



Detection of HEV in Estonia



**Anna Ivanova,
Irina Golovljova,
Valentina Tefanova**



Tervise Arengu Instituut
National Institute for Health Development

National Institute for Health Development

Department of Virology

Zoonotic pathogens

Tick-borne pathogens:

**TBEV,
Borrelia sp.,
Rickettsia sp.,
Babesia sp.,
Ehrlichia sp.**

Rodent-borne pathogens:

Hantaviruses

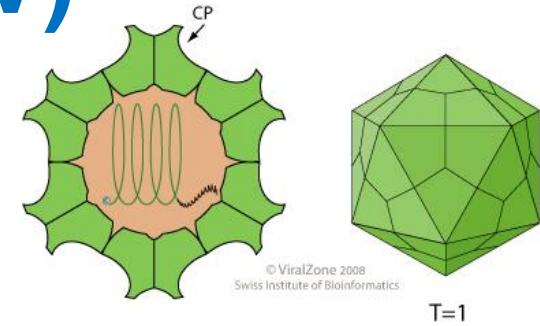
Hepatitis viruses

HAV, HBV, HCV, HEV



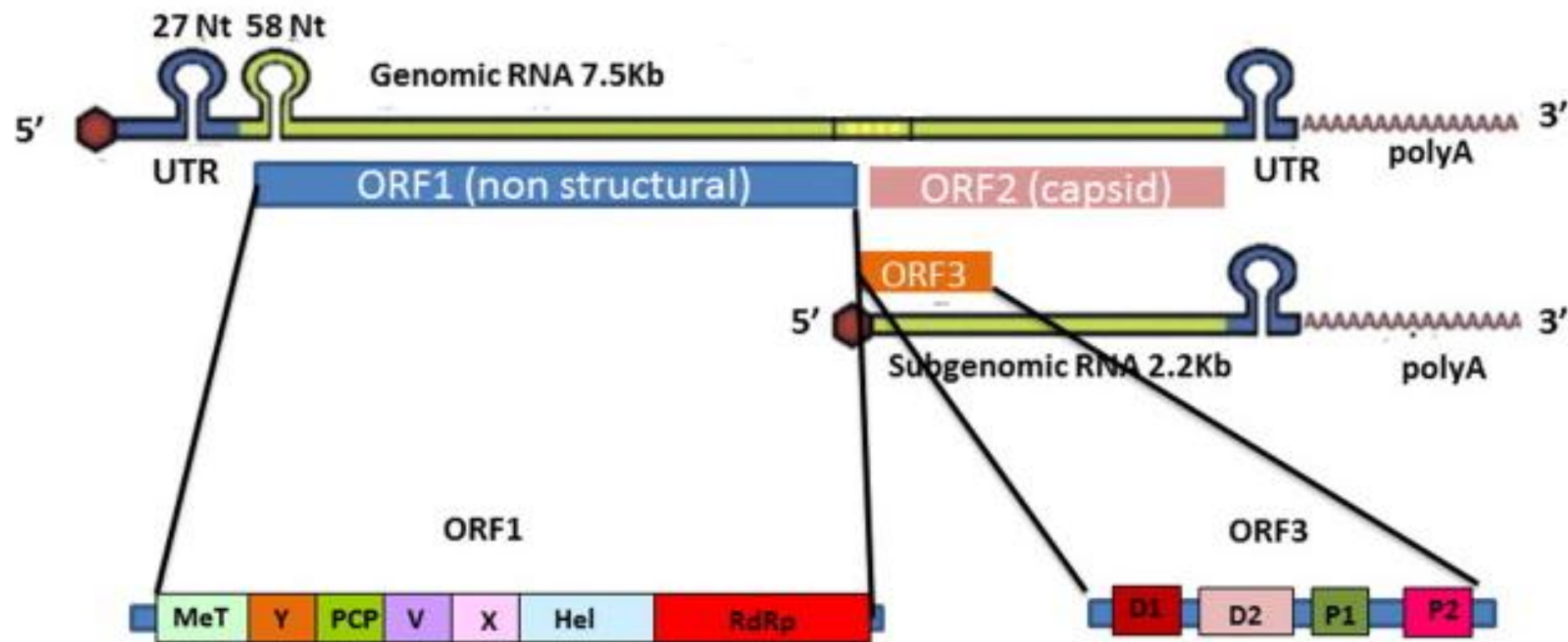
Hepatitis E virus (HEV)

Family: Hepeviridae
Genus: Hepevirus



Small, non-enveloped virus
ssRNA (+)

HEV genome



Hepatitis E: An emerging disease

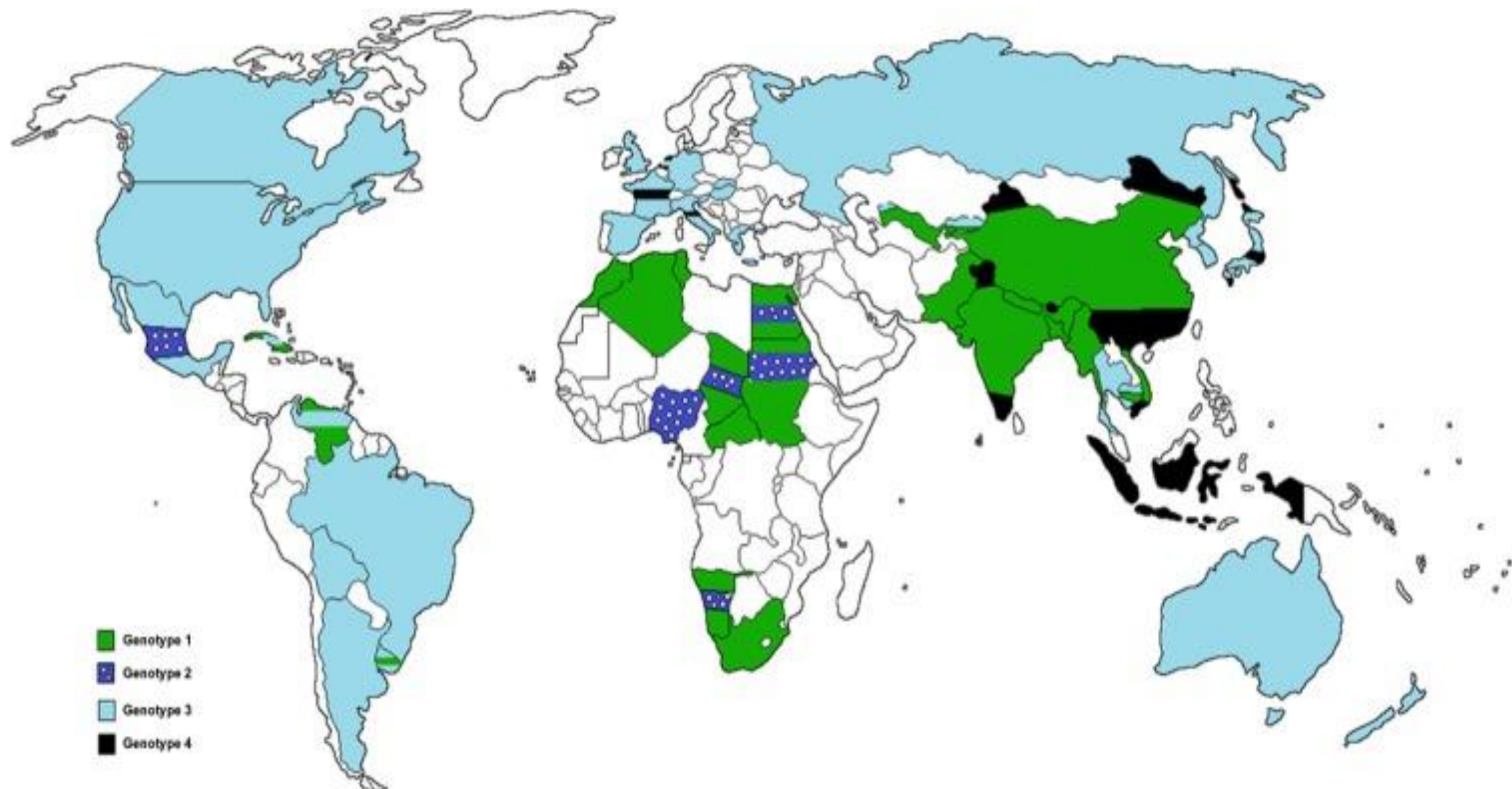
M. Pérez-Gracia et al.

Infection, Genetics and Evolution, Volume 22, 2014, 40 - 59

Klaipeda, 12.06.2015



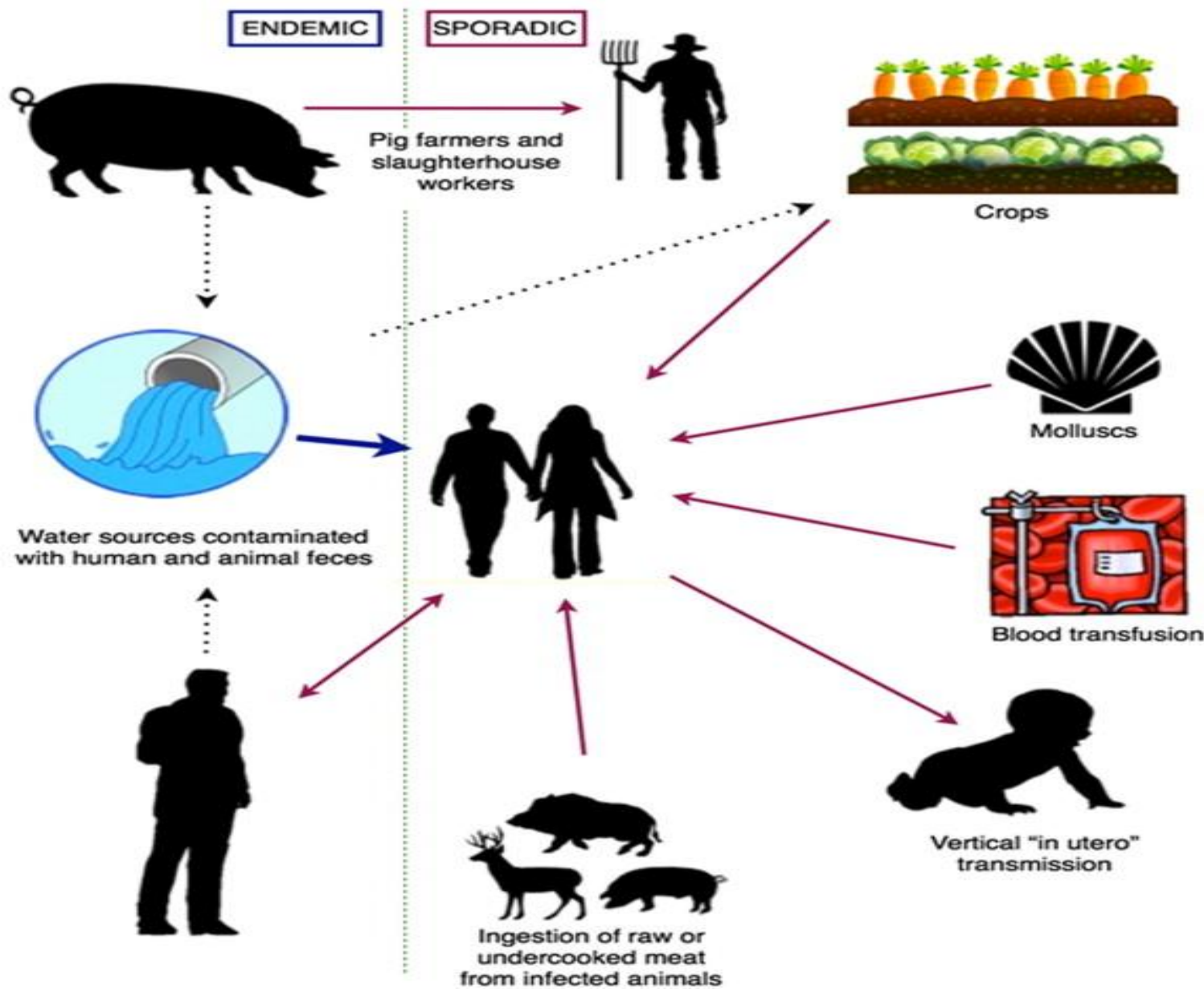
Geographical distribution of hepatitis E virus genotypes.



S. Mirazo, et al *Hepat Med.* 2014; 6: 45-59.



Transmission routes of HEV



Hepatitis E: An emerging disease

M. Pérez-Gracia , et al.

Infection, Genetics and Evolution, Volume 22, 2014, 40 - 59



Aims



- To assess HEV seroprevalence level in different human populations in Estonia



- To assess the presence of HEV infection in Estonian domestic pig and wild boar populations

Human serum samples

Retrospective samples

Ambulatory pt. without any known infectious disease (AP; 2003)	151
Acute nonA-nonC (1994-2000)	762
Health care workers (2004)	163
Hemodialysis pat. (1996-2006)	176
IDU (2009-2010)	205

Samples collected for the current study

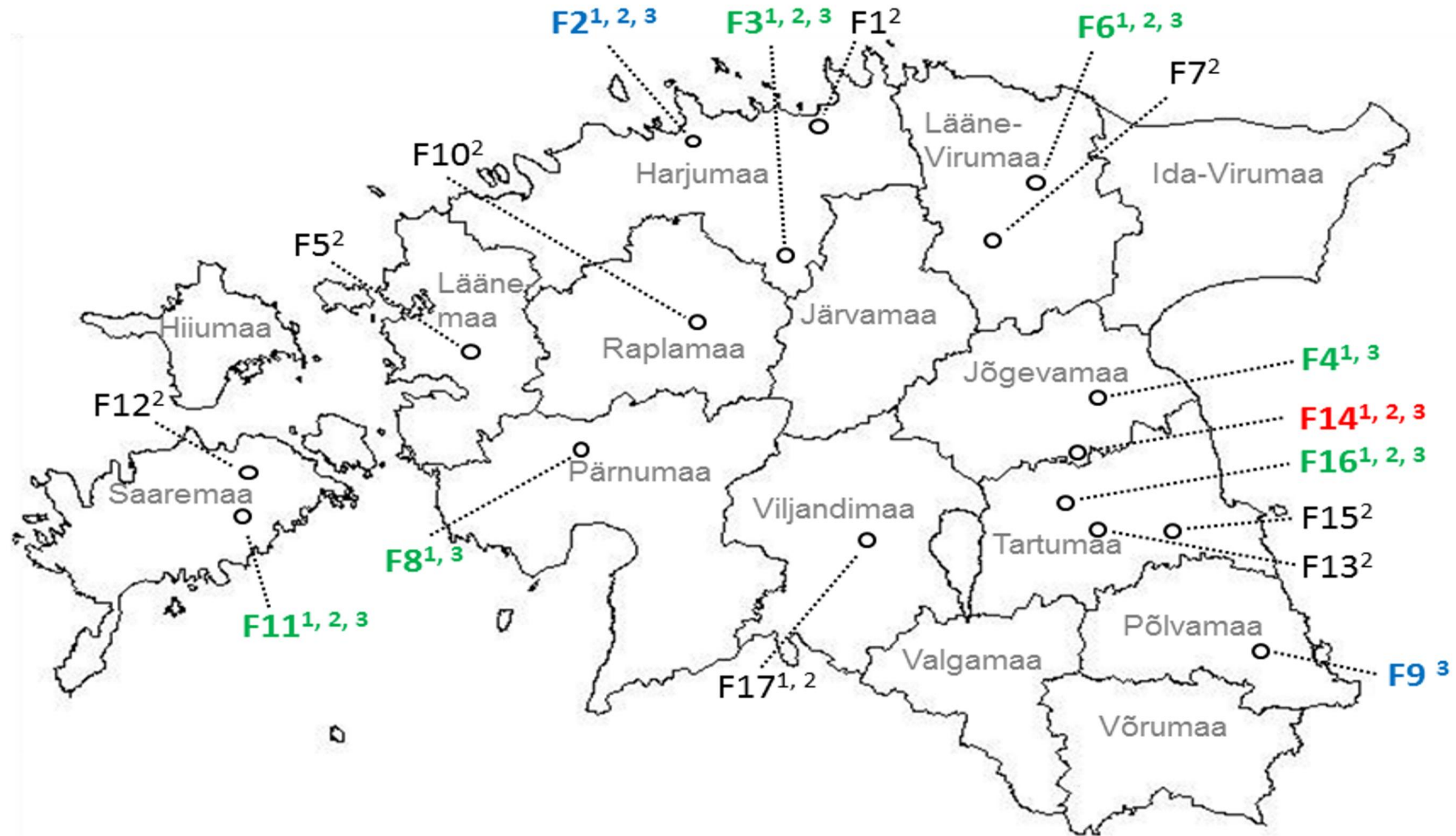
Veterinarians	158
Pig farm workers	67
Hunters	144

Samples from domestic pigs and wild boars

Serum samples from adult pigs ($\geq 1,5$ y)	380
Fecal samples from pigs (2 - 4 months)	449
Meat juice from wild boars	471

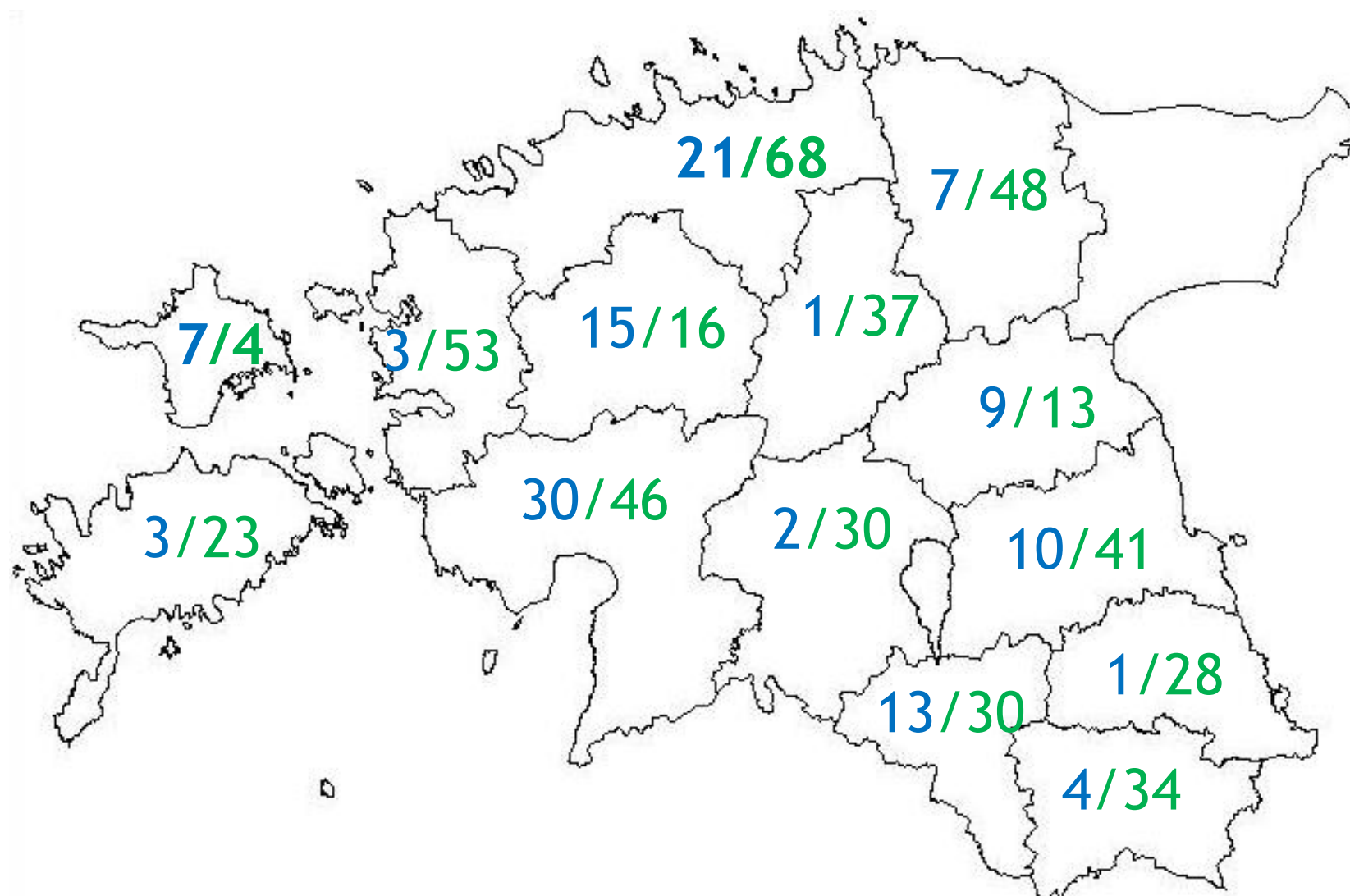


Location of 17 farms where samples were collected



- 1 - Serum samples of pig farm workers
- 2 - Serum samples of domestic pigs
- 3 - Fecal samples from pigs

Collection of serum samples from hunters and wild boars



Serological assays

Human samples:

ELISA: recomWell IgG and IgM (Mikrogen GmbH, Germany)

Confirmatory IB test: recomLine HEV IgG/IgM (Mikrogen GmbH, Germany)

Pig serum and wild boar meat juice samples

ELISA: PrioCHECK HEV porcine kit (Prionics AG, Switzerland)

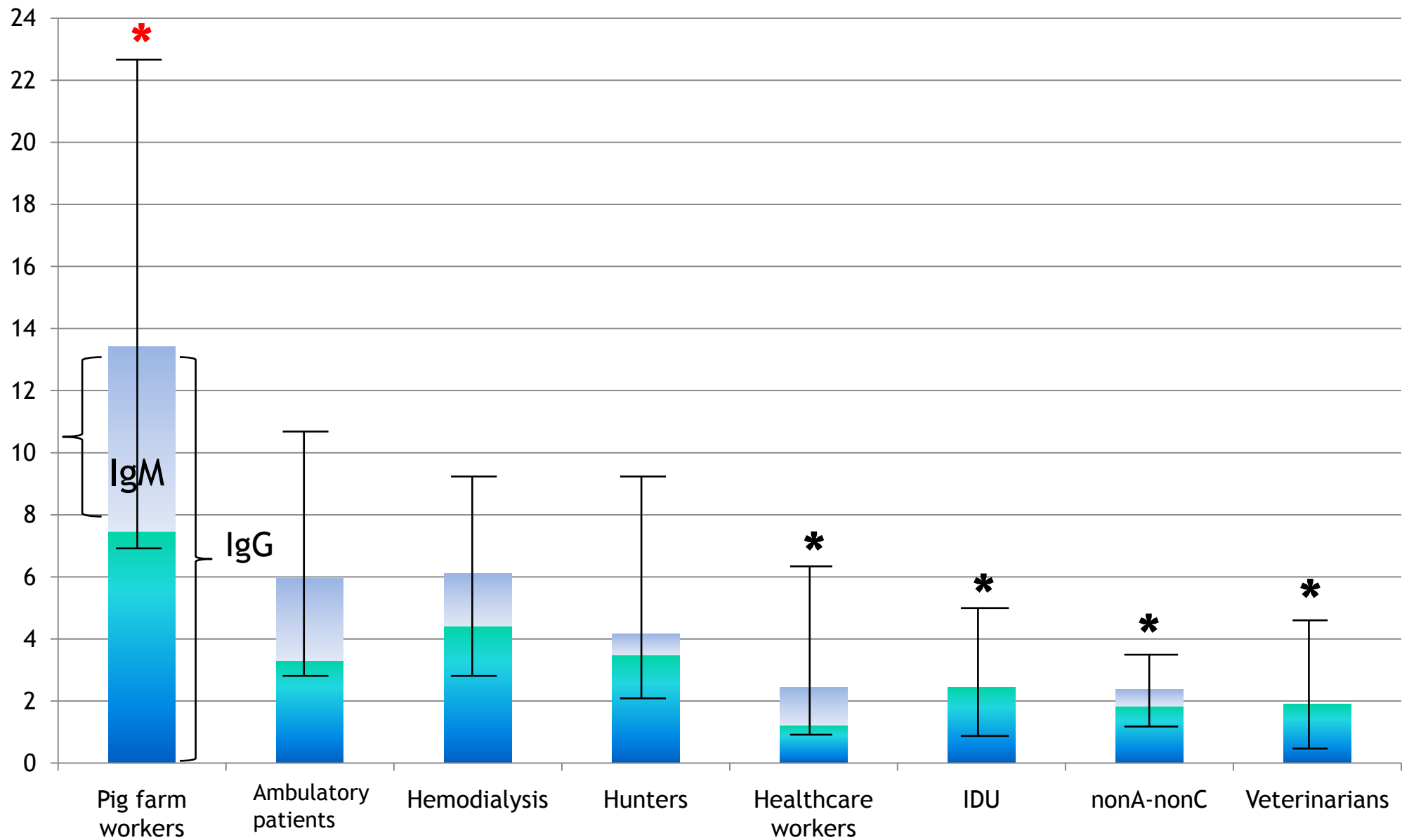
Detection of viral RNA

- qPCR for samples screening (Jothikumar et al., 2006)
- Samples positive in qPCR amplified in the ORF2 region (1011 nt)



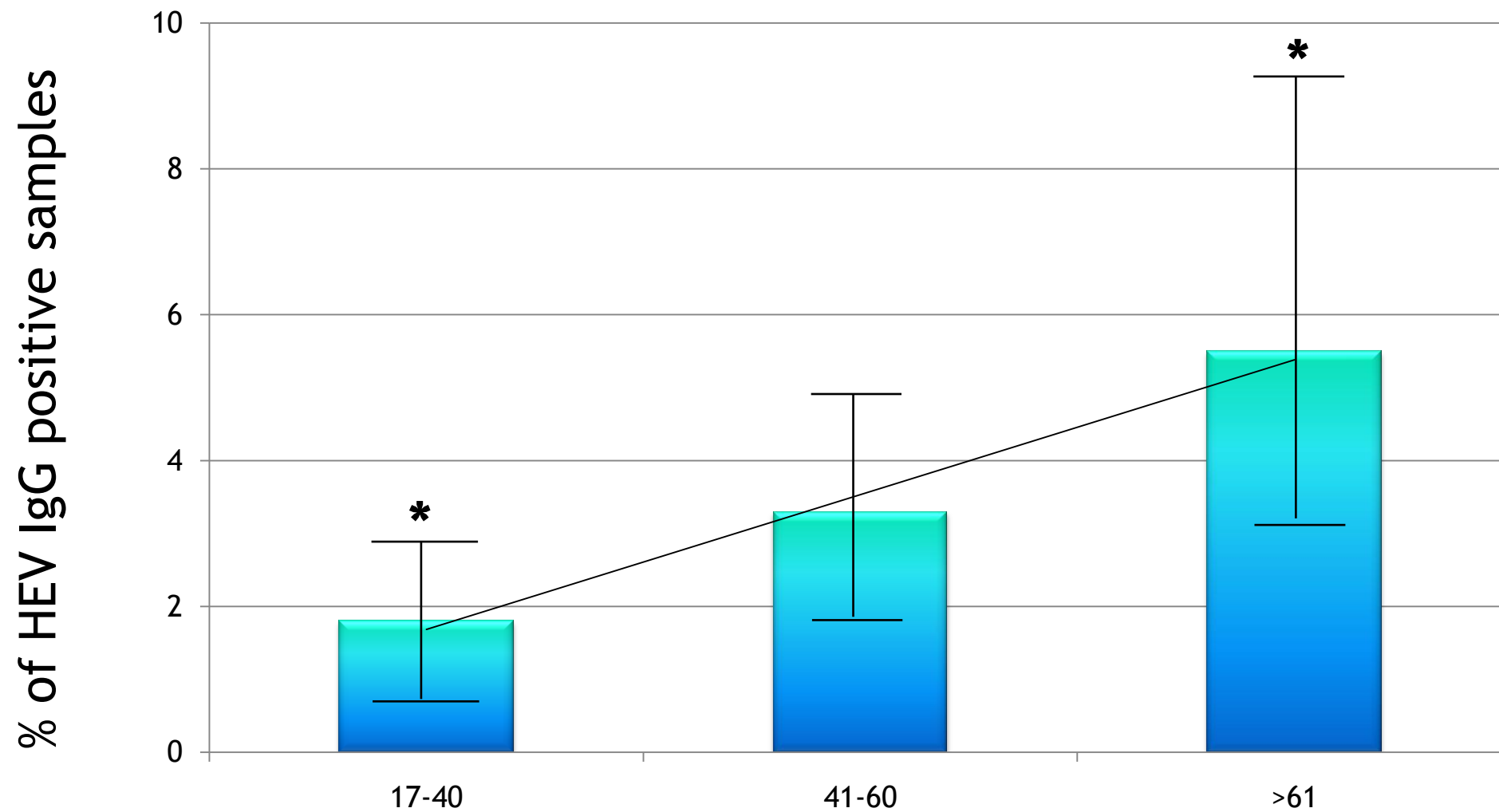
Detection of antibodies against HEV in Estonian human population

% of HEV IgG/IgM positive samples

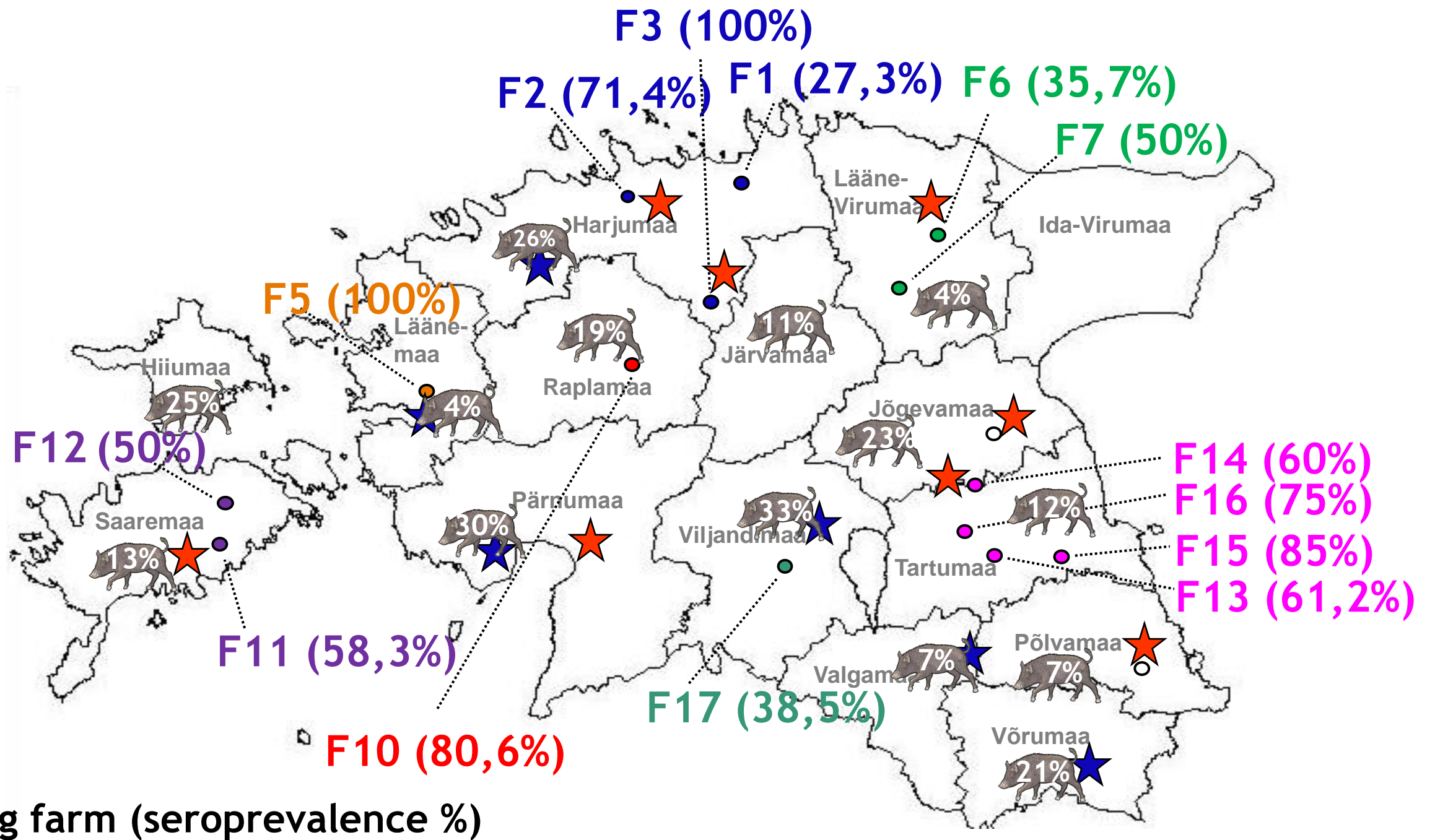




Anti-HEV IgG seroprevalence in different age groups



HEV antibodies and HEV RNA in domestic pigs and wild boars



F - pig farm (seroprevalence %)



Seroprevalence in wild boar



HEV RNA in domestic swine

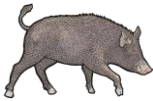


HEV RNA in wild boar

Klaipeda, 12.06.2015



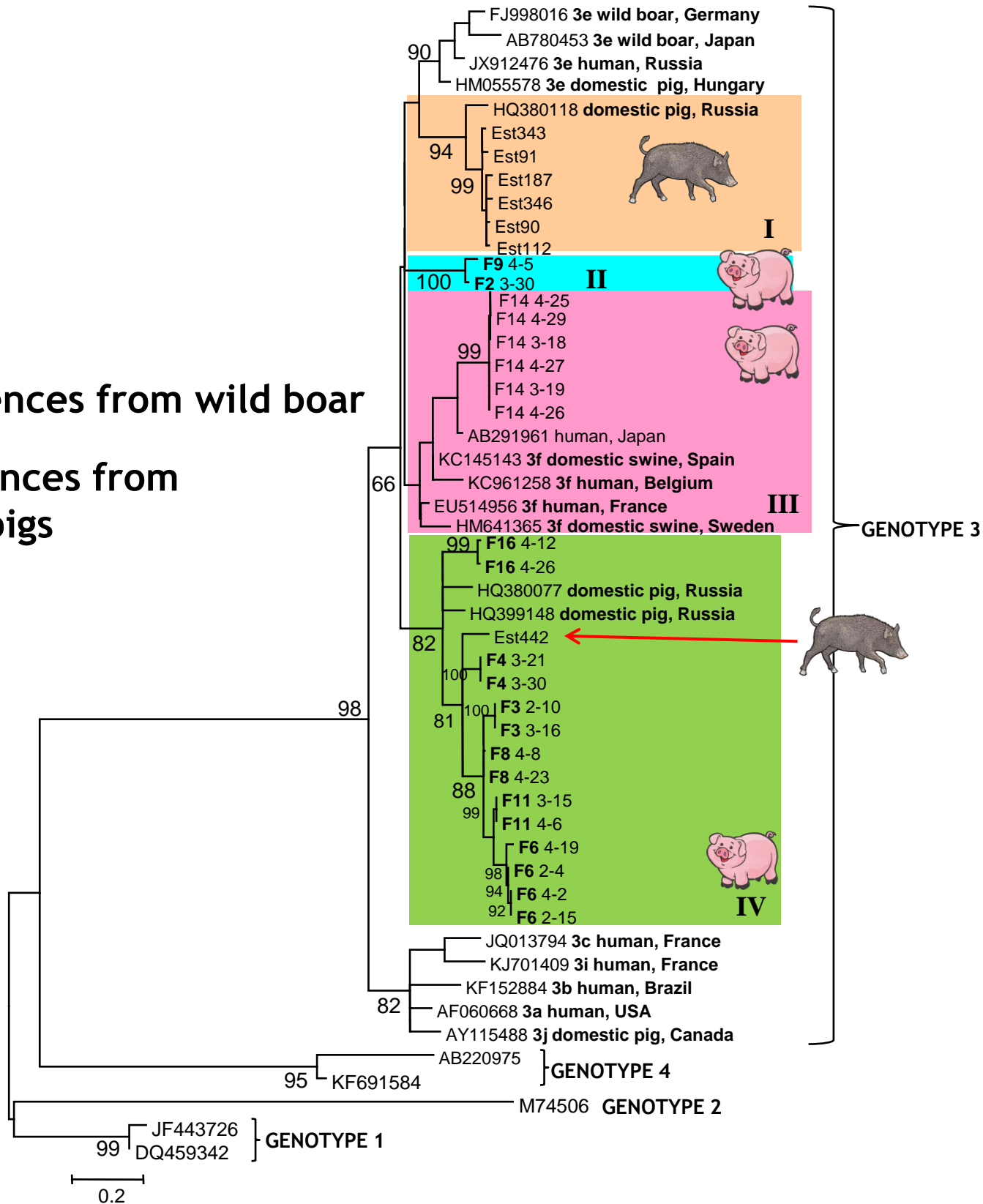
Phylogenetic tree based of Estonia HEV sequences on the partial ORF2



HEV sequences from wild boar

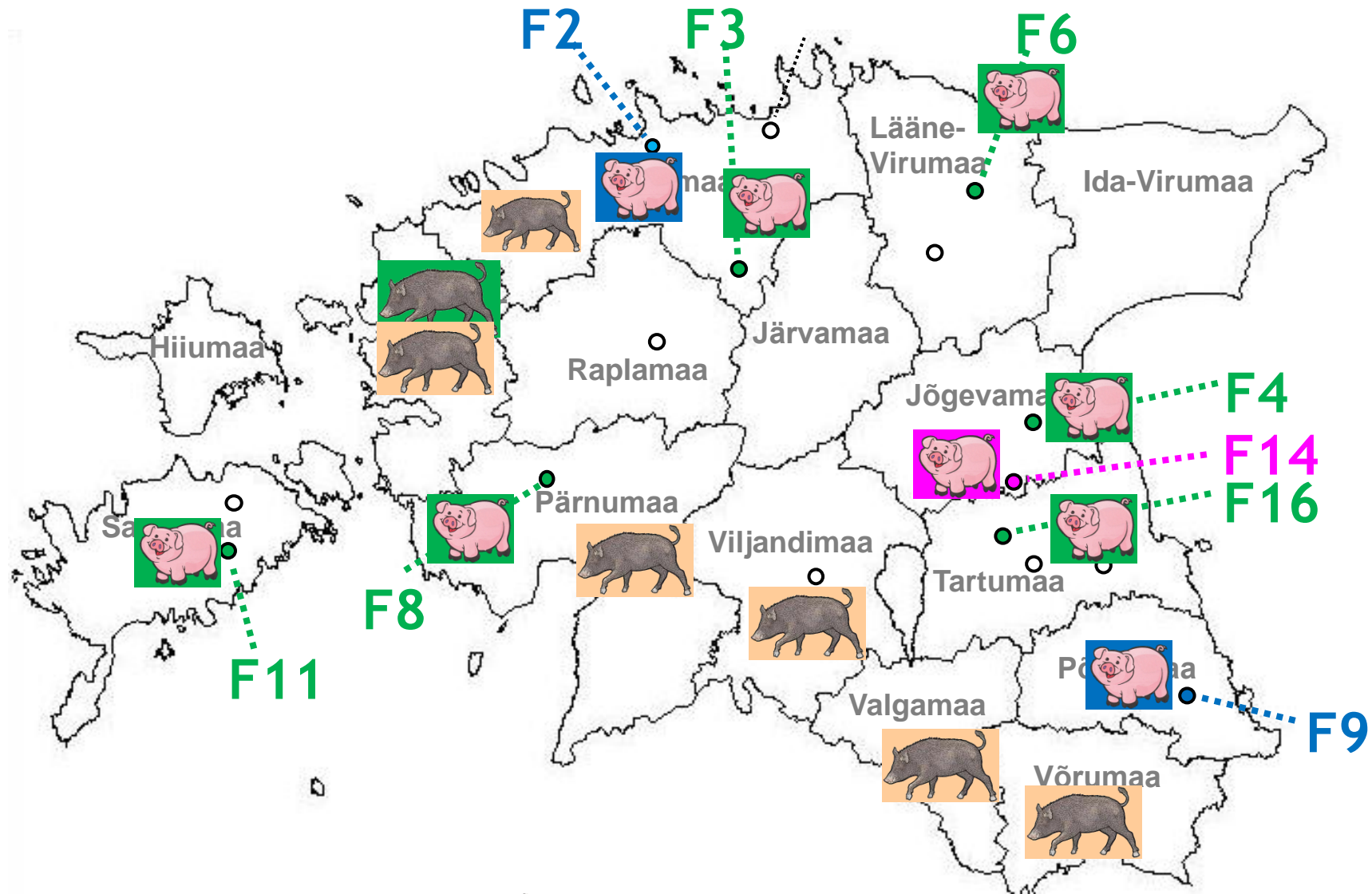


HEV sequences from domestic pigs





Geographical distribution of HEV lineages



- Lineage 1
- Lineage 2
- Lineage 3
- Lineage 4
- Sequences from wild boars
- Sequences from domestic pigs

Conclusions



HEV circulates in Estonia





Domestic pigs and wild boars are possible reservoirs and source of human HEV infection



Seroprevalence in pig farm workers appears to be highest among the analysed groups

All Estonian HEV strains from animals belong to genotype 3, but form 4 separate lineages

Acknowledgments



**Arvo Viltrop, Brian Lassen, Tiiu Saar,
Department of Basic Veterinary Science and Population
Medicine, Estonian University of Life Science**



**Jevgenia Epstein, Kuulo Kutsar, Natalia Kerbo
Public Health Board of Estonia**

**The study was financially supported by the European Regional Development
Fund, Programme TerVe,
Projects ZoonRisk and EKZE**