Helseovervåkningsprogrammet HOP for hjortevilt og moskus

XX Anniversary
1998-2018

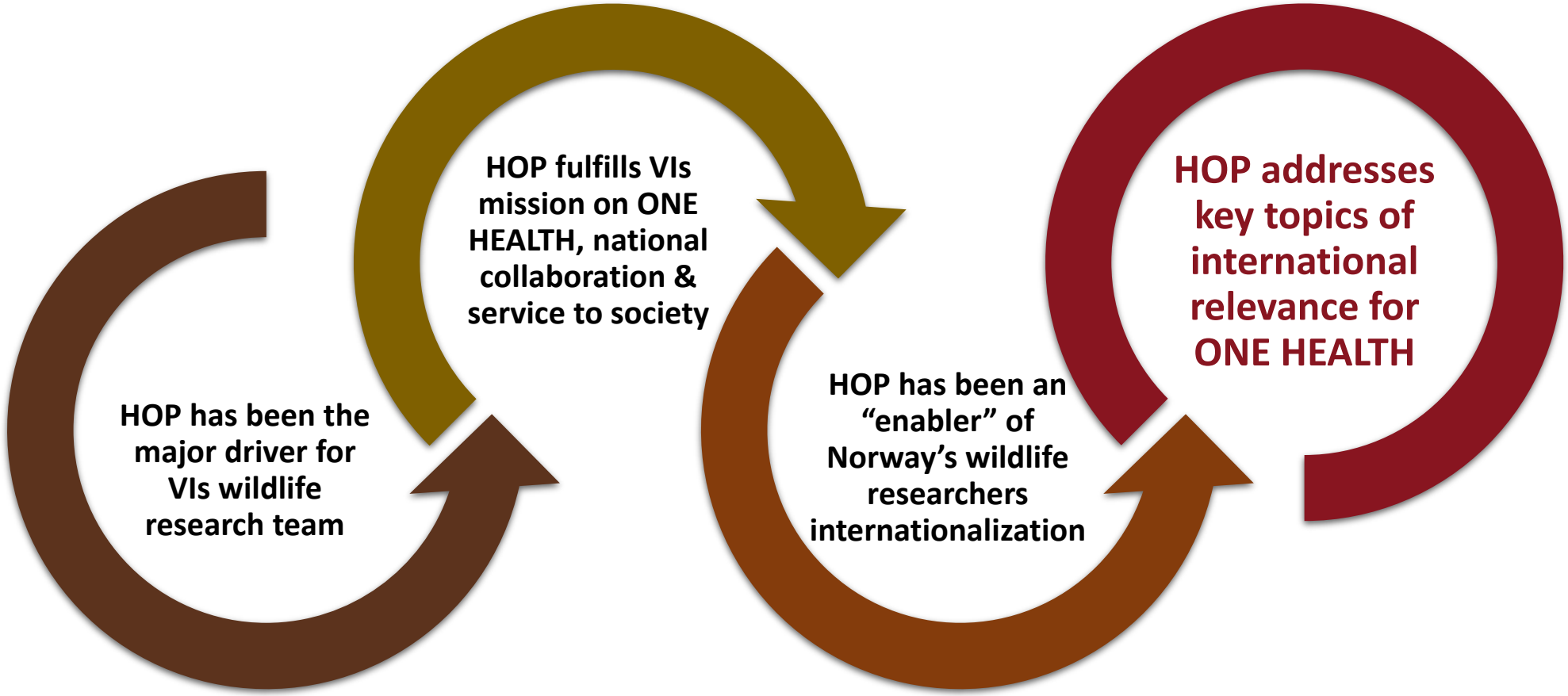
# A NATIONAL PROGRAM
# A DRIVER FOR WILDLIFE RESEARCH
# AN INTERNATIONAL MISSION

**Carlos G. das Neves**
DVM PhD Dipl.ECZM (Wildlife Pop. Health)
Associate Professor
Head of Food Safety & Emerging Health Threats

Veterinærinstituttet
Norwegian Veterinary Institute
Davvi-Norgga šibitdoavttirinstituhtta

# Today's "4 dogmas"…

Helseovervåkningsprogrammet HOP for hjortevilt og moskus




Veterinærinstituttet
Norwegian Veterinary Institute
Davvi-Norgga šibitdoavttirinstituhtta

HOP has been the major driver for VIs wildlife research team

# A small "publishing" team…






1998 2005 2006 2013 2017


As of today: **3, 75-4 person/years**

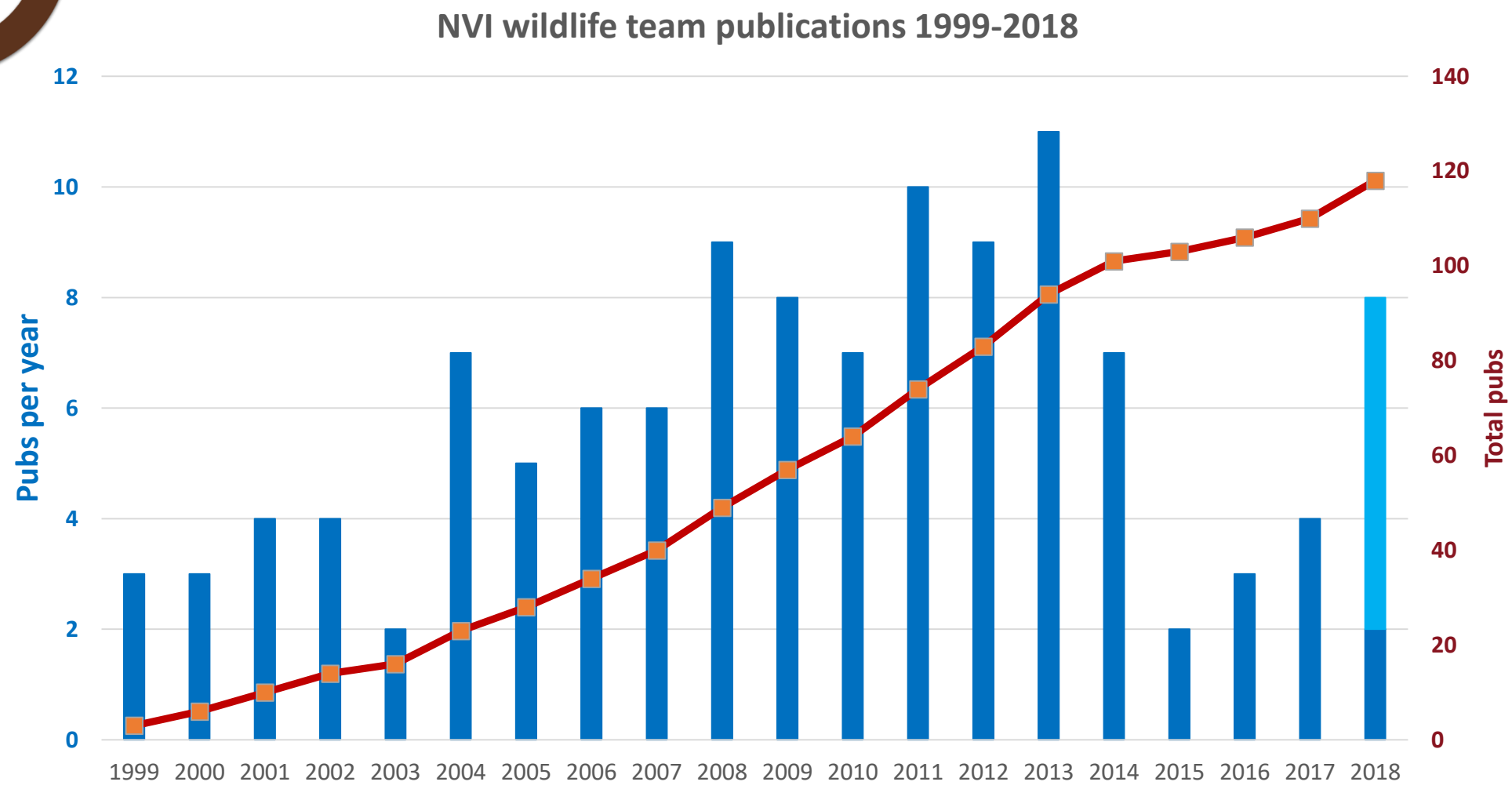
As of 01.08.18: **3, 15-3,4 person/years**

**5,75 person/years**

Veterinærinstituttet
Norwegian Veterinary Institute
Davvi-Norgga šibitdoavttirinstituhtta

HOP has been the major driver for VIs wildlife research team

# Publications…




**+ reports, + national magazines, +scientific opinions, + + +**

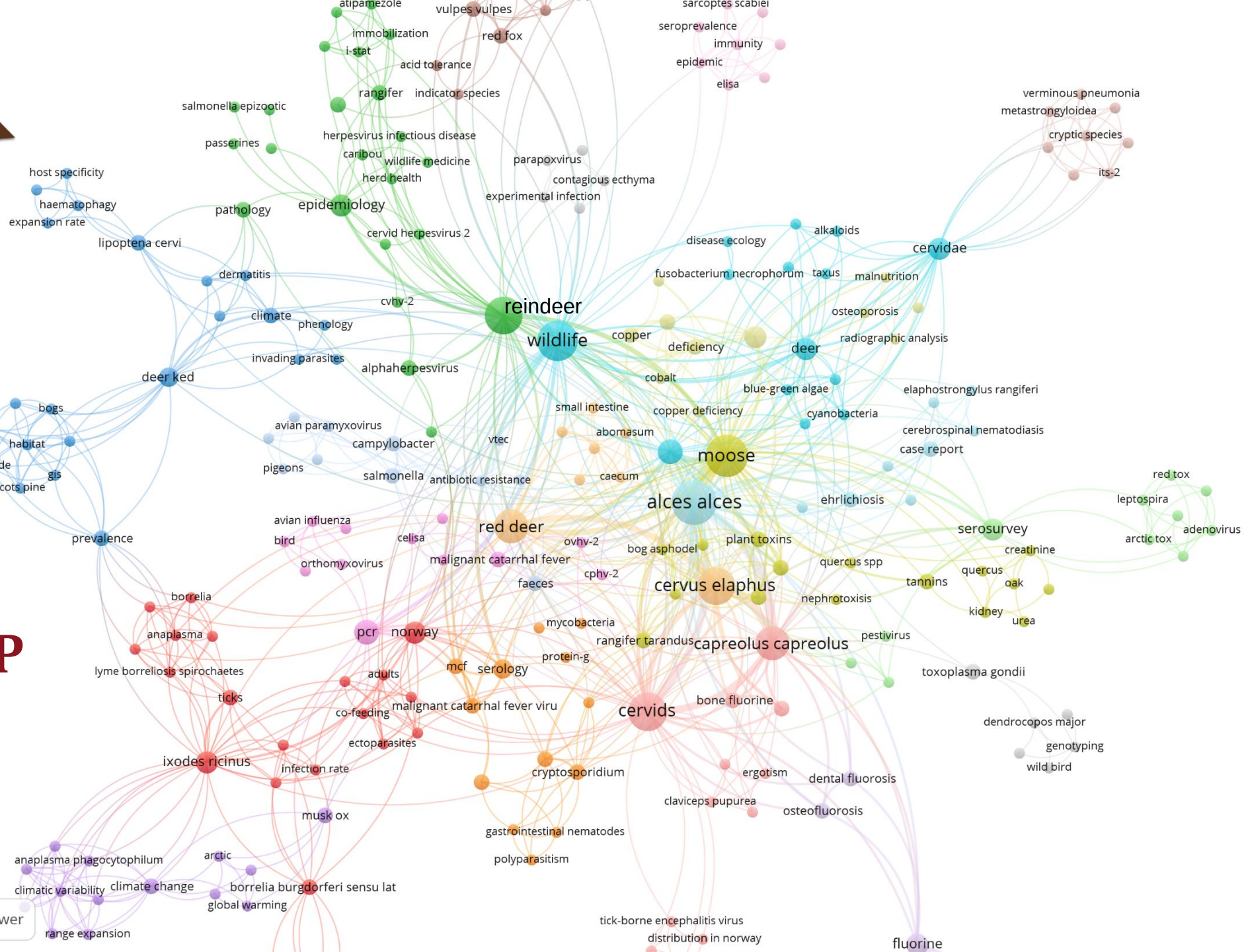
Veterinærinstituttet
Norwegian Veterinary Institute
Davvi-Norgga šibitdoavttirinstituhtta

Helseovervåkningsprogrammet HOP for hjortevilt og moskus

HOP has been the major driver for VIs wildlife research team

# What have we published on?

**~65% is HOP related**

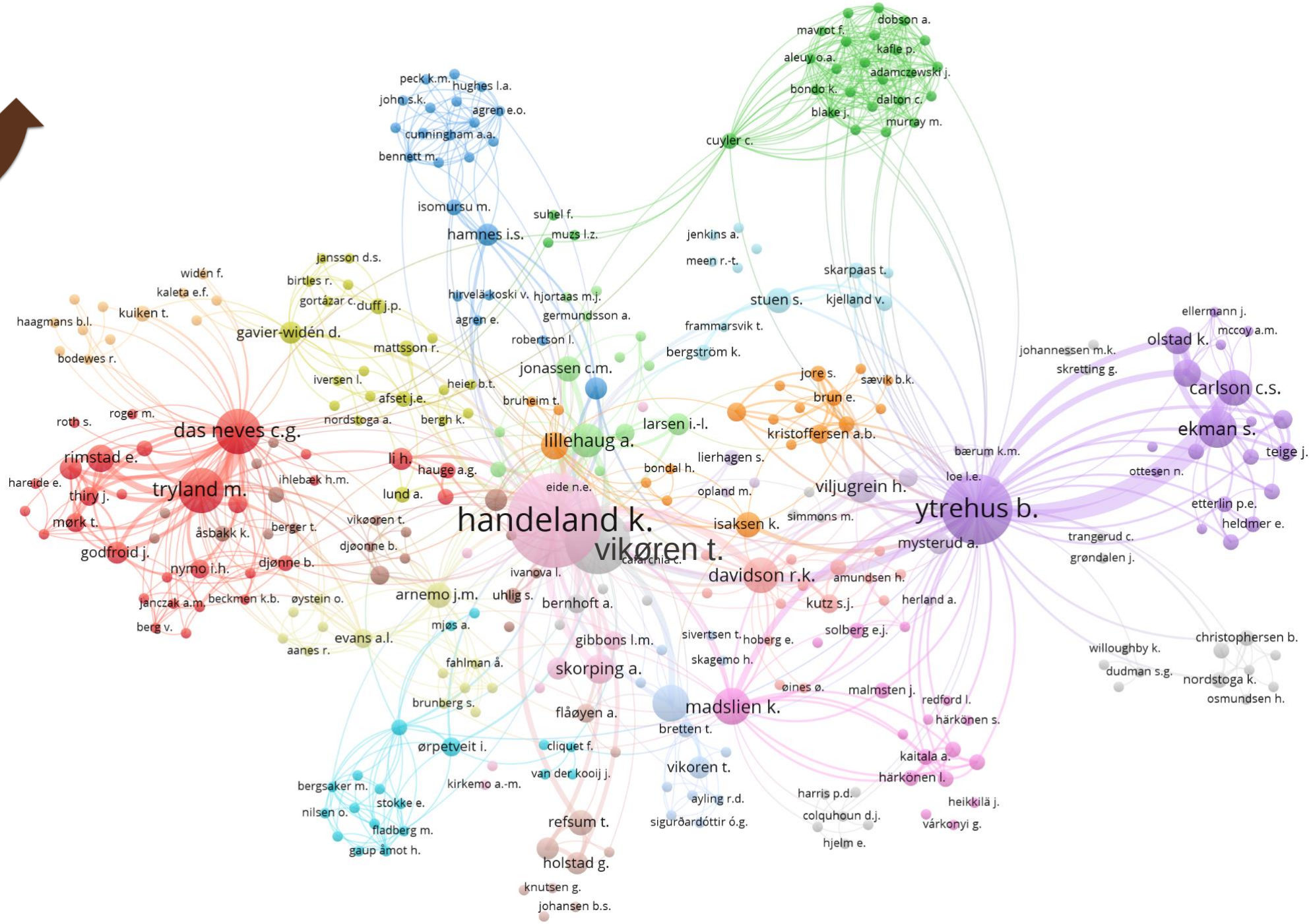



Veterinærinst
Norwegian Veteri
Davvi-Norgga šibitdo

VOSviewer

Helseovervåkningsprogrammet HOP for hjortevilt og moskus

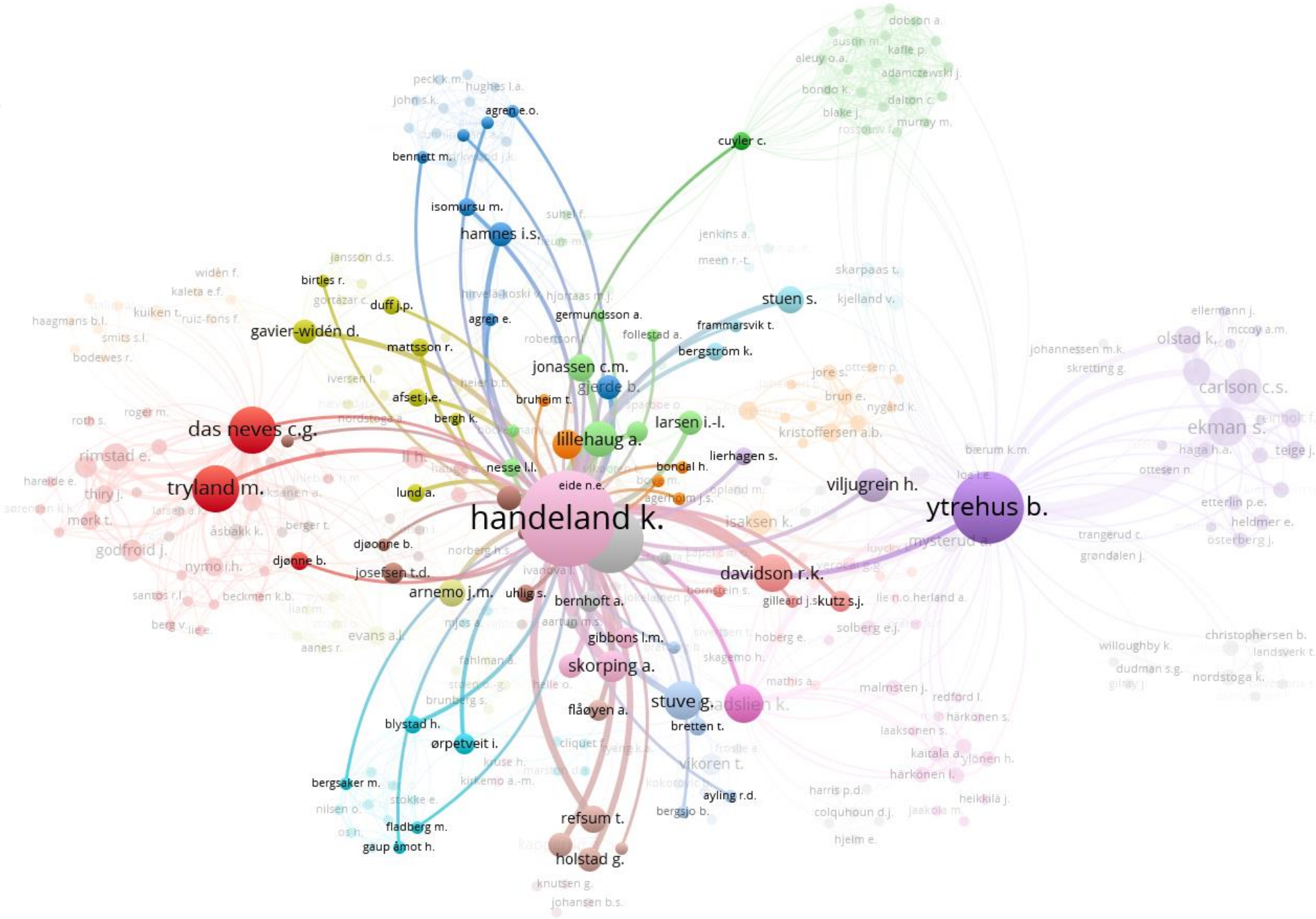
HOP has been the major driver for VIs wildlife research team




Veterinærinstituttet
Norwegian Veterinary Institute
Davvi-Norgga šibitdoavttirinsti

Helseovervåkningsprogrammet HOP for hjortevilt og moskus

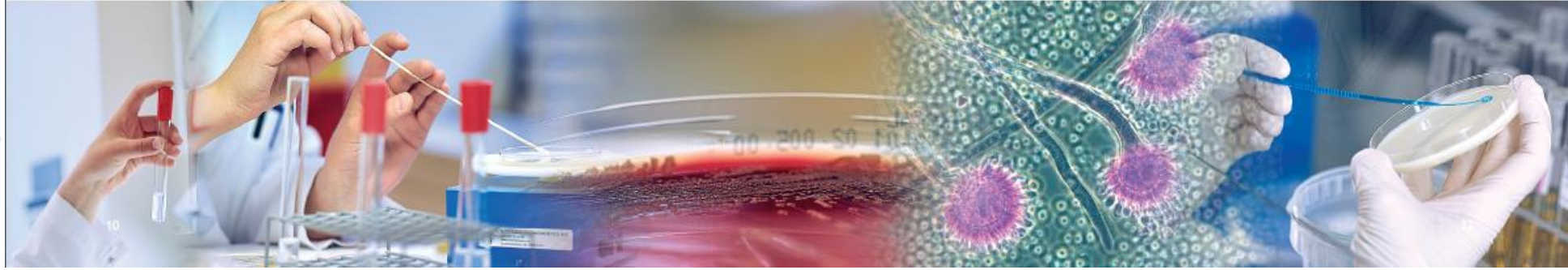
HOP has been the major driver for VIs wildlife research team




Veterinærins
Norwegian Ve
Davvi-Norgga šibi

HOP
Helseovervåkningsprogrammet for hjortevilt og moskus

HOP fulfills VIs mission on ONE HEALTH, national collaboration & service to society



# Our mission…

The Norwegian Veterinary Institute is a research institute in the areas of animal health, fish health and food safety, whose primary function is supply of research-based knowledge support to the authorities.

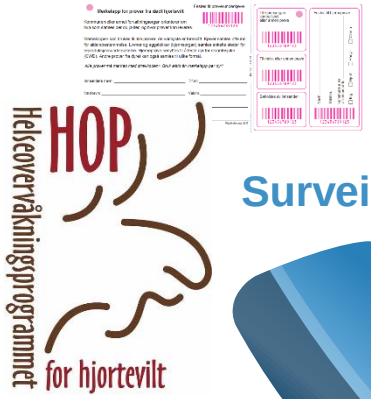
- **Diagnostics/analyses**
- **Counselling about diseases**
- **Risk communication**
- **R&I domestic and abroad**


Veterinærinstituttet
Norwegian Veterinary Institute
Davvi-Norgga šibitdoavttirinstituhtta

HOP
Helseovervåkningsprogrammet
for hjortevilt og moskus

HOP fulfills VIs mission on ONE HEALTH, national collaboration & service to society


HEALTHY ANIMALS, HUMANS & ENVIRONMENT




Diagnostics

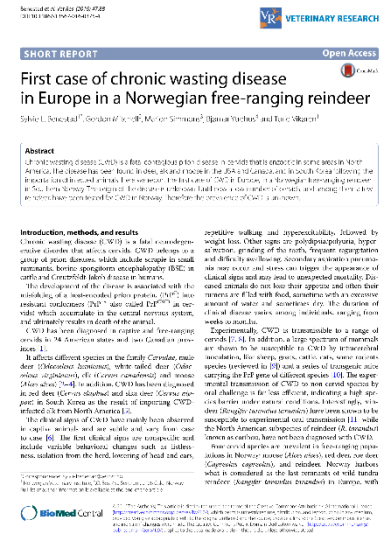
Counselling

Surveillance

Research


Wildlife as Source of Zoonotic Infections

Hilde Kruse,* Anne-Mette Kirkemo,* and Kjell Handeland*


SHORT REPORT Open Access

First case of chronic wasting disease in Europe in a Norwegian free-ranging reindeer


Experimental Infection of Reindeer with Cervid Herpesvirus 2

Veterinærinstituttet
Norwegian Veterinary Institute
Davvi-Norgga šibitdoavttirinstituhtta

# National collaboration…


Munnskurv

Čalbmevihki

Fotråte

EIDs

Velferd


AMR

CWD

HOP Helseovervåkningsprogrammet for hjortevilt og moskus

Veterinærinstituttet
Norwegian Veterinary Institute
Davvi-Norgga šibitdoavttirinstituhtta

UiT / Norges arktiske universitet

NIBIO Norsk institutt for bioøkonomi

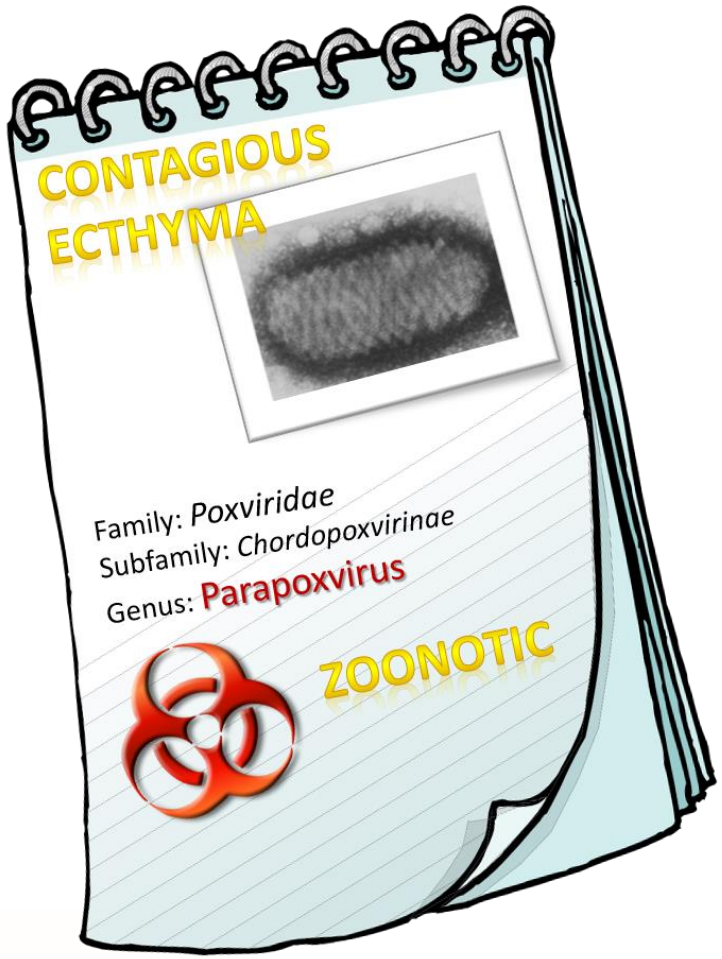
Norsk Polarinstitutt

NINA

HOP
Helseovervåkningsprogrammet for hjortevilt og moskus

HOP fulfills VIs mission on ONE HEALTH, national collaboration & service to society

# Preparedness… beredskap!




Veterinærinstituttet
Norwegian Veterinary Institute
Davvi-Norgga šibitdoavttirinstituhtta

HOP
Helseovervåkningsprogrammet for hjortevilt og moskus

HOP fulfills VIs mission on ONE HEALTH, national collaboration & service to society

# Preparedness… beredskap!



Veterinærinstituttet
Norwegian Veterinary Institute
Davvi-Norgga šibitdoavttirinstituhtta

HOP has been an "enabler" of Norway's wildlife researchers internationalization

"New and emerging infections keep coming back and the world needs a collective system, and that requires **international cooperation and collaboration**, in the name of global solidarity"

*Margaret Chan – WHO Director General*

Veterinærinstituttet
Norwegian Veterinary Institute
Davvi-Norgga šibitdoavttirinstituhtta

HOP

Helseovervåkningsprogrammet for hjortevilt og moskus

HOP has been an "enabler" of Norway's wildlife researchers internationalization

# Who do we work with?

**19 countries**

Veterinærinstituttet
Norwegian Veterinary Institute
Davvi-Norgga šibitdoavttirinstituhtta

Helseovervåkningsprogrammet HOP for hjortevilt og moskus

HOP has been an "enabler" of Norway's wildlife researchers internationalization


Veterinærinstituttet
Norwegian Veterinary Institute
Davvi-Norgga šibitdoavttirinstituhtta

Helseovervåkningsprogrammet HOP for hjortevilt og moskus

HOP has been an "enabler" of Norway's wildlife researchers internationalization

Veterinærinstituttet
Norwegian Veterinary Institute
Davvi-Norgga šibitdoavttirinstituhtta

HOP
Helseovervåkningsprogrammet for hjortevilt og moskus

HOP has been an "enabler" of Norway's wildlife researchers internationalization

Veterinærinstituttet
Norwegian Veterinary Institute
Davvi-Norgga šibitdoavttirinstituhtta



DOI: 10.7589/2017-03-053

*Journal of Wildlife Diseases*, 54(2), 2018, pp. 000–000


# Gammaherpesvirus (Type 1 Ruminant Rhadinovirus) in Muskox (*Ovibos moschatus*) in Greenland

**Kjell Handeland,[1,4] Lajos Zoltan Muzs,[2] Christine Cuyler,[3] Marianne Heum,[1] Faisal Suhel,[1] and Carlos G. das Neves[1]** [1]Norwegian Veterinary Institute, PO Box 750 Sentrum, N-0106 Oslo, Norway; [2]Lajos Zoltan Muzs, Veterinary & Food Authority of Greenland, Box 169, 3920 Qaqortoq, Greenland; [3]Greenland Institute of Natural Resources, PO Box 570, 3900 Nuuk, Greenland; [4]Corresponding author (e-mail: kjell.handeland@vetinst.no)

ABSTRACT: The world's native distribution of muskox (*Ovibos moschatus*) is restricted to Canada and Greenland, and a muskox-specific gammaherpesvirus has been described from Canadian populations. We analyzed spleen samples from the Kangerlussuaq muskox population in Greenland and identified muskox gammaherpes by PCR and sequencing.

Malignant catarrhal fever (MCF) is a generally fatal viral disease primarily affecting ruminants of the Bovidae and Cervidae (Li et al. 2014). It is caused by closely related gammaherpesviruses known as MCF viruses (MCFVs), now placed in the genus *Macavirus*. The viruses exist within the bovid subfamilies Caprinae (sheep, goat) and Alcelaphinae (wildebeest) as latent infections in reservoir hosts (Russel et al. 2009). Both the *Ovine herpesvirus 2* (OvHV2) of sheep and *Caprine herpesvirus 2* from goats have been recognized as a cause of MCF in free-ranging cervids in Norway (Vikøren et al. 2006). Several viruses closely related to known MCFVs have now been reported. Due to limited information, these viruses have mostly been named as ruminant rhadinovirus, depicting an older nomenclature of ruminant rhadinovirus type 1 (Type 1 RuRv–MCF like) and type 2 (Type 2 RuRv–lymphotropic like; Li et al. 2005) based on antigenic epitopes shared by MCFVs and absent in lymphotropic viruses.

In 2003, a gammaherpesvirus specific to muskox (*Ovibos moschatus*) was described from Canada and classified as MCFV-muskox (Type 1 ruminant rhadinovirus of muskox; Li et al. 2003). The same virus has been identified in the muskox population in Norway (Vikøren et al. 2013). To date, there have been no investigations of this virus in muskox in Greenland. The objective of our study was to examine whether this virus is present in the muskox population at Kangerlussuaq in southwestern Greenland (Kangerlussuaq Airport, 67′01″N, 50′41″W).

The muskox belongs to the bovid subfamily Caprinae. Its native distribution is restricted to Canada and northeastern Greenland. The Kangerlussuaq population originates from 27 animals translocated from northeastern Greenland in the 1960s. Today, the Kangerlussuaq muskoxen are a well-established population that provides the basis for commercial harvesting (Cuyler et al. 2009; Gunn et al. 2013). Spleen samples from 27 muskoxen aged 1 yr or older were collected at the Kangelussuaq slaughterhouse in February 2014. One half of each spleen was cut off and placed in a plastic bag. In the laboratory, the capsule was cut open, and a tissue sample was removed from the depth of the spleen. Approximately 35 mg of tissue was homogenized in 750 µL of lysis buffer (NucliSENS®, BioMerieux, Durham, North Carolina, USA). We extracted DNA from the homogenate (total volume 750 µL) by using the automatic extraction system NucliSensH® easyMag™ (BioMérieux) according to the manufacturer's protocol. The DNA was diluted in 40 µL and stored at –80 C. Detection of herpesvirus DNA was performed by amplifying a 215–315-base pair (bp) fragment of the DNA polymerase gene by using a nested PCR with degenerate primers as described previously (VanDevanter et al. 1996), having however replaced the original Taq polymerase by Platinum® *Tfi* DNA polymerase (ThermoFisher Scientific–Life Technologies, Carlsbad, California, USA) and increased the primers final concentrations from 0.2 µM to 0.3 µM.



67th Annual International Conference
**WILDLIFE DISEASE ASSOCIATION**
August 5-10, 2018 | St. Augustine, FL | USA
*Connecting Wildlife Health, Conservation and Management in a Changing World*


**OIE Global Conference on Wildlife**
*Animal Health and Biodiversity - Preparing for the Future*
Paris (France), 23-25 February 2011

ABSTRACT BOOK


# To be or not to be.... BE!


**The 62nd International Conference of the Wildlife Disease Association**

**July 27- August 2, 2013**
**Knoxville, Tennessee**

63rd Annual
Wildlife Disease Association Conference
One Health:
Transitioning from Theory to Practice


July 27 – August 1, 2014
Albuquerque, New Mexico

**WDA**
**KALAAN-KAB • WDALA**
*San Cristóbal de Las Casas 2017*

Wildlife Health in a Shrinking World:
ECOLOGY, MANAGEMENT AND CONSERVATION

WILDLIFE DISEASE ASSOCIATION
INTERNATIONAL CONFERENCE
June 26 - July 1, 2005
Cairns, Queensland, Australia



59th Annual International
Conference of the Wildlife
Disease Association


Veterinærinstituttet
Norwegian Veterinary Institute
Davvi-Norgga šibitdoavttirinstituhtta

8th CONFERENCE of the
ewda
EUROPEAN WILDLIFE DISEASE ASSOCIATION
ROVINJ - CROATIA
2-5 October, 2008






Veterinærinstituttet
Norwegian Veterinary Institute
Davvi-Norgga šibitdoavttirinstituhtta

# VI's international «wildteam»

HOP has been an "enabler" of Norway's wildlife researchers internationalization

OIE NATIONAL FOCAL POINTS FOR WILDLIFE DISEASES

Vitenskapskomiteen for mat og miljø
Norwegian Scientific Committee for Food and Environment

harmonised Approaches in monitoring wildlife Population Health, And Ecology and Abundance

Founded in 1951

WORLD ORGANISATION FOR ANIMAL HEALTH

Veterinærinstituttet
Norwegian Veterinary Institute
Davvi-Norgga šibitdoavttirinstituhtta

HOP addresses key topics of international relevance for ONE HEALTH

«A threat anywhere..
Is a threat everywhere!»

*Barack Obama*

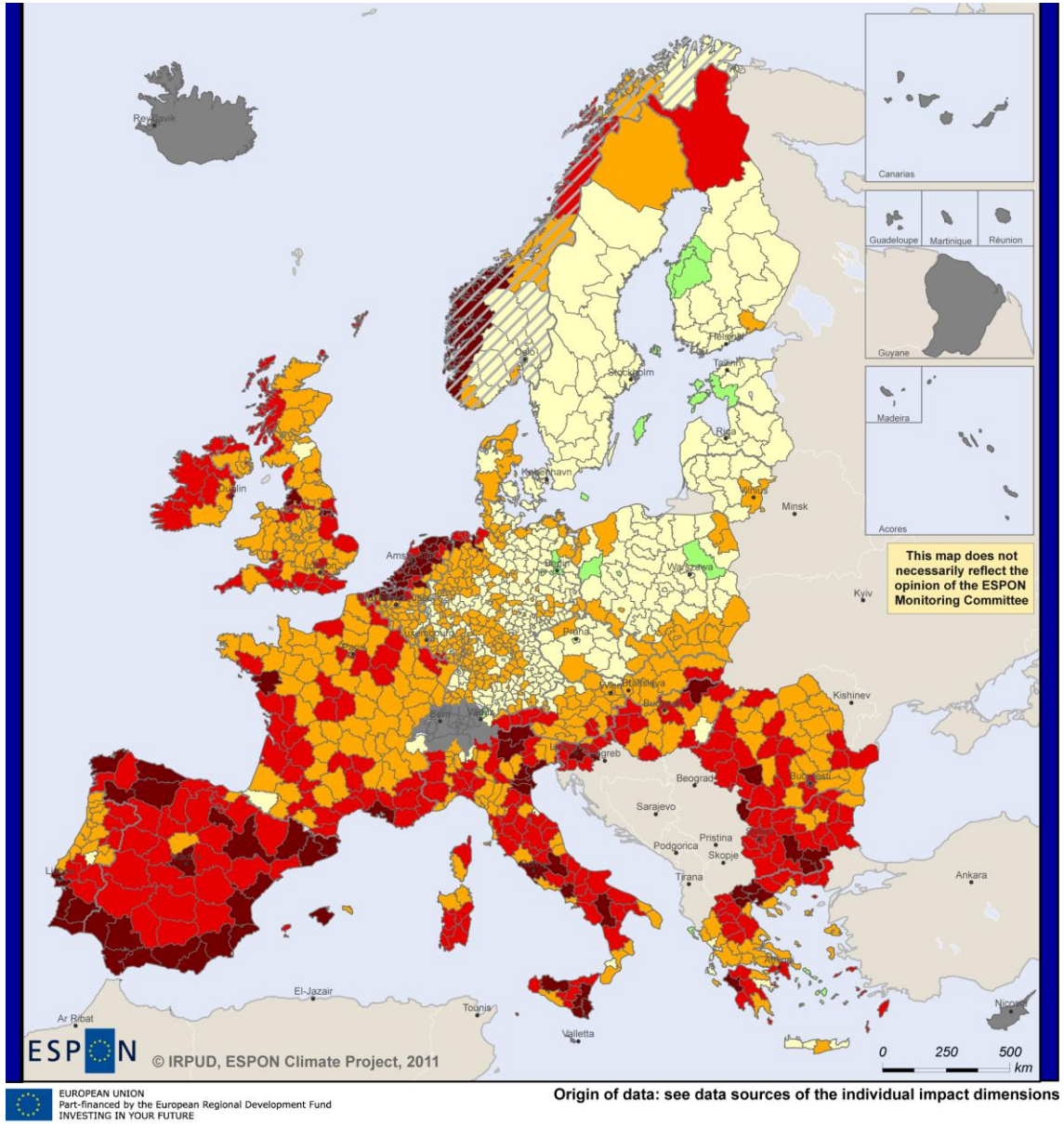

Veterinærinstituttet
Norwegian Veterinary Institute
Davvi-Norgga šibitdoavttirinstituhtta

HOP

Helseovervåkningsprogrammet for hjortevilt og moskus

HOP addresses key topics of international relevance for ONE HEALTH

# Climate change is also a Norwegian problem




**Aggregate potential impact of climate change**

Veterinærinstituttet
Norwegian Veterinary Institute
Davvi-Norgga šibitdoavttirinstituhtta

Helseovervåkningsprogrammet HOP for hjortevilt og moskus

HOP addresses key topics of international relevance for ONE HEALTH

FHI Folkehelseinstituttet

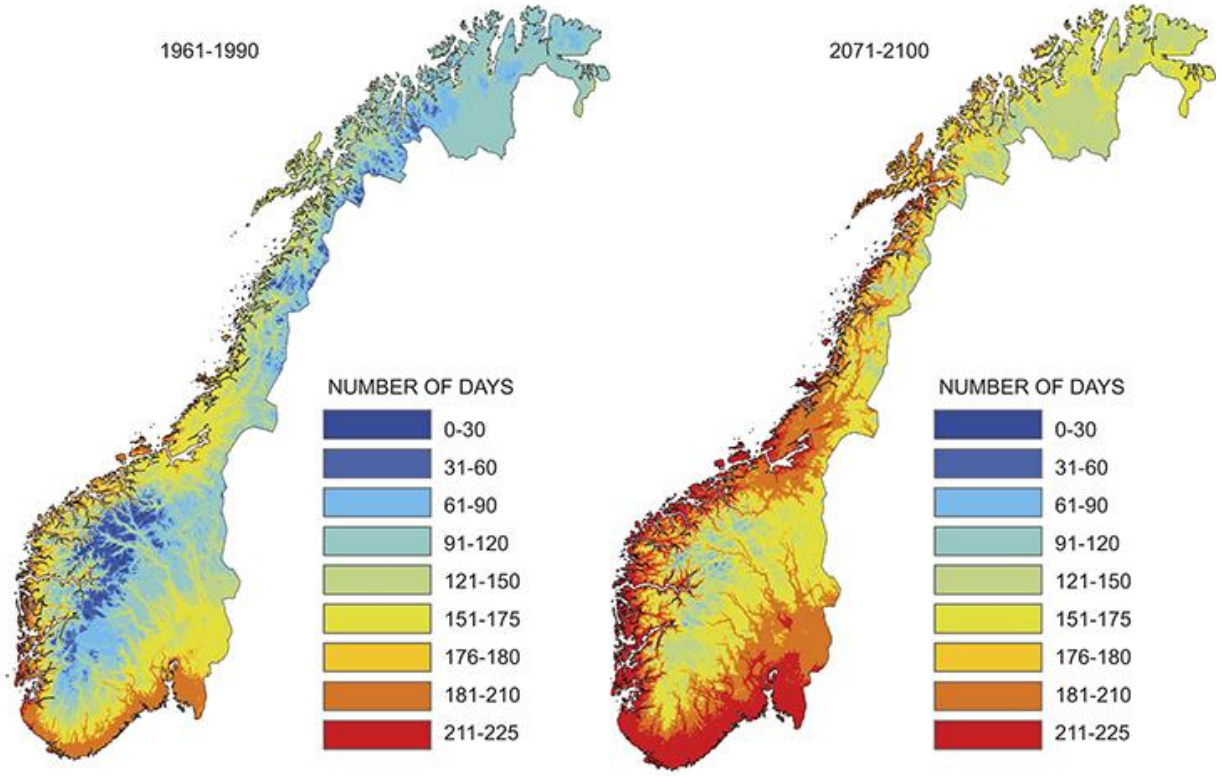



*Figure 3.5 Tick distribution is related to the length of the growing season*

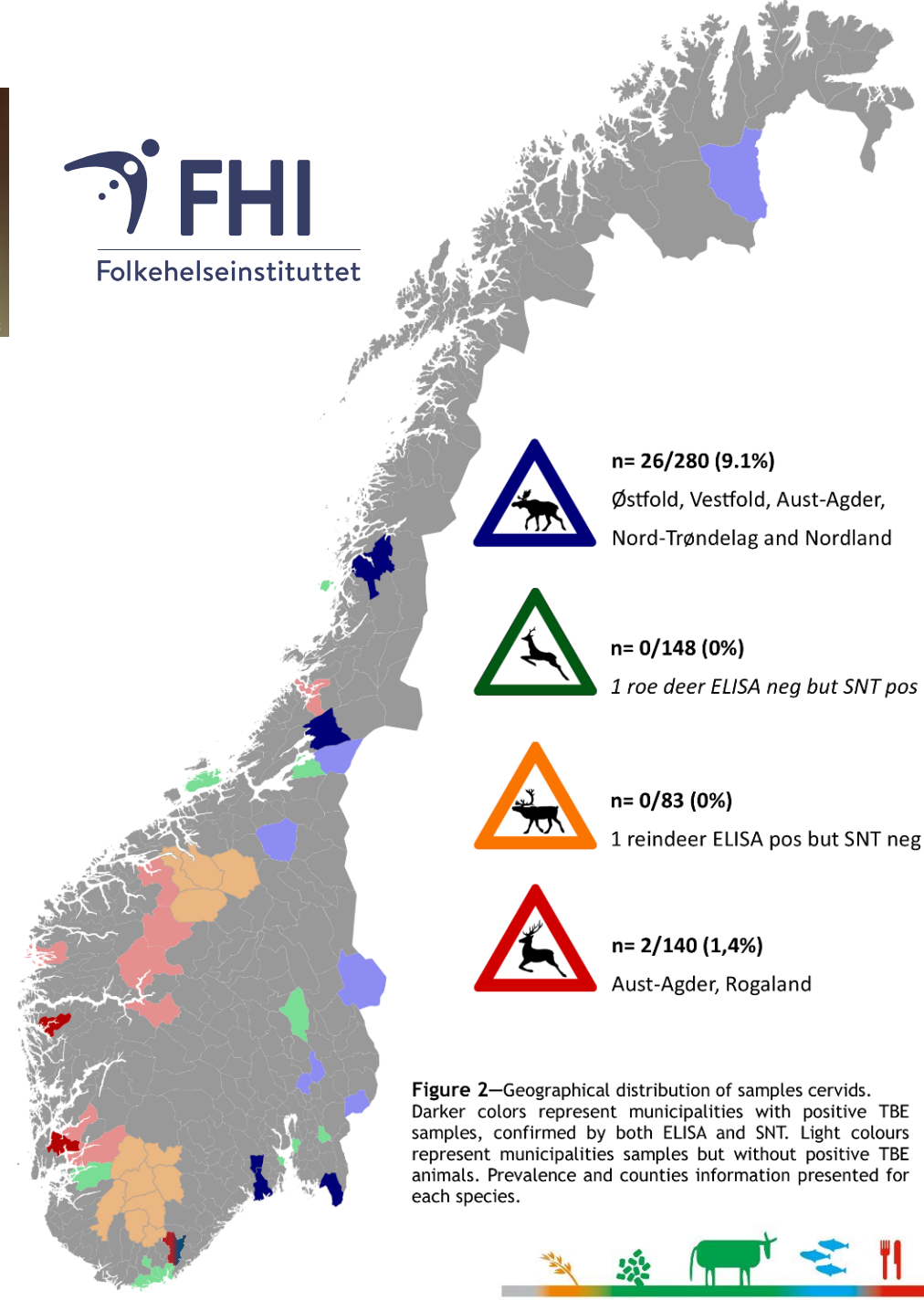


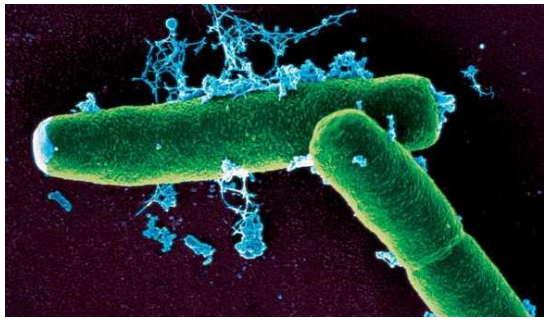

**Figure 2**—Geographical distribution of samples cervids. Darker colors represent municipalities with positive TBE samples, confirmed by both ELISA and SNT. Light colours represent municipalities samples but without positive TBE animals. Prevalence and counties information presented for each species.

Veterinærinstituttet
Norwegian Veterinary Institute
Davvi-Norgga šibitdoavttirinstituhtta

Helseovervåkningsprogrammet HOP for hjortevilt og moskus

HOP addresses key topics of international relevance for ONE HEALTH

# Anthrax




Veterinærinstituttet
Norwegian Veterinary Institute
Davvi-Norgga šibitdoavttirinstituhtta

# Antimicrobial Resistance in SVALBARD




Veterinærinstituttet
Norwegian Veterinary Institute
Davvi-Norgga šibitdoavttirinstituhtta

Helseovervåkningsprogrammet HOP for hjortevilt og moskus

HOP addresses key topics of international relevance for ONE HEALTH

# Antibiotic resistance in Svalbard reindeer

*(Rangifer tarandus platyrhynchus)*

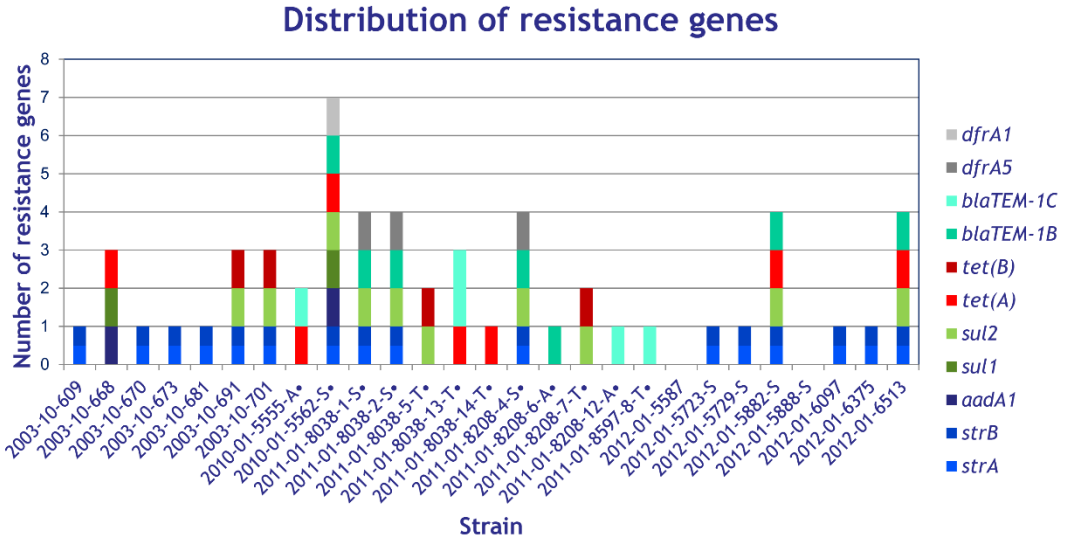



**Figure 1.** Isolates included in the study and their genotypic resistance profile. Strains marked with "•" are isolated from Svalbard reindeer.

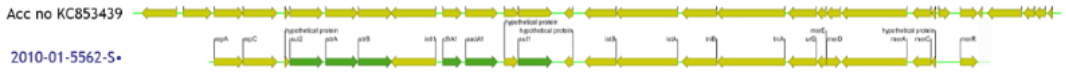



**Figure 3.** Structure of conjugative resistance plasmid originating from *E. coli* (2010-01-5562-S) from Svalbard reindeer and map of a 19 kb region (below) containing resistance genes with 99% identity to part of plasmid pACN001-F (KC853439) isolated from poultry in China

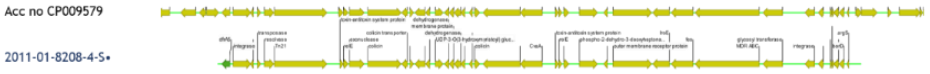


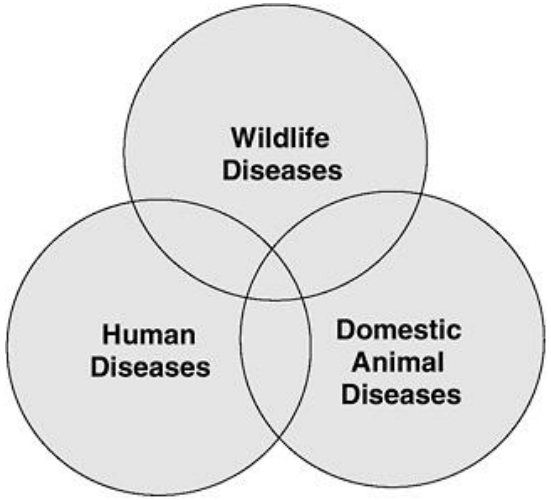

**Figure 4.** Structure of conjugative resistance plasmid originating from *E. coli* (2011-01-8208-4-S) from Svalbard reindeer and map of 36 kb region (below) with 99% identity to part of plasmid FAP1 plasmid 1 (CP009579) isolated from pig faeces in the Netherlands.

Veterinærinstituttet
Norwegian Veterinary Institute
Davvi-Norgga šibitdoavttirinstituhtta

HOP addresses key topics of international relevance for ONE HEALTH

Helseovervåkningsprogrammet for hjortevilt og moskus

# 20 years of diagnostic & research

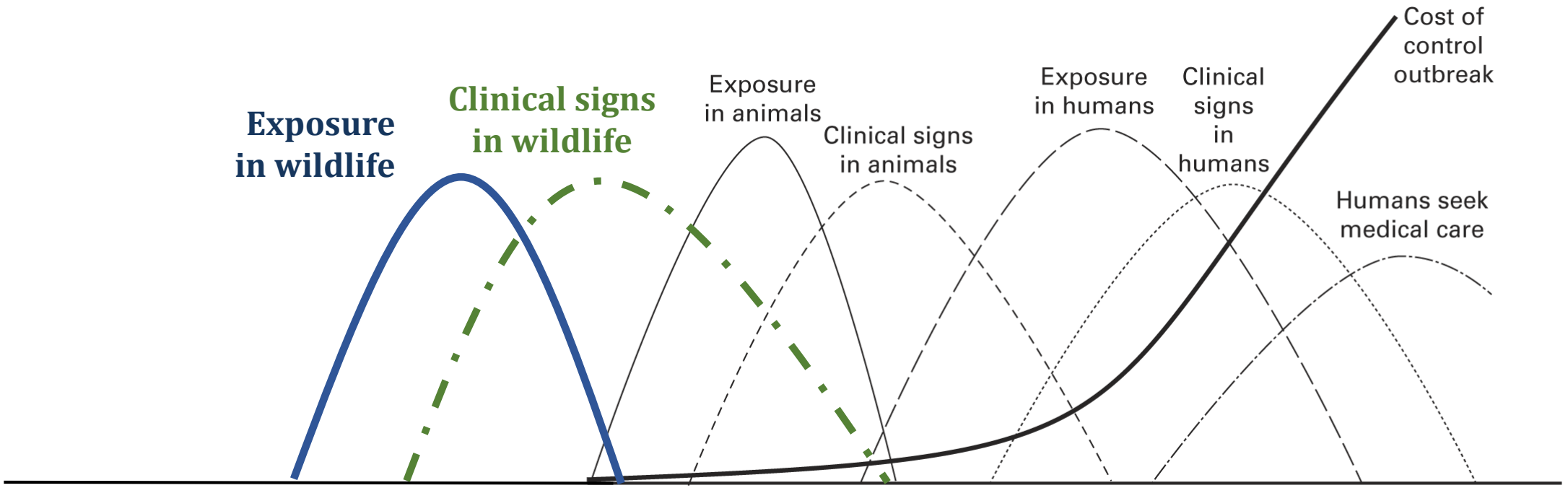



- Digital necrobacillosis in wild reindeer (*F.necrophorum*)
- Rabies in wild reindeer in Svalbard
- Oestrinae (*Cephenemyia trompe*) severe infestation in wild reindeer
- Contagius ecthyma (Parapoxvirus) in muskox
- *Mycoplasma ovipneumoniae* pneumonia in muskox
- European yew (*Taxus baccata*) poisining in moose
- Deer ked (Lipoptnea cervi) alopecia in moose
- Borrelia burgdorferi infection in moose and roe deer
- Bartonella in moose and red deer
- MCF (gammaherpesvirus) in red deer, reindeer and muskox
- Chronic Wasting Disease

Veterinærinstituttet
Norwegian Veterinary Institute
Davvi-Norgga šibitdoavttirinstituhtta

HOP addresses key topics of international relevance for ONE HEALTH

# A strong strategy for a health future for wildlife, animals, humans & environment

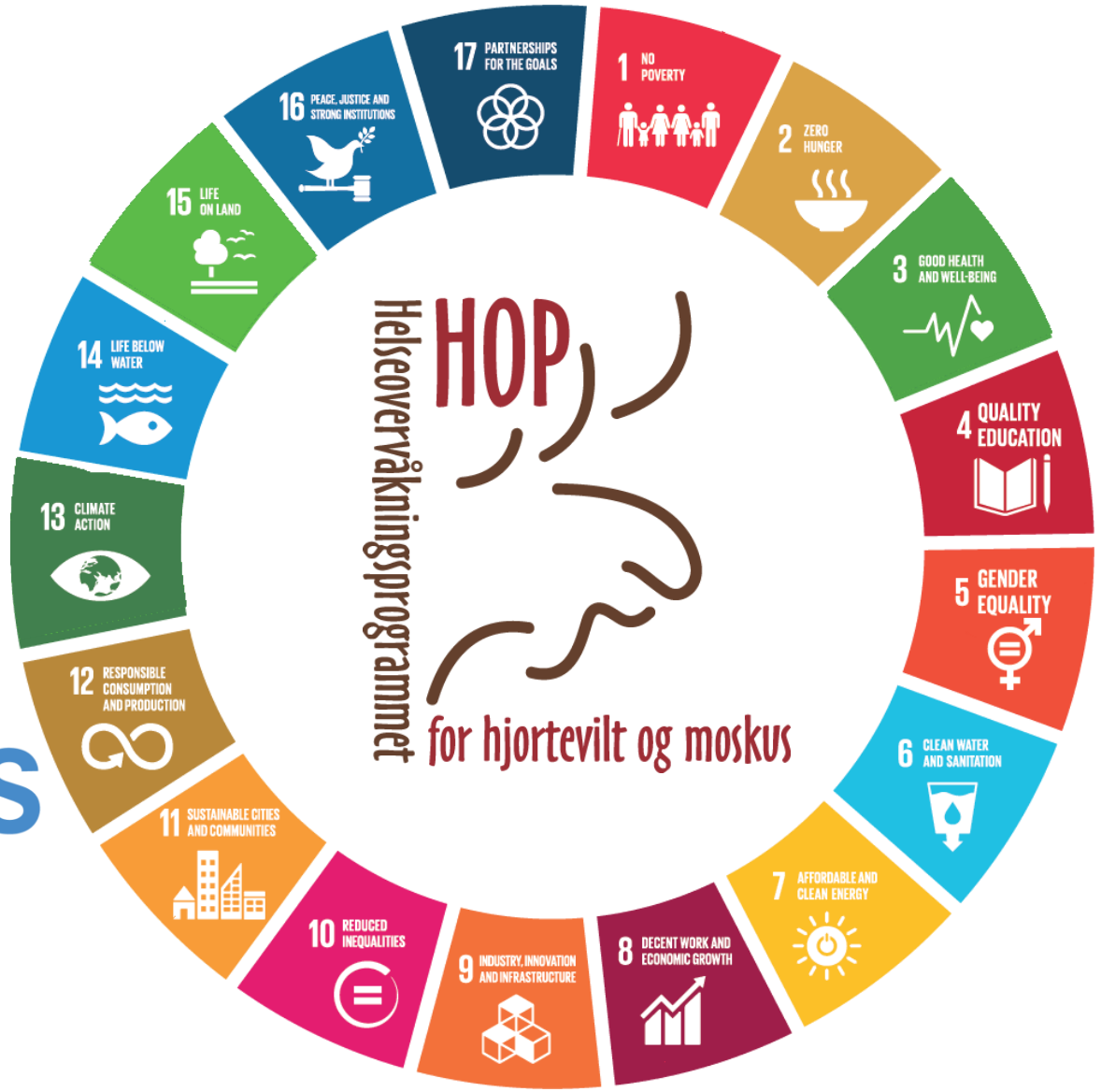



*Source:* Adapted from IOM (2009).

Veterinærinstituttet
Norwegian Veterinary Institute
Davvi-Norgga šibitdoavttirinstituhtta

Helseovervåkningsprogrammet HOP for hjortevilt og moskus

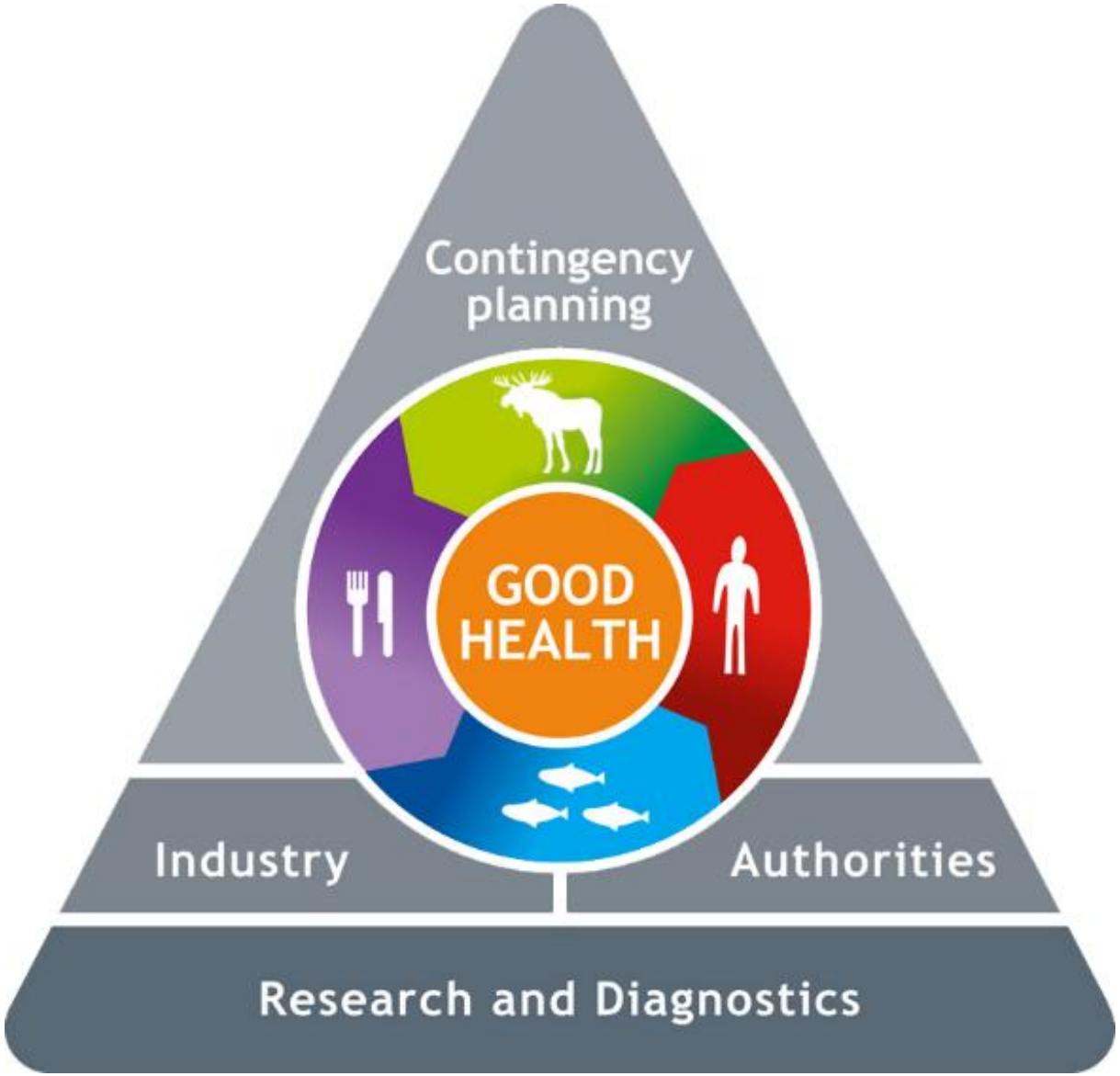
HOP addresses key topics of international relevance for ONE HEALTH




SUSTAINABLE DEVELOPMENT GOALS

Veterinærinstituttet
Norwegian Veterinary Institute
Davvi-Norgga šibitdoavttirinstituhtta

HOP
Helseovervåkningsprogrammet for vilt




***Tusen takk!***

***Giitu!***

Veterinærinstituttet
Norwegian Veterinary Institute
Davvi-Norgga šibitdoavttirinstituhtta