



Prevalence and genetic structure of *Chlamydia trachomatis* population in Estonia

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Quattromed HTI Laborid Short Facts

HISTORY:

- HTI Laboratory founded in 1992
- Quattromed founded in 1999
- Operations merged in 2006

LOCATIONS:

- Central laboratory in Tallinn
- Molecular laboratory and branch laboratory in Tartu
- 4 satellite laboratories
- 10 blood drawing stations

PERSONNEL: 85 employees

MARKET SHARE:

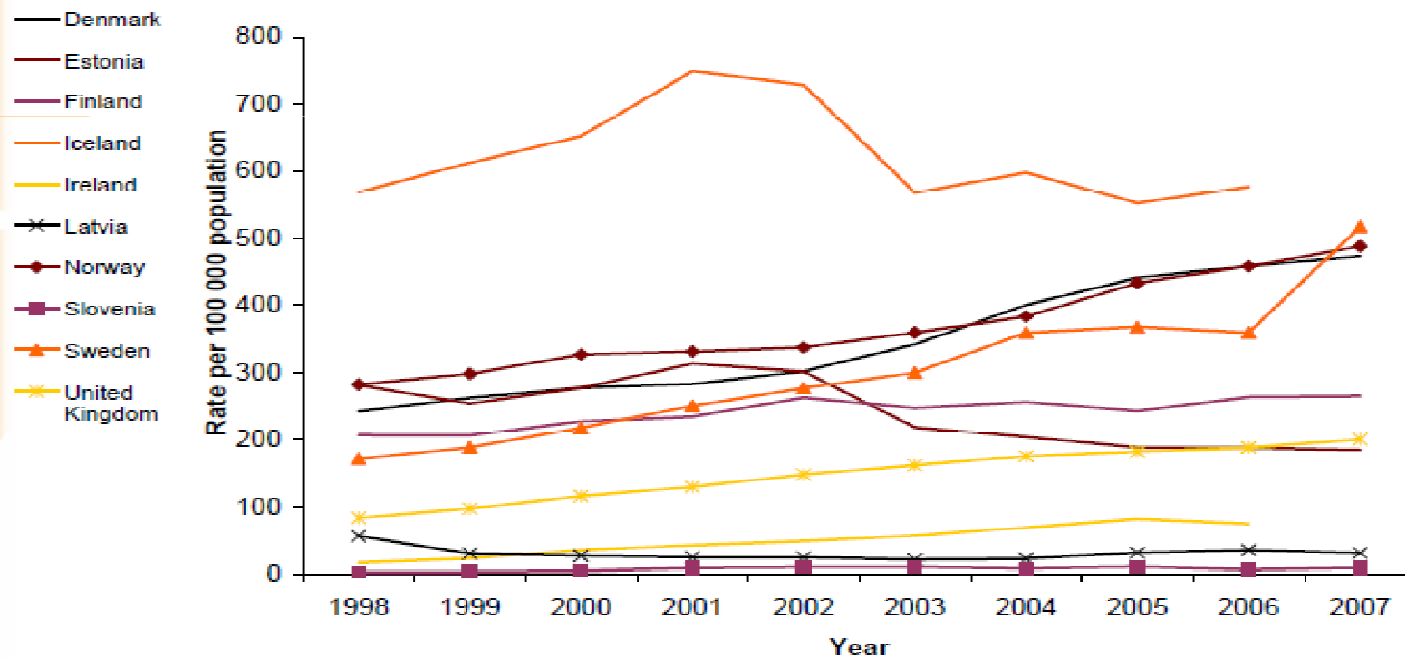
- #1 Private laboratory in Estonia
- Customer segmentation: 60% GP's, 25% clinics, 15% hospitals

ACCREDITATION: according to ISO 15189

TESTS: approximately 2 million performed annually

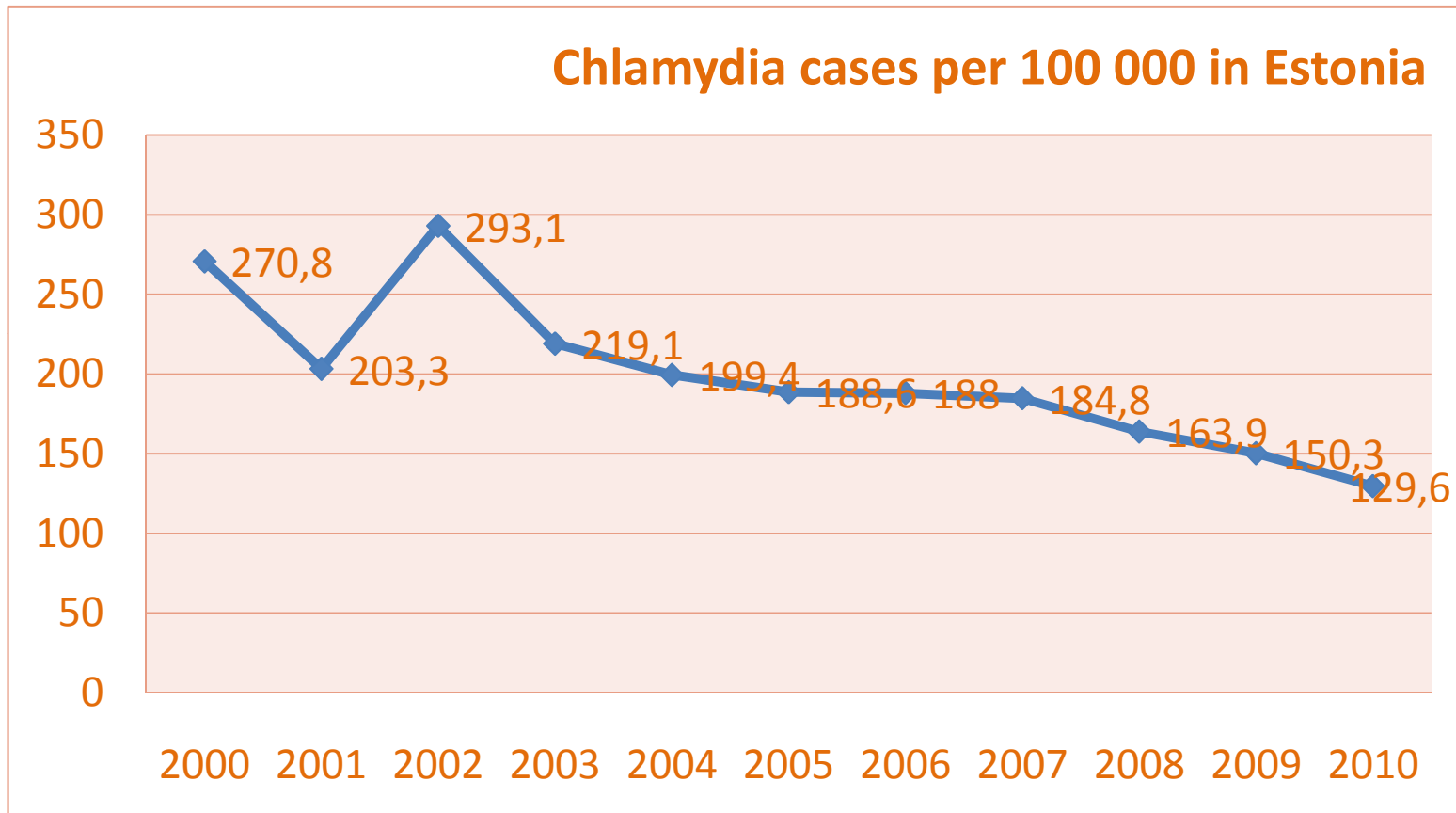
Chl.trachomatis in Europe 1998 - 2007

Figure 2.1: Rate of reported chlamydia cases per 100 000 population: 1998-2007



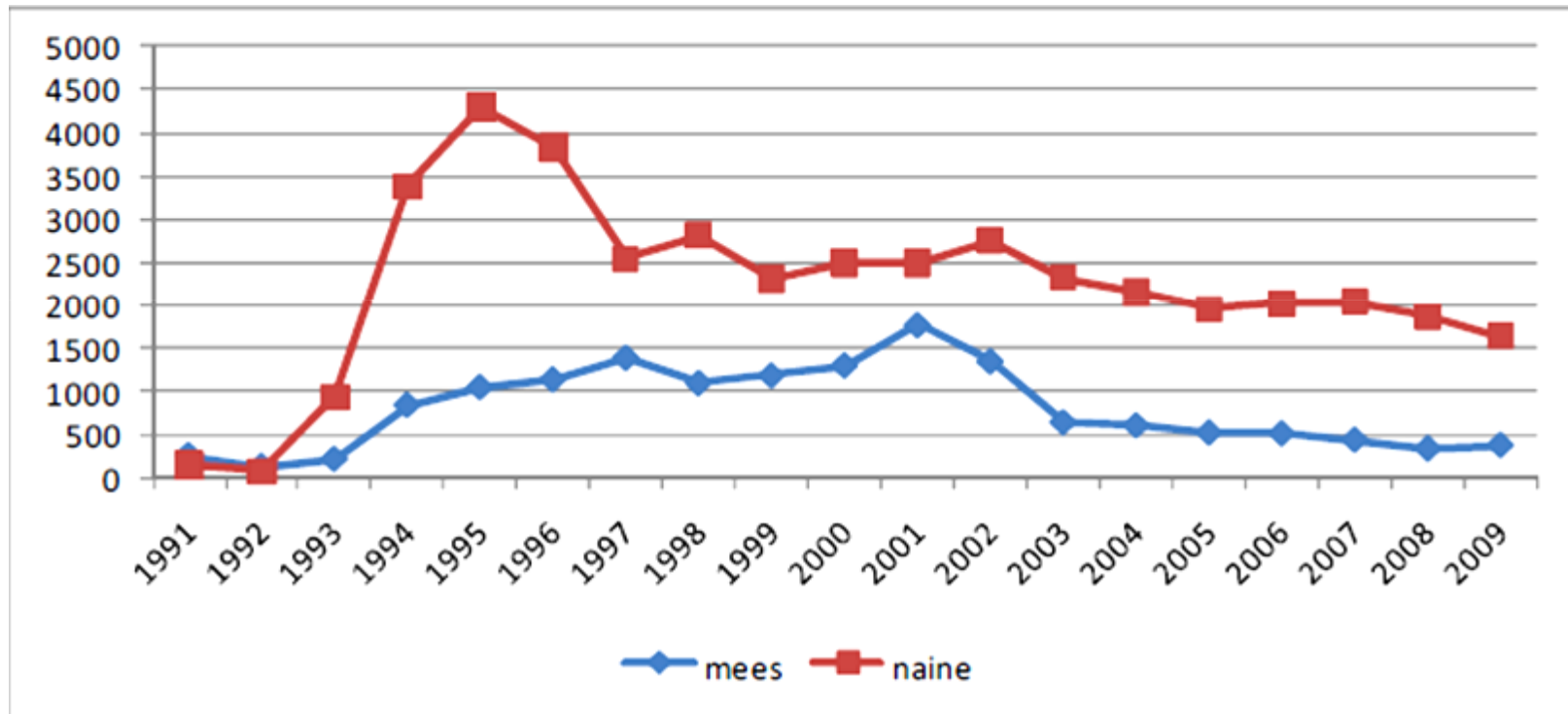
Country	Cases per 100 000 in 2008 (ECDC)
Denmark	532
Sweden	457
Finland	262
Estonia	164
Latvia	31
Lithuania	12

Chl.trachomatis prevalence in Estonia 2000-2010



Estonian Health Board

Chl. trachomatis prevalence in Estonia 1991 - 2009



In 2009 Chl. trachomatis was diagnosed in 1644 women (red) and in 371 men (blue) in Estonia (Estonian Health Board)



Aims of the study:

- To determine the frequency of *C. trachomatis* infections among patients who sought help from the doctors based on samples sent to Quattromed HTI Laboratories.
- To determine the most prevalent serotypes of *C. trachomatis* in Estonia.
- To establish a DNA-based genotyping method for *C. trachomatis* suitable for Estonian population.
- To analyze the population structure of *Chlamydia trachomatis* in Estonia using that method.



C. trachomatis prevalence in Estonia based on samples sent to Quattromed HTI Laboratories

C. trachomatis detection was done using PCR-based in-house method.

C. trachomatis serotyping was based on *ompA* sequencing.

C. trachomatis prevalence in Estonia based on samples sent to Quattromed HTI Laboratories

C. trachomatis prevalence

	Number of samples	<i>C. trachomatis</i> positive cases	<i>C. trachomatis</i> positive %
Men (with complains)	193	17	8,8
Women	1007	70	7,0
Total	1200	87	7,3

The prevalence in Estonia is similar to the one in Sweden (9,3% for men and 5,9% for women, Sylvan *et al.*, 2002) but smaller compared to Thailand (16,7% for men and 22,8% for women, Chen *et al.*, 2007).

C. trachomatis prevalence in Estonia based on samples sent to Quattromed HTI Laboratories

C. trachomatis prevalence in different groups

Patient sex and diagnos	Number of samples	of <i>C. trachomatis</i> positive cases	<i>C. trachomatis</i> %	Mean age
Women without complains	127	6	4,7	30
Pregnant women	211	19	9,0	27
Women with complains	669	45	6,7	34
Men with complains	193	17	8,8	35

Non of these differences between groups are statistically relevant ($p > 0,15$).

The frequency of different serotypes of *C.trachomatis*

	Serot. E	Serot. F	Serot. K	Serot. G	Serot. D	Serot. J	Serot. B	Serot. H
Number of samples	15	8	7	6	4	3	2	1
serotype	32,6 %	17,4 %	15,2 %	13,0 %	8,7 %	6,5 %	4,3 %	2,2 %

The frequency of serotypes of *C.trachomatis* in some European countries

2006 Hungary (Petrovay <i>et al.</i> , 2009)	2008 Sweden (Lagergård <i>et al.</i> , 2010)	2008 Estonia
D (34,4 %)	E (49,5 %)	E (32,6 %)
E (21,9 %)	F (16,2 %)	F (17,4 %)
F (18,8 %)	G (11,4 %)	K (15,2 %)
G (9,4 %)	K (7,6 %)	G (13,0 %)
J (9,4 %)	D (4,8 %)	D (8,7 %)



Finding suitable DNA loci for Multi Locus Sequence Tag (MLST) analysis.

Based on the literature we chose 12 loci for testing and ordered the appropriate primers (*oppA*, *gidA*, *enoA*, *hemN*, *CT144*, *CT222*, *hctb*, *FumC*, *Four*, *rr*, *gatA* ja *Hflx*). One additional primer pair was designed to amplify 23S *rRNA* sequence (*clam*)

8 primer pairs were able to amplify the expected region from *C. trachomatis* genome using clinical samples as templates.

The sequences of these 8 loci were determined, and polymorphisms were identified.

This allowed us to establish a MLST-based genotyping method with high discriminatory index ($D=0,97$)

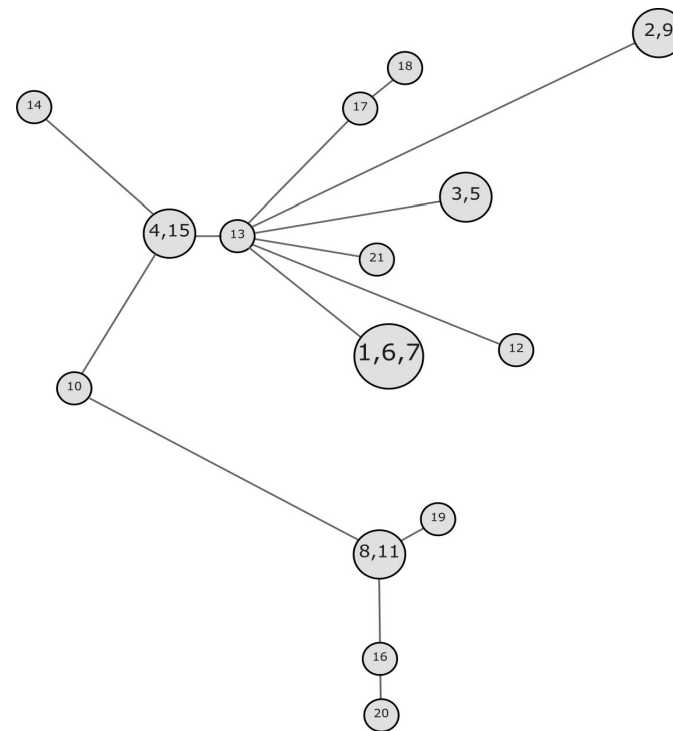
Polymorphisms in MLST loci

Proovi nr.	Lookus oppA		gidA		enoA		hemN		clam			CT144										CT222							Hctb											
	I	II	I	II	I	II	I	II	I	II	III	I	II	III	IV	V	VI	VII	VIII	IX	X	I	II	III	IV	V	VI	VII	I	II	III	IV	V	VI						
1	G	C	G	A	T	G	C	A	A	G												C	A	G	A	G	A	G	A	C	A	G	G	A	A	C	A	G	G	
2	A	T	A	A	T	A	A	G	A	A	C	G	G	T	C	A	G	A	C	G		T	A	A	A	A	G	G	T	G	T	G	G	G	G					
3	G	C	G	A	T	G	A				C	G	G	T	C	G	C	A	C	A		C	G	A	G	G	G	A	A	C	A	G	G	G	G					
4	G	C	G	G	C	G	A	A	A	G	C	G	G	C	T	G	G	G	A			C	G	A	G	G	G	G	A	A	C	A	G	G	G					
5	G	C	G	A	T	G	A	A	A	G	C	G	G	T	C	G	C	A	C	A		C	G	A	G	G	G	A	A	C	A	G	G	G						
6	G	C	G	A	T	G	C	A	A	G	T	A	T	C	T	G	G	G	A	A		C	A	G	A	G	A	G	A	A	C	A	G	G						
7	G	C	G	A	T	G	C	A	A		T	A	T	C	T	G	G	G	A	A																				
8					T	A	A	G	A	A	C	G	G	T	C	A	G	A	C	G		T	A	A	A	A	G	G	A	G	T	G	G	G	T					
9	A	T	A	A			A	G	A	A	C	G	G	T	C	A	G	A	C	G																				
10	G	C	G	G	T	G	A	A	A	G	T	A	T													G	G	G	G	A	G	C	A	G	G					
11	A	T	A	A	T	A	A				C	G	G	T	C	A	G	A	C	G																				
12	G	C	A	A		A	A	G	A	A	C	G	G	C	T	G	G	G	C	G																				
13	G	C	G	A		G	A	A	A	G	C	G	G	C	T	G	G	G	A	A																				
14			G	G		G	A	A	A	G	T	A	T	C	T	G	G	G	A	A																				
15			G	G		G	A	A	A	G	C	G	G	C	T	G	G	G	A	A																				
16	A		A	A		A	A	G	A	A	C	G	G	T	C	A	G	A	C	G																				
17			G	A		G	A	A	A	G	T	A	T	C	T	G	G	G	A	A																				
18			G	A		G	C	A	A	G	T	A	T	C	T	G	G	G	A	A																				
19			A	A		A	A	G	G		C	G	G	T	C	A	G	A	C	G																				
20			A	A		A	A	G	A		C	G	G	T	C	A	G	A	C	G																				
21	G		G	A		G	A	A	A	G	T	A	T	C	T	G	G	G	A	A																				

Roman numerals designate different polymorphisms in the same locus.

The population structure of *C. trachomatis*

We analyzed 21 *C. trachomatis*-positive samples and identified 15 different genotypes. Such a high heterogeneity indicates that local *C. trachomatis* population has been stable for quite some time without significant population sweeps or bottlenecks.



Every circle is a separate genotype, number identifies a sample. The size of the circle is proportional to the number of samples belonging into this genotype and the length of a line is proportional to the genetic distance.

Summary

1. The prevalence of *C. trachomatis* among 1200 patients that came to the doctor was 7.3 %. This was similar to Sweden (6.7%), but lower compared to Thailand (18,4%).
No statistically relevant differences between subgroups were identified.
2. 8 different serotypes were found - E (32,6 %), F (17,4 %), K (15,2 %), G (13,0 %), D (8,7 %), J (6,5), B (4,3 %) ja H (2,2 %); these frequencies are similar to Sweden
3. Only men with complains visit doctors, there were no samples from men without complains. In order to effectively fight *C. trachomatis* infections we need to recruit more men to test themselves.

Self-testing (www.testikodus.ee)

TESTIKODUS

SUGUHAIGUSTE DISKREETNE TESTIMINE

OTSI:

EST | RUS ▶

AVALEHT
SUGUHAIGUSED
SUGUHAIGUSTE TESTID
TESTIMISEST
KUIDAS TELLIDA
KOOSTÖÖPARTNERID
TEIE KONTO

- ✓ KIIRE
- ✓ KINDEL
- ✓ DISKREETNE



- 1 TELLI TEST
- 2 VÕTA PROOV JA PANE POSTI
- 3 VAATA TURVALISELT TULEMUST

Testikodus.ee võimaldab ennast testida enamlevinud suguhaiguste suhtes. Teie proovile annab vastuse tunnustatud labor.

LOGI SISSE:

Kasutajanimi

.....

SISENE

Kaotasid parooli?



SUGUHAIGUSED

Suguhai­gused on seksuaalsel teel edasikanduvad haigused. Edasi võivad kanduda erinevad haigustekitajad - bakterid, viirused, seened või parasiidid.

Vaata lisaks...



TESTID

Kahtluse korral soovitame esmalt tellida kolmiktesti. Ravi efektiivsuse kontrolliks on mõistlik testida konkreetse haiguse suhtes.

Vaata lisaks...



TURVALISUS

Testikodus.ee hindab Teie konfidentsiaalsust ja tagab turvalisuse testide tellimisel ning tulemuste avaldamisel.

Vaata lisaks...

KOLMIKTEST

Klamüüdia, gonorröa ja trihhomonoosi DNA test

TELLI



GONORRÖA

Gonorröa DNA test

TELLI



MÜKOPLASMA

Mükoplasmoosi DNA test

TELLI



Self-testing (www.testikodus.ee)

In Estonian market science February 2010

From one sample client can order the tests for:

Chlamydia trachomatis

Neisseria gonorrhoeae

Trichomonas vaginalis

Mycoplasma genitalium



Male: first void urine

Female: self obtaine waginal swabs



Chlamydia cases in testikodus.ee

Number of tested samples: 343

Men: 246 (72%)

Women: 95 (28%)

Chlamydia trachomatis positive cases 9,6% (usually 5 -7 %)

Testikodus.ee is becoming an alternative for men who are not eager to visit andrologist/dermatologist.



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