



AMR and animal agriculture

Perspective from a global animal health company

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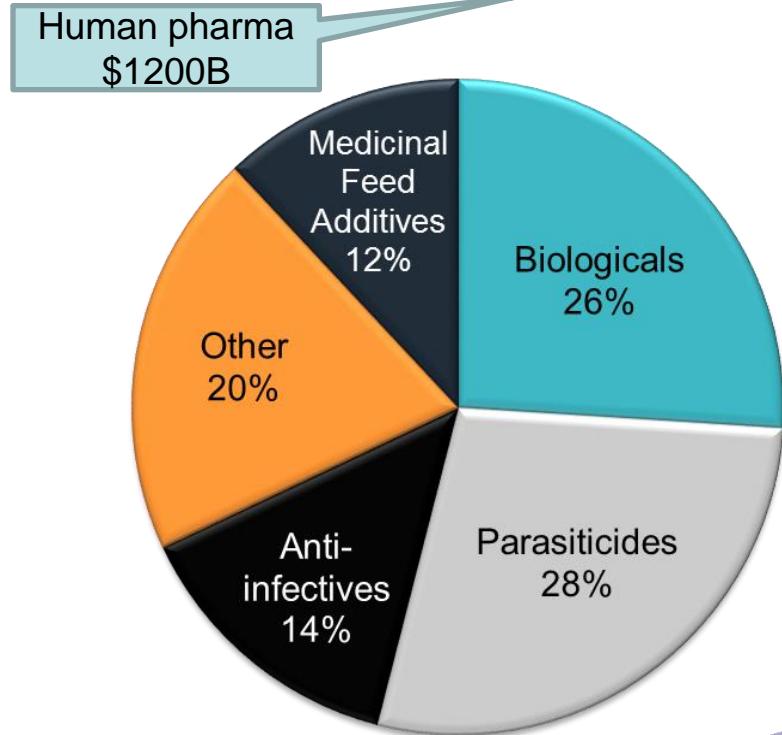
MSD Animal Health Today



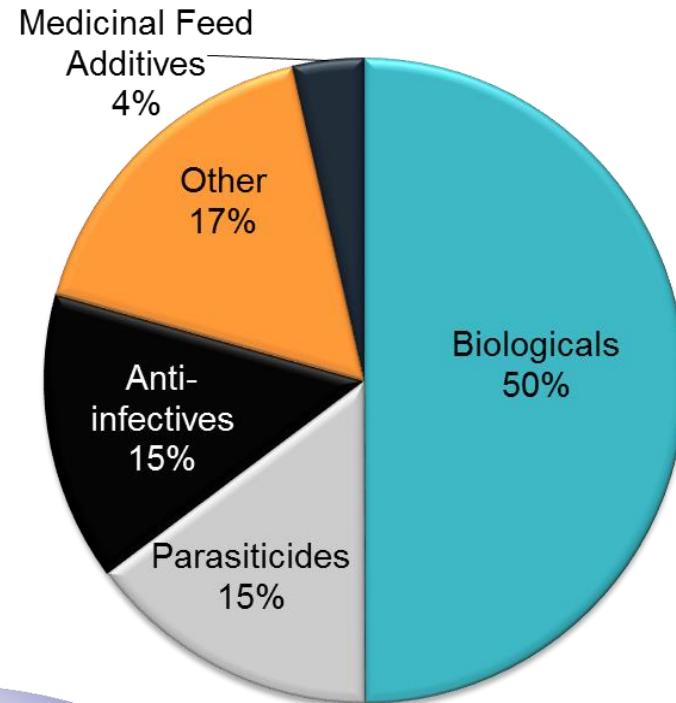
- Pharmaceuticals and vaccines (= biologicals)
- Species categories: ruminants, poultry, swine, aquatic, and companion animals
- Broad product range: vaccines, anti-parasitics, anti-infectives, reproduction management, pharmaceutical specialties, and innovative animal health programs, such as pet recovery
- Offices in more than 50 countries, marketing activities in more than 140 countries
- Operating dedicated animal health manufacturing and research & development sites around the world

Global Animal Health – Sales by Product Category

Global Animal Health Market
2014 (\$24B)



MSD Animal Health
2014 (\$3.5B)*



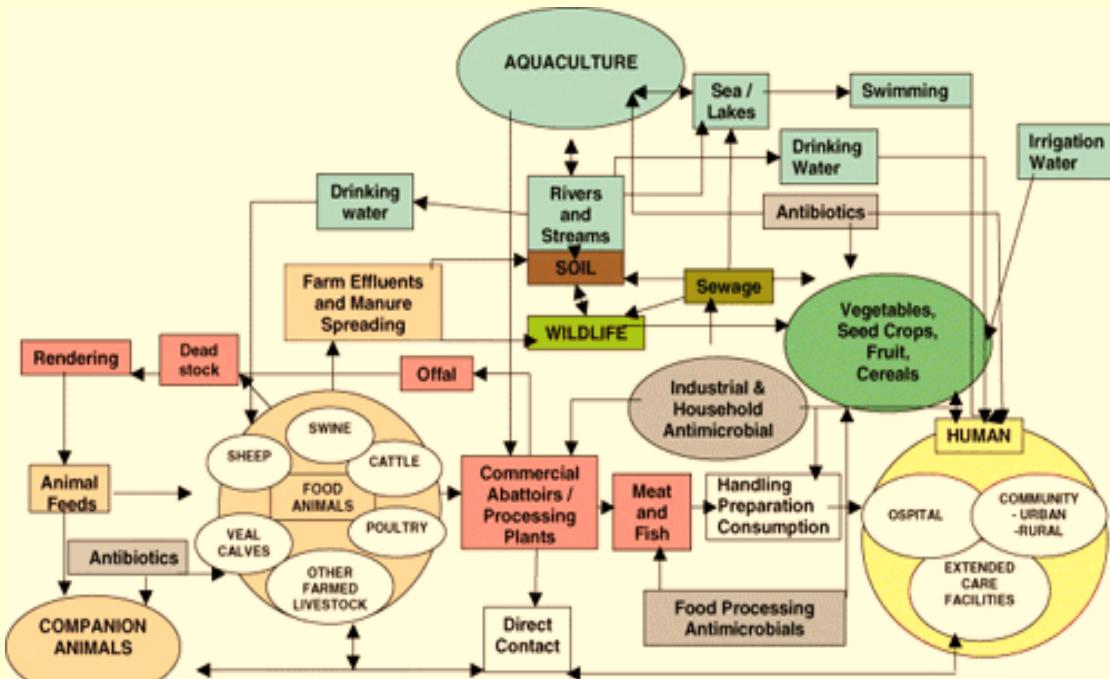
Source: Vetnossis and internal sales data.



* 2014 Global ranking #2

The AMR One Health dimension = complexity

Epidemiology of antimicrobial resistance



Source: www.ift.org/knowledge-center/read-ift-publications/science-reports/expert-reports/antimicrobial-resistance.aspx?page=viewall

- AMR is ancient
- Modern ‘tracking’ technologies help to better quantify impact of different reservoirs
- Growing list of publications* help to quantify the impact of animal reservoir on efficacy antibiotic therapy in human medicine → lower as previously expected and depends on drug/bug combination

- Future efficacy of antimicrobial therapy in human and veterinary medicine is a shared responsibility and the primary objective.

* Like EMA-CVMP Draft Strategy on Antimicrobials 2016-2020 (Nov 2015), UK DoH and Defra UK Five Year Antimicrobial resistance Strategy 2013-2018 (Sept 2013) and MARAN 2012, SVARM 2012 and 2014, and DANMAP 2014

The role / activities MSD AH / AH industry

We actively support :

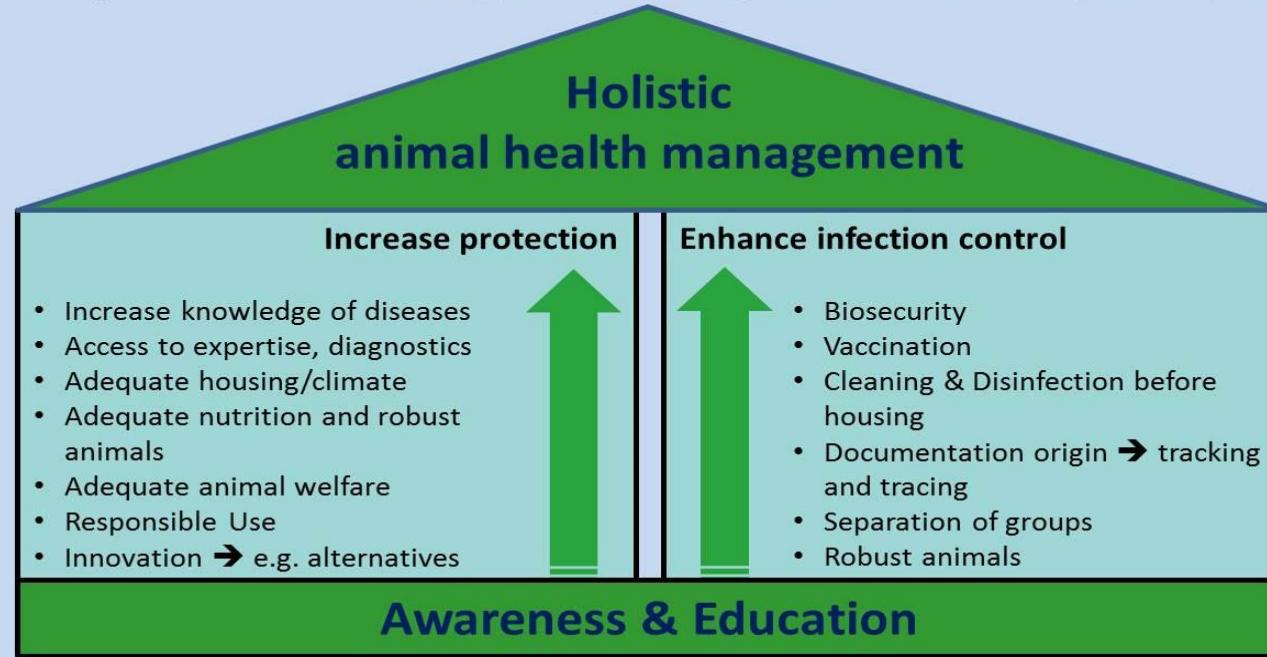
- ✓ A holistic approach: optimal management, nutrition, climate, genetics, biosecurity, vaccination, etc.
- ✓ Responsible Use Platform → members:



, www.epruma.eu,



Figure 2. Simplification of the holistic approach regarding animal health management by the farmer



MSD AH's tools for responsible use

- Our complete portfolio (not only vaccines) combined with our extensive expertise



- For poultry*



- For swine*



Behind every healthy pig
is a healthy partnership

MSD Animal Health's program
for control of respiratory diseases
in swine



$$P = I \times I$$

Progress = Innovation x Implementation

- For cattle*

- ✓ Udder Health, see example
- ✓ Respiratory Health
- ✓ Reproductive Health

* The focus of these programs is not limited to antibiotics, but to enhancing the health status in general, thereby reducing the need for treatment

MSD AH's responsible use – an example of Udder Health

- Mastitis impacts animal health and welfare and food quality
- Farmers treat till the visual signs of infection (flakes in milk) disappear
- Is this necessary / optimal ?
- We did field studies in NL, FR, IT, HU, UK and GE:
 - Bacterial infection disappears quickly (1-2 days) after antibiotic treatment
 - Visual signs of inflammation take longer to disappear



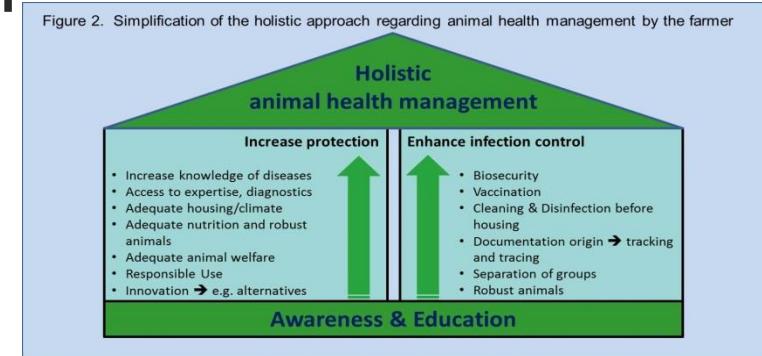
90% of farmers treat till flakes 'are gone', and accept extra antibiotic costs and more discharged milk, why?

- Interviews Danish and Dutch farmers: "I want to be a good farmer, taking good care of my cows and therefore mastitis cases will receive a 'firm' treatment"
- Our advice: there is no rationale for extended treatment.
Responsible use = as little as possible, as much as needed

Feasible business models / preferred strategies to improve animal health

Progress = Innovation x Implementation

- Low hanging fruit:
 - Biosecurity: do what you already know you should do and do it **ALWAYS**
 - Prevention and control: increase use of (available) vaccines



Majority stakeholders accept 'Prevention is better than cure', but use of vaccines is far from optimal (differences between species):

- Lack of awareness of benefits vaccination across the full chain
 - awareness campaigns and agreed, basic vaccination schemes → role for governments / science as this is forbidden for industry
 - Insufficient knowledge of drivers for reluctance to vaccinate
- Economic → sharing of costs and benefits across complete chain, incl. benefits for animal health and welfare and public health
- Social/emotional and regulatory hurdles against vaccination, enhanced by reluctance to accept modern technologies

A success story: Vaccination versus antibiotic use in aquaculture

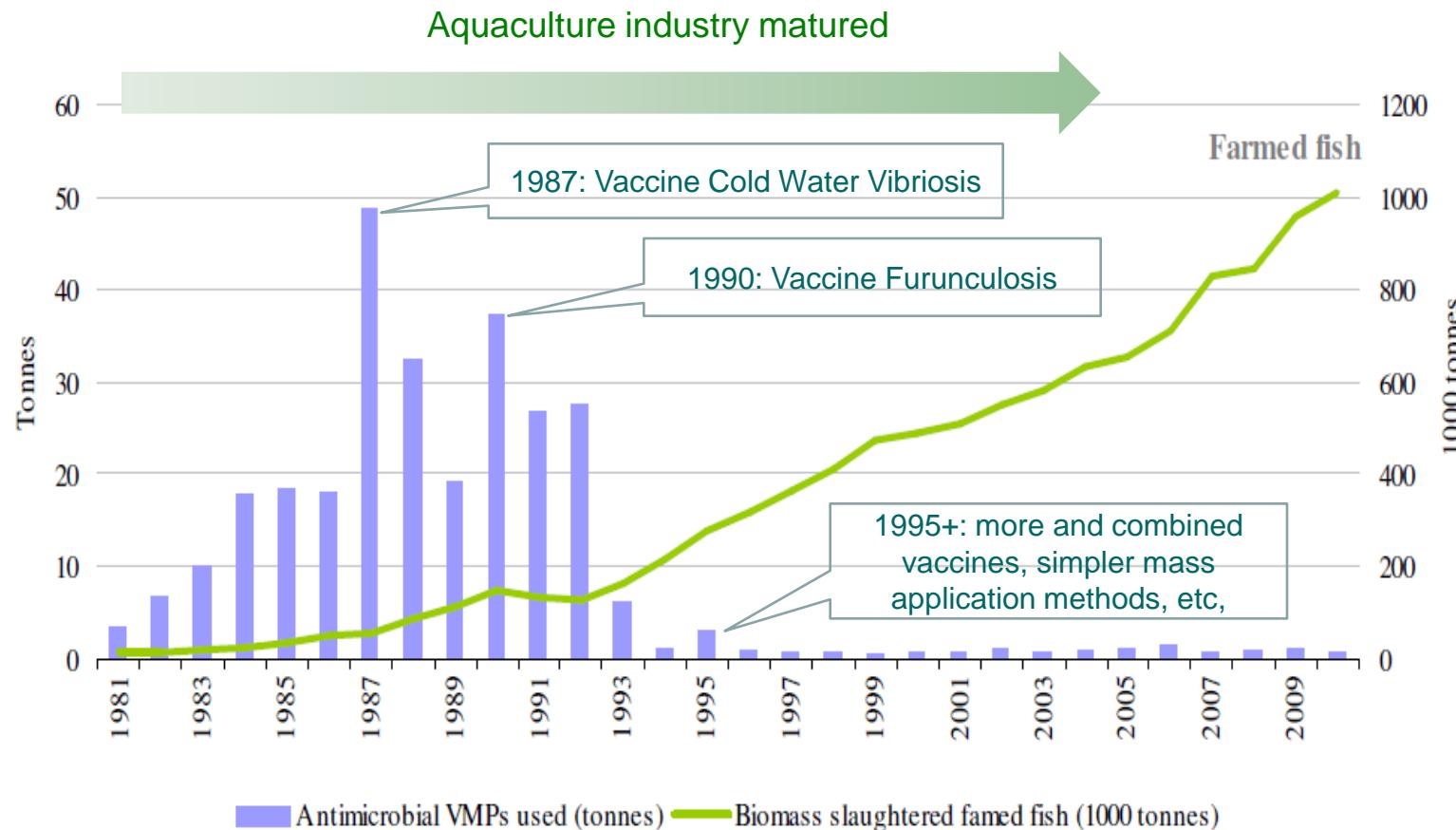


FIGURE 5. Total sales (kilograms of active substance) of antimicrobial veterinary medicinal products (VMPs) for therapeutic use in farmed fish in Norway in the period 1981-2010 versus produced biomass (live weight slaughtered) farmed fish. Preliminary data for 2010 for slaughtered biomass.

Source: NORM/NORM-VET 2010. Usage of Antimicrobial Agents and Occurrence of Antimicrobial Resistance in Norway. Tromsø / Oslo 2011.

Conclusions / take home messages

- The **common goal should be to protect public health, animal health and welfare** and to ensure that antibiotics are effective now and in the future for relevant indications in all species, **e.g. a One Health approach**
- **Responsible Use** is the way forward → As MSD Animal Health we accept the leadership position
- Impact of the veterinary use of antimicrobials on efficacy of human antimicrobial therapy is considerably lower as initially thought → **One Health** approach needed. **Responsible Use** remains an AH priority
- Ignoring the **complexity** may prove contra-productive long term.
- **Reduction targets should not become competitive tools.**
- **Communication and education** are elementary to create and maintain understanding and commitment.

We support our customers in the transition to follow the market trends and legislation

Thank you for your attention

THERE'S
ONLY ONE
THING THAT
DRIVES US



THE SCIENCE
OF HEALTHIER
ANIMALS