Economic consequences of novel solutions to control production diseases in pigs and poultry

Jarkko Niemi, Anna Stygar, Thomas Rimmler, Philip Jones & Richard Tranter

PROHEALTH scientific symposium, 28 November 2018, Ghent, Belgium
Outline

- Economic consequences of production diseases in pigs and poultry
- Modelling economic consequences of novel solutions to control production diseases in pigs and poultry
  - Farm-level modelling
  - Value chain analysis
Background

- Intensive pig and poultry production systems are fairly efficient and well-controlled, but the competition is intense, so in order to maintain and improve the competitiveness it is essential to enhance the control of production diseases.
- Although production diseases can have a substantial impact on farm economics, their overall impacts are not very well known.
- Changes in animal health can have wider societal consequences due to contributions to animal welfare and antimicrobial resistance.
- The aim of this presentation is to highlight some of the modelling work we have carried out regarding interventions.
What is financial burden of production diseases?
Some examples on the significance of diseases

Production diseases can cost up to €30-40 per pig

Necrotic enteritis can cost globally €2 to €5 billion per year

€3 billion is spent each year worldwide to prevent coccidiosis
Some examples on the costs of production diseases in growing pigs

- Porcine respiratory disease complex
- Pre-weaning mortality
- Post-wean enteric disease
- Tail biting
- Untreated Ascaris suum

Mortality (overall)
Production diseases cost money - even when the diseases are controlled

- Examples of the losses of net margin due to production diseases in broilers

![Chart showing costs of various production diseases in broilers.]

- Tibial dischondroplasia
- Ascites
- Clostridiosis
- Coccidiosis

Costs after intervention (€/bird) and Costs due to uncontrolled disease (€/bird)
Modelling consequences of novel solutions to control production diseases in pigs
Dynamic optimisation model for pig fattening

- Disease
- Intervention
  - Production results
  - Slaughter timing
  - Financial return
  - Price parameters
  - Intervention costs
Piglet production model accounted for events during the farrowing cycle (from farrowing to farrowing)
Interventions in pigs
Disease associated with poor hygiene

- Lower growth rate
- Altered feed consumption
- Elevated incidence of respiratory lesions
- Annually, up to 18% less pig meat per pig space
- Substantial financial losses, up to €15-23 per pig, depending on the scenario, which reduce farm income
- Disease costs correspond to 3-5% of consumer price
Net benefits of selected interventions in piglet production

Positive handling of the sows
Support piglet survival
Enrichment to gestating sows
Newer interior of farrowing unit
Mechanical ventilation

Support

€/piglet

Low

High

-1
0
1
2
3
4
5

Positive handling of the sows
Support piglet survival
Enrichment to gestating sows
Newer interior of farrowing unit
Mechanical ventilation
Interventions in broilers
Bio-economic modelling

- Constructed a computer-based optimisation model to explore the economic rationale for adoption of health-improving interventions
  - Explored in the project (intervention trials)
  - Other recent trials
  - The scientific literature

- We focussed on trials with data on common leg disorders (FPD)

- Other interventions available in literature – not included
  - Don’t provide productivity data (and/or)
  - Don’t provide data on FPD
Types of interventions found

- Nutritional supplement (Vitamin D)
- Increased bird movement
- Physical separation from floor litter
- Better data on house environmental conditions (to vet & producer)
- 12 different interventions in total
Impact of treatments on FPD score and net margin
Control: 18.78 € cents per kg or €4543 per farm (10000 birds)

Financial consequences of some interventions are dependent on the scale where they are applied
Value chain analysis
Several interventions were addressed

- Improved hygiene in pig fattening
- Enhanced care and handling of sows and piglets
- Increased distance between broiler feeders and drinkers
- Finland and the UK were used as examples to put these into perspective
- Value chains were characterised
- Potential impact to farms, consumers and the sector were quantified
Diagram representing a broiler value chain

- Input supply
  - Genetics suppliers
  - Feed suppliers
  - Labour
  - Veterinarians
  - Consultants
  - Pharmaceuticals & chemicals
  - Housing & equipment
  - Finance
  - Other input suppliers

- Production
  - Import of DOCs
  - Breeders
  - Hatcheries
  - Rearing units
  - Other farming systems than intensive broiler
  - Manure

- Processing
  - Traders
  - Transporters
  - Slaughterhouses
  - Processors
  - By-product processors
  - Exports of poultry meat/carcasses
  - Exports of processed Poultry products
  - Imports of poultry products
  - Retailers
  - Wholesalers
  - Restaurants & catering

- Distribution
  - Consumers

- Governance - Policy - Citizens
  - Exports of live birds
  - Exports of poultry products
Risk of production disease can influence food price and supply

- Reduced productivity
- Loss of revenues
- Prevention costs

Increase in production costs per unit of output
Risk of production disease can influence food price and demand

- Reduced productivity
- Prevention costs
- Loss of revenues

- Risk of antimicrobial resistance
- Food safety concerns
- Animal welfare concerns

Increase in production costs per unit of output

Reduced WTP for animal-based food
Risk of production disease can influence food price, demand and supply

Influences on demand for and prices of pig and poultry products
Estimated farm-level impacts of adoption % gross margin and % turnover

- Improved hygiene in pig fattening
- Measures to reduce piglet mortality
- Positive handling of sows
- Water-feeder distance increased

% of gross margin or turnover

GM, FI
GM, UK
Turnover, FI
Turnover, UK
Interventions can have on business impacts

- Breeding companies: Market for more robust animals, getting the best performance from their products
- Veterinarians: Selling more advice, testing and systematic visits, less treatments
- Pharmaceutical companies: Market holistic health care protocols
- Farm workers: more/less work, better job satisfaction
- Housing and equipment suppliers: Develop new products
- Finance: reduced credit risk
- Logistics and slaughtering: Higher quality of products, potential for labelled products, potential for more production
- Retailers: Potential for reduced input price, wider choice of products
Three principal economic reasons why an intervention can be adopted

- It reduces production costs per unit of output leading to economic gains
- It increases demand for the product because it contributes valuable characteristics which are preferred by the consumers
- Policy measures or coordinated actions provide additional incentives which encourage farmers to adopt the measure
Concluding remarks

- Good hygiene, robust animals and their positive handling and good management are examples of interventions which can provide efficiency gains.
- Interventions are *not* economically or societally preferred *per se*, because their financial and social viability is dependent on the case.
- Both pig and poultry systems tend to be vertically integrated, this provides opportunities to adopt interventions which look at animal health from the system perspective.
- Evidence-based policy is needed to support public policies and business decision-making in these sectors.
- Distribution of value along the supply chain also matters.
- Effective control of production diseases can benefit the consumer!
Contact:
Jarkko Niemi

Natural Resources Institute Finland (Luke)

Mobile: +358 40 358 0487
Email: jarkko.niemi@luke.fi
Twitter: @Jarkko_Niemi

@fp7_PROHEALTH is expected to increase competitiveness and resilience of EU pig and poultry systems. From this perspective it is important that strategies to control production diseases are economically viable and societally acceptable @betsy_clark @LukeFinlandInt

www.fp7-prohealth.eu