
GD
Teaming up for animal health, in the interest of animals, their owners and society at large

Teaming up for animal health

Control of *Salmonella* spp. in Dutch dairy herds

Maarten F. Weber,

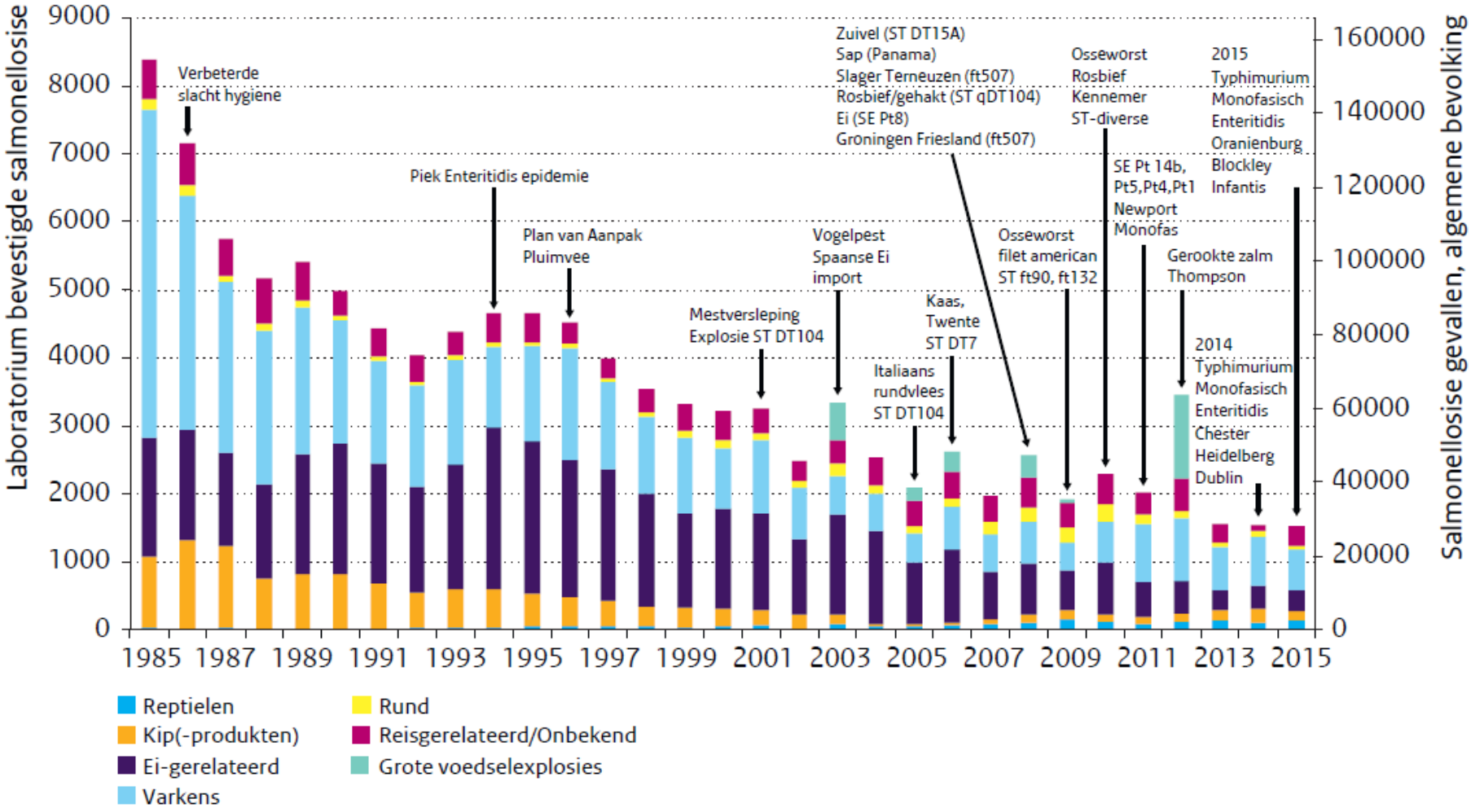
GD Animal Health, Deventer, The Netherlands

Human salmonellosis (NL)

Human salmonellosis cases (per 17,000,000 humans)	2013	2014	2015
General population	28,000	27,500	27,200
General practitioner	4,200	4,100	4,380
Hospitalised	1,100	1,080	1,068
Death	27	27	25

National Institute for Public Health and the Environment 2016, Staat van zoonosen 2015

Figuur 2.19.2A Geschatte bijdrage aan de humane, laboratoriumbevestigde salmonellose (linker y-as) door reizen (of onbekend), landbouwhuisdieren of hun producten. Omvangrijke explosies die niet representatief zijn voor de *Salmonella*-status van de Nederlandse vee- en pluimveestapel, zijn in groen aangegeven. (Bron: Laboratoriumsurveillance RIVM)



National Institute for Public Health and the Environment 2016, Staat van zoonosen 2015

Epidemiol. Infect. (2009), **137**, 1548–1557.
doi:10.1017/S0950268809002337 Printed in the United Kingdom

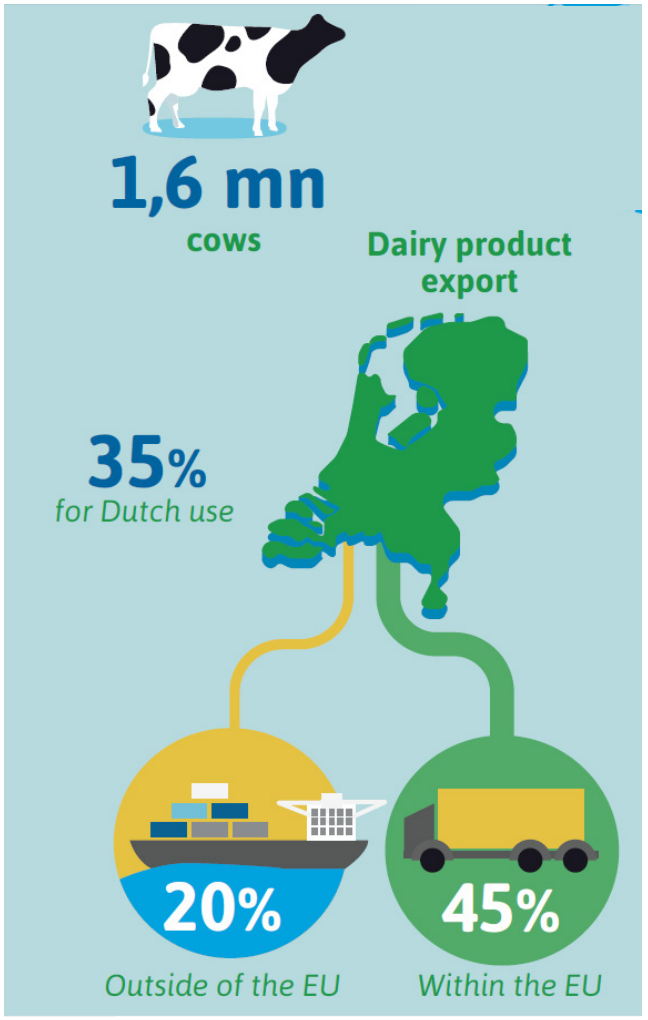
A prolonged outbreak of *Salmonella* Typhimurium infection related to an uncommon vehicle: hard cheese made from raw milk

Y. T. H. P. VAN DUYNHOVEN[1]*, L. D. ISKEN[1], K. BORGEN[1,2], M. BESSELSE[3], K. SOETHOUDT[3], O. HAITSMA[3], B. MULDER[4], D. W. NOTERMANS[1], R. DE JONGE[1], P. KOCK[5], W. VAN PELT[1], O. STENVERS[6] AND J. VAN STEENBERGEN[1], on behalf of the Outbreak Investigation Team†

[1] *Centre for Infectious Disease Control Netherlands, National Institute of Public Health and the Environment (RIVM/CIb), Bilthoven, The Netherlands*
[2] *European Programme for Intervention Epidemiology Training, European Centre for Disease Prevention and Control, Sweden*


Export value
€ 6,6 bn


Dairy's contribution to the Dutch trade balance
9%

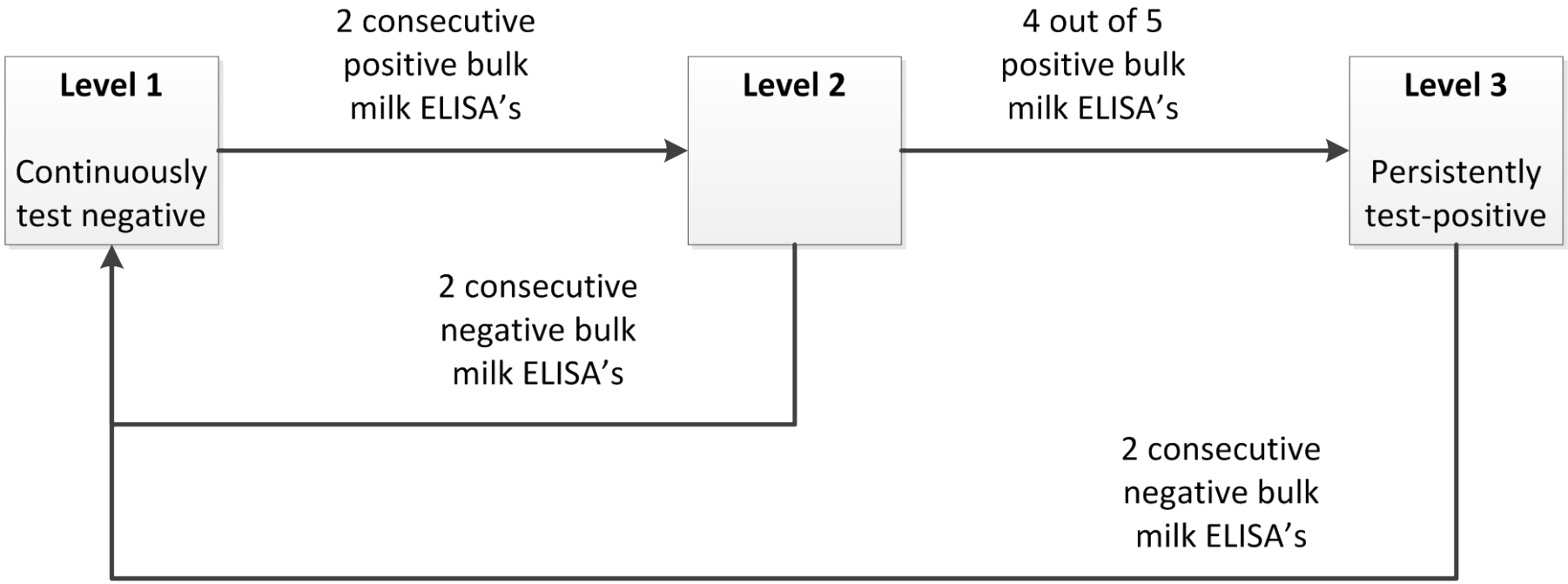

1,6 mn
cows
Dairy product export
35%
for Dutch use
20%
Outside of the EU
45%
Within the EU

Control in Dutch dairy herds

- Certification-and-surveillance programme (2000 – present)
  - enable low risk trade of cattle between herds
  - alert farmers to an infection in their herd
  - reduce human exposure
- Control programme dairy processors (2008 – present)
  - stimulate farmers to control infection in their herd
  - reduce prevalence of infection

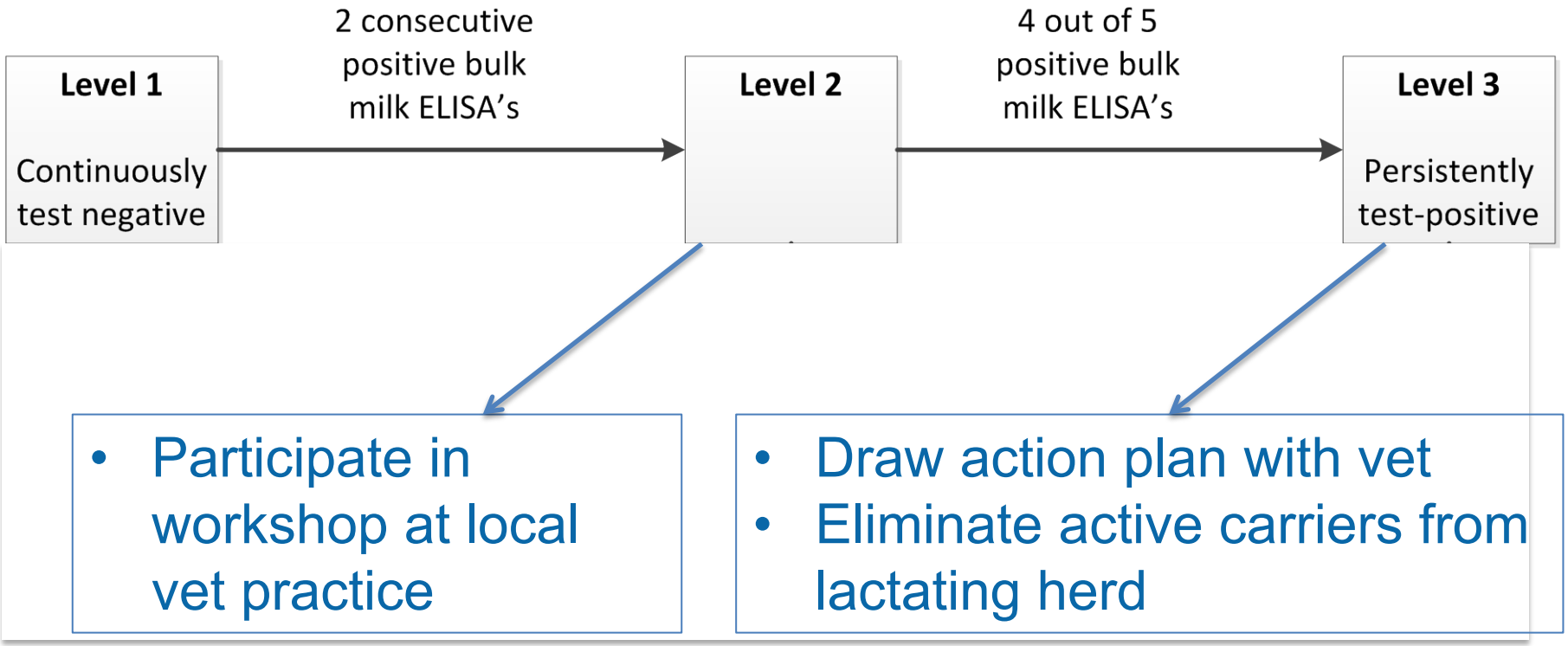
Scheme of dairy processors

- Bulk milk ELISA @ 4 month intervals



Scheme of dairy processors

- Bulk milk ELISA @ 4 month intervals



Test round (1 to 11)

OR = 0.91

Season: Sept - Dec

OR = 2.1

Province (1 to 12)

Soil type:

Sand: reference
Clay: OR = 1.8
Sandy loam: OR = 1.4

Surface water area

≤ 2%: reference
>2%: OR = 1.3

Dairy herds within 500 m:

No herds: reference
Test-negative herd(s): OR = 0.8
Test-positive herd(s): OR = 2.0

Distance to pigs:

>2 km: reference
0 km: OR = 1.9

Net profit

Average: reference
10% highest: OR = 0.5

Herd size

Average: reference
< 36: OR = 0.7
36-75: OR = 0.9
73-137: OR = 1.1
>137: OR = 1.6

Increase of herd size (1 yr)

Average: reference
>12.5% increase: OR = 0.9

Cattle introduced from other herds

None: reference
Test-negative herd(s): OR = 1.2
Test-positive herd(s): OR= 1.4

Concept of control

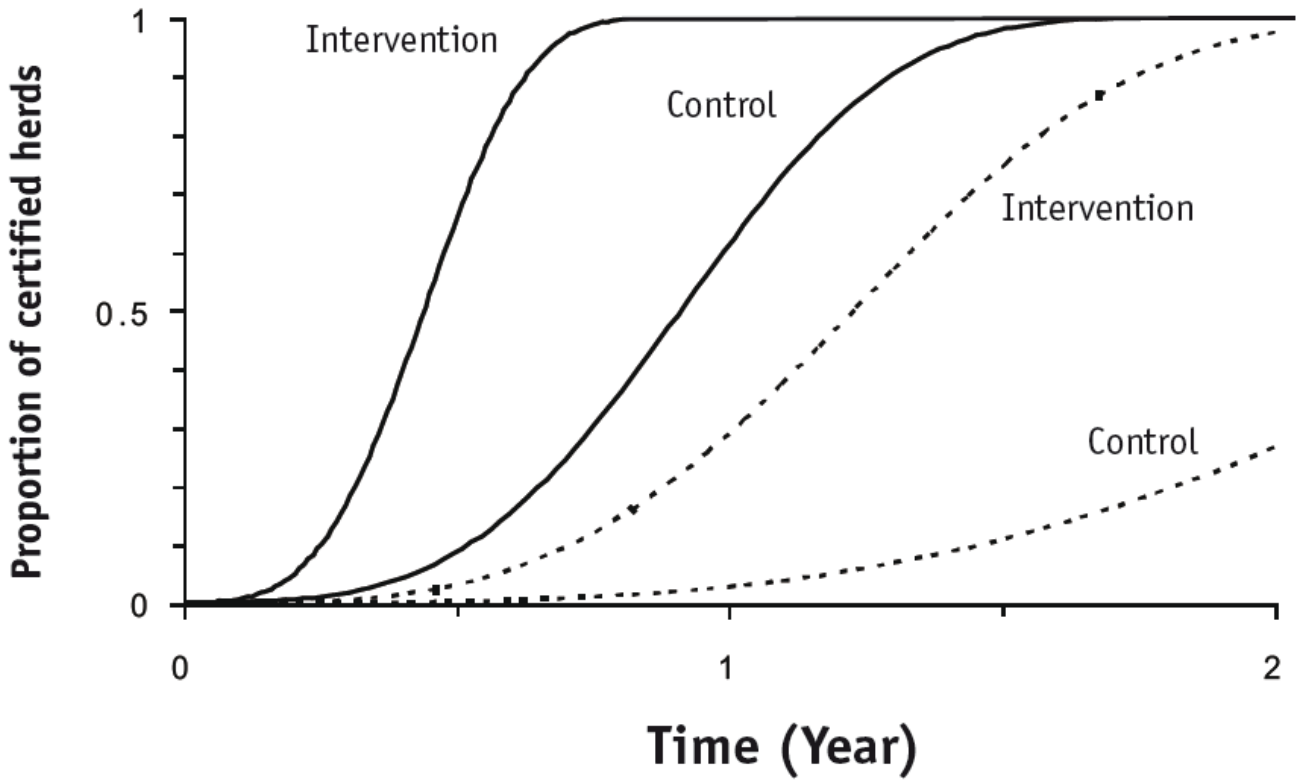
- Preventive measures
  - reduce rate of introduction of infection
  - increase probability of extinction of infection

Clinical trial (2005-2008)

- 50 herds, > 1 year infected
- intervention: identification of salmonella carriers & advice to eliminate them
- aim: evaluate efficacy of intervention, adjusted for differences in herd management

Clinical trial

- Fitted time until ‘salmonella-unsuspected’



—— = good and ------- = poor herd management

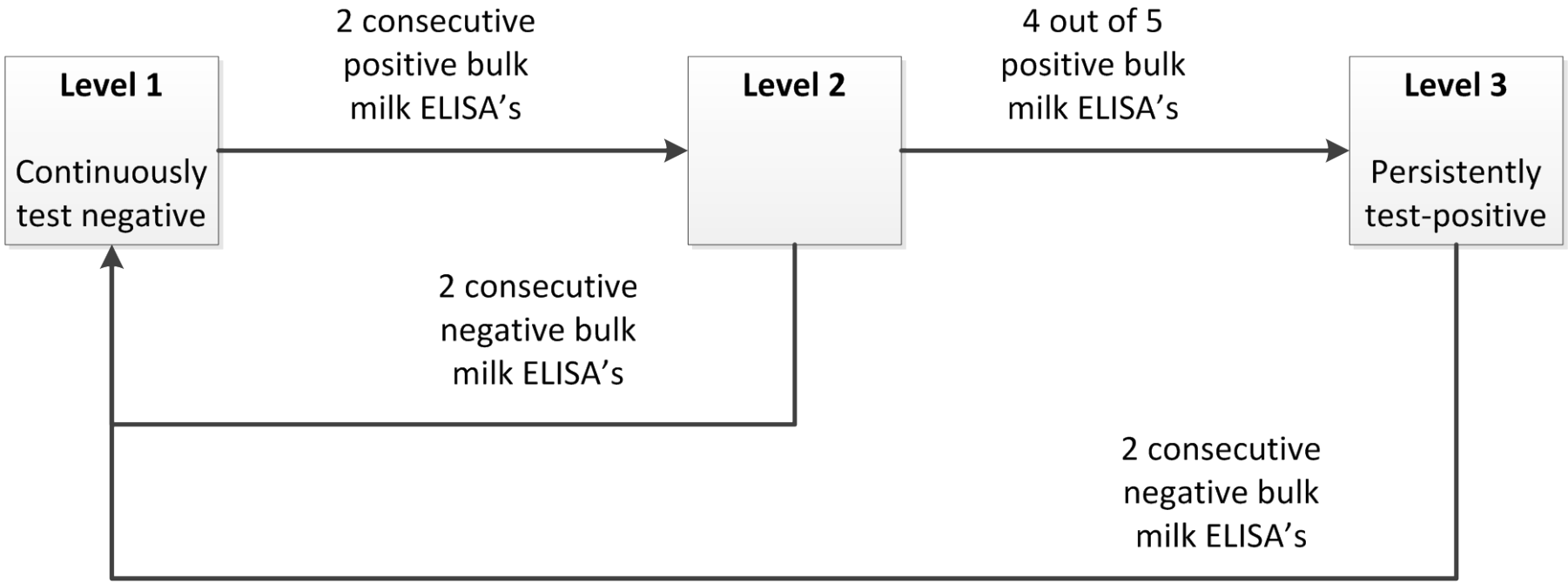
Clinical trial

- Probability of achieving ‘salmonella-unsuspected’ status within 1 year:

Culling salmonella carriers: 	30%
Preventive herd management: 	57%
Combined approach:	>95%

Scheme of dairy processors

- Bulk milk ELISA @ 4 month intervals



Field study (2012-2014)

- 100 dairy herds, level 3 after test round 2012-2:

Herds	2012-3	2012-3	Number of herds
Control	N	N	30
	P	N	20
Case	**P**	**P**	50

Concentrates 14 days ante partum

Yes: reference
No: OR = 4.0

Calves 1st week water

Yes: reference
No: OR = 4.2

Calving shed

Individual: reference
Group: OR = 14
None: NS

Cats: OR = 7.2

Soil:

Sandy loam, low moor bog, clay >> sand

Harvesting silage between fertilisation with slurry and summer barn feeding

Yes or N/A: reference
No: OR = 6.1

Field study (2012-2014)

Further analyses confirm effects of

- Infection pressure
- Hygiëne and separation of groups
- Resistance to infection
- Soil type

Field study (2012-2014)

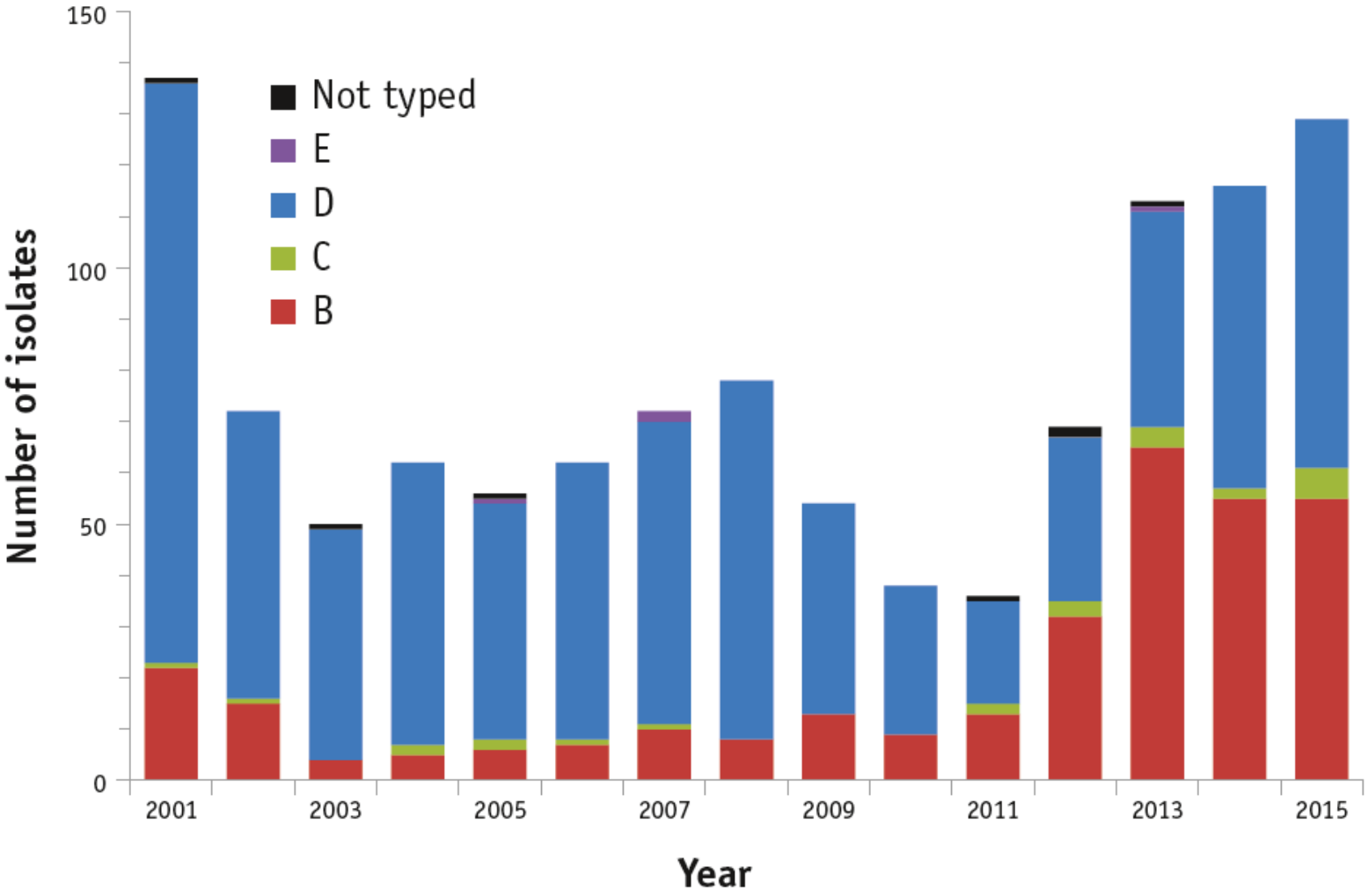
Action plans

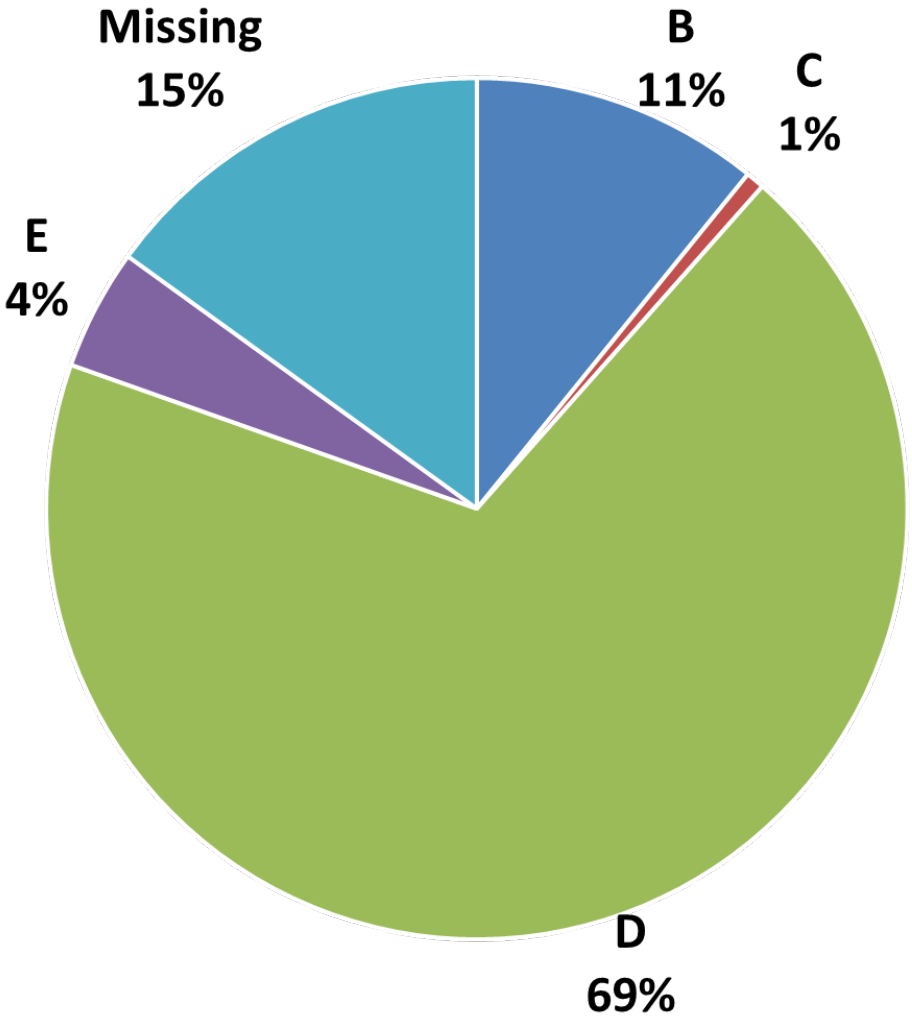
- Important preventive measures frequently not identified
- Poor compliance
- Often only part of herd tested to identify active carriers
- Identified active carriers not always eliminated

Results

- 1/3 of Level 3 herds achieved Level 1 during 16 months study period

Post mortem (dairy herds)





Active carriers, 2008-2012 (*n* = 286)

Discussion

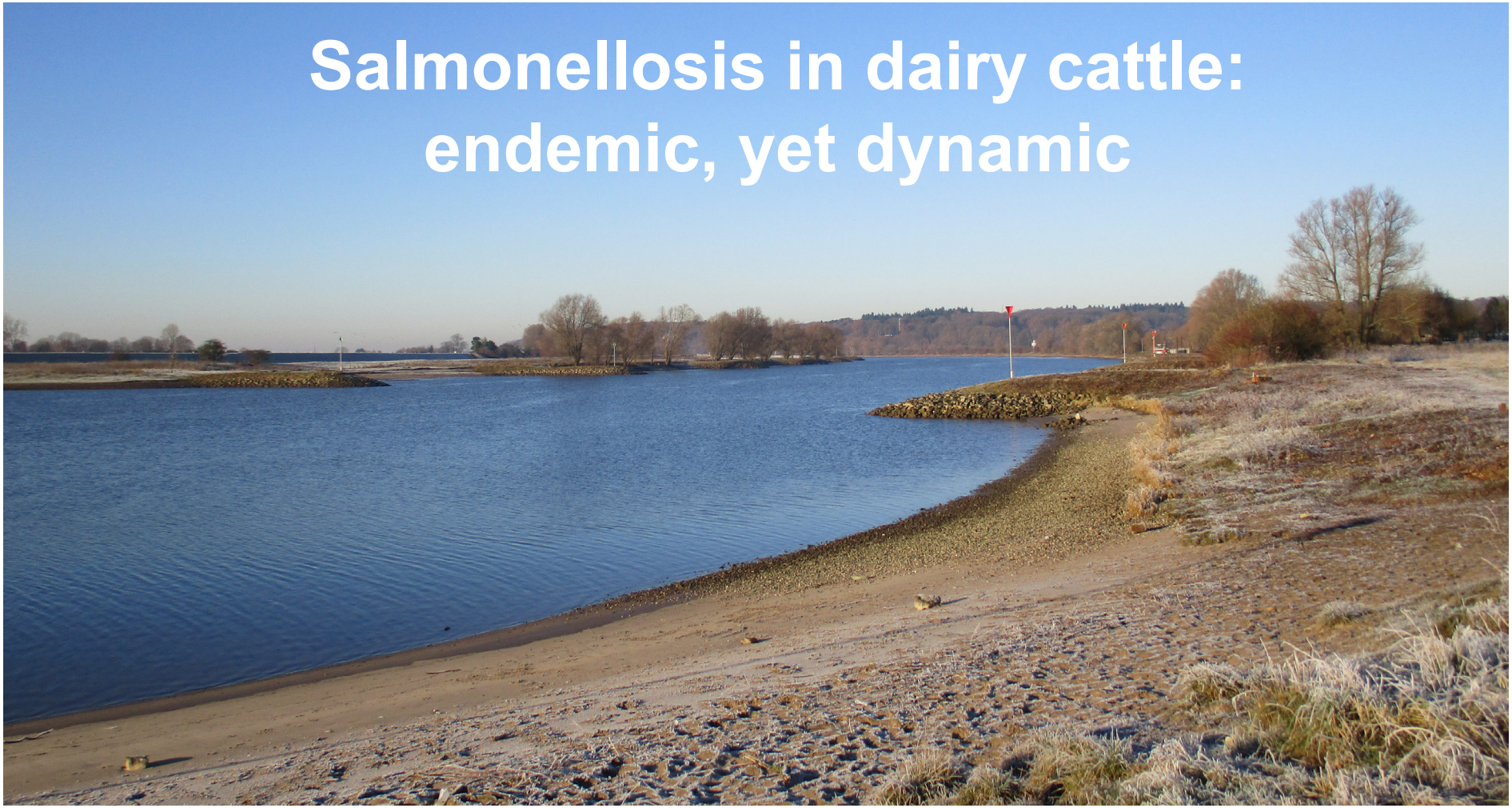
- Control in infected herds is feasible, provided the farmer is prepared to take vigorous action
- Progress on national level less than anticipated

Discussion

Challenges for the future:

- Influence contact structure between herds
- Stimulate farmers to take action, right now
- Study dynamics of various serotypes and adapt, if needed, control measures

Conclusion



m.weber@gdanimalhealth.com