CHALLENGES WHEN DESIGNING MODELS FOR INFECTIOUS DISEASES

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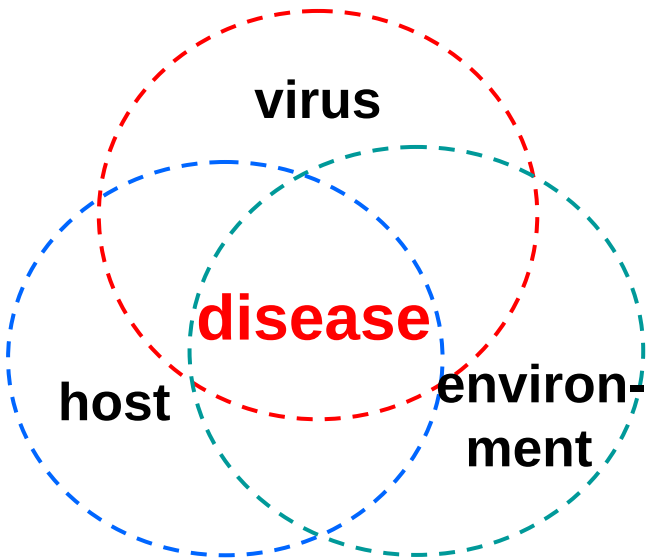
The interaction between host, virus and environment affects disease development



1. The susceptibility of the host:

-species
-age
-general health condition
-immunological resistance/genetic background
-other diseases
-carrier condition

3. Environmental factors:

-Temperature

-Fish density

-Water quality

-Water flow

-Oxygen level

-etc.

Procedures of infection

- **Route of infection; bath or injection**
- **Duration time (bath)**
- **Number of parallels**
- **Number of fish in each group**

An experimental model of IPN

- **Use natural infection route; waterborne infection**
- **Standardize the model as far as possible**
- **Achieve reproducible mortality in unvaccinated smolts**
- **Possibilities to test oil-based - and DNA vaccines; mortality levels above 50%**

IPNV carriers

-carriers are widespread in Norwegian aquaculture

-low to undetectable virus titres

-amount of virus varies with time

-virus present in few organs

-IPNV specific antibodies not always detectable

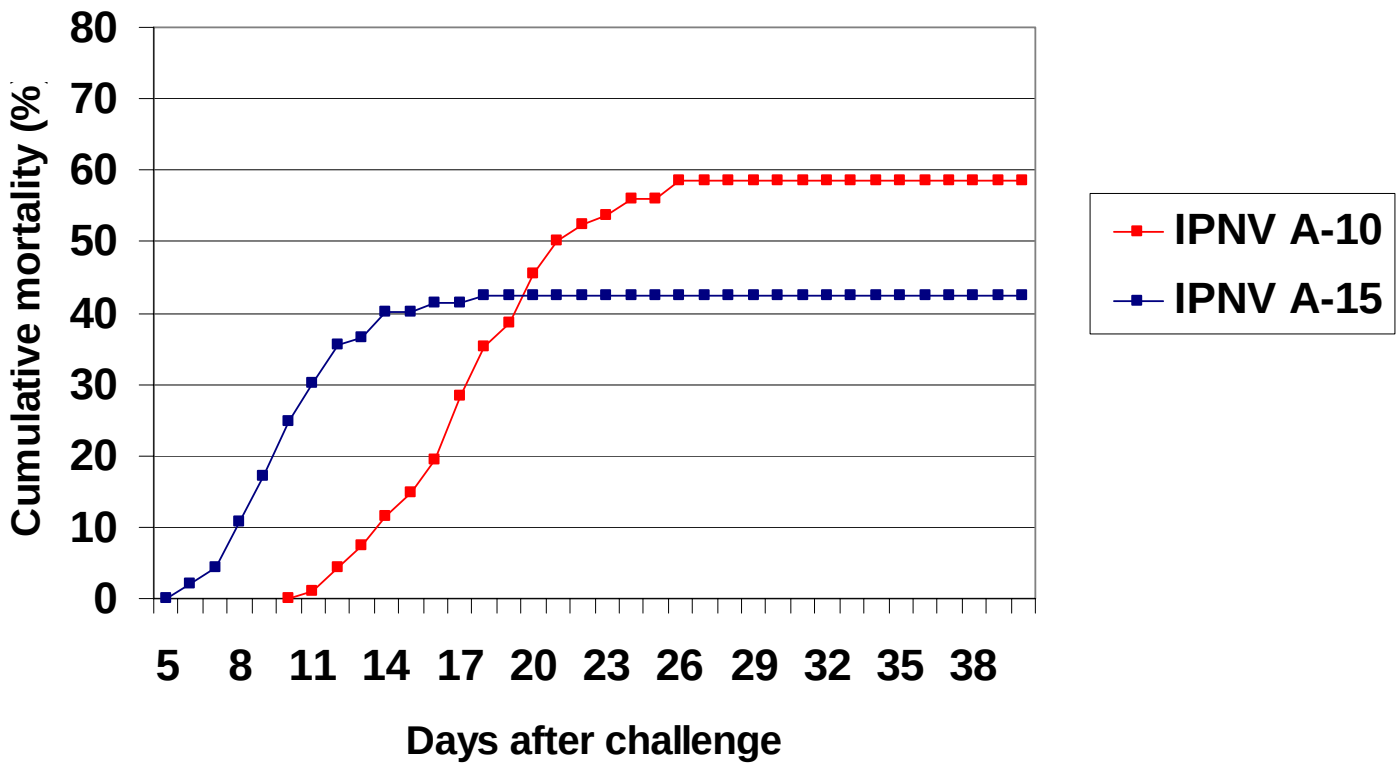
Testing for IPNV carriers

- **At the start of an experiment (before smoltification) and before sea water transfer**
- **Head kidney homogenates**
- **Fresh samples**
- **Seeding in cell culture bottles;**

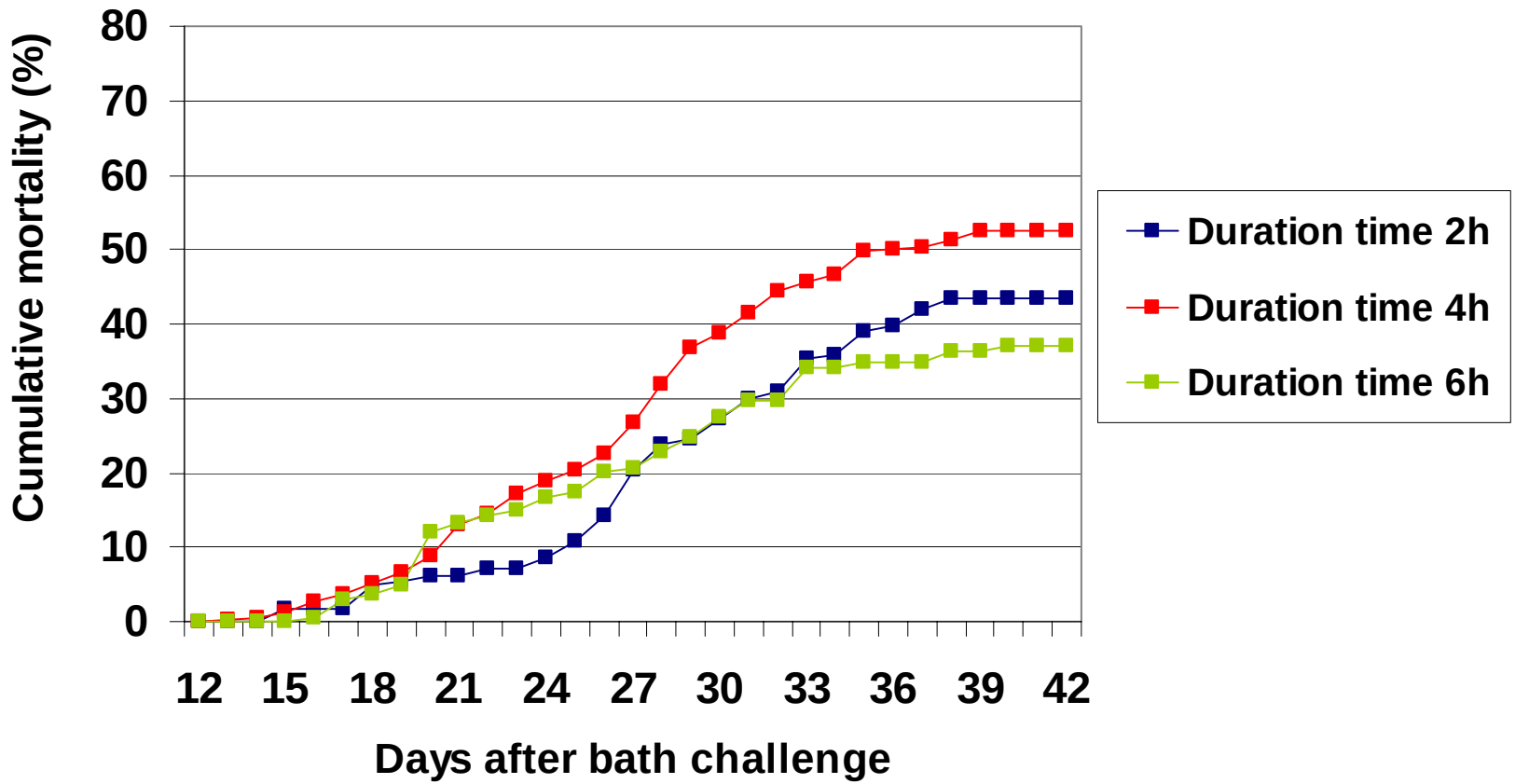
  -sensitive and reliable

  -detection limit 5-10 infectious particles/gram tissue

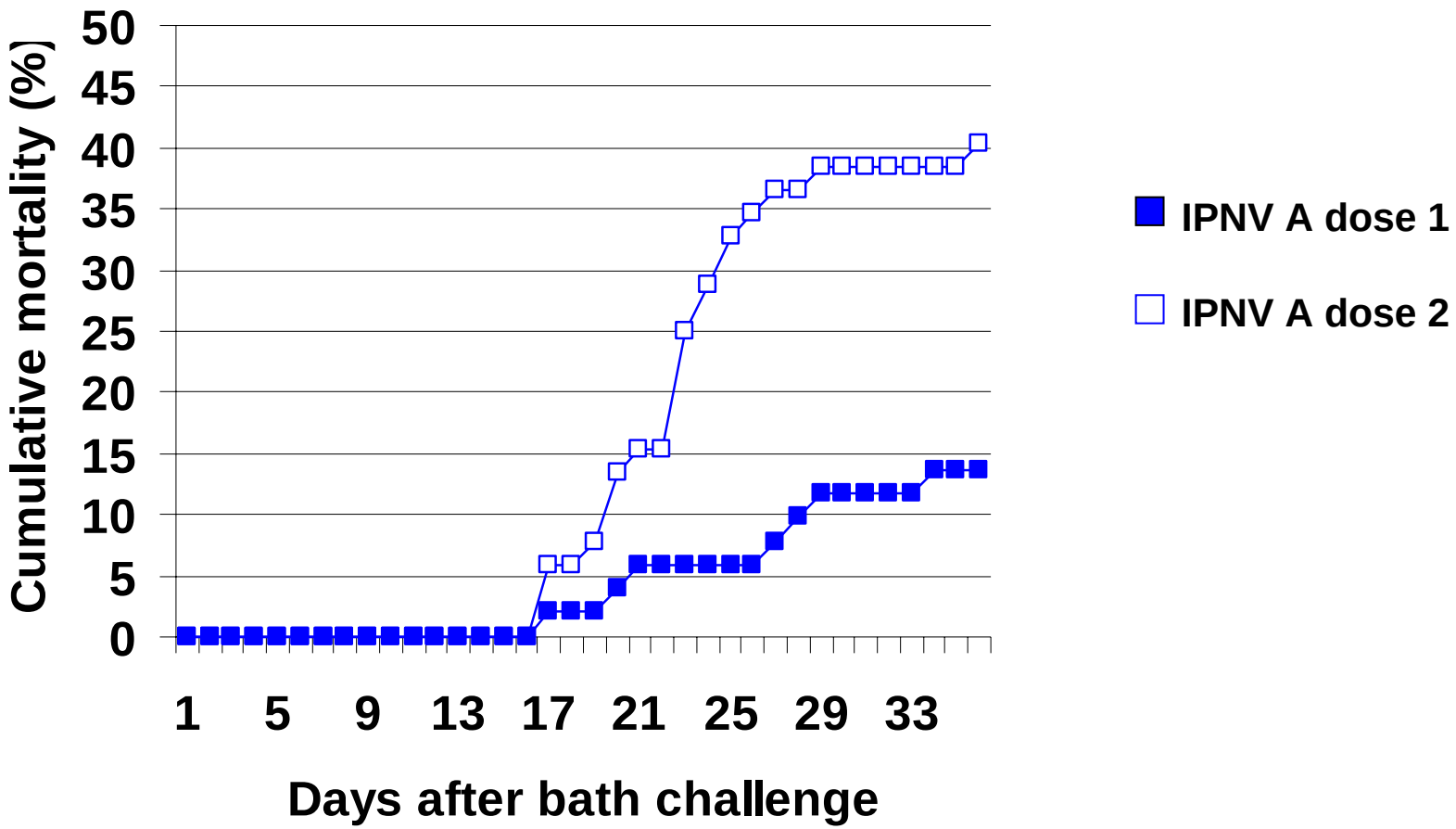
Bath challenge of Atlantic salmon with one IPNV strain at two different temperatures



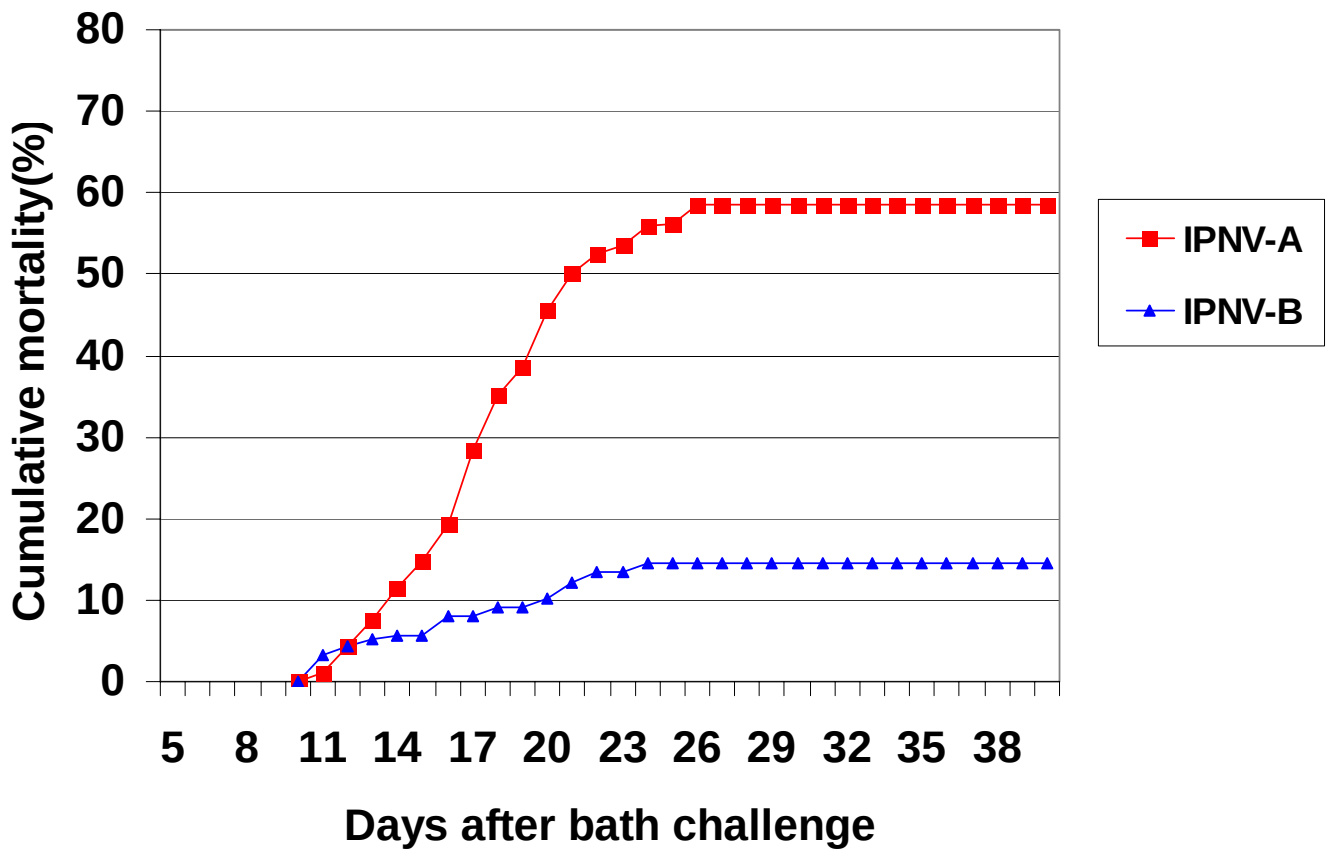
Bath challenge of Atlantic salmon using 3 different duration times



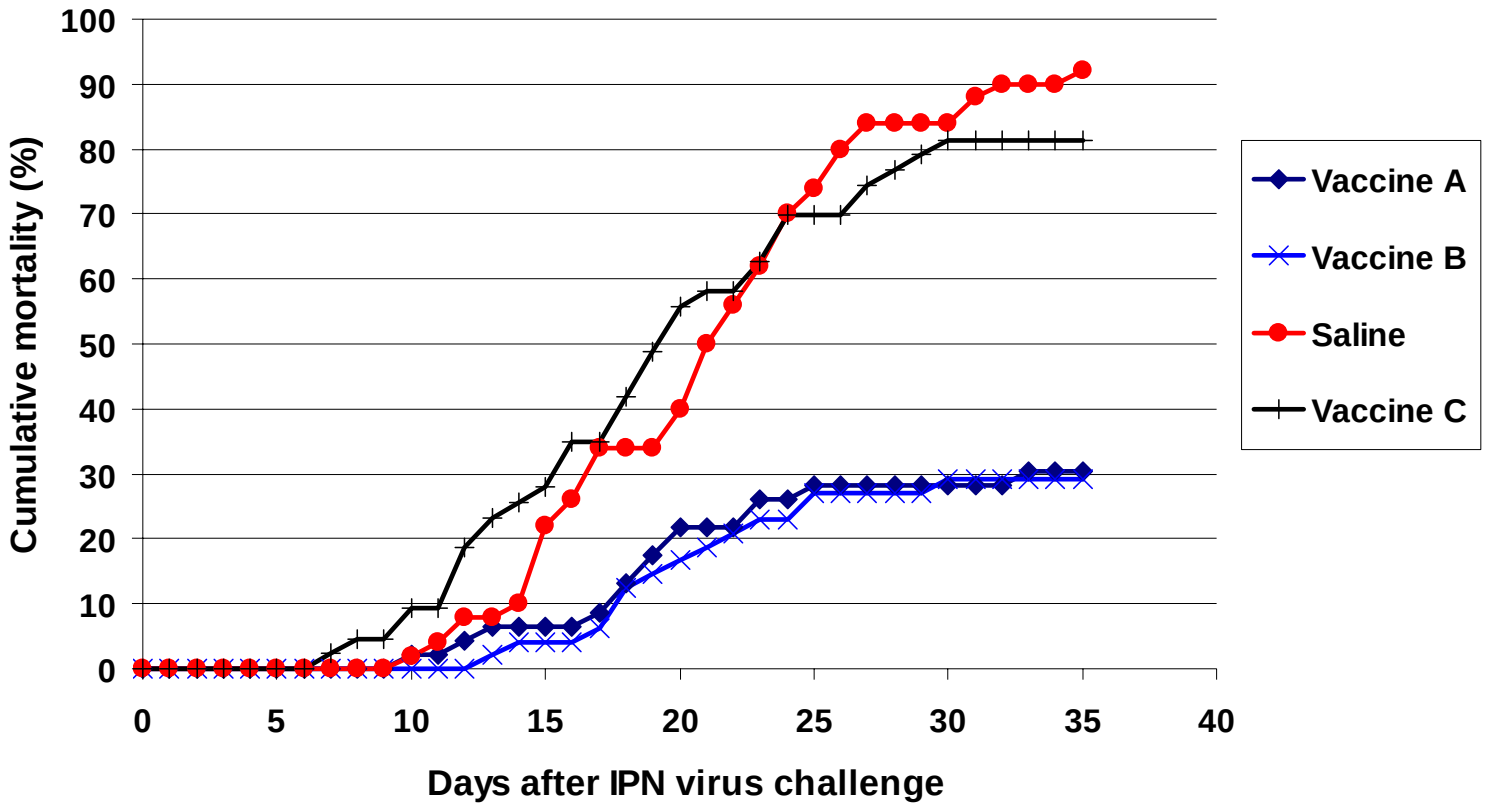
Testing different doses of IPNV strain A



Bath challenge of Atlantic salmon with two different strains of IPNV

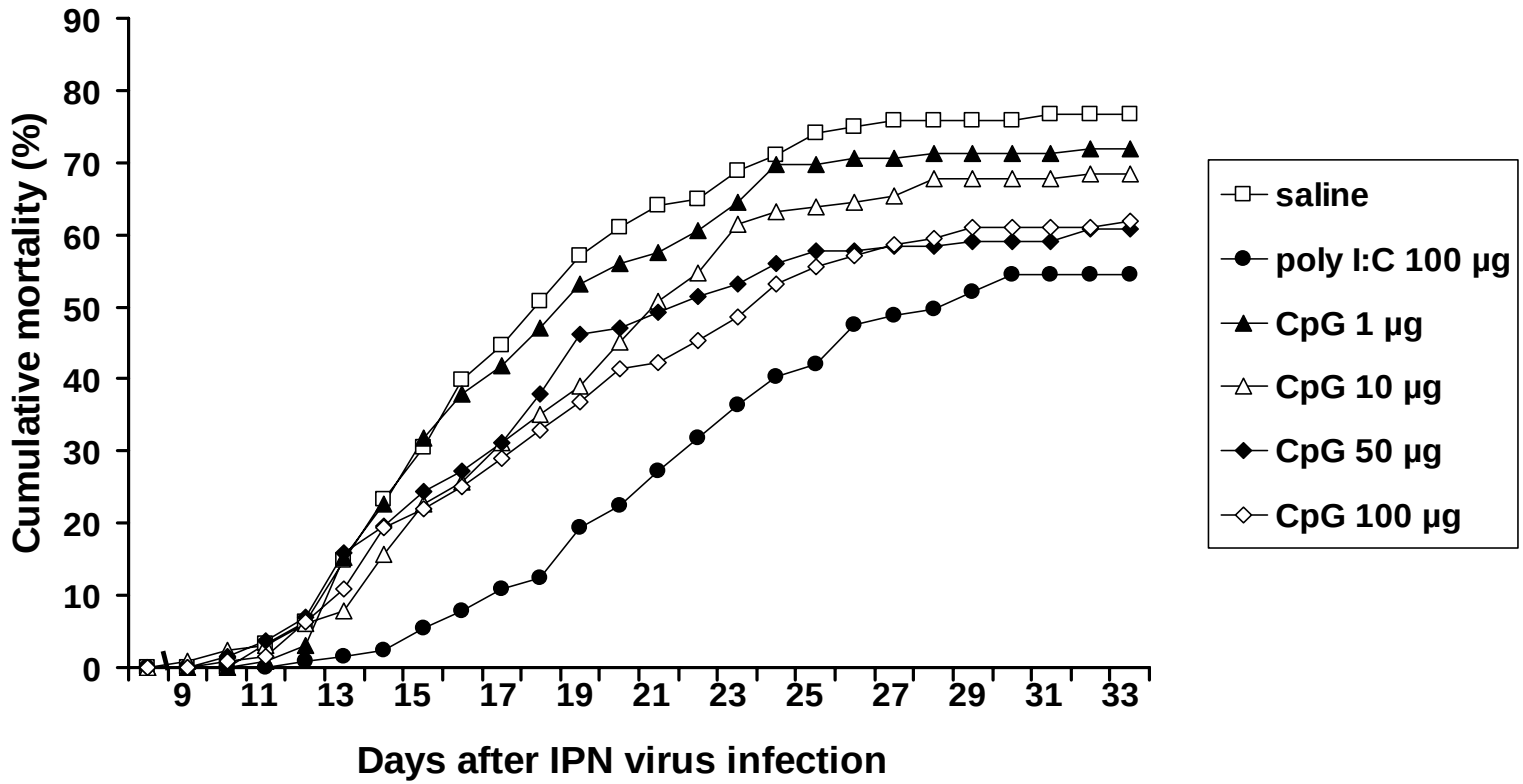


Efficacy of IPN vaccines – early experiment



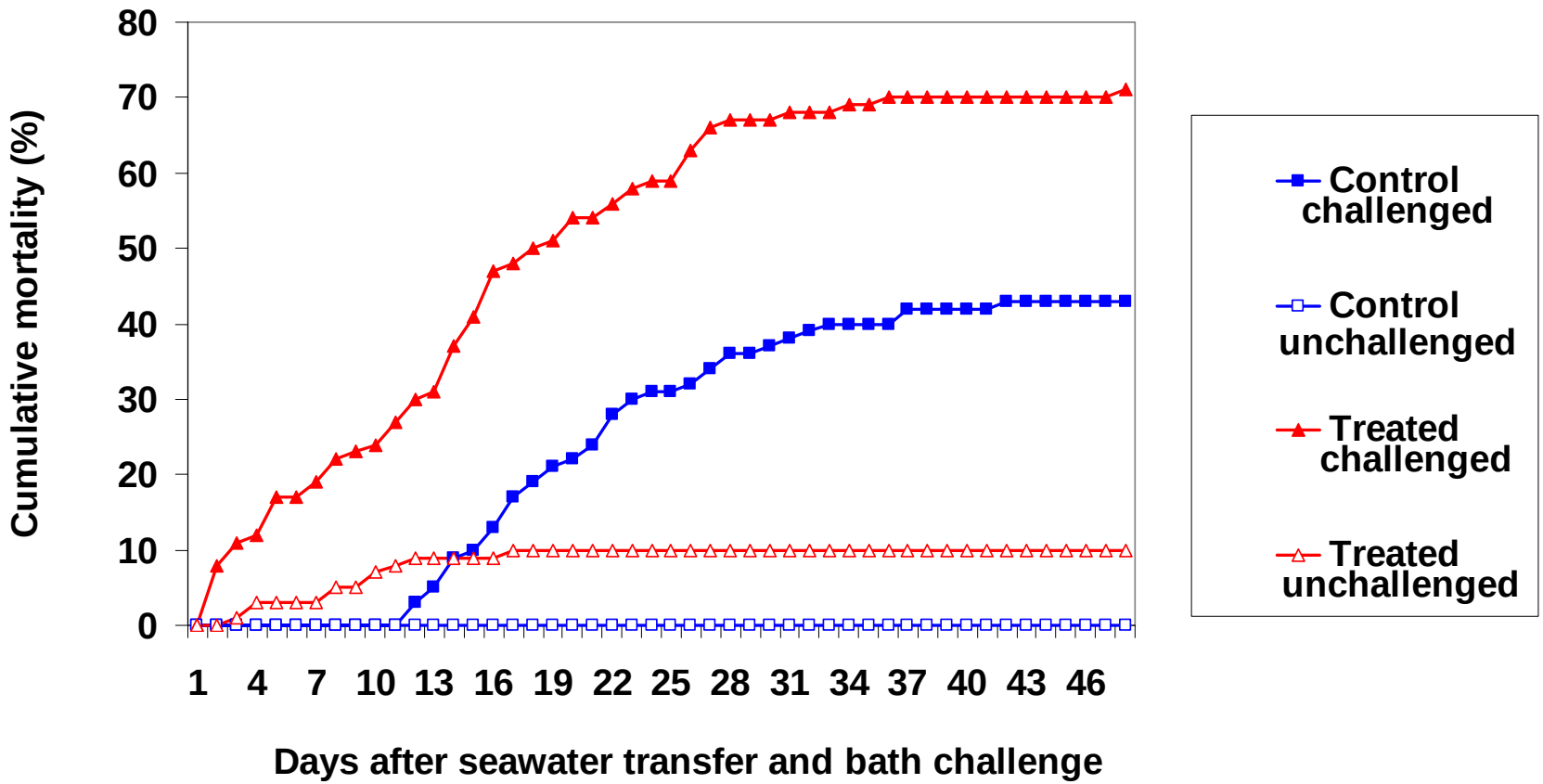
(Sommer, Knappskog og Rødseth, Norsk Fiskeoppdrett nr. 18, s. 30-32,1998).

Testing the protective effect of immunestimulants in Atlantic salmon



(J. Jørgensen, L-H Johansen, K Steiro and A Johansen (2003) ”CpG DNA induces protective antiviral immune responses in Atlantic salmon (Salmo salar L)”. *Journal of Virology* vol 77, no 21, pp. 11471-11479)

Intensive rearing conditions and increased risk of IPN



(Sommer, A.-I., Johansen, L.-H & Toften, H.. (2001). Sammenhenger mellom intensivert drift og IPN-utbrudd hos smolt. Norsk Fiskeoppdrett, 8: 60-62.)

Limitations of the model

-The challenge is done within a week after sea water transfer

-Different generations and families of Atlantic salmon have different susceptibility to IPN virus

- Every new generation of salmon is tested in an IPNV challenge at our own cost.
- The mortality level obtained is representative for the specific generation of salmon; some variation in mortality from year to year.