

## TICK-BORNE INFECTIONS IN THE NORTH SEA REGION

An Interreg project supported by the North Sea Programme of the European Regional Development Fund of the European Union.

### PROJECT VISION

“To reduce the number of tick-borne infections in humans and production/pet animals as well as to cure and delimit the suffering among humans and animals affected by tick-borne infections in the North Sea region”

### PROJECT PARTNERS

- Region Jönköpings Län, lead partner, Sweden
- Amsterdam Universitair Medische Centra, Netherlands
- NHS Highland, Scotland
- Rigshospitalet Köpenhamn, Denmark
- Stiftung Tierärztliche Hochschule Hannover, Germany
- University of Aberdeen, Scotland
- Rijks Instituut voor Volksgezondheid en Milieu, the Netherlands
- Roskilde universitet, Denmark
- Sahlgrenska Universitetssjukhuset, Sweden
- Sørlandet sykehus HF, Norway
- Universiteit Antwerpen, Belgium

### AN INTERREG NORTH SEA REGION PROJECT

Project period: September 1, 2019 - June 30, 2023.

Total budget: 7 million Euro.



### A COMPETENCE NETWORK TO IMPROVE PUBLIC SERVICE DELIVERY BASED ON A 'ONE HEALTH' PERSPECTIVE

Ticks are the most important vectors for transmitting diseases. During last decades, ticks carrying disease-causing microorganisms in humans and animals have increased in numbers and spread to new areas. Thus, the number of people and animals afflicted by tick-borne diseases are on the rise.

The reasons are complex but include climate change, increased urbanization and other human influences on ecosystems.

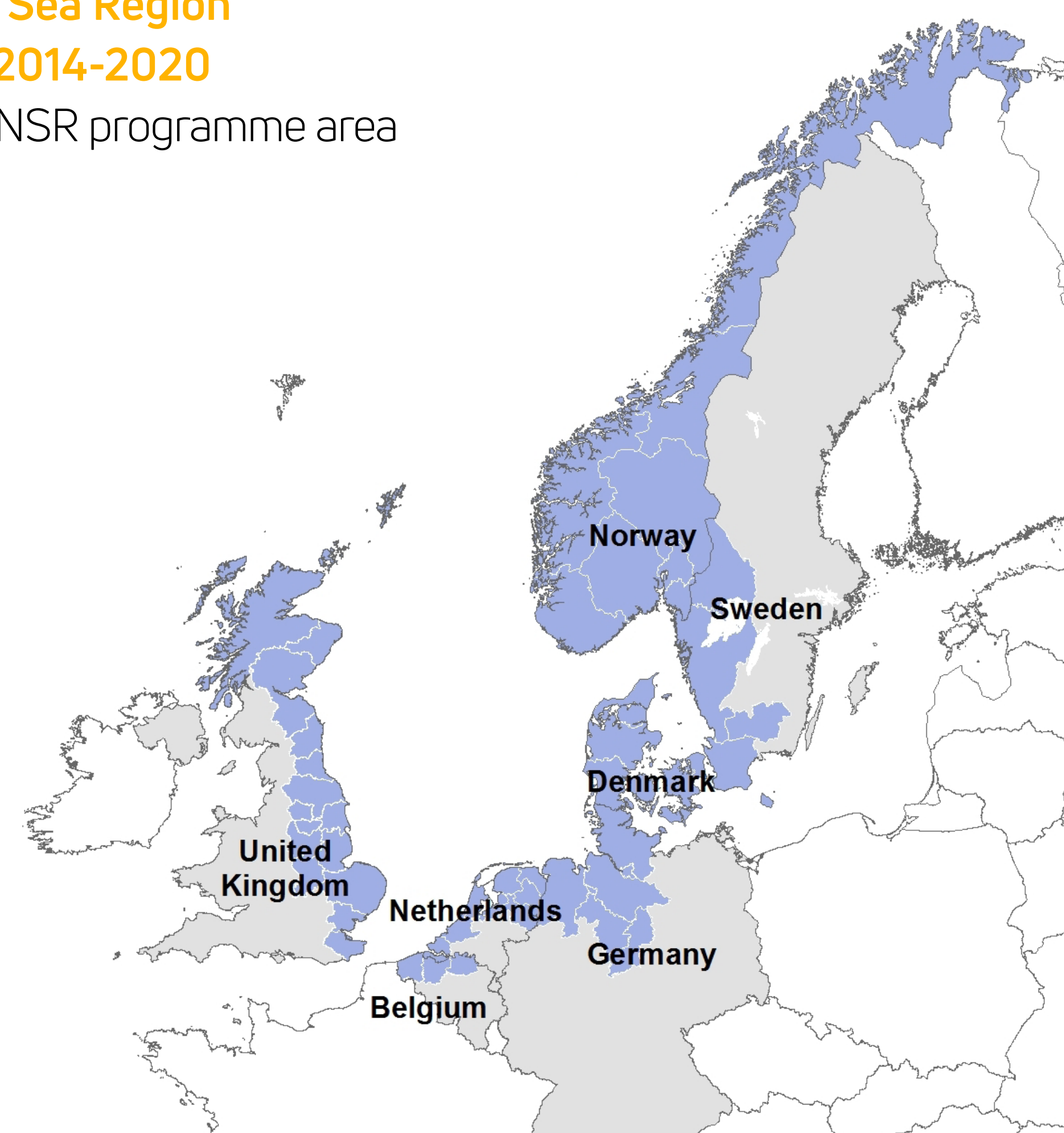
It is challenging for health services and authorities to be updated on optimal strategies for prevention and management of Borreliosis and Tick-borne Encephalitis, and to keep up with newer tick-borne microorganisms and diseases, and to give adequate information to a concerned public.

NorthTick aims to meet these challenges by providing a interdisciplinary and transnational joint effort to improve public health service delivery regarding:

- risk assessment
- efficient preventive measures
- optimal diagnostic strategies
- best patient management recommendations

### Interreg VB North Sea Region Programme Area 2014-2020

Regions within the NSR programme area





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### Some of the main achievements in the NorthTick project

#### RISK ASSESSMENT AND PREVENTION

- Tens of thousands of ticks were collected and analysed for tick-borne pathogens.
- Risk-maps for tick bites were created.
- Increased awareness of tick and pathogen prevalence and new risk areas.
- In Scotland, the annual incidence of borreliosis may be 5 times higher than previously estimated.
- The Dermacentor reticulatus tick has expanded its range in Germany (and Europe). This tick may transmit the potentially fatal canine babesiosis parasite, as well as TBE virus.
- New risk areas for TBE virus were identified.

#### CITIZEN SCIENCE

- In Flanders the general public collected data on tick abundance and tick-species in private gardens. Ticks were present in about 40% of the gardens.
- Websites where people can register human-tick encounters were set up in Denmark and Norway.

#### DIAGNOSTICS

- Diagnostic tests were evaluated and compared.
- Increased awareness about the emerging and often underdiagnosed tick-borne diseases such as Borrelia miyamotoi and Neorhlichia mikurensis.
- A simple blood test that can detect which borrelia species a patient is infected with was developed. Neuroborreliosis is mainly caused by garinii, while erythema migrans (tick skin rash) is mainly caused by afzelii.
- A prototype App for early diagnosis of skin rashes after tick bites was developed.

#### MANAGEMENT OF TICK-BORNE DISEASES

- Experts from the NorthTick group made a comprehensive overview and recommendations on diagnostic, treatment and management strategies of tick-borne diseases in the different countries. The recommendations are mainly alike, with some minor differences in choice and duration of antibiotics. Results from a specialized unit on tick-borne diseases in Denmark found that 34% of patients suspected of having a tick-borne infection actually had other diagnoses. The NorthTick project has shown the benefits of a multidisciplinary approach in managing this patient group.







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As part of the NorthTick project we produced a series of fictive cases of human tick-borne disease caused by *Anaplasma phagocytophilum*, *Babesia* species, *Borrelia miyamotoi*, *Neoehrlichia mikurensis*, *Rickettsia helvetica* and *Spiroplasma ixodetis*. These microbes usually do not cause disease in healthy people, but some people get sick, and studies have shown that immunocompromised people and the elderly are most at risk.

Even though these diseases are rare, they are largely unknown to clinicians and the general public, and as a result often underdiagnosed. It is therefore important to increase the awareness about typical symptoms, diagnostic tests and treatment. This overview will be of aid for health personnel involved in laboratory diagnosis and the clinical care of such patients, and for educational purposes.

### Fictive cases of human tick-borne diseases in the North Sea Region.

For complete overview please scan QR code.



TICK-BORNE DISEASE	MICROBIAL AGENT	TYPICAL SYMPTOMS
Anaplasmosis	Caused by the <i>Anaplasma phagocytophilum</i> bacterium	Fever, headache, loss of appetite/nausea, joint pain, cough, malaise/fatigue
Babesiosis	Caused by <i>babesia</i> parasites.	Fever, chills, body aches, fatigue
<i>Borrelia miyamotoi</i> disease	Caused by the <i>Borrelia miyamotoi</i> bacterium	Mild case: High fever, chills, marked headache and/or myalgia Severe case: Above mentioned symptoms, but also nausea, drowsiness and decreased consciousness, neck stiffness, difficulties with concentration and memory.
Neoehrlichiosis	Caused by the <i>Neoehrlichia mikurensis</i> bacterium	Fever (with chills in the evening), nightly sweats, pain in the neck region, skin rash left arm (that does not itch), swollen legs, fatigue
Tick-transmitted rickettsiosis	Caused by the <i>Rickettsia Helvetica</i> bacterium.	Mild infection with non-specific symptoms such as low-grade fever, headache, fatigue and myalgia/arthralgia.
Spiroplasmosis	Caused by the <i>Spiroplasma ixodetis</i> bacterium.	High fever, mild headache