

# Occurrence and control of Salmonid alphavirus in the North Atlantic

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May 30<sup>th</sup>, 2018



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# Introduction

- Salmonid Alphavirus:
  - Sleeping disease
  - Pancreas disease
- Piscine myocarditis virus:
  - Cardiomyopathy syndrome
- Hosts: Salmonids

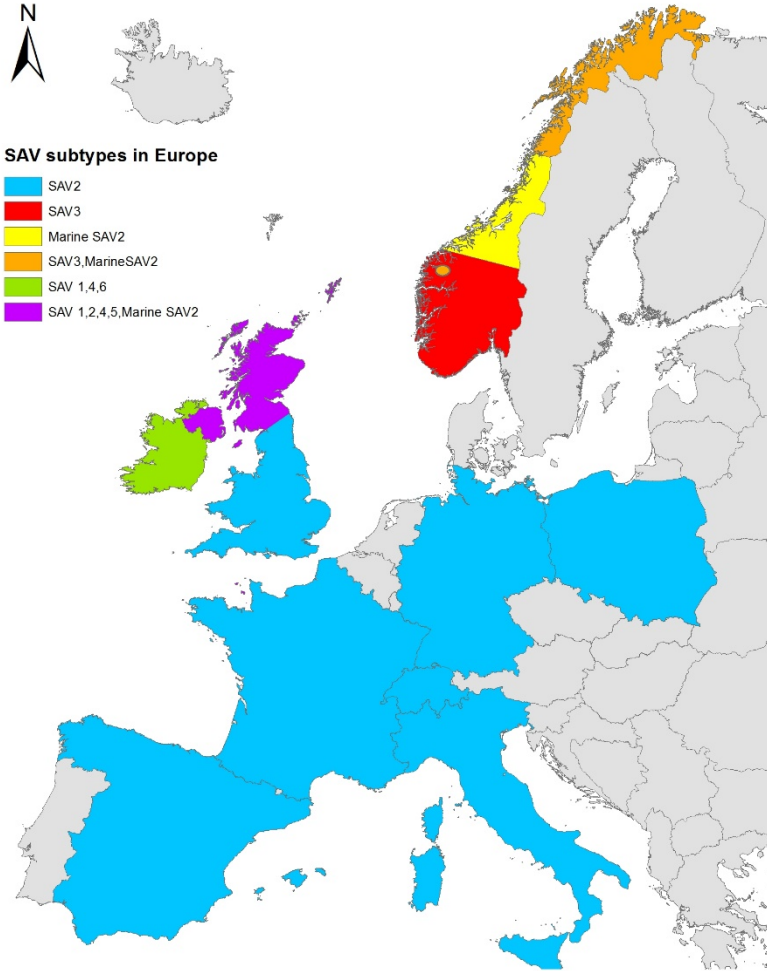


Photo: Trygve Poppe



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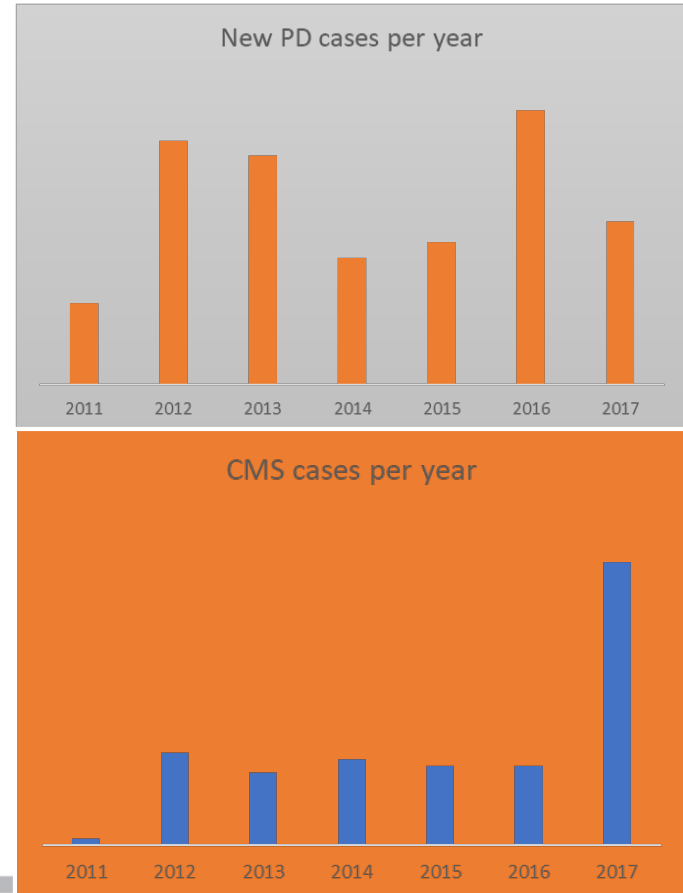
# Occurrence of SAV & CMS

- PD epidemics in Scotland, Ireland and Norway
- CMS also on Faroe Islands



# PD & CMS in Scotland (from Marian McLoughlin, PD TriNation 2018)

- Number of PD cases in Scotland declined in 2017.
- CMS increased dramatically
- Database from FishVetGroup
- (PD not notifiable)



# Current concerns in Scotland (from Marian McLoughlin, PD TriNation 2018)

- Dramatic and worrying rise in CMS cases and it is occurring in smaller fish.
- No accurate information of the impact of any of the cardiac myopathies (PD, HSMI & CMS).
- More information held by individual salmon companies.
  - More to be done to fully understand the impact of these diseases and available control measures.



# Industry concerns in Ireland (from Susie Mitchell, PD TriNation 2018)

- How to categorise mortalities when concurrent infections present
- Interaction between other infectious agents and SAV – need further research
- Still questioning the efficacy of vaccination – further evidence would be good
- Availability of new/better PD vaccines??

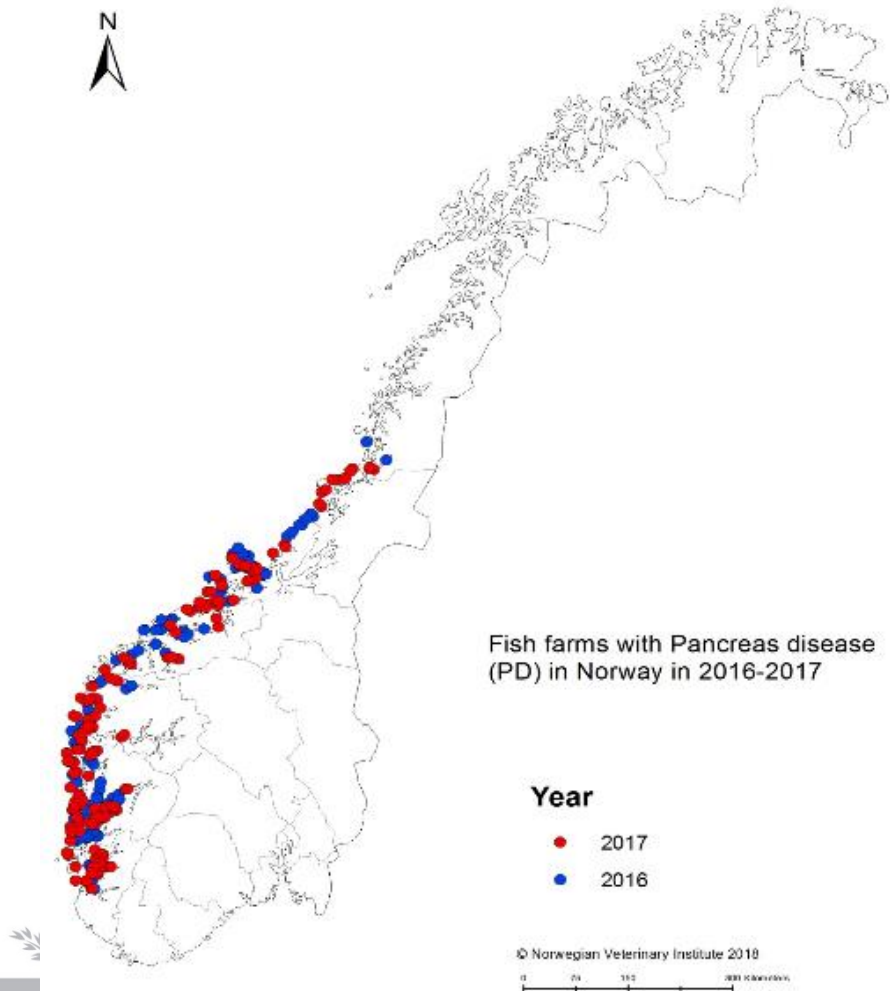


# PD & CMS in Norway

Number of annual outbreaks of PD	
2017	176
2016	138
2015	137
2014	142
2013	99
2012	137



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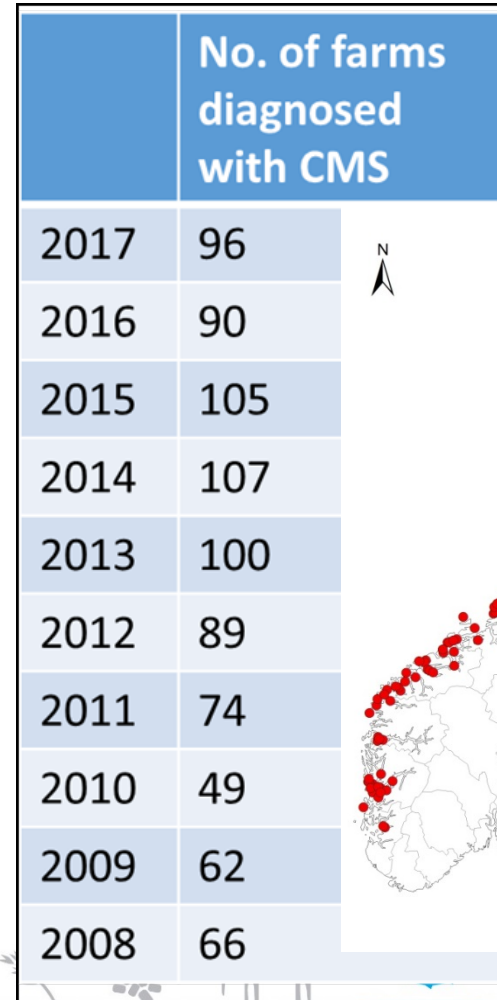


# PD & CMS in Norway

- CMS was diagnosed in 96 farms at NVI, and 100 farms in private labs – Overlap likely
- PMCV is widespread (Svendsen et al, EAFP)
- CMS ranged as the second most important problem by the fish health personnel
- One company says it causes double the loss as PD

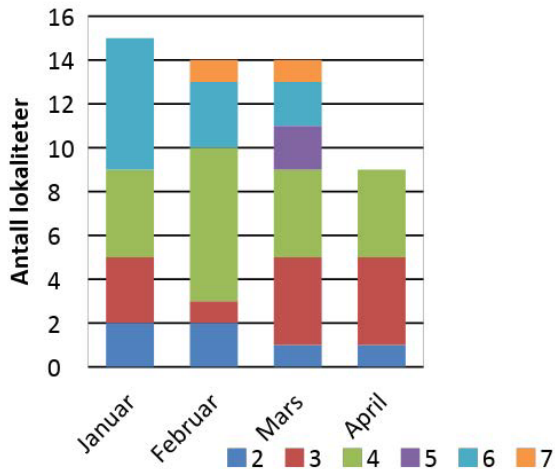


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# PD 2018



Produksjonszone



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Sikker | <https://www.barentswatch.no/en/fishhealth>

WEEK 22  
28. May - 3. Jun 2018

Read more about the lice limit

**PD 134**  
134 of the aquaculture sites have pancreatic disease (PD) or are suspected of having PD

**ISA 0**  
0 of the aquaculture sites have infectious salmon anemia (ISA) or are suspected of having ISA

Amount of aquaculture sites above lice limit

During week 16-26, the lice limit for certain parts of the country is lowered

Disease outbreaks (0)

ISA 2018  
So far this year there has been 0 outbreaks of ISA.

**No annual disease outbreaks**

PD 2018  
So far this year there has been 62 outbreaks of PD.

76° 00.830 N 27° 40.468 E

WEEK 22  
May, 2018

# PD in Norway –control by regulations

- Notifiable on national list
- New legislation fall 2017:
  - Two zones
    - Endemic & non-endemic
    - Different implications of outbreaks
    - No stamping out if no/negligible risk of disease spread
    - Restrictions on transport of fish
    - Direct slaughter –limited use of holding pens



# PD in Norway -regulations

- New legislation fall 2017:
  - Mandatory monthly screening of all salmonid farms using seawater
  - 20 fish per site
  - Heart (kidney)
  - PCR & subtyping
  - Results (+ & -) reported to NRL



# Management of PD in Ireland (from Susie Mitchell, PD TriNation 2018)

- Good quality LARGE smolts
- Stock to final density
- Biosecurity
- Clean nets
- Low stress management
- Single year class
- Feeding protective diets
- Vaccination



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# Vaccination:

## PD:

- Inactivated monovalent vaccine available since 2007 (based on SAV1)
  - Multivalent vaccine since 2015
- New vaccine targeted at SAV3 since 2015
- Claims to reduce virus shedding and disease
- Does not hinder infection with SAV
- DNA-based vaccine launched in march 2018

## CMS:

- Not in the near future....



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# Infection pressure and firegates

- Most important transmission route is from other farms:
  - Seaway distance explains 80% of the outbreaks

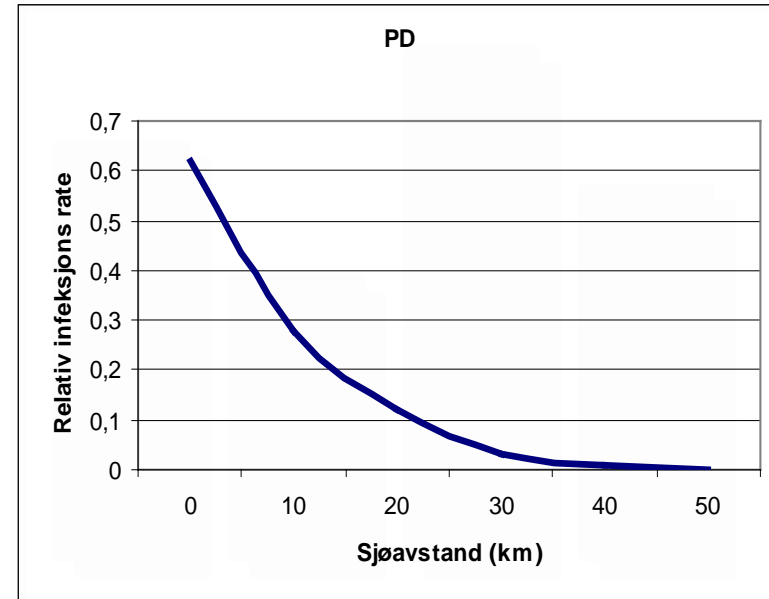


Preventive Veterinary Medicine  
Volume 93, Issue 1, 1 January 2010, Pages 51-61



A stochastic model for the assessment of the transmission pathways of heart and skeleton muscle inflammation, pancreas disease and infectious salmon anaemia in marine fish farms in Norway

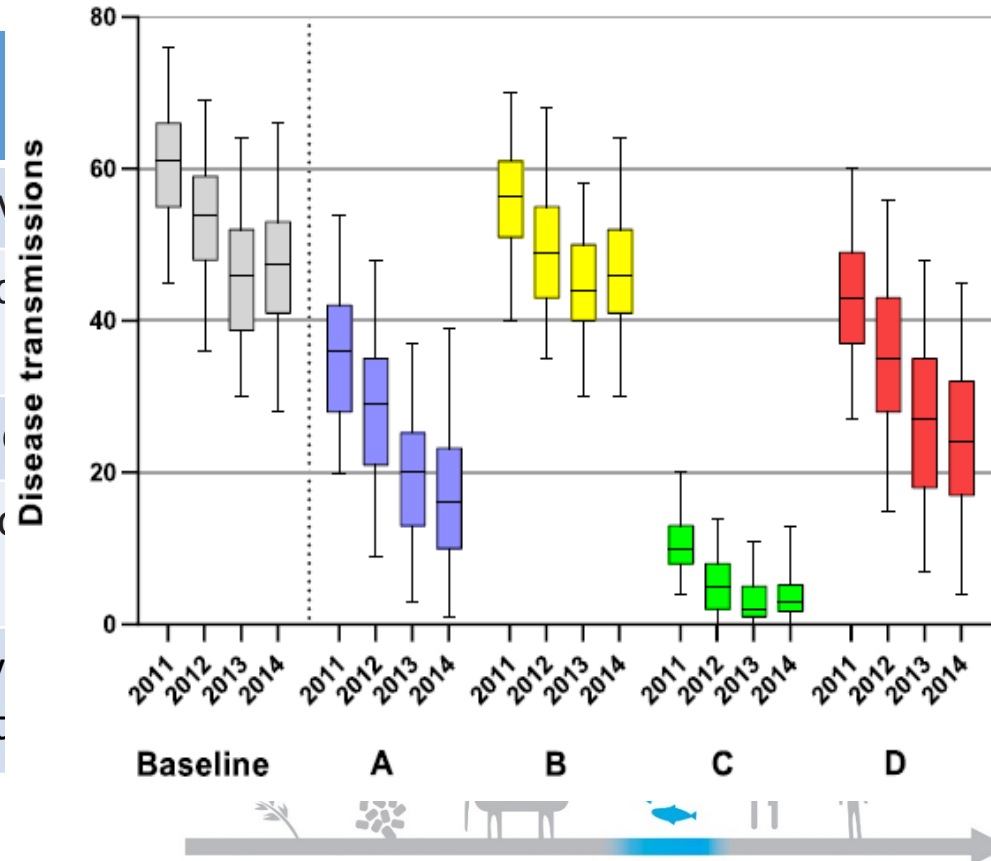
Magne Aldrin <sup>a, b, c, d, e</sup>, Bård Storvik <sup>a, b</sup>, Arnaldo Frigessi <sup>a, b, c</sup>, Hildegunn Viljugrein <sup>d, e</sup>, Peder A. Jansen <sup>d</sup>





# Control by pre-scheduled harvest

Scenario	Description
Baseline	No disease-triggered harvest
A	Infected cohorts removed at the onset of a clinical outbreak
B	As A, but only if economically justified
C	Infected cohorts are removed before the onset of infection
D	Infected cohorts are harvested at the onset of a clinical outbreak



# Summary

- PD is still a serious problem, but more concern about CMS
- PMCV is more widespread than suspected
- Knowledge of occurrence= Control(?)
- Vaccination is still not sufficient
- No cell culture for PMCV
- Control by compartments and biosecurity
  - Possible and economically beneficial in the long run





# Knowledge gaps

- Difficult to capture the impact of the diseases
- Standardizing tests and diagnostic Se and SP of tests for different purposes
- What is reasonable to expect from a PD or CMS-vaccine?
- What are the most important transmission routes for PMCV?
- What triggers disease development?
- What are the barriers to implementing the measures that we know works



# PD TriNation

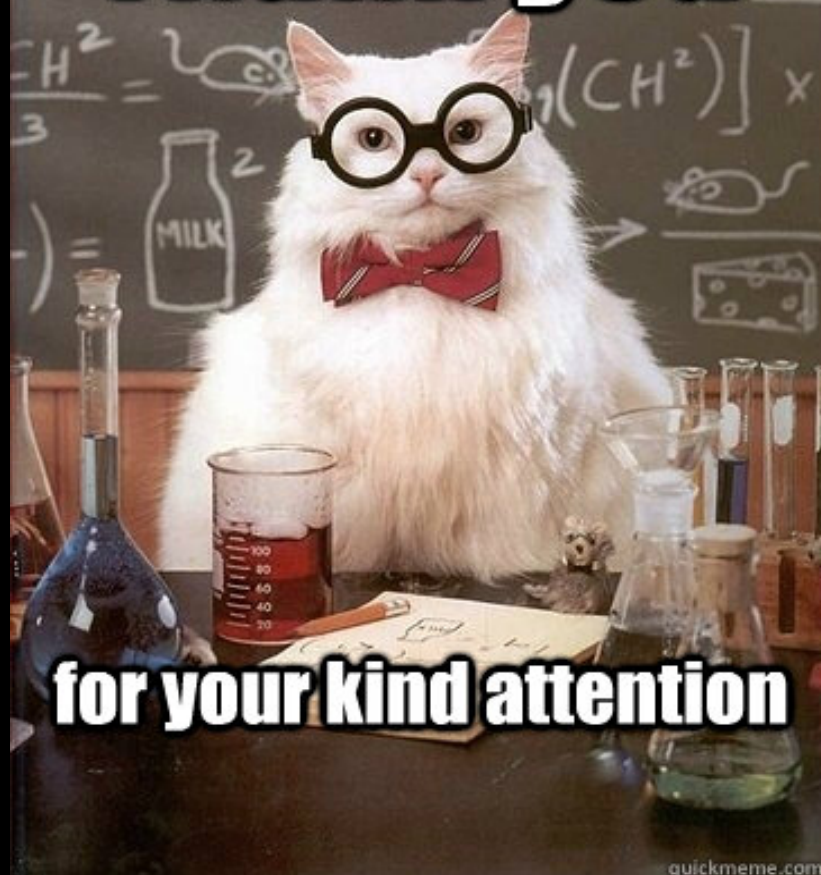
- Meetings between science, industry and decision-makers since 2005
- 80-100 participants each time
- Presentations posted on website: [www.trination.org](http://www.trination.org)
- Next meeting:
  - Dublin in June 2019



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**Thank you**



**for your kind attention**