



# Norway's BVD Program: A Success Story and actions taken in Europe

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# The Norwegian and European Story

- The establishment of the Norwegian program
- The Control-scheme
- The Test-scheme
- Observed effects of BVDV within herds
- Observed trends in the population
- Cost-benefit of Norwegian BVD control
- The success factors
- AND What's going on in Europe?



# The Norwegian Cattle industry

- Dairy cattle 300,000 (stable figures)
- Dairy herds 17,000 (and decreasing)
- Beef cattle 25,000 (slow increase)
- Beef herds 4000 (and decreasing)



# 'How it all startet.'

- Focus within the academics – e.g. UK and Sweden (mid 80'ies)
- Formulation of a test-scheme – Alenius & Niskanen (late 80'ies)
- Focus within national academics (late 80'ies)
- Focus among private practitioners (early 90'ies)
- Focus (and eventually demands) among farmers and following thereafter their cooperatives (early 90'ies)



# A Cooperative approach

National  
Animal  
Health  
Authorities  
And  
Veterinary  
Institute

'Dugnad' =

voluntary communal work  
or

Farmers  
The industry  
(TINE, GENO  
and Norwegian  
Meat)  
their Health  
Services and  
local vets  
pushing

'Join the neighbours in giving a hand with a house'



# The Norwegian Control-Scheme

- Isolation of infected herds by official movement restrictions
  - BVD was already a notifiable disease in Norway

A  
Compulsory  
and National  
approach

Versus  
Individual Farm  
approaches



# The Risk Factors addressed i.e. the Educational focus for Biosecurity

- Young stock on common pasture
- Over-the-fence pasture contact
- Purchase of live animal
- Not asking for health certificates
- Other animal(cattle) traffic
- Not using advisory services



# Test-scheme

(measuring antibodies i.e. the foot prints of infection!)

Bulk Tank Milk (BTM) test

First Calving Heifers Milk (FCHM) test

Young Stock (YS) pooled blood

- *YS positive* => *Official Movement Restrictions*

Optional!

Herd-screening at  
Farmers cost!!



# Observed Herd Health effects

- Abortion + > twice the risk (OR=2,2)
- Time to first calving: + 14 days (1-27) by sero-conversion(SC)  
+ 18 (1-37) in YS positive herds
- Milk production: - 96 kg/lactation (28 to -220)
- Culling + 2,5/100 cow years (CY) by SC  
+ 2,3 in year after SC
- Animals lost/died\* + 0,2/100 CY by SC  
+ 0,25/100 CY in year after SC  
+ 0,32/100 CY in YS herds
- Disease Treatments\* + 9.8 (0 – 21)/100 CY in year after SC  
+ 21 (0 – 48)/100 CY in YS herds

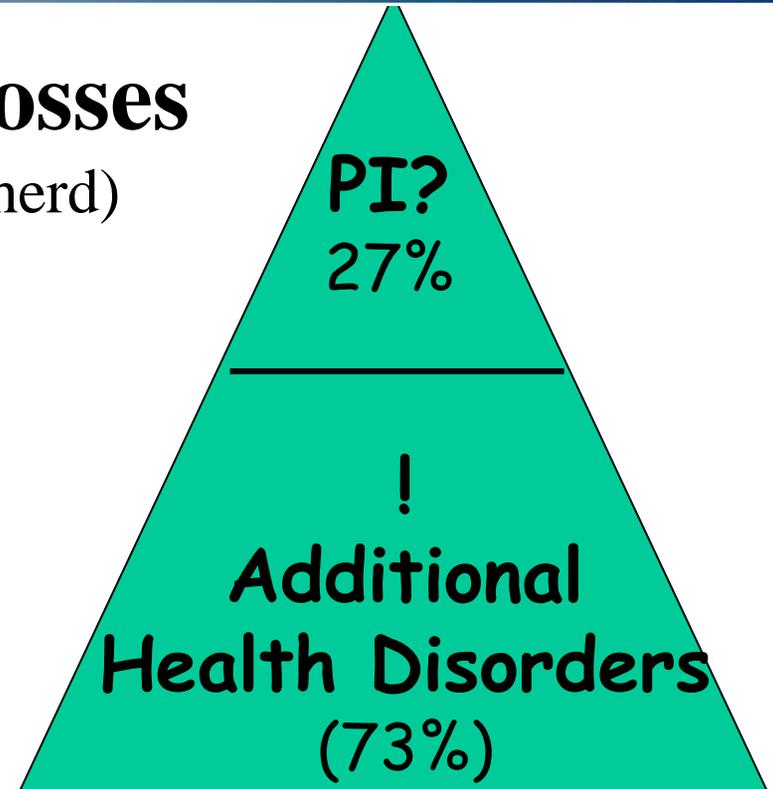
\* e.g. mastitis showing a 7% increase



# Herd level losses

(30 dairy cattle herd)

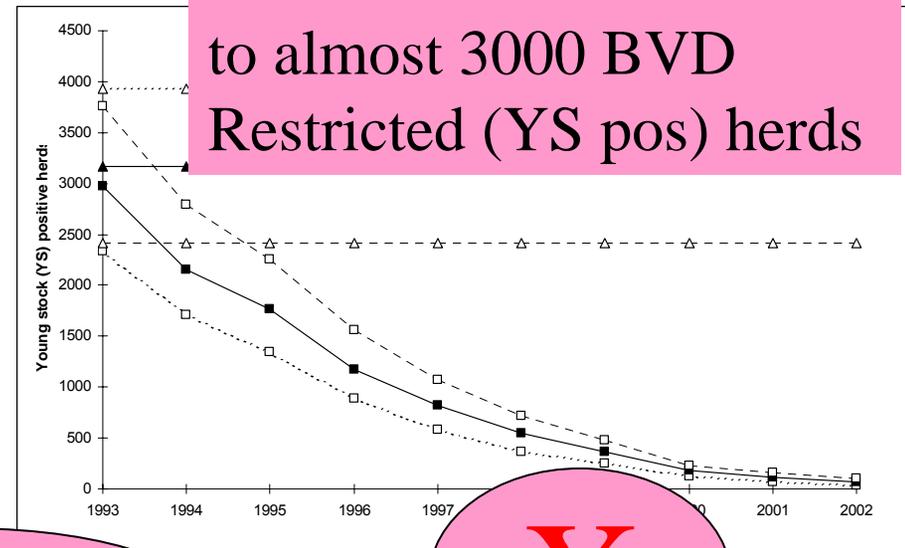
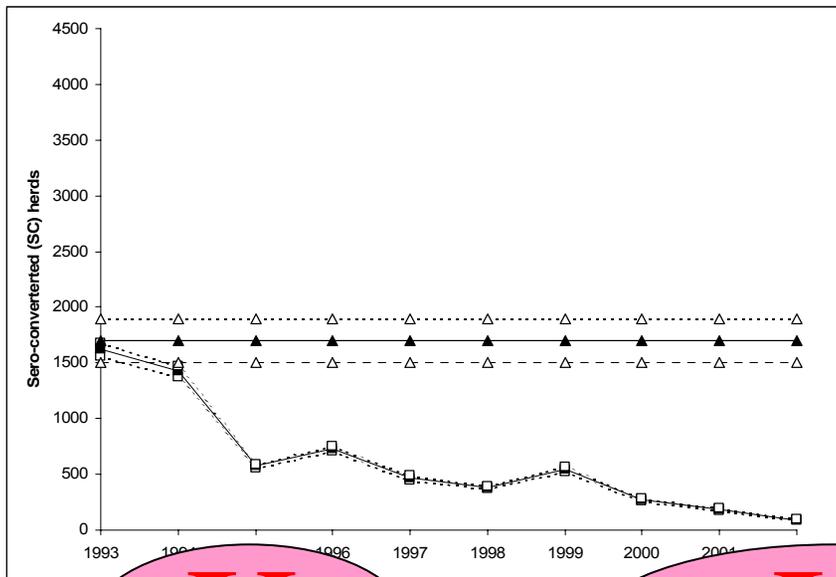
- Relative impact
  - Animals lost (PI?) 27%
  - Reproduction 26%
  - More treatments 19%
  - Reduced milk production 10%
  - Additional culling 17%
- Estimates for expected losses (per cow year)
  - 1 400 (47) US \$ at seroconversion
  - 2 200 (74) US \$ in year after seroconversion
  - 1 300 (45) US \$ in addition in young stock positive herds





# Trends of the BVDV infection in Norway

A: Sero-conversion    B: Young stock positive herds



~~Sheep~~

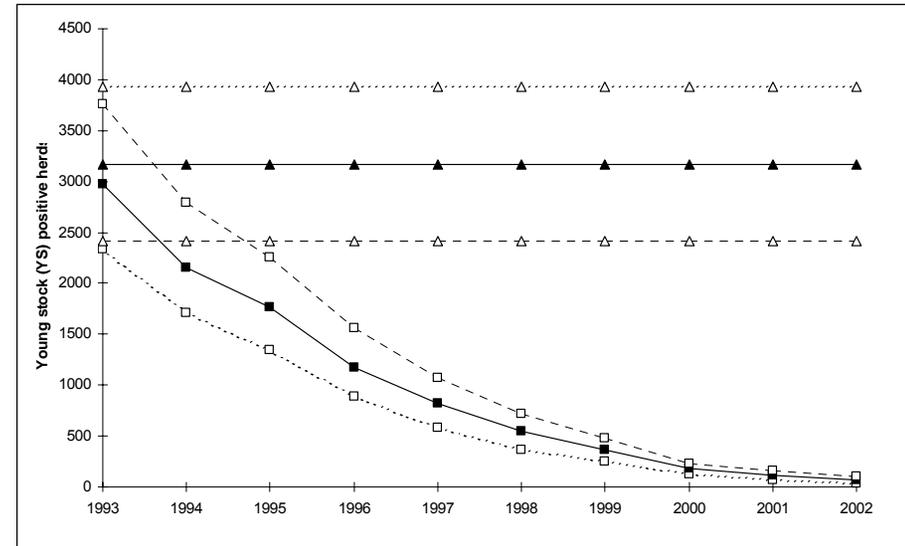
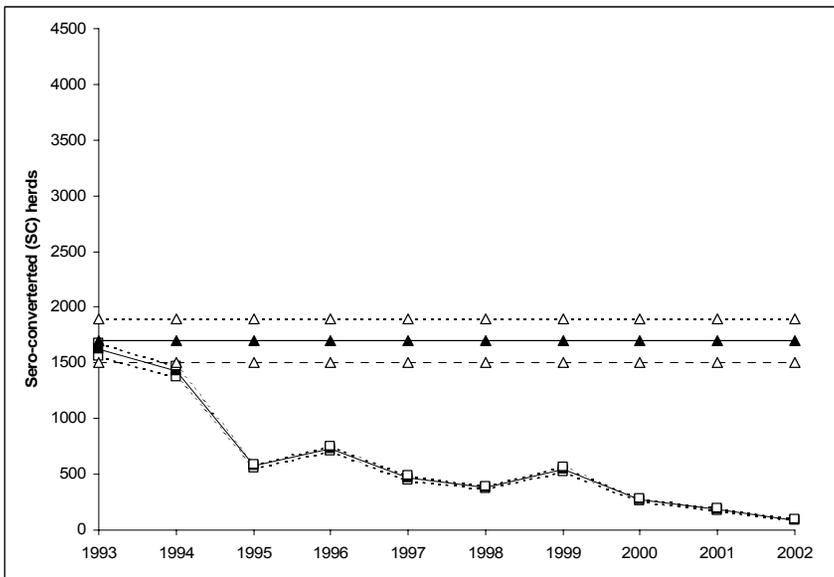
~~Wild ungulates~~

~~Latency~~



# Trends of the BVDV infection in Norway

A: Sero-conversion    B: Young stock positive herds

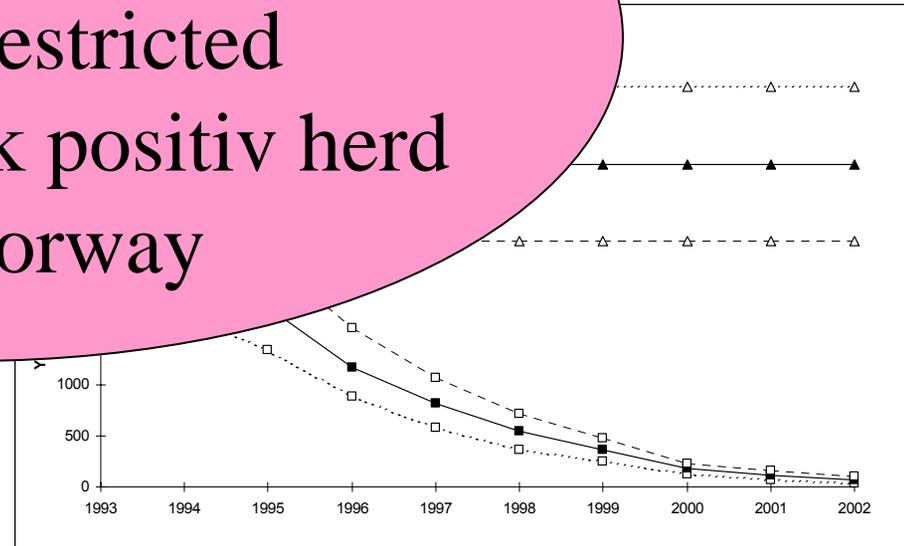
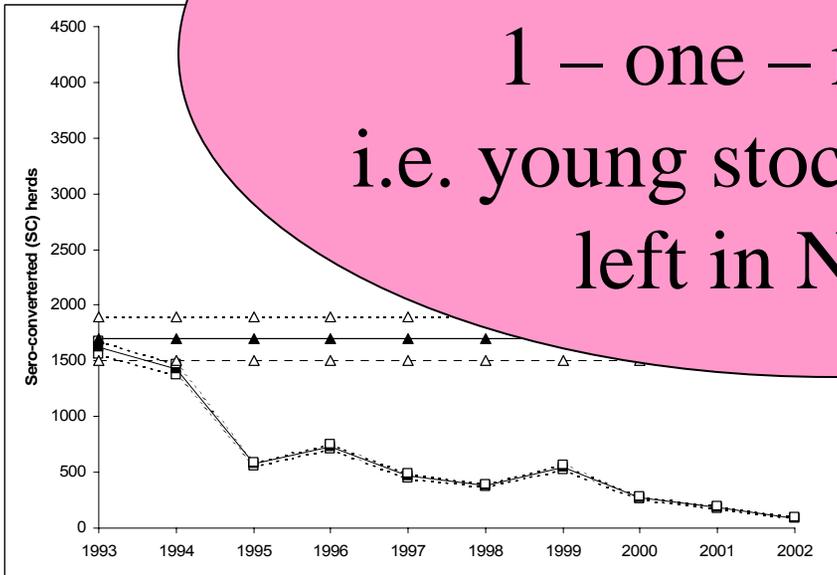




# Trends of the BVDV infection in Norway

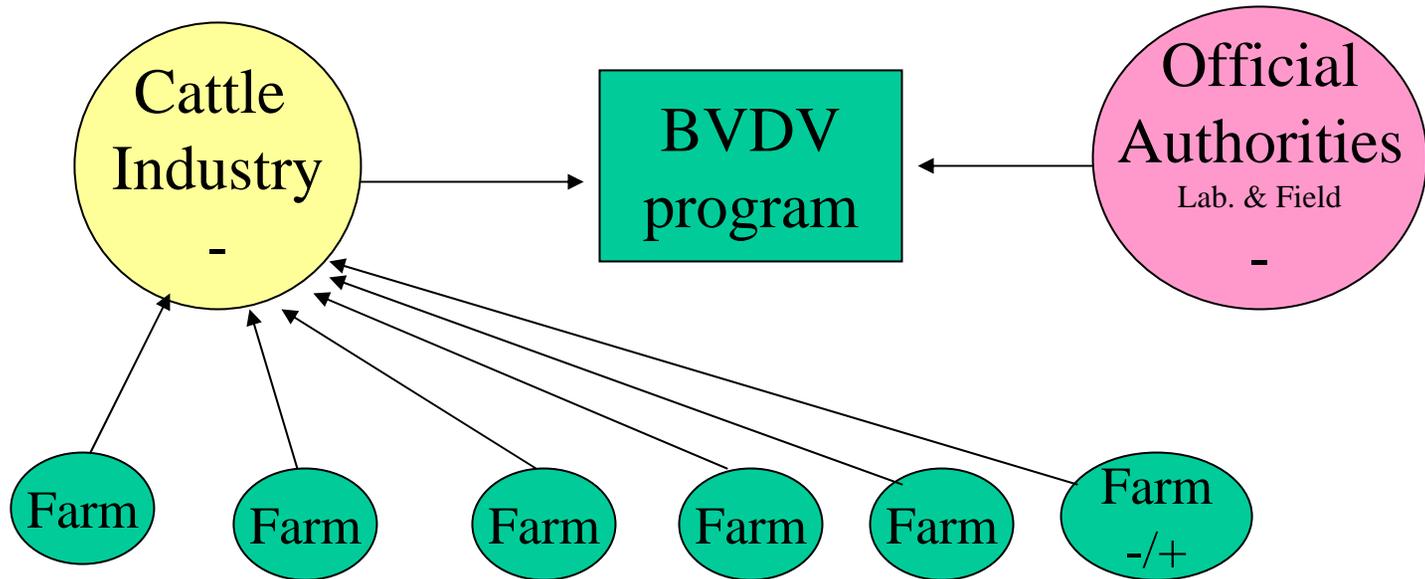
A: Sero-converted herds Currently – Jan 2006: 1 – one – restricted positive herds

1 – one – restricted  
i.e. young stock positive herd  
left in Norway





# Benefit-Cost evaluation



- Summing Economic Impact of Infection (health, reproduction and production) in year of SC, year after SC and in YS positive herds.
- Benefits = Expected losses without control – Observed losses under control
  - Net Benefits = Benefits – Program cost



# Cost inputs

## Program costs:

### Cattle industry

- Program manager!
- Meeting & travel expenses
- Information expenses
- Test-kits

### NAHA

- Travel, labor and expenses associated with on farm work
- (No overhead costs accounted for)

### Laboratory Services

- Labor for analysis and expenses associated with program test-scheme (BTM/FCM/YS)
- (No overhead costs accounted for)

## Farmers costs in affected herds:

- **Movement restriction effects:**
- Lost option - no live animal trade
- Extra costs - no common pasture
- Extra costs - double fencing
  
- **Herd screening costs (optional!)**
- Testing
- Sampling



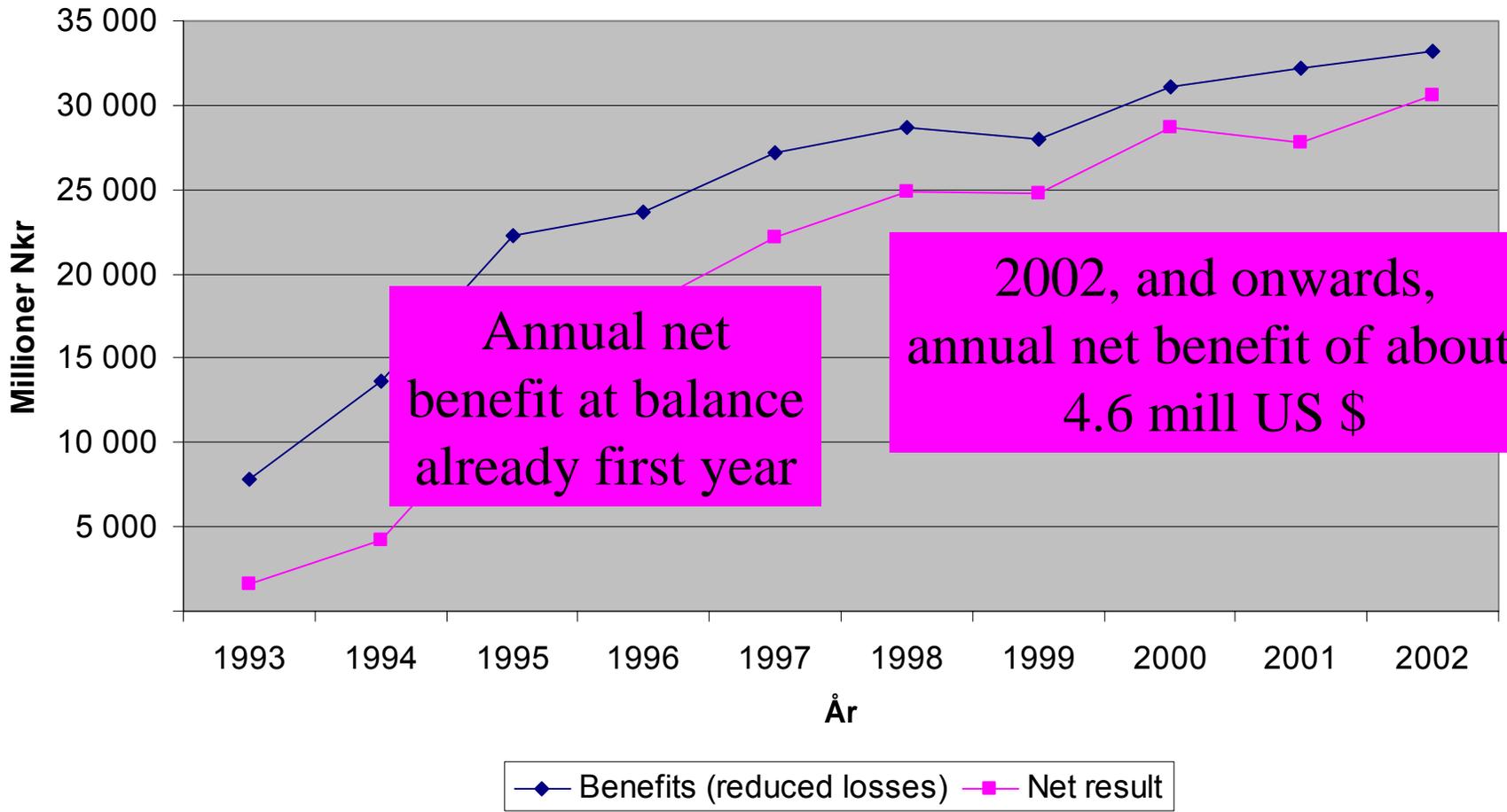
# Program costs, 1993-2003

• <b>Control program costs</b>	<b>US \$</b>
– Cattle Industry	1 480'
– NAHA	2 050'
– Official Lab services	650'
– <u>Farmers (the BVDV restricted ones!)</u>	<u>3 250'</u>
– <u>Total control costs</u>	<u>7 400'</u>

- Industry - farmers incl. - taking 64% of the total costs



### Benefit and net benefit





- Cost-Benefit results

Total cost 7.4 mill US \$

Total benefits 37 mill US \$

Total net benefits approx. 30 mill US \$

Net present value (1993) 21 mill US \$



# The Success Factors

- Efficient and cheap screening (herd level screening)
- Support of legislations – official movement restrictions
- Compulsory and National approach
- Well defined regions with controlled animal movements between
- Organized education of private and official vets, farmers and dairy advisors regarding biosecurity measures
- High appliance among farmers!
- The joint efforts!! of government, industry and applying farmers
  
- **HOWEVER:**
- Norwegian cattle population is susceptible to re-introduction of virus
- **BUT:**
- low risk due to low prevalence & low live animal and semen import



# Conclusion from Norway

- **BVD is causing considerable losses!**
  - **Eradication is possible!**
- **And**
- **can be done Cost-efficiently!**



**Consequences taken in  
Europe –  
the European thematic  
network for BVDV Control  
(funded 2002)**

The perception of the BVDV complex

**MUCOSAL DISEASE**

**ABORTIONS**

**STILLBORN  
CALVES**

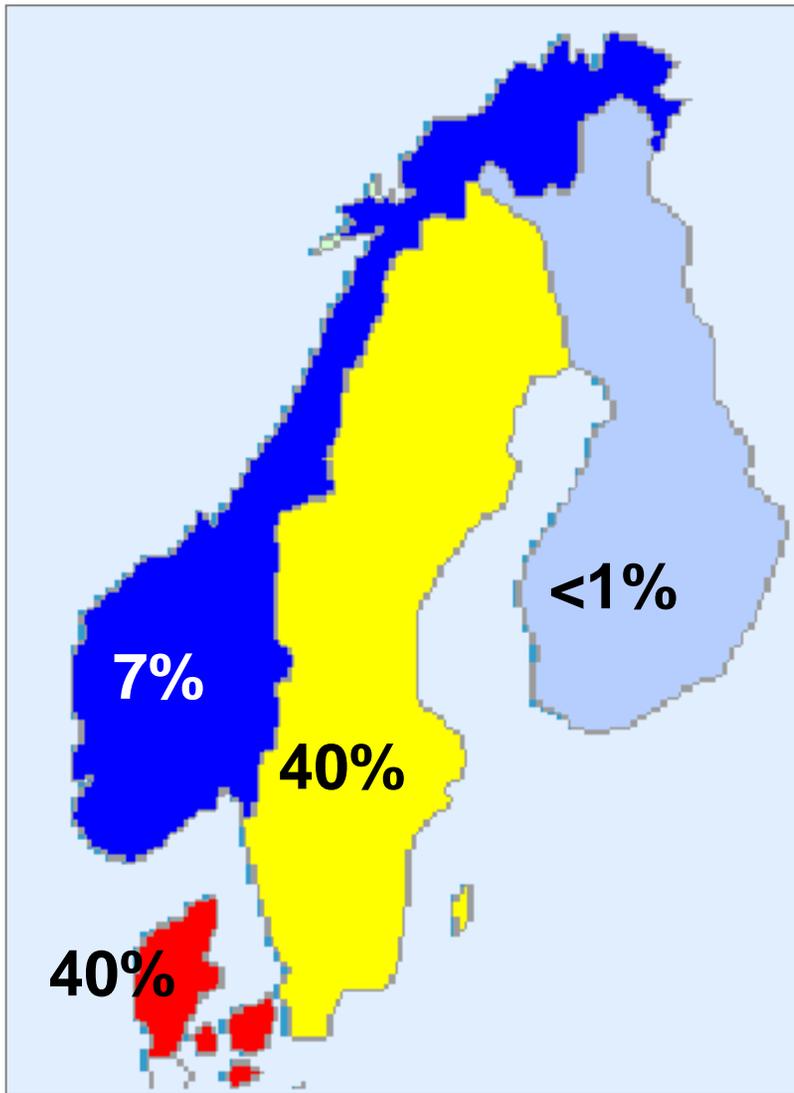
**MALFORMATIONS**

**REPEAT BREEDING**

**POOR GROWTH**

**SECONDARY INFECTIONS**

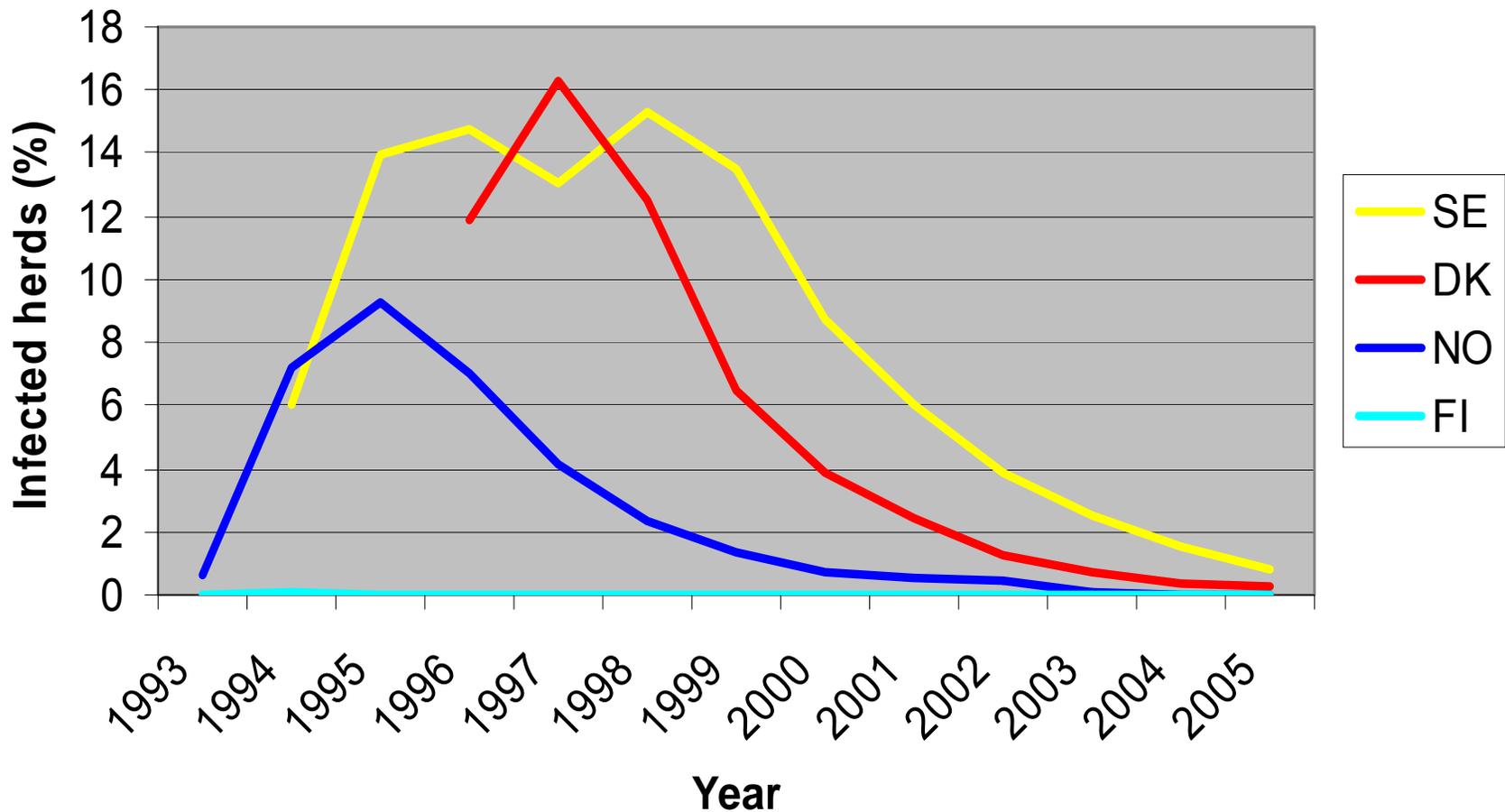
**DECREASED MILK YIELD**



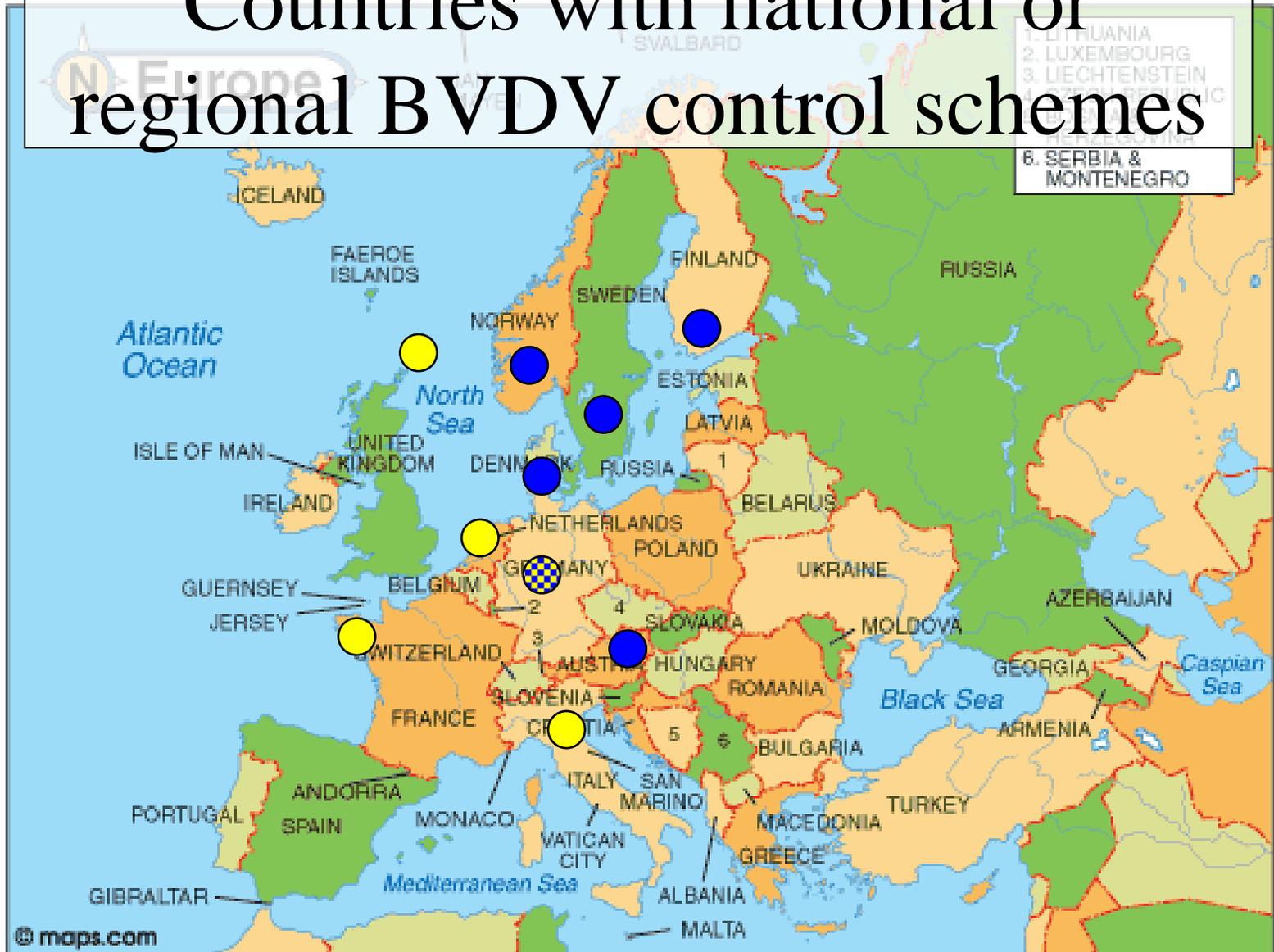
Prevalence of  
herds with  
antibody levels  
in bulk milk  
indicative of  
recent/ongoing  
BVDV infection

1993

# Prevalence of herds under investigation 1993-2005



# Countries with national or regional BVDV control schemes

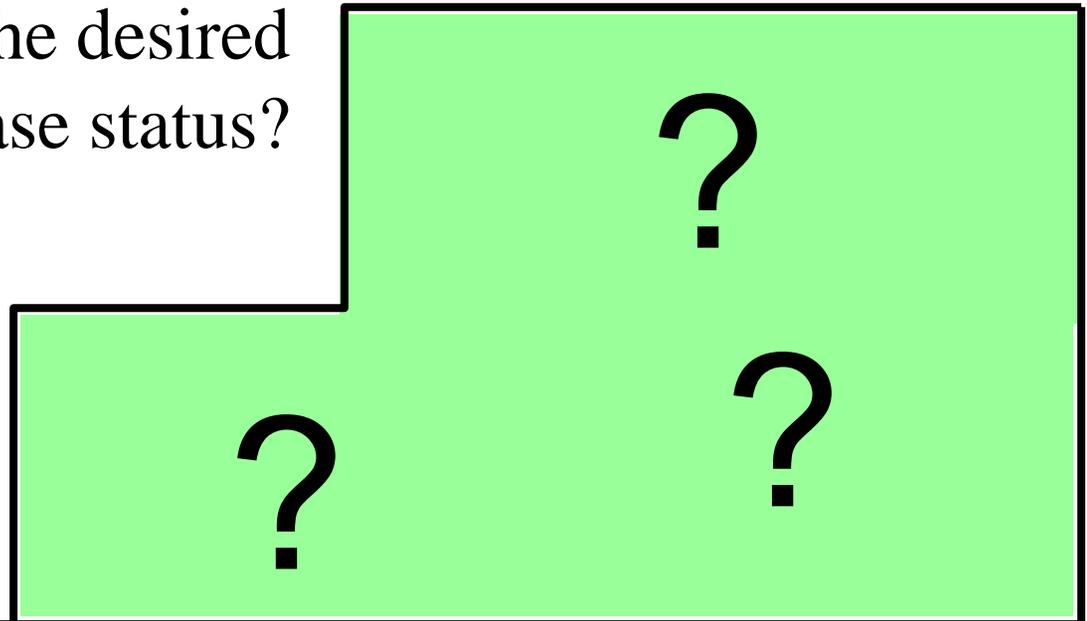


# The "control initiation threshold"

Is it possible / desirable to  
achieve, maintain and  
restore this status?

What is the desired  
disease status?

Is the disease a  
priority?



# Farmer's decision problem

## Paradox:

- Countries with the highest economic pressure  $\neq$  countries with control
- Confounding factors are
  - 1) other disease priorities and
  - 2) unfavourable preconditions  $\Rightarrow$  high risk of reinfection
- Unilateral investment into establishing a BVD free herd is associated with risk and with high costs for maintaining status.
- Investing farmers creates public good for others without getting any for themselves.

## Drivers:

- Vets and other farmers in favour of control
- Others do their bit, financial benefit is real, image/future of farming, autonomy

## Barriers:

- No fully trusted source of advice; GOV is perceived as a necessary actor to co-ordinate but not trusted
- Others not doing their bit, efficacy of measures, fear of losing freedom/autonomy

# Common factors for areas with large scale control

- Initiatives driven by primary stakeholder organisations
  - Provides guarantee that responsibility is shared
  - Provides a social pressure to conform
- Large networks for extension services
- Necessary know-how accessed and developed together with competent research institutions/diagnostic labs
- Fairly conflict-free relationship with authorities

**Systematic control approaches**

**vs**

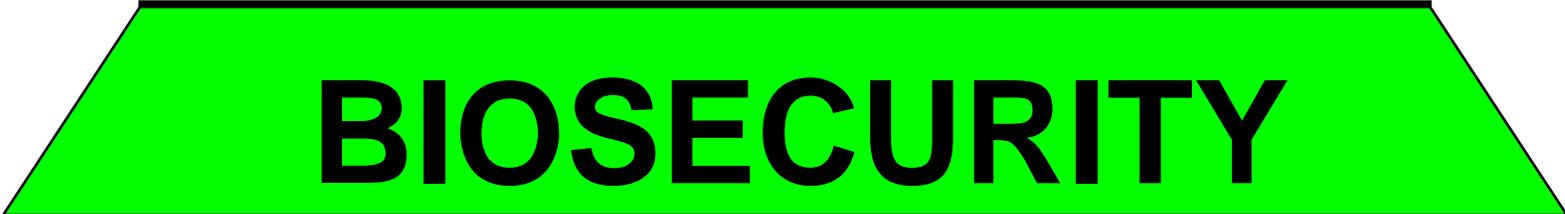
**Non-systematic control approaches**

# Systematic control

- Goal-oriented, systematic reduction in the incidence and prevalence of BVDV infection
- Implies that progress is being monitored
- Scale – herd/sectoral/regional/national

# Non-systematic control

- Measures lacking an organised effort to achieve and maintain freedom from BVDV
- No surveillance in place
- Typically immunisation strategies using live or killed vaccines and/or removal of PI animals in selected cohorts without systematic follow-up

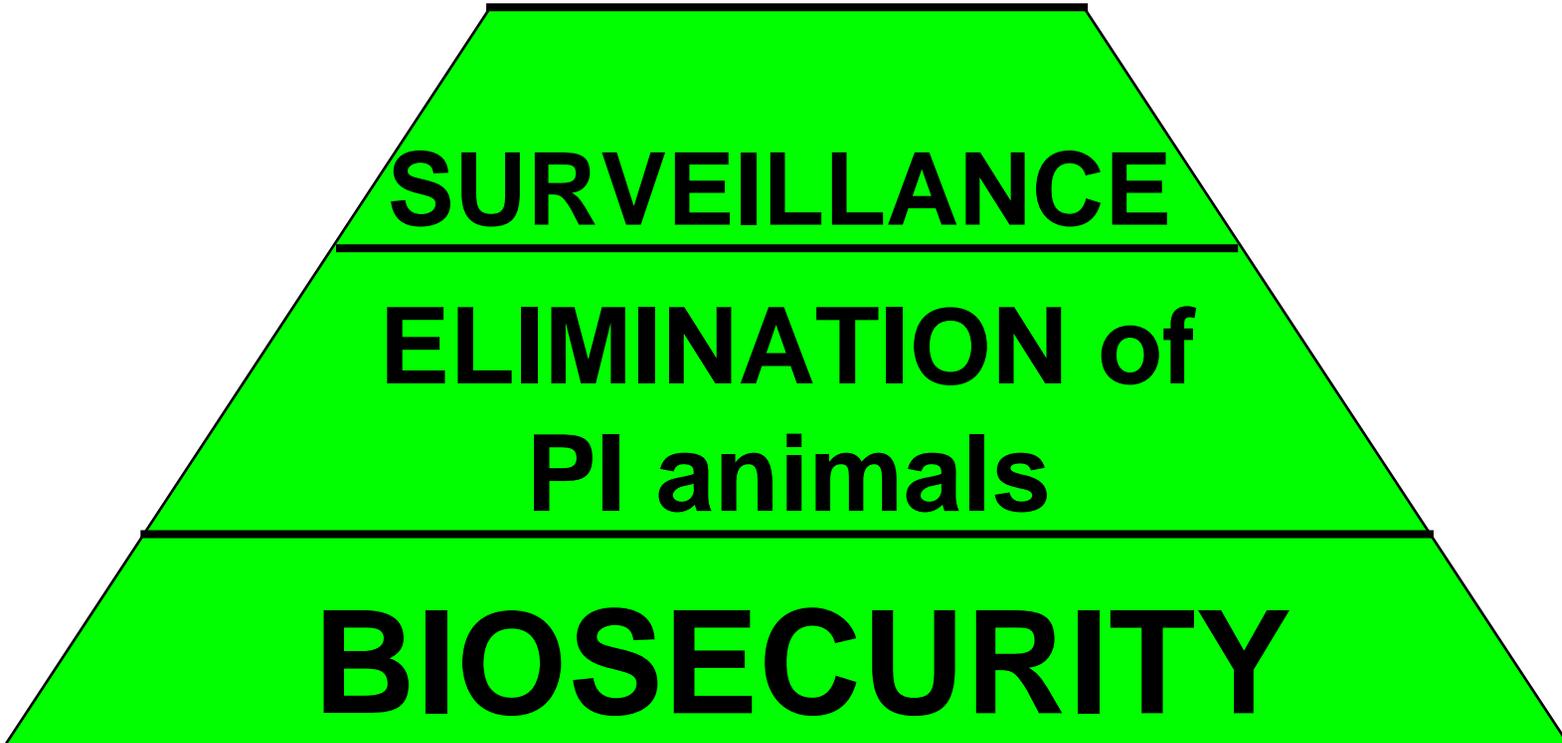


**BIOSECURITY**



**ELIMINATION of  
PI animals**

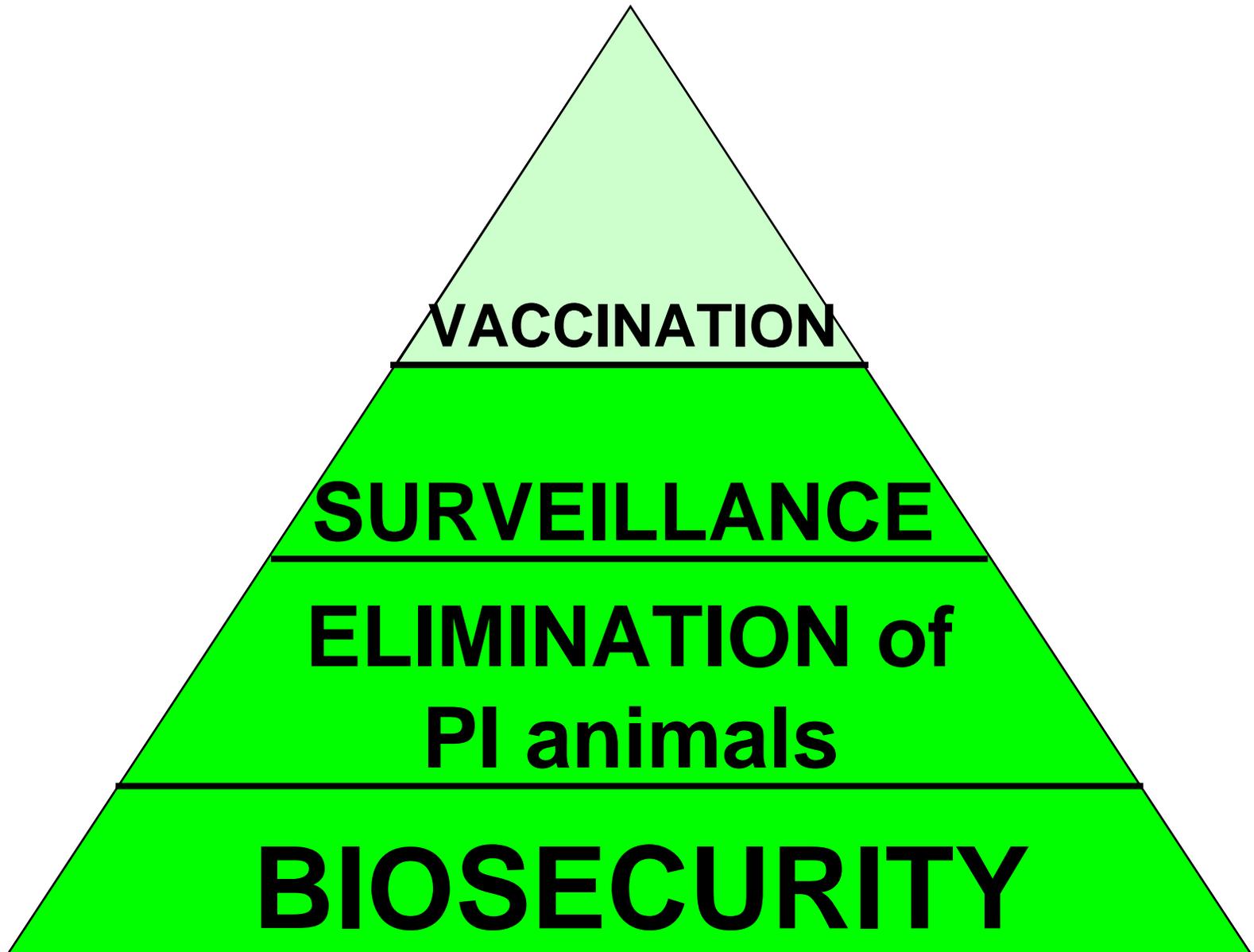
**BIOSECURITY**



**SURVEILLANCE**

**ELIMINATION of  
PI animals**

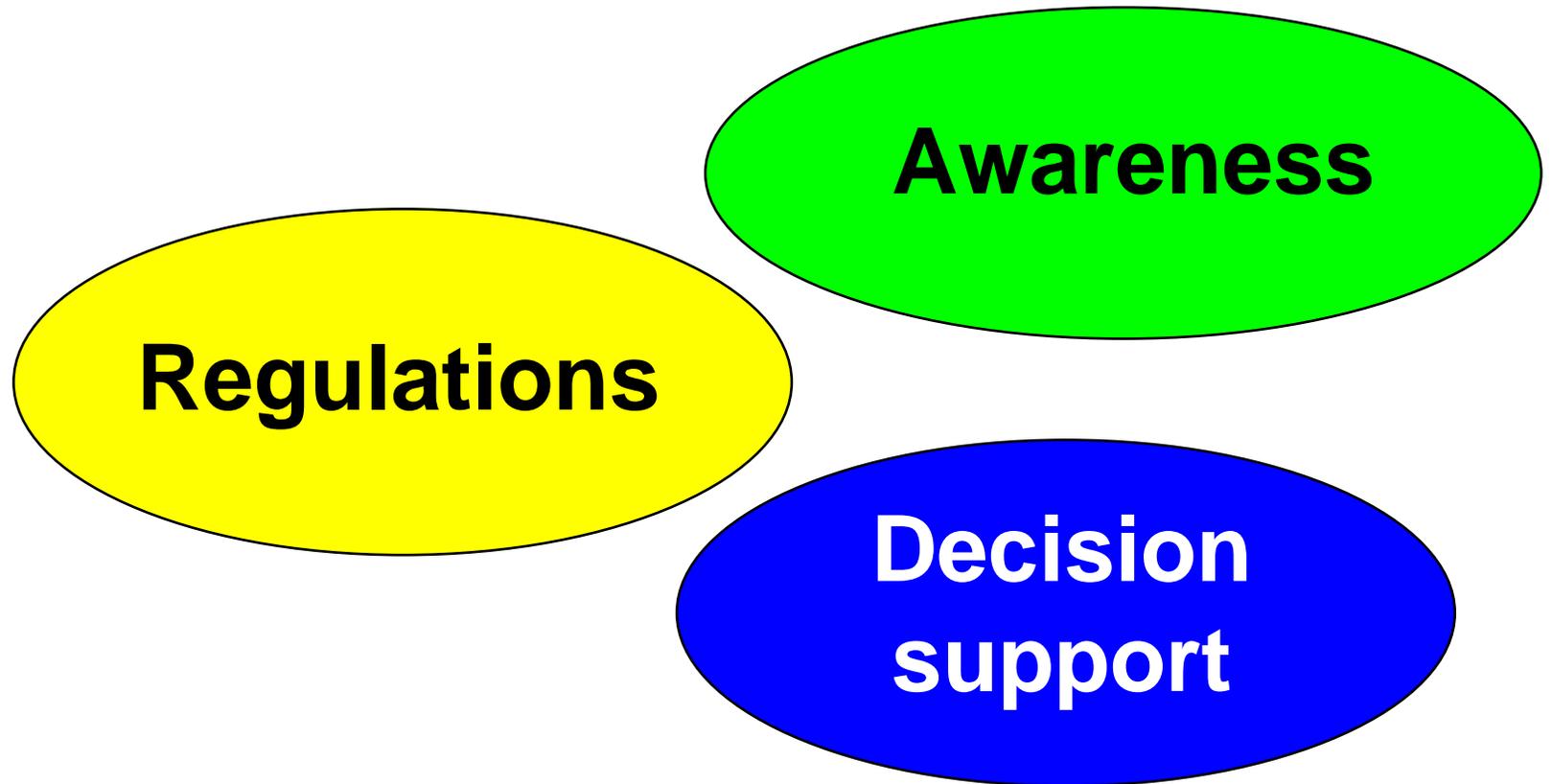
**BIOSECURITY**



# Biosecurity

- All measures targeted at preventing between-herd transmission
- Core: Preventing introduction of PI animals and dams carrying PI fetuses

# Elements of biosecurity



# Regulations

- A common formal framework outlining what measures are required to break between-herd transmission
  - Practical measures (incl. vaccination)
  - Definition of a free/infected herd and measures needed to ascertain status

# Stakeholder awareness

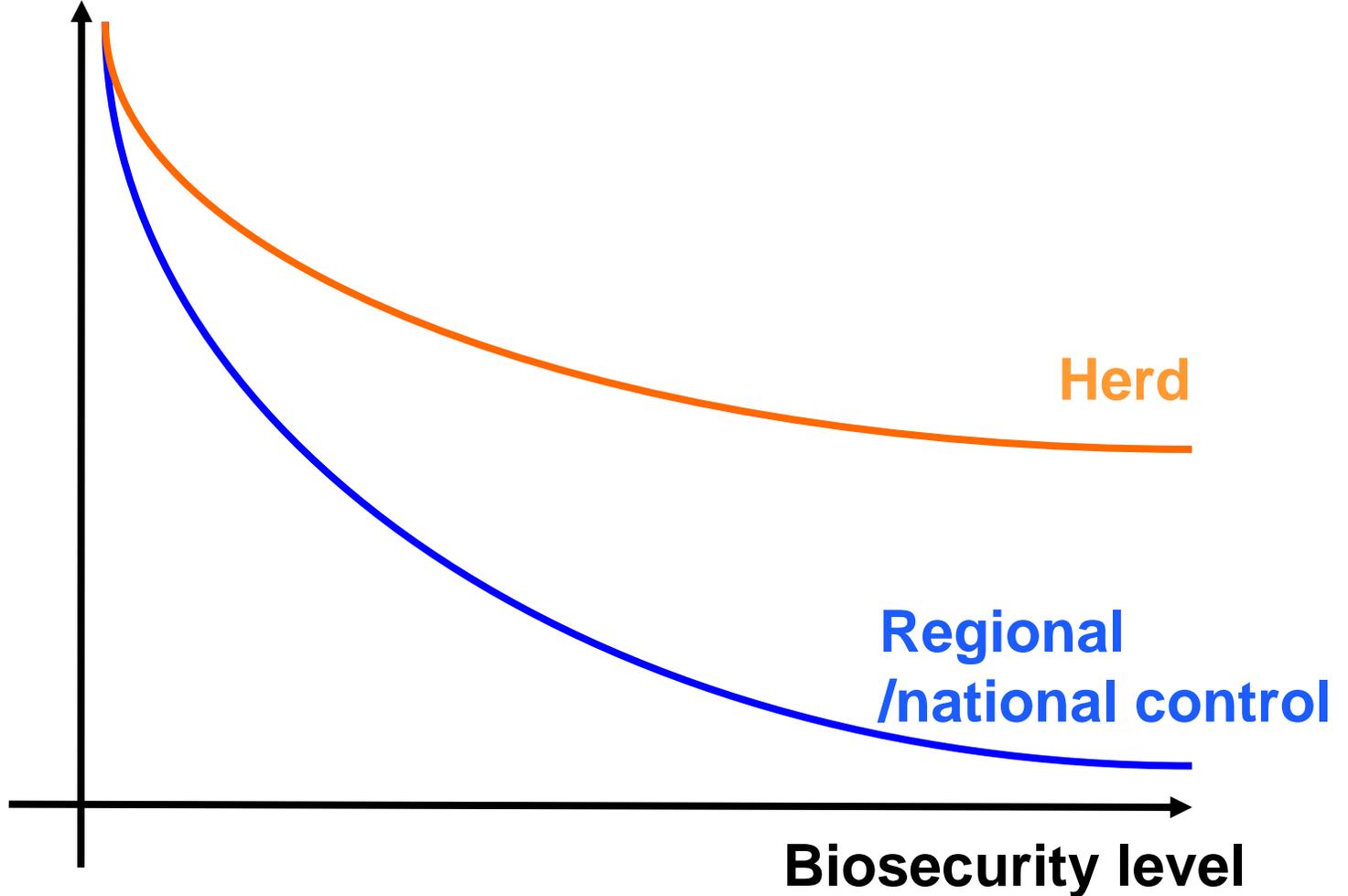
- First line defense!
- Education / information
- Real target: Change/influence behaviour..
  - Function of a person's attitudes and subjective norms (social pressure)

# Decision support

- System for obtaining and disseminating information on BVDV status (animal and/or herd)
  - To help people aware of BVDV risks make correct decisions
  - Updated information!



**Risk of acquiring  
BVDV infection**



**Herd**

**Regional  
/national control**

**Biosecurity level**

# Need to use vaccines?

- ...will differ between countries/regions
- ...will change over time
- Adding a vaccination regime adds a cost
- Has to be evaluated against the benefits

# Considerations

- Problems can arise if..
  - Antigenic makeup of products do not match circulating strains
  - Vaccines are used incorrectly
  - Vaccines fail to elicit an adequate immune response
  - Vaccine expectations are unrealistic
  - Vaccines are contaminated with BVDV

# Considerations

- Vaccines implies..
  - additional demands on surveillance
  - additional demands on education and communication
  - additional costs for control
  - higher demands on vaccine manufacturers

# Conclusions

- The consensus within the Thematic network provides an opportunity to work towards a long-term improvement of the BVDV situation in Europe
- The dynamics of the network have already resulted in moving BVDV up on stakeholders' agendas
- OIE listing and additional countries embarking on control will help in manifesting BVDV as a priority not only for farmers and the industry, but also for policy makers at the European level

**Thank you for your attention!**

