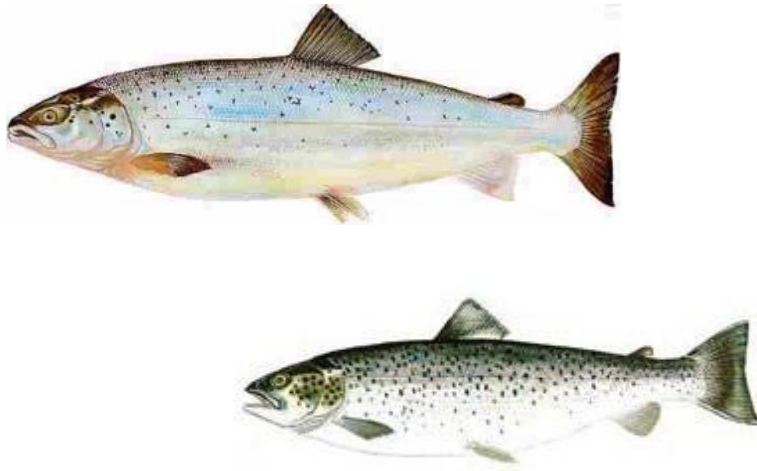


Good animal husbandry practices/biosecurity as risk mitigation on AMR and alternatives to antimicrobials.

Edgar Brun and Brit Hjeltnes



Veterinærinstituttet
Norwegian Veterinary Institute



Biosecurity

in poultry industry; Biosecurity means doing everything possible to protect your birds from infectious diseases



LOOK
for Signs



REPORT
Sick Birds



PROTECT
Your Birds

http://www.aphis.usda.gov/animal_health/birdbiosecurity/biosecurity/basics.htm

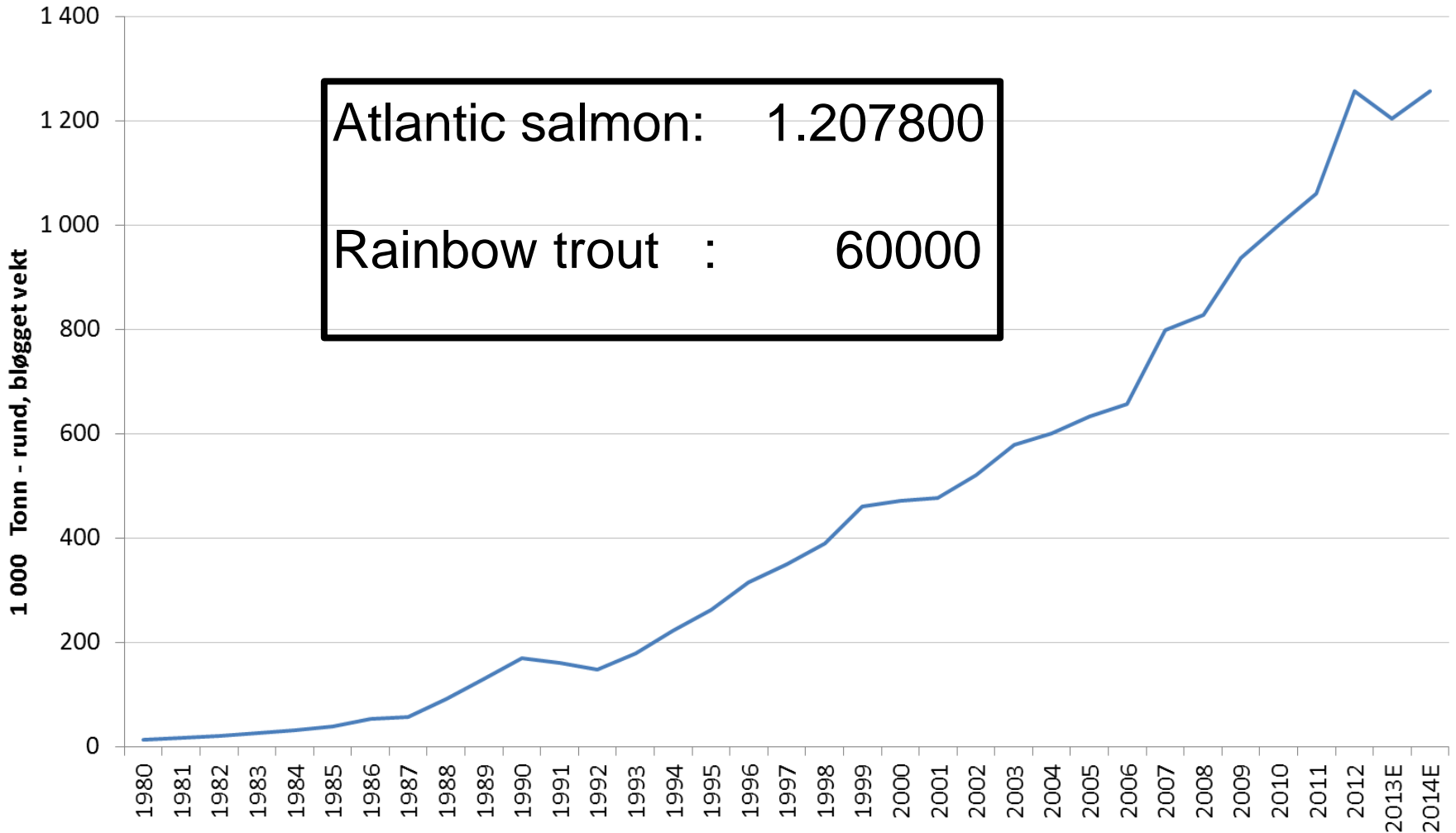
Biosecurity is the key to keeping a nation's aquatic animal population healthy with low level of AMR. It's a responsibility that we all share by working together



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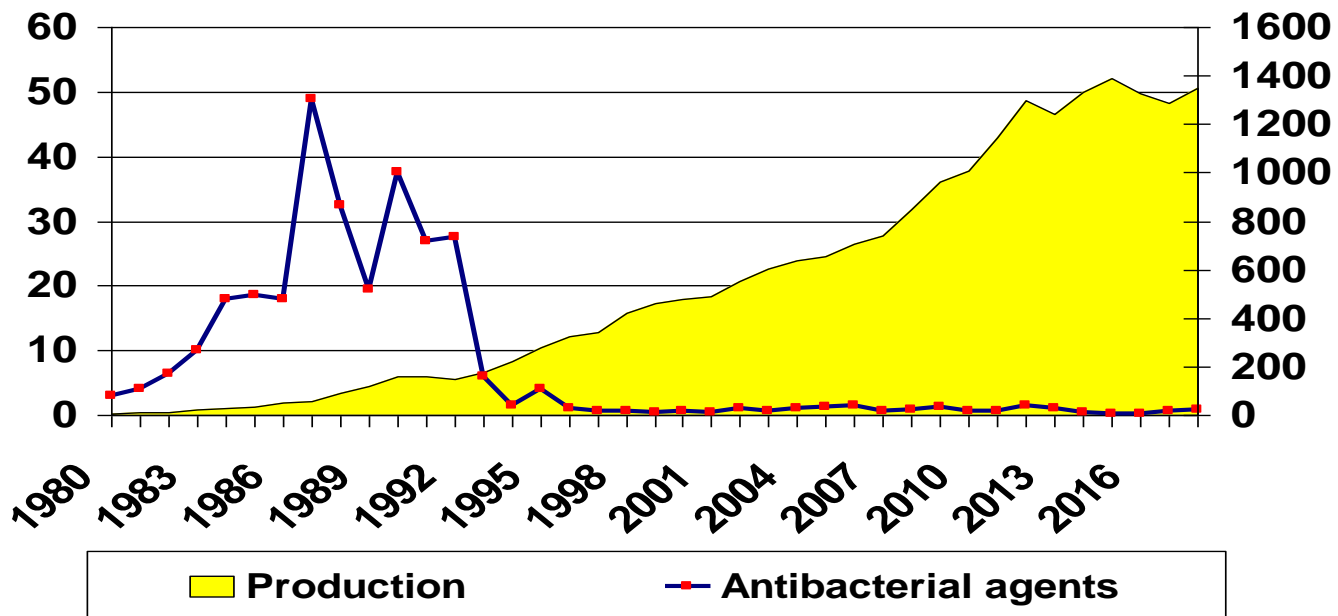
Norwegian production (tons) of Atlantic salmon and rainbow trout 1980-2017



Antibacterial agents (1980 to 2018)

**Antibacterial agents
(metric tons)**

**Production
(metric tons x 10³)**



Source: Therapeutic consumption: www.fhi.no, Fish production: www.fiskeridir.no

Antimicrobials in aquaculture

- Chronic diseases that cause reduced growth, low food conversion rate and poor survival thus leading to reduced production
- Epidemic diseases that can cause mass mortalities
- Failure of preventive therapy
 - good husbandry and vaccination does not always ensure or can act alone to prevent infections by pathogens that can only be resolved by the use of antimicrobials.
- New species in culture and new culture systems/management
 - use of veterinary medicines in a lag phase between the identification and characterization of pathogens and the development of disease control procedures



“Therefore, our efforts should be to reduce irresponsible use of antibiotics in aquatic animal production sector or **Improve Prudent Use of Antibiotics in Aquaculture**. Prudent Use is a complex process “



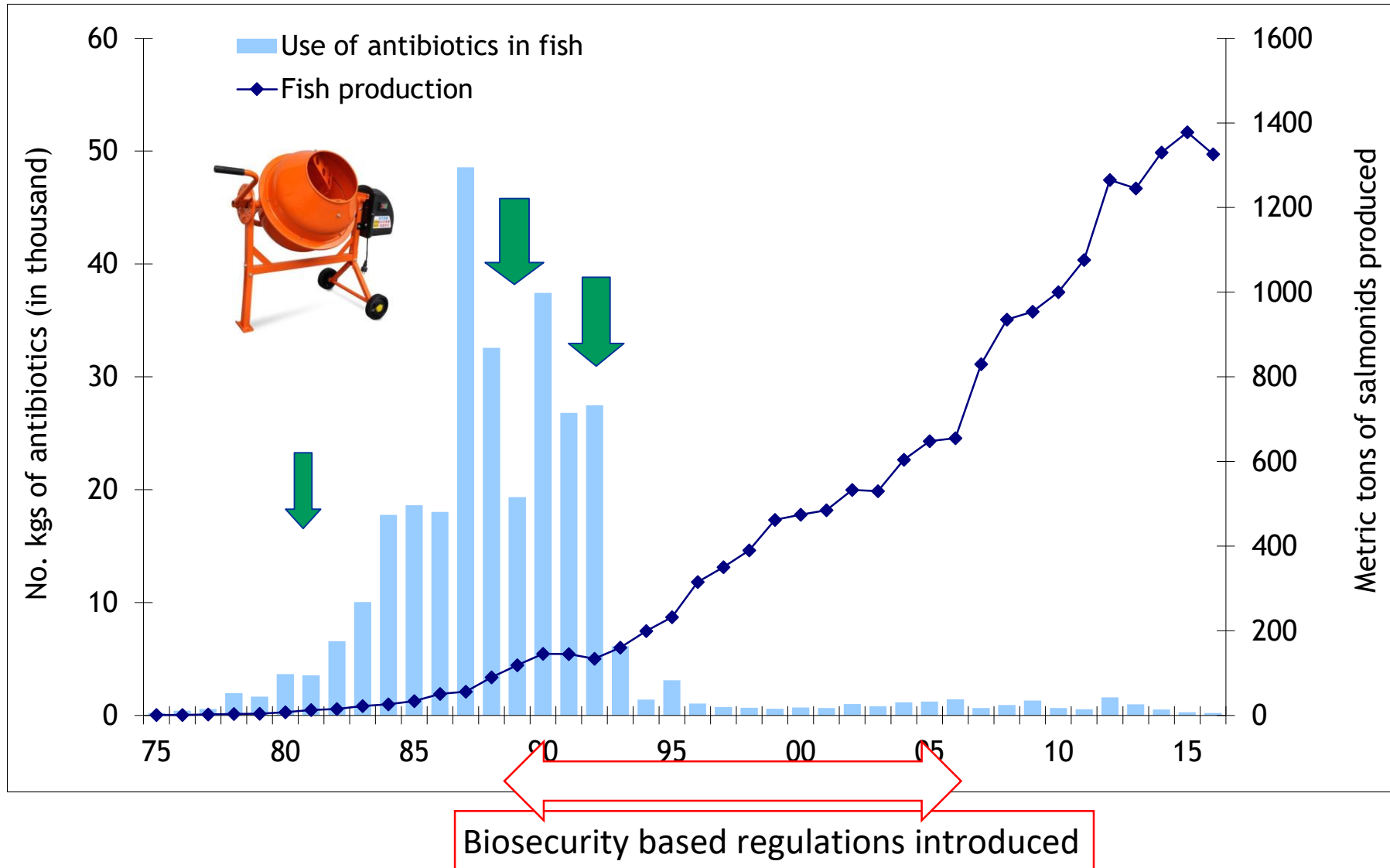
Non-prudent use drives AMR development



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Vaccines against cold water vibriosis and furunculosis

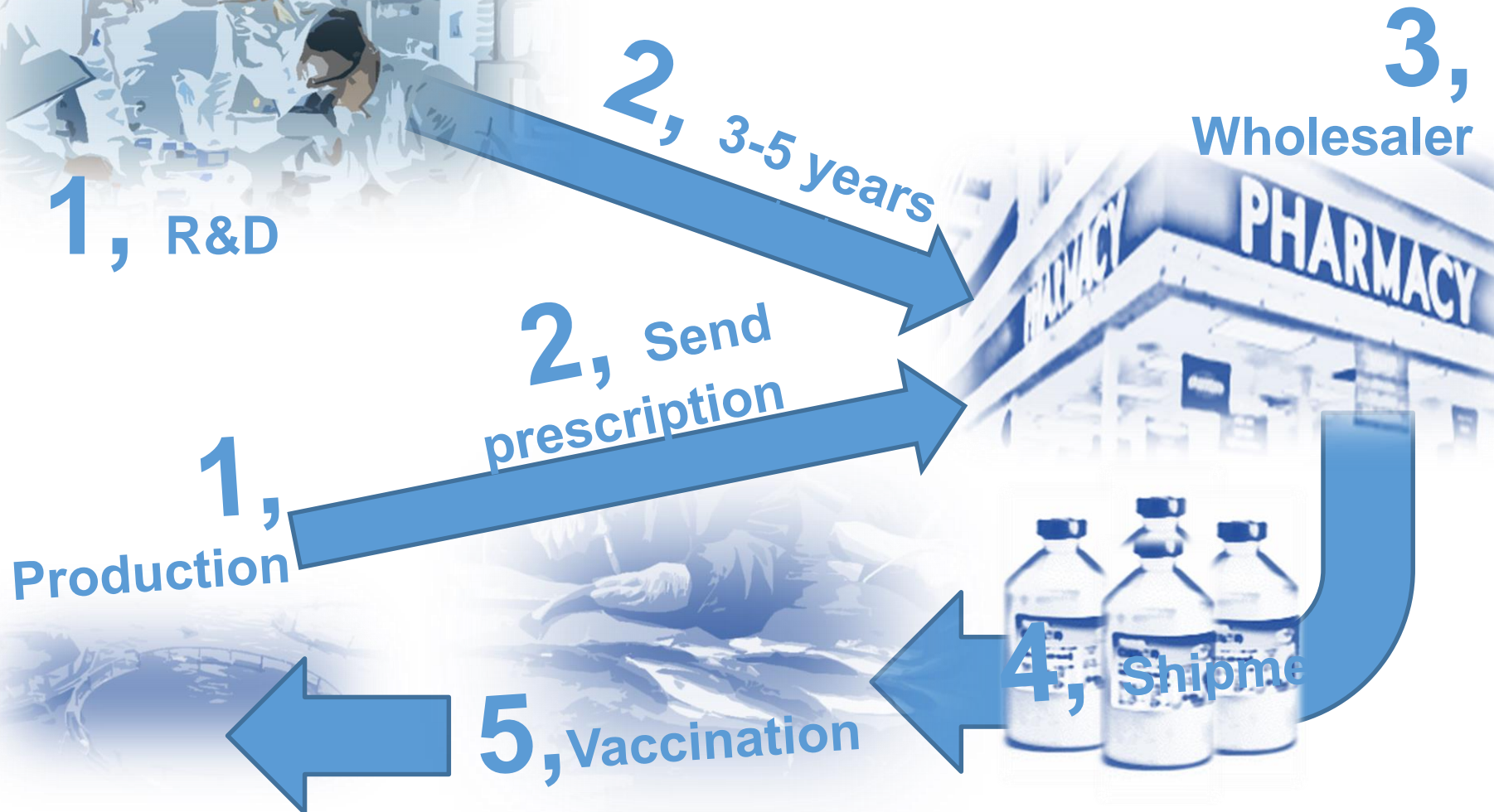


General biosecurity principles

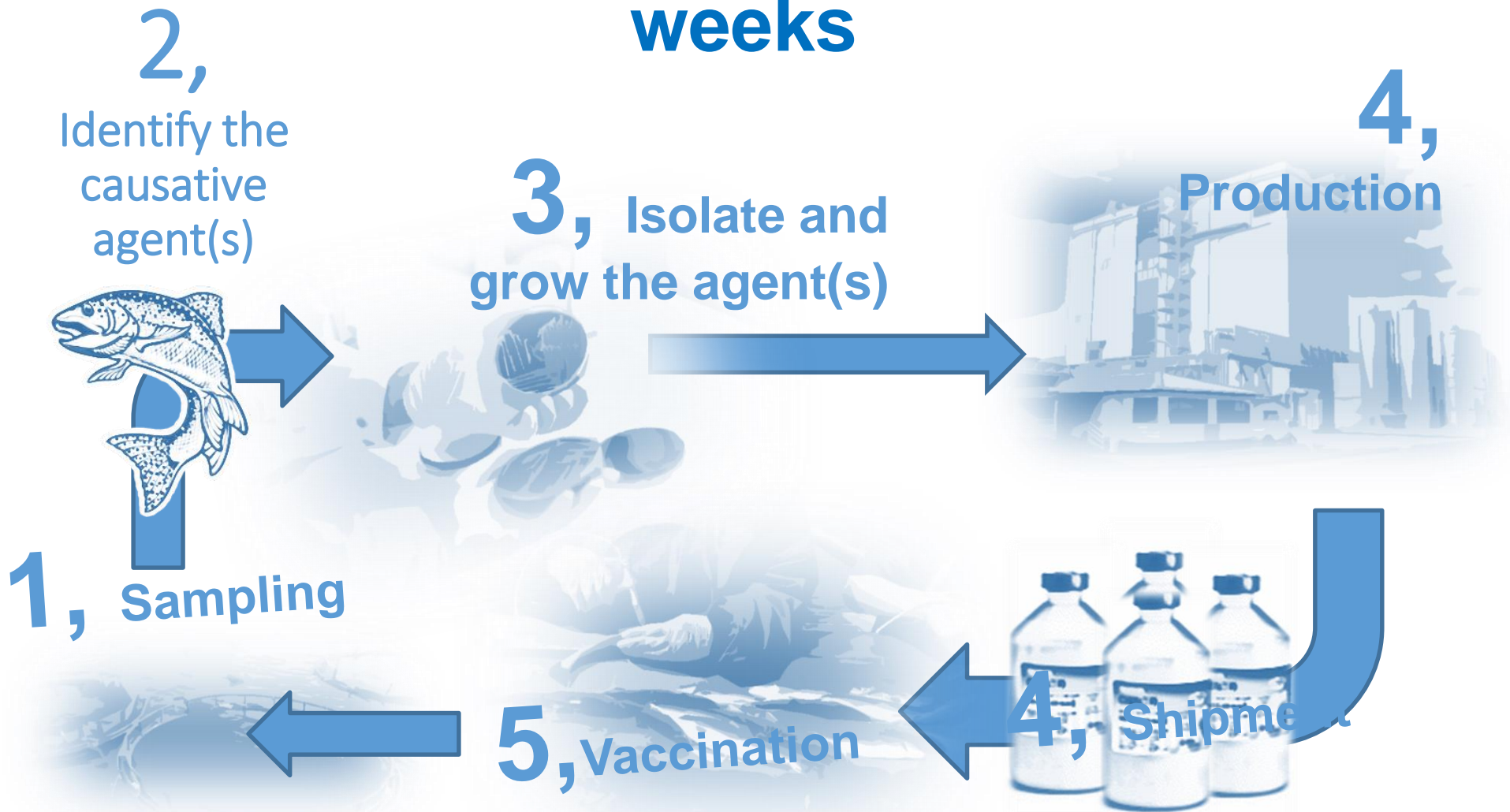
- Following and disinfection.
 - All inn all out
 - Synchronized following
- Separate generations
- Control with movement of fish
- Control with slaughter facilities
- Cooperation between fish farmers



Licensed vaccines,

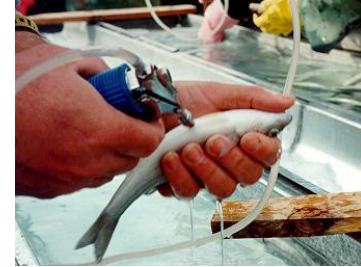


Autogenous vaccines, 8-12 weeks



Delivery systems

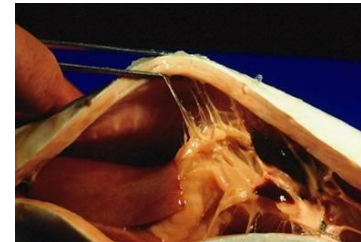
- Immersion



- Injection (i.p., i.m.)



- Oral

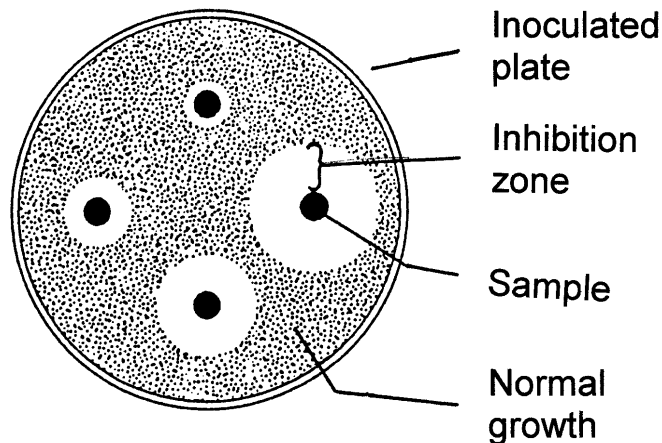


Algae based platform for oral delivery of drugs and vaccines (TransAlgae)



Fast and reliable diagnostic system

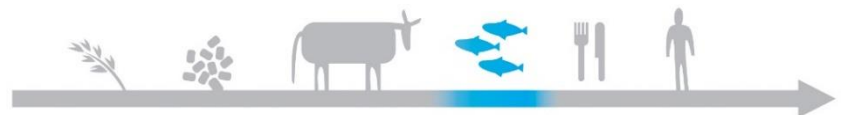
- Mandatory fish health control
- Trained people at all levels
- Sufficient laboratory capacity
 - Incl testing for resistance



Biosecurity hazards related to AMR

Availability;

- Governance, e.g. effective registration, regulations and enforcement
- Restricted access (licence to prescribe)
- Capacity building at all levels



Biosecurity hazards related to AMR

2. Registration and availability «vet-reg»

- Unique numbers
- Four copies
- Information on
 - Veterinarian: name, ID number
 - Fish farm: licence no., locality.
 - Drug: use, formulation and strength.
 - Withdrawal period
 - Vaccination status
- Information from
 - Feed mills
 - Pharmacies

20058 Standardresept for legemiddel til fisk m.v. VETERINÆR

Fra: 0000 Bjørn Hesten
(Vet. ID - nr.) (Veterinærens navn)

9995 Holmen 789 12345
(Veterinærens adresse, poststed og telefonnr.)

Til: Z/c 5 Holmenlaks AS, lok. Øya
(Konsesjonsnr.) (Oppdretters navn)

9997 Fjordholmen 789 54321
(Oppdretters adresse, poststed og telefonnr.)

Behandling foretatt på:
(Sett kryss) stamfisk yngel matfisk
 klekkeri settefisk skjell, skaldyr, m.v.

Art: Laks Størrelse: 800 g (gj. snittsvekt) Mengde: 25000 kg (samlert vekt)

Rp. # V.M.

Legemiddel/medisinor: Florfenikol / Floragpharma vet.
Styrke: 2 g / kg
Pelletsstørrelse og produsent: 6 mm T. Skretting AS
Mengde: 1250 kg (= 2,5 kg florfenikol)

D.S.S.N. Bruksområde: Kaldtvannsvibriose (Tentativ diagnose)

Bruksanvisning: Til behandling av not 1, 3 og 4:
Not 1 (11000 kg): 55 kg dgl i 10 dg
Not 3 og 4 (7000 kg/not): 35 kg/not dgl i 10 dg
Dagsdosen utføres om mulig i ett måltid.

Behandling startes: 14.4.1999 (dato) Behandling avsluttes: 23.4.1999 (dato)

Er fisken vaksinert mot sjukdommen det gis behandling for? Ja Nei
Anbefalt tilbakeholdelsestid: 30 dager etter siste behandling.

Legemiddel rekvirert fra: T. Skretting AS, Tromsø (Utsalgstedets navn)

apotek tårfirma

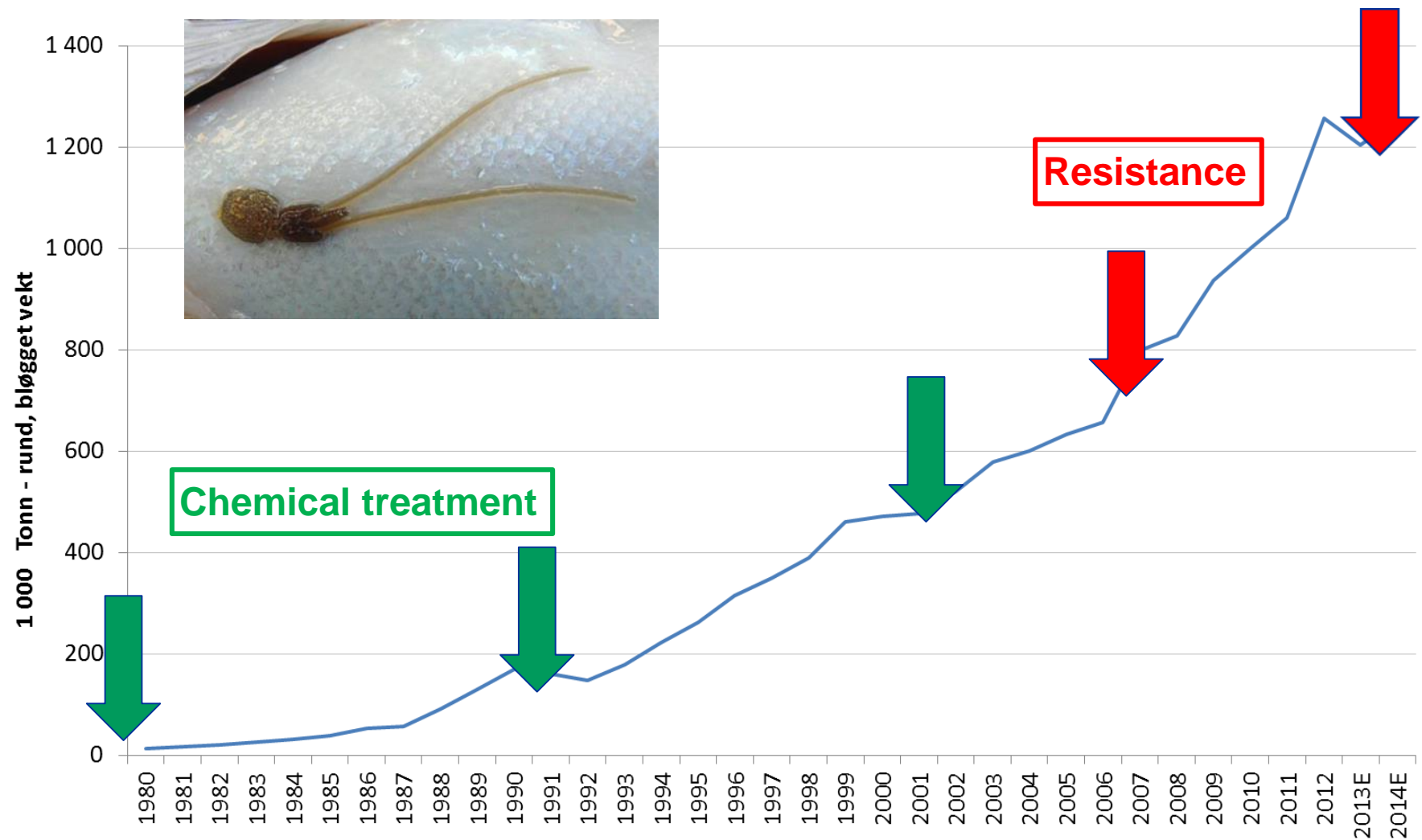
13.4.1999 B. Hesten
(dato) (veterinærens underskrift)

Ekspedert:
1. utlevering (Mengde) (Dato/sign.)
2. utlevering (Mengde) (Dato/sign.)

Distriktskontor Kontrollverket: Tromsø (Påføres av veterinæren)

IK 1166

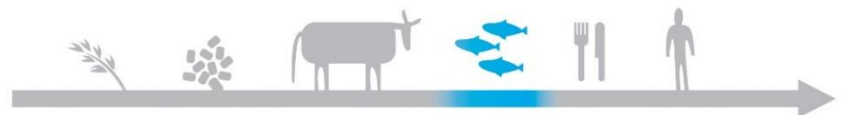
Salmon lice treatment



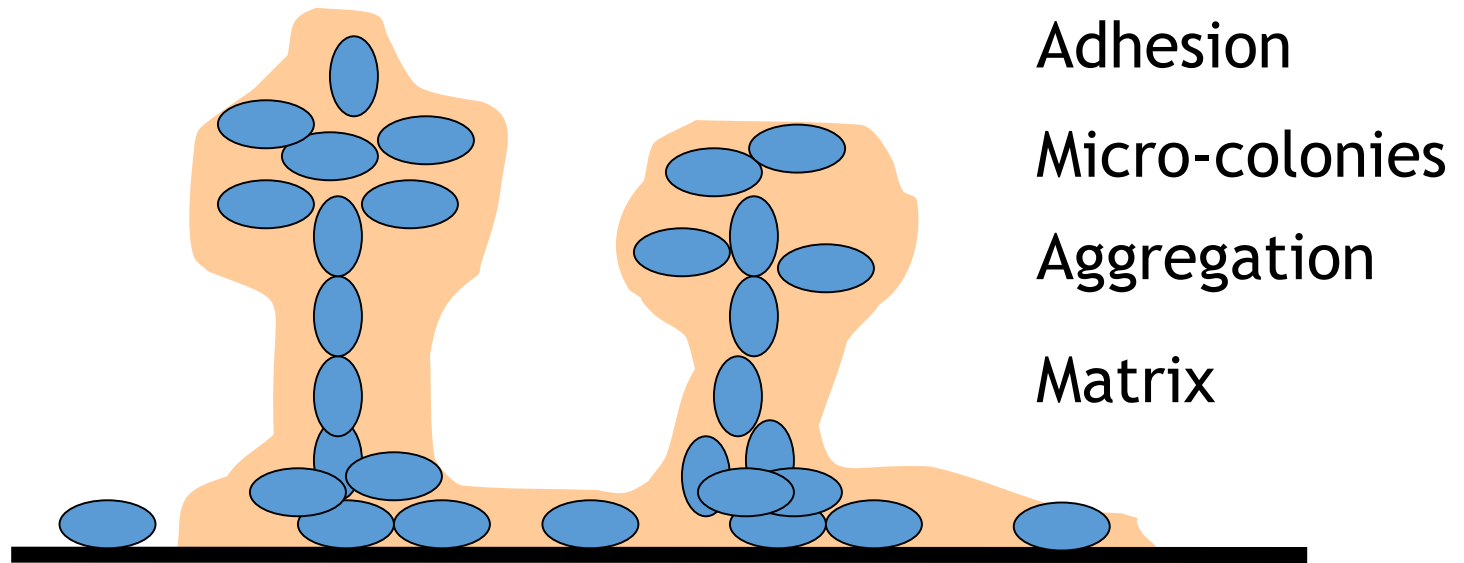
Biosecurity hazards related to AMR

3. Others

- Introduction of animals (national, regional, farm)
- Environmental exposure
 - Neighbour activities, water, animals, people
 - AMR a zoonoses
- Lack of proper cleaning and disinfection
- Biofilms --
- When and how to use ab?
 - Sick fish eat less/don't eat



Bacterial aggregation on surfaces



- Can tolerate 1000 times as much antibiotics and disinfection as outside a biofilm

Need of proper cleaning !!!



Thank you for listening



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