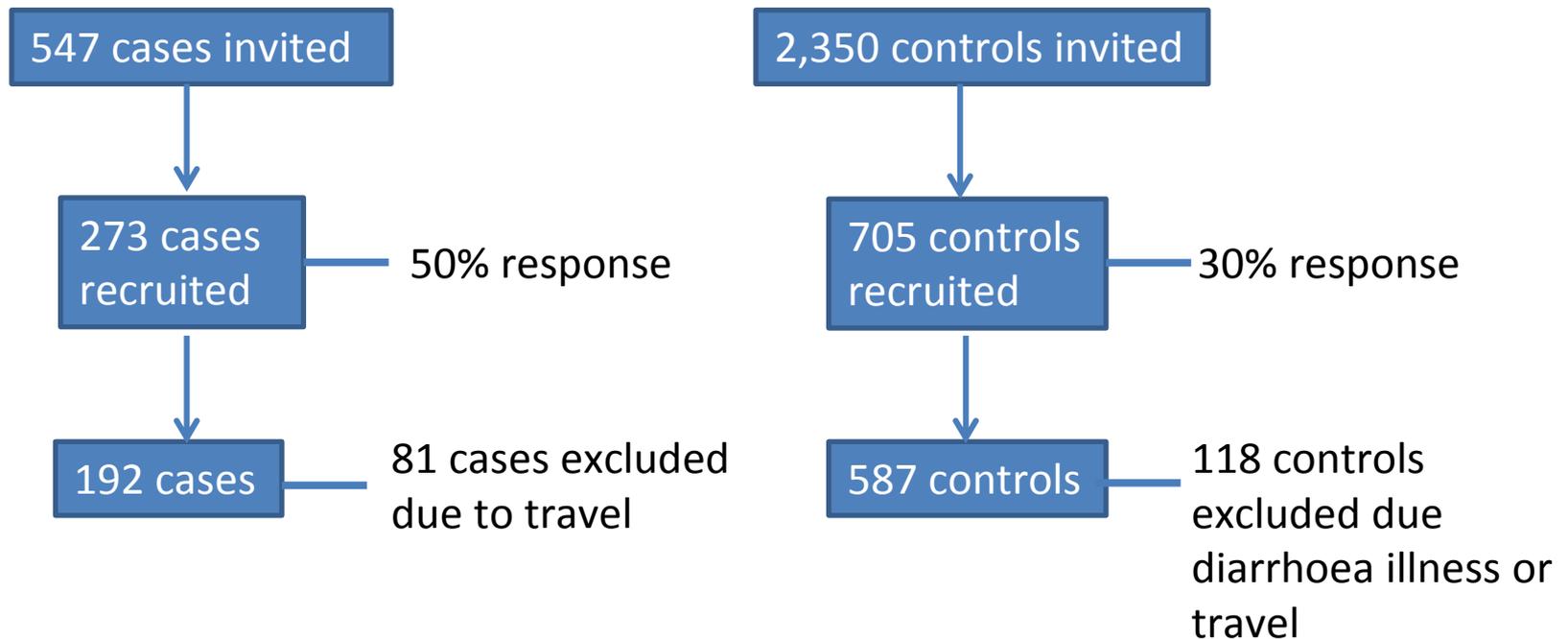
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National Institute for Public Health and the Environment (RIVM),  
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# Recruitment of participants April 2013- April 2014





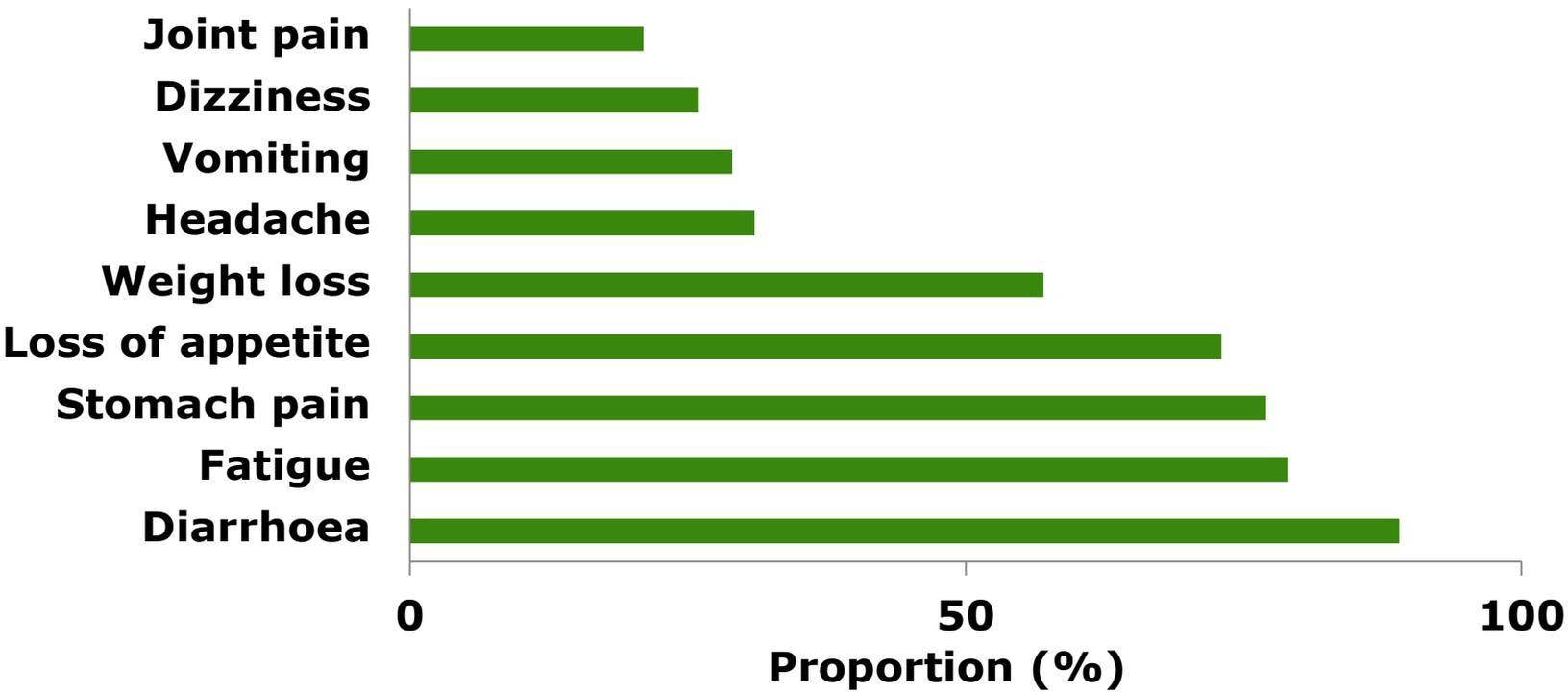
# Factors associated with cryptosporidiosis: multivariable analysis (na 1 jaar, vooral C.parvum)

<b>Characteristics</b>	<b>Odds ratio*</b>	<b>95% CI</b>
Swam in a river or lake	4.9	2.0-12.0
Had contact with cattle	3.8	2.0-7.0
Ate barbequed foods	3.8	2.4-6.1
Shared house with a case	1.8	1.1-3.0
Played in a sandbox	0.4	0.2-0.7



# Characteristics of cases of cryptosporidiosis, the Netherlands, 2013-2014

- 59% females (n=162)
- Median age of cases: 28 years (range 1-95)





## Komende analyses

- Chronische sequela
  - Vragenlijst 4 maanden na begin
  - 274 personen die een vragenlijst hebben ingevuld
  - Geen gegevens uit NL;
  - Paul Hunter in UK: *C.hominis* meer extra intestinale klachten

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- Jeroen Roelfsema
- Sietze Brandes
- Nahid Nozari
- Denise Hoek

## ● **Deelnemende labs**

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- NIJMEGEN
- ROTTERDAM
- TERNEUZEN
- TILBURG
- UTRECHT/SALTRO
- VELDHOVEN
- WOERDEN



Westfriesgasthuis



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Reinier de Graaf



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 **saltro**  
DIAGNOSTIEK IN DE ZORG

 **Lab  
MICTA**  
samen tegen infecties



 **VieCuri**



# Algoritme

- Wordt Cryptosporidium altijd bepaald – ook als het niet specifiek wordt aangevraagd?
  - Wanneer wel/wanneer niet?



Vragen?