



UNIVERSITY OF COPENHAGEN



Professor Anders Miki Bojesen

University of Copenhagen Research Centre for Control of Antibiotic Resistance

UC-Care



generates knowledge and tools to combat antimicrobial resistance in humans and animals

COMBAT DRUG RESISTANCE



No action today,
no cure tomorrow

7 APRIL 2011 WORLD HEALTH DAY





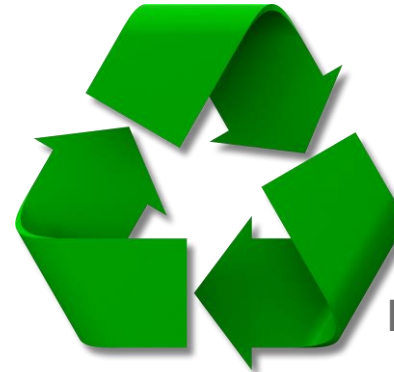
Forebyggelse (biosecurity & vaccination)

- **Høj belægningsgrad**
- **Immunologisk sårbare**

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Antibiotika



Hygiejne



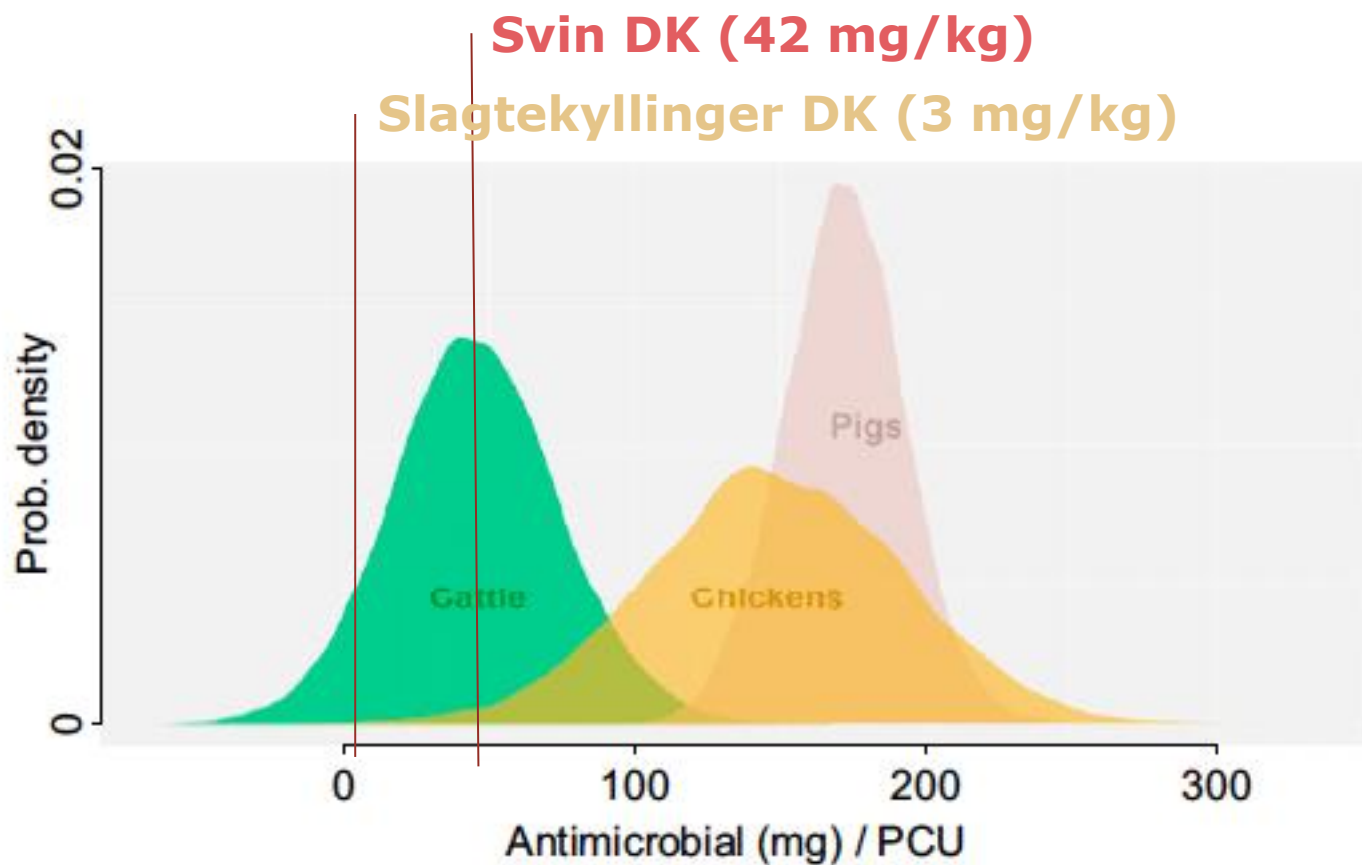


Fig. 2. Posterior distributions for estimates of antimicrobial consumption in cattle, chickens, and pigs in OECD countries.

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Konventionelle slagtekyllinger

32-37 dage/rotation

8,3 rotationer/farm/år



~3% rotationer behandles med AB

Kunderrestriktioner
(WHO report)



>1 rotation/år behandlet >> restrikt.

Age	Disease	Vaccine	Application
Day-old	Hønselammelse, Mareks	HVT + Rispens	Injection
Ved ankomst	Coccidiose	Paracox 8 (70)%	Feed/spray
1. uge (3 dage)	Infektøs Bronkitis, IB	Nobilis IB Ma5	Aerosol
3 uger (25 dage)	Gumboro, IBD	Avipro Gumboro vac. Vet	Drinking W.
5 uger (35 dage)	Newcastle disease, ND	Avinew	Drinking W.
7 uger (45 dage)	Blåvingesyge, CAV	Avipro Thymovac. Vet.	Oralt *
8 uger (56 dage)	Infektøs Bronkitis, IB	Nobilis IB 4-91	Aerosol
9 uger (63 dage)	Newcastle disease, ND	Avinew	Drinking W.
10 uger (70 dage)	Infektøs Bronkitis, IB	Nobilis IB Ma5	Aerosol
11 uger (77 dage)	Hjerne-rygmarvsbetændelse, AE	Avipro AE	Drinking W.
13 uger (91 dage)	Aviær pneumovirus, TRT	Nobilis Rhino CV	Aerosol
17-18 uger (ved flyt)	IB, ND, G, TRT Combi vaccine	Nobilis RT-IBmulti-G-ND	Injection

Vaccination forældredyr

E. coli

(Meget høj biosecurity)

18 individuelle vacciner!

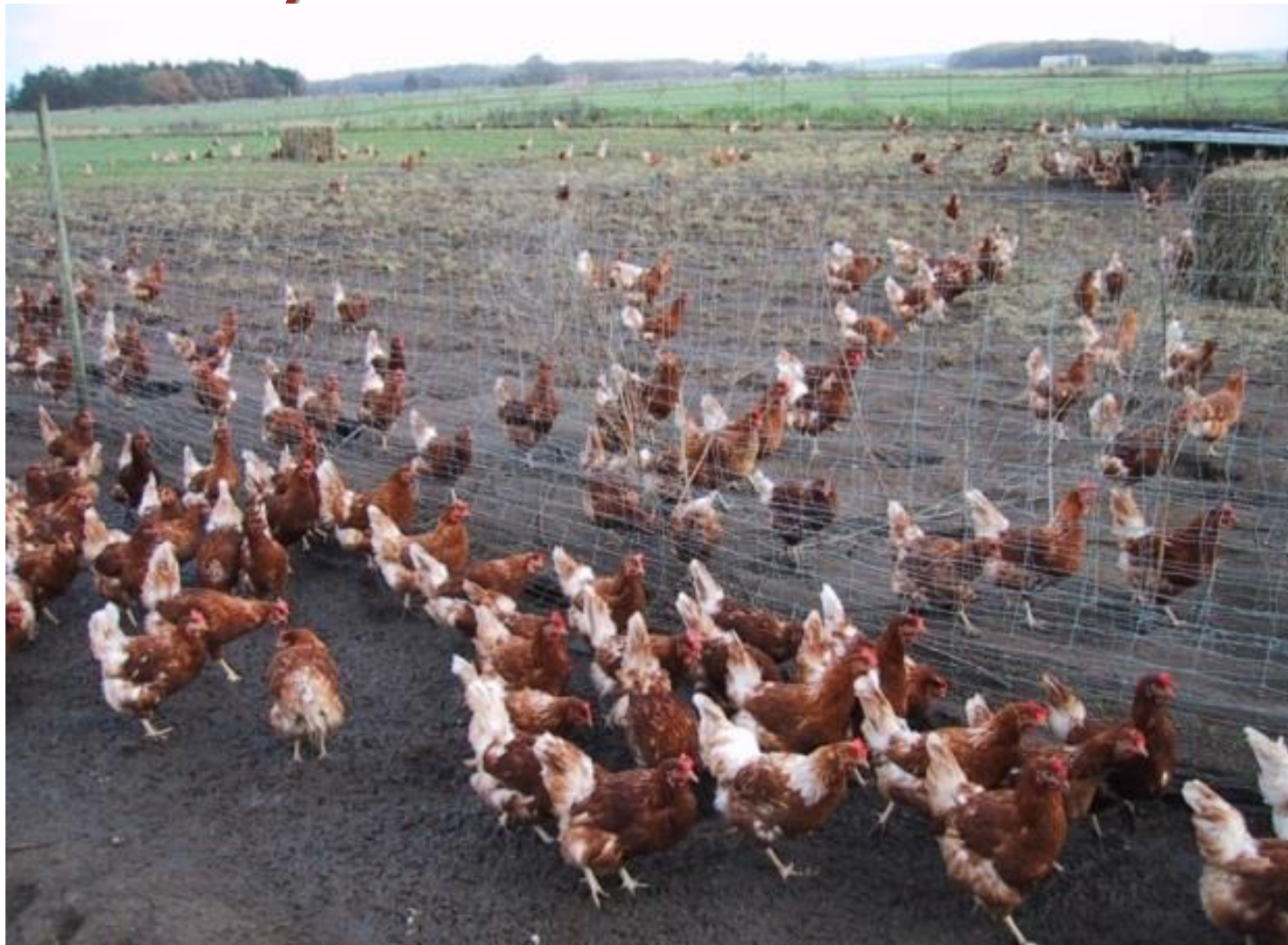
- 10 agens (9 vira + 1 bakterie)

E. coli

E. coli



Biosecurity?

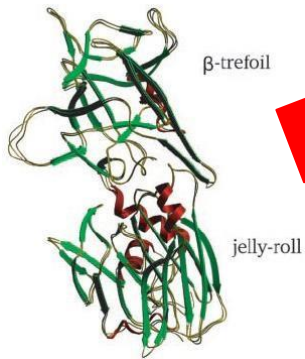


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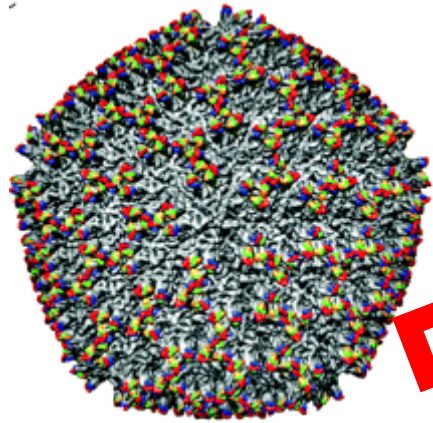
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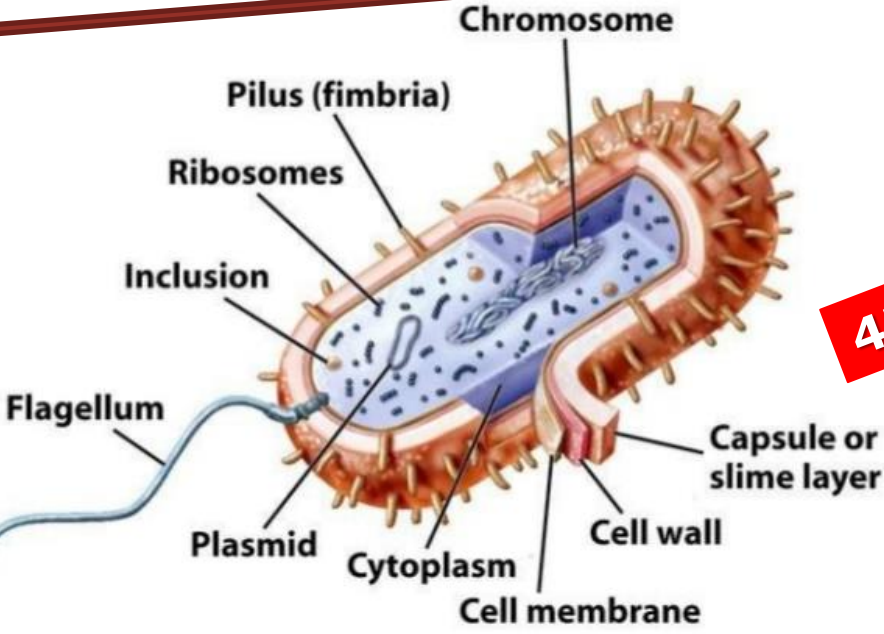
Et protein

**Tetanus toxin
(stivkrampe)**
Et toxin – Én vaccine



Fire proteiner

**Infectious Bursal
Disease Virus
(Gumboro)**
En serotype – Én vaccine



4500 proteiner

Escherichia coli
100's serotyper – 100's
vacciner



Autovacciner

Farm-specifikke vacciner

Step 1



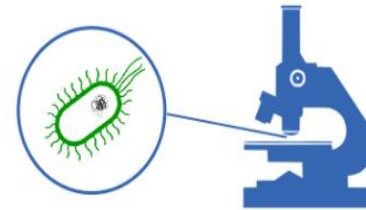
Viral and bacterial pathogens weaken the animal



Step 3

Production of a herd-specific vaccine

Step 2



Identification of the pathogen from tissue or sampling of the infected animal



Step 4

Treatment with herd-specific vaccine



Step 6

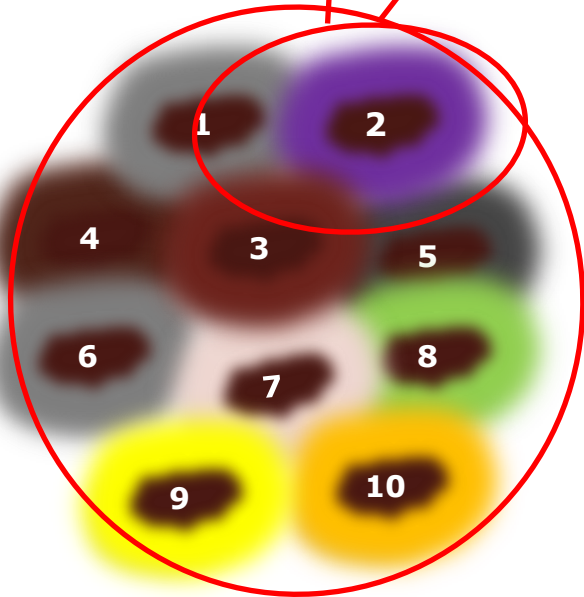
Vaccine reduces morbidity from field infection

Step 5

After treatment the animal form antibodies against the pathogen

Vaccine dækning -smal vs bred beskyttelse

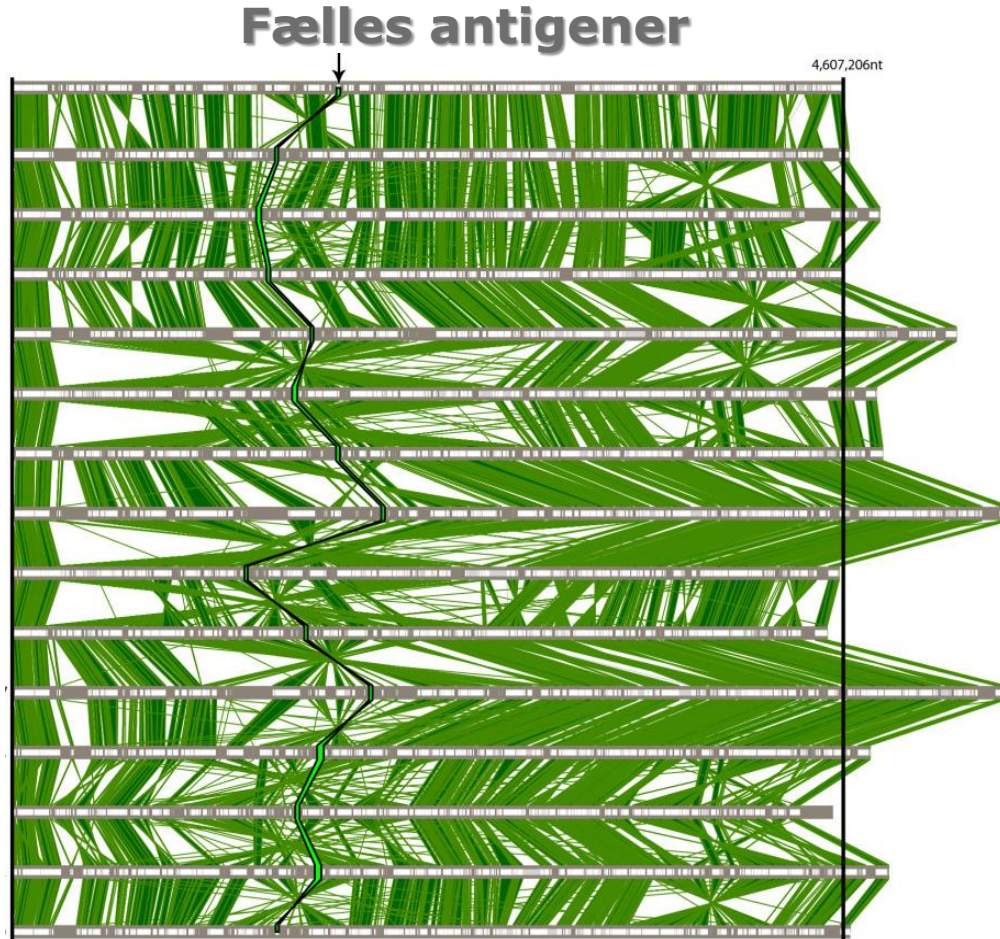
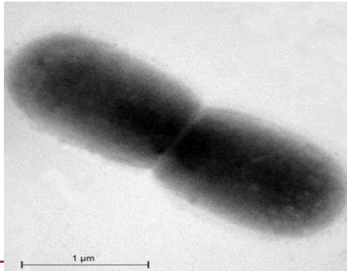
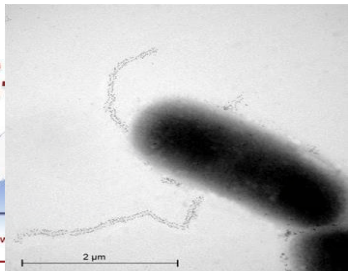
Auto vaccine Serotype-uafhængig



10 serotyper

flfA

$\Delta flfA$



Treangen and Messeguer *BMC Bioinformatics* 2006
7:433 doi:10.1186/1471-2105-7-433



UC-Care strategi



- **Drug discovery alene er ikke nok** til at imødegå resistensproblemer.
- **Forskning indenfor nye områder er nødvendigt** for at øge effektiviteten af eksisterende antibiotika og diagnostiske værktøjer.
- **Adfærdsforskning med sundhedsprofessionelle, veterinærer og den almindelige befolkning er afgørende** for en mere rationel anvendelse af antibiotika.

Hvordan sikrer vi at indsatsen bliver interdisciplinær?



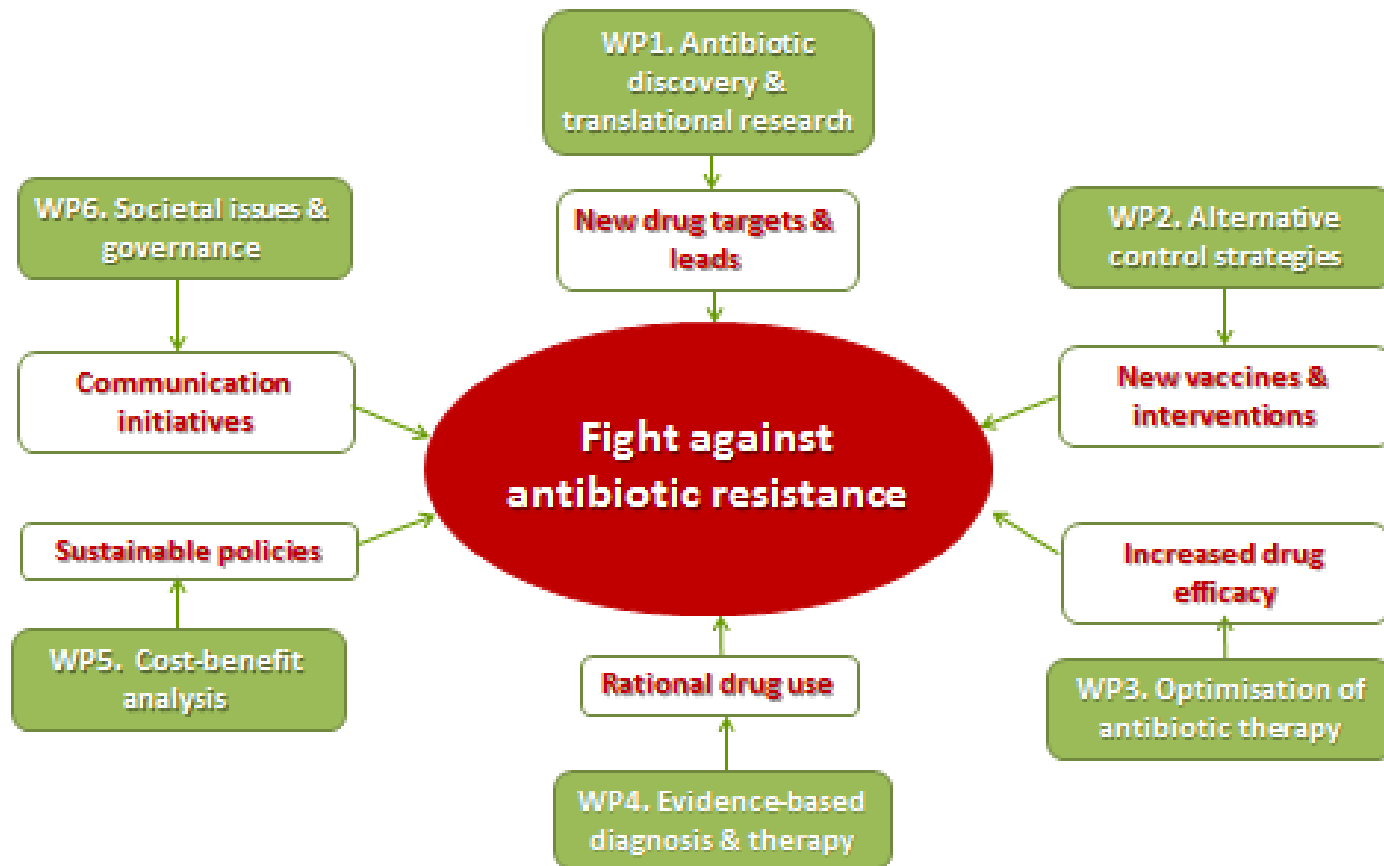
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Interdisciplinær tilgang



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- 33 mio DKK fra Københavns Universitet



Forbedret diagnostik kan nedsætte forbrug

Veterinært



(Pedersen *et al.*, 2014)

Antibiotic Use Guidelines for
Companion Animal Practice

~25%



Antibiotic Use Guidelines for Companion Animal Practice.

*L.R. Jessen, P.P. Damborg, A. Spohr, B. Schjøth,
B. Wiinberg, G. Houser, J. Willesen, M. Schjærff, T. Eriksen, V.F. Jensen,
L. Guardabassi.
SvHKS (DDD), 2012.*

Forbedret diagnostik kan nedsætte forbrug

Humant

KOMMUNAL
ALMEN PRAKSIS

Unødige antibiotikakure kan halveres med dyrkning

Et nyt studie viser, at når praktiserende læger undersøger patienter for urinvejsinfektioner med dyrkning, udskriver de kun halvt så mange unødvendige antibiotikakure.

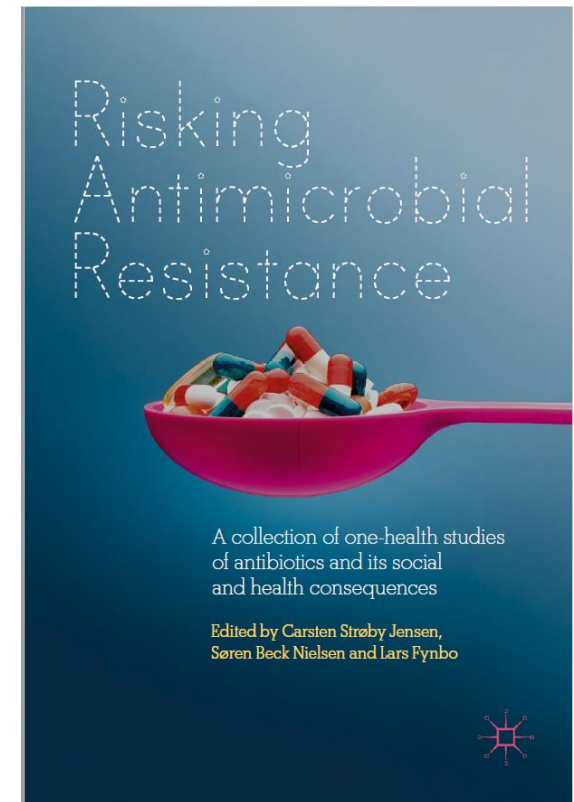
(Holm, Cordoba & Bjerrum, 2016)

~50%

Kommunikationsanalyse patient-læge/dyrlæge



~30%



- vigtigere med afklaring end specifik behandling
- "vent og se" recepter

Antimicrobial resistance: a threat for human and animal health



Obligatorisk fælleskursus for Veterinær- og Medicinstuderende på KU

Efteruddannelseskurser – i DK og internationalt



Target Audience

30 – 50 small animal veterinary practitioners, specialists and nurses interested in developing and implementing antimicrobial stewardship and infection control programmes within their clinics.

Faculty Members

Christina Åhrén, Gothenburg, Sweden
Magnus Arpi, Herlev, Denmark
Peter Damberg, Copenhagen, Denmark
Ursula Grönlund, Uppsala, Sweden
Luca Guardabassi, Basseterre, St. Kitts
Gunnar Jacobsson, Skövde, Sweden
Lisbeth Rem Jessen, Copenhagen, Denmark
Constança Pomba, Lisbon, Portugal
Françoise Roux, Nantes, France
Scott Weese, Guelph, Canada

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Scientific picture inside: Handling of antibiotics, © University Hospital for Companion Animals, University of Copenhagen
Scientific picture outside: Collection of urine by ultrasound-guided cystocentesis, © University Hospital for Companion Animals, University of Copenhagen



ESCMID Postgraduate
Education Course

**Antimicrobial Stewardship
in Veterinary Medicine**

Gothenburg, Sweden
11 – 12 September 2016



ESCMID Postgraduate
Education Course

**Antimicrobial Stewardship
in Veterinary Medicine**

Organizers

- ESCMID Study Group for Veterinary Microbiology (ESGVM)
- ESCMID Study Group for Antimicrobial Policies (ESGAP)
- University of Copenhagen
- Ross University School of Veterinary School
- Faculty of Veterinary Medicine, University of Lisbon
- University of Gothenburg
- UC-Care – University of Copenhagen Center for Control of Antibiotic Resistance
- CARE – Centre for Antibiotic Resistance Research at University of Gothenburg

Supporter

bioMérieux

Course Coordinators

- Christina Åhrén, Gothenburg, Sweden
- Luca Guardabassi, Basseterre, St. Kitts
- Constança Pomba, Lisbon, Portugal

Course Objectives

The overall goal is to promote antimicrobial stewardship and educate a new generation of infectious disease specialists who are able to develop and implement antimicrobial stewardship and infection control programmes in veterinary clinics. The course will offer a practical approach to rational antimicrobial use, implementation of antimicrobial stewardship and infection control programmes to surgeons and nurses across all small animal veterinary specialties and settings.

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Nationale Råd for Antibiotikaresistens

Professor Lars Bjerrum
Department of Public Health

Professor Jens Peter Nielsen
Department of Veterinary and Animal Sciences

Professor Anders Miki Bojesen
Department of Veterinary and Animal Sciences



Opbygning af nyt forskningsområde (ONE HEALTH)



+



+



+



+



Reel interdisciplinær forskning

- Fælles sprog
- Kommunikations kanaler
- Tværfaglig finansiering

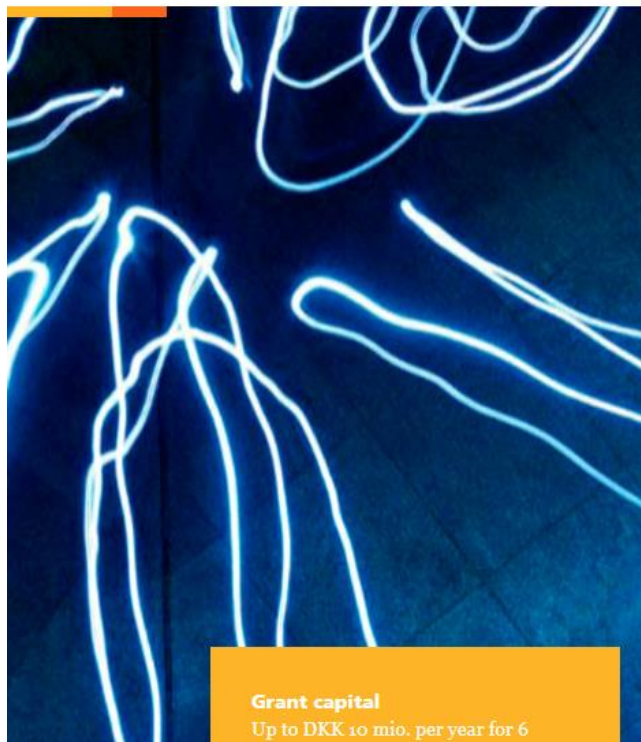
- **Fælles platform**



Silo-funding?

novo nordisk **fonden**

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Grant capital
Up to DKK 10 mio. per year for 6

CHALLENGE PROGRAMME 2016

OBJECTIVE

With the Challenge Programme the Novo Nordisk Foundation wishes to contribute to the development and strengthening of the Danish research environment within biomedicine and biotechnology. The goal of the Challenge Programme is to make substantial contributions to the funding needed for overcoming specific challenges in global health, technology and the environment. This programme is a strategic effort targeting specific challenges within a specific research theme.

RESEARCH THEMES 2016

For the application round of 2016, the Challenge Programme is seeking to support outstanding scientists working within the following two themes:

- *Antibiotic resistance and/or alternative antibiotics*
- *Oral drug delivery of biopharmaceuticals*

Professor Hanne Mørck Nielsen	Department of Pharmacy, Københavns Universitet	Center for Biopharmaceuticals and Biobarriers in Drug Delivery	DKK 59.954.111	2016
Professor Peter Eigil Nielsen	Department of Cellular and Molecular Medicine, Københavns Universitet	Center for Peptide-Based Antibiotics: Peptide Antibiotics against Resistant Bacterial Infections	DKK 57.479.842	2016

International evaluating

- **Professor Klaus Bock (Chair)**
 - Vice President of the European Research Council
 - Expertise: Organic Chemistry
- **Professor John Gardner**
 - Oxford University
 - Expertise : Law and philosophy
- **Professor Peter C. Tyler**
 - University of Wellington
 - Expertise : Organic Chemistry
- **Professor Wim H.M. Saris**
 - Maastricht University
 - Expertise : Human Nutrition
- **Professor Yasemin Soysal**
 - University of Essex
 - Research interests: Sociology



Evalueringsskomentarer

"As I hope to have made clear, the project is very impressive."

"I should close by saying that we would be in better shape globally if more countries were taking this approach and if there was more cross-national cross-disciplinary work going on. Hats off to the University of Copenhagen!"

"The quality of the project is internationally recognized with some excellent elements."

Major Outputs



- 125 peer-reviewed forskningspublikationer
- 100+ Konference bidrag
- 250 mio DKK i ekstern funding
- Adskillige formidlingsaktiviteter



- 21 PhD projekter
- 12 Post doc projekter
- Fælles ONE konferencen for vet og med stud

Tak for opmærksomheden!

