The costs of poultry production diseases: what do we actually know?

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Setting the scene

The economic problem

- Producer margins being squeezed by increasing costs
- Limited opportunity to pass on these extra costs to consumers due to:
  - lack of market power
  - Fierce competition from other international suppliers

Industry response

- Increase efficiency as a way of further reducing costs (the historic response).
  - A key part of this strategy is to reduce losses caused by production diseases

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How is good disease management achieved?

- Good disease management decision making requires data on:
  - The risks posed by various production diseases
    - incidence and severity;
  - The financial impacts of different diseases; and
  - Availability and effectiveness of different control and prevention measures
  - Cost of interventions
    - financial benefits/disbenefits arising from use
- **Goal of study**: to what extent are these data available?
  - What are the financial impacts of diseases & interventions?

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What do we mean by the term: ‘production disease’?

- A health condition
- May occur in wild bird populations
- Not limited to infections
  - Physical damage (bruising, bone breaks, skin lesions)
- Becomes increasingly problematic with the intensity of production system and failures in management

- Nine production diseases were identified for study
  - Selection made by scientists on the project
  - Selection based on importance in their respective countries

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Data sources

- Literature review
  - Generate financial impacts data
- Stakeholder consultation
  - Responses from 100 upstream & downstream stakeholders
    Vets, transporters, abattoirs, processors, retailers
  - Finland, Germany, Poland, Spain & UK
    Identify most important production diseases financially
    Validate financial data derived from literature review
- Bio-economic modelling

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The literature search

- Systematic literature review of studies reporting financial or productivity impacts (9 production diseases)
  - Web search tools, websites, reference lists (recent projects)

- Exclusions:
  - Regions where production not similar to EU conditions
  - Studies prior to 1995
  - Modelling exercises and reviews (i.e. no primary data generated)
  - Duplicates

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The results of the literature review?

- **No financial data found**
- Costs had to be estimated from changes in physical parameters

- 127 relevant publications found:
- **Surveys** (occasional) of disease incidence (countries or regions)

- **Experimental studies** - productivity effects of disease 'V' control group
  - Impacts measured in physical terms (e.g. FCR)
- **Experimental studies -** efficacy of measures to control diseases
  - Usually measured in physical terms (productivity or disease indicators, eg bacteria counts)

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Standard cost model

	Broiler production costs (€/ 100 kg l.w.)	Layer production costs (€ / hen)
Revenues		
Broilers, 2,276 g of meat per bird;	124.00	
Layers, 340 eggs at €8.67/100		29.48
Spent hen		0.36
Costs		
Day old chicks / pullets (17 weeks)	15.20	3.30
Mortality	2.02	0.87
Feed	67.00	10.29
Medication	1.40	0.09
Heating & electricity	2.20	1.41
Water	0.60	
Litter (incl. cleanout & disposal)	3.70	
Labour	3.40	1.10
Housing	6.40	2.75
General	1.00	0.41
Total costs	102.92	20.22
Net margin	21.08	9.62

Sources: van Horne (2014); Agro-Business Consultants Ltd (2012); RBR (2014)

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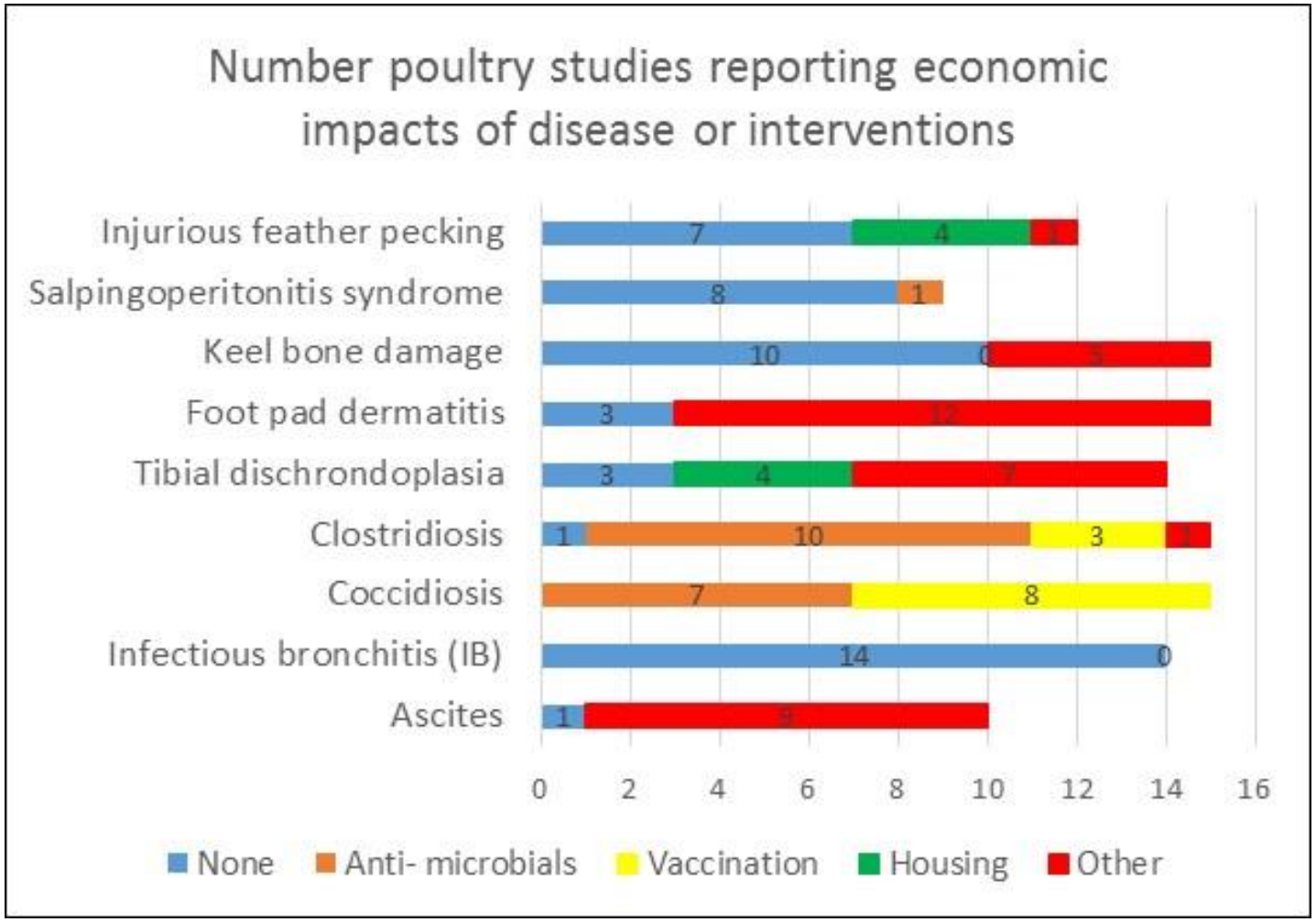
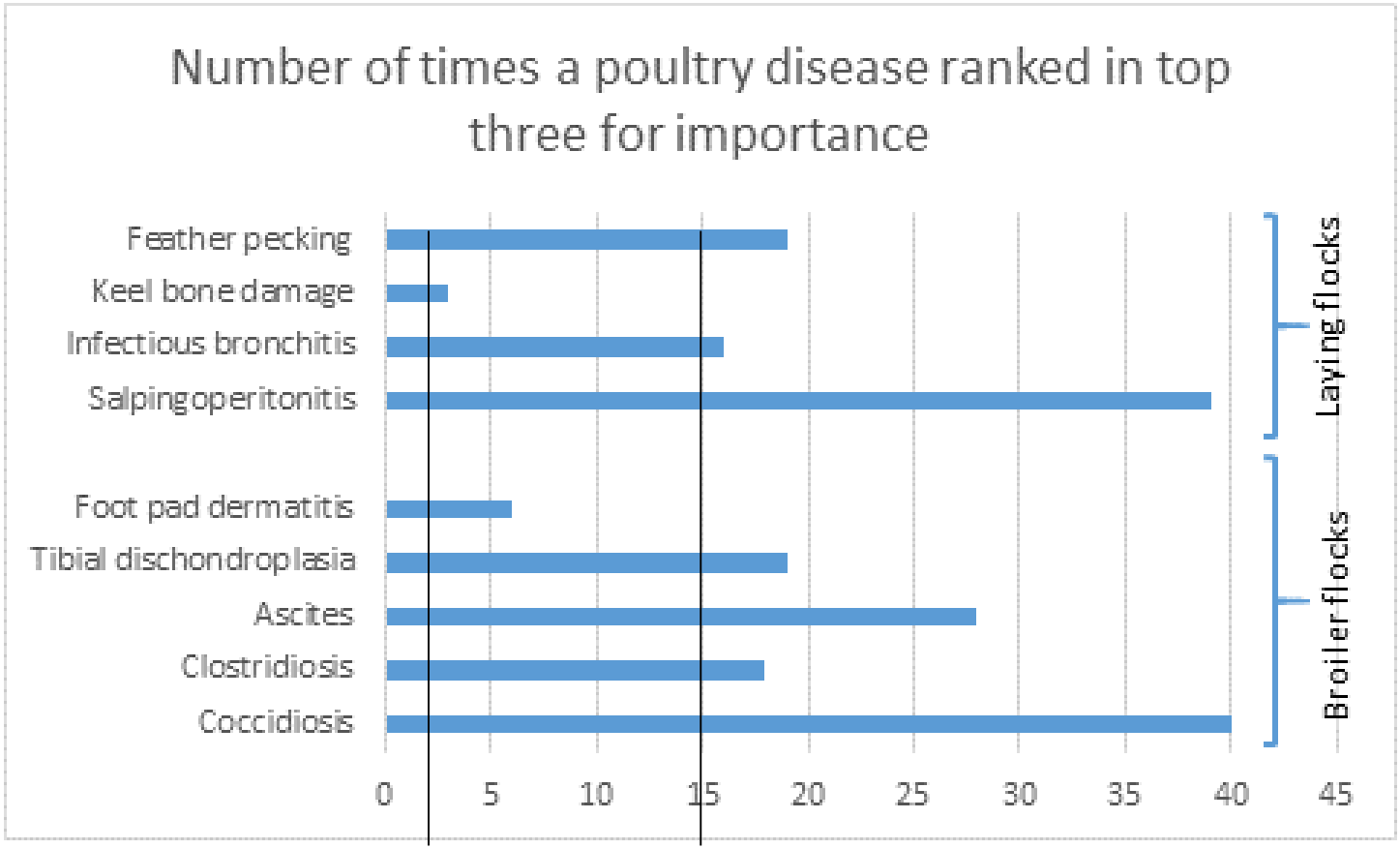
Poultry diseases and their interventions



Have we chosen the right diseases?



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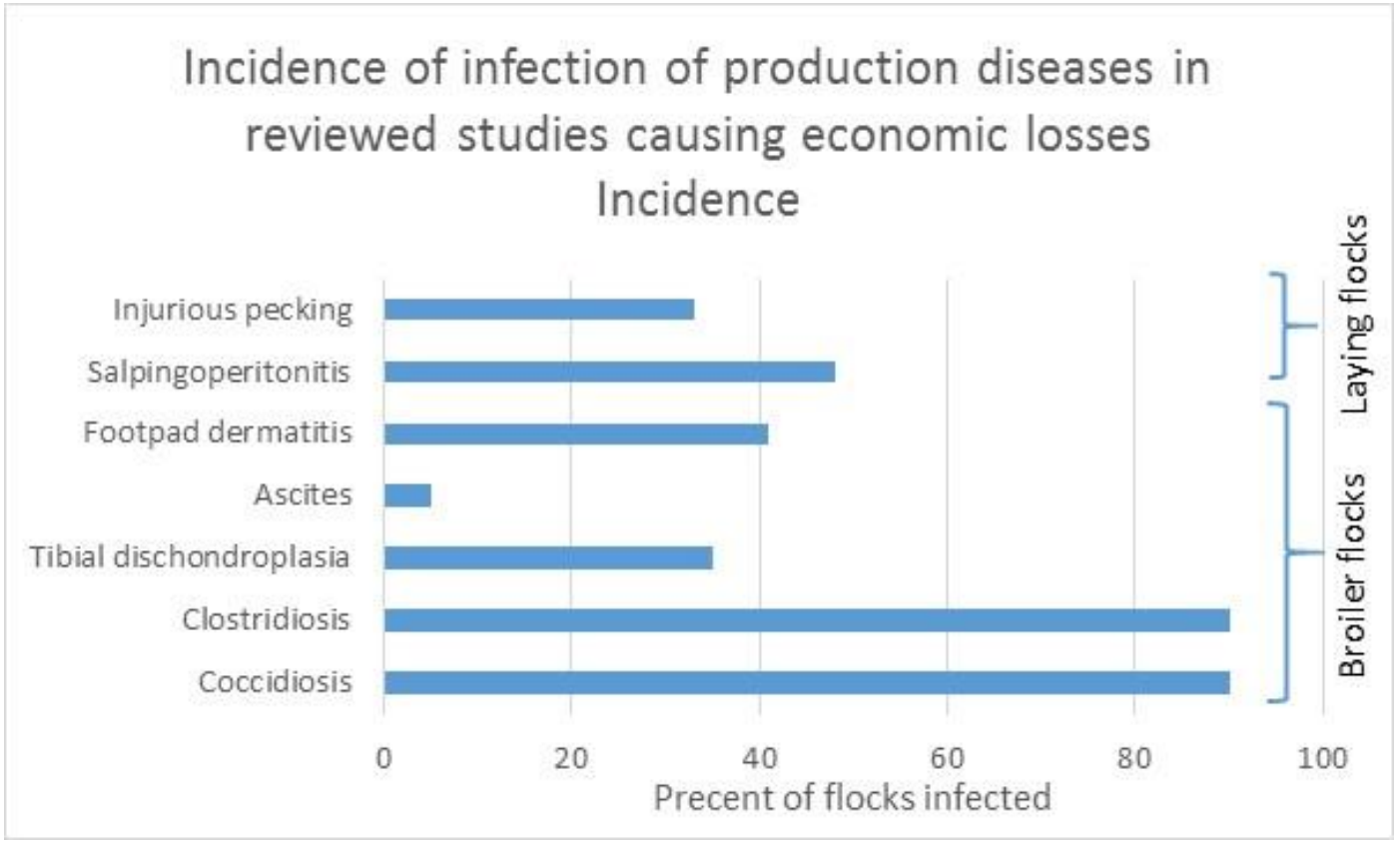
What is the incidence of the selected production diseases?



Note: Incidence = % of flocks with disease at a severity that causes financial losses

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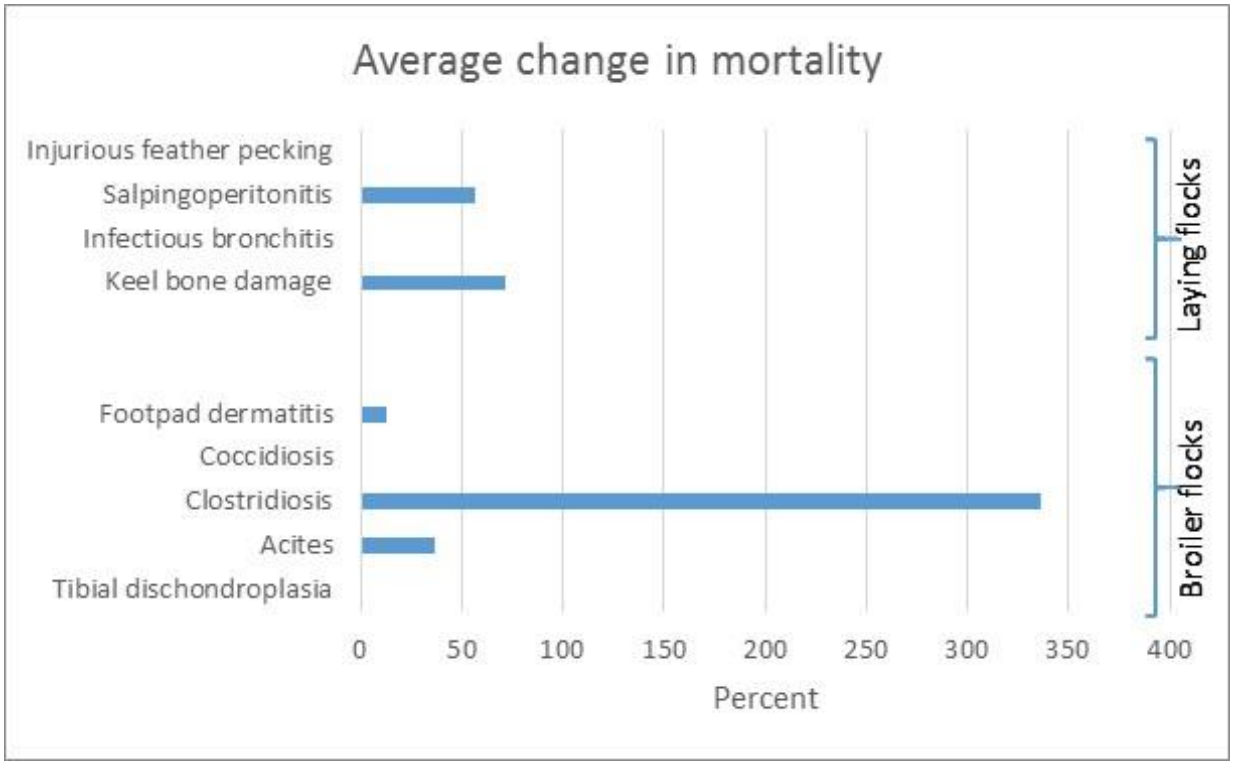
Impacts - mortality

- Current mortality: layers (6-11%); Broilers (4-6%)
- Losses: revenues; expenditures on birds that die; disposal of carcasses



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Impacts - physical outputs

Production disease	Average change in output (%)		
Broilers	Meat (liveweight)	Carcass downgrades	
Tibial dischondroplasia	-10	<1	
Acites	0	N.A.	
Clostridiosis	-1.24	N.A.	
Coccidiosis	-17.7	N.A.	
Footpad dermatitis	-7.3	<1	
Laying flocks	Eggs (number)	Egg downgrades	
		Weight	Quality
Keel bone damage	-3.5	-3.2	N.A.
Infectious bronchitis	-32,9	-8.7	N.A.
Salpingoperitonitis	N.A.	N.A.	<1
Injurious feather pecking	-5.1	0	0

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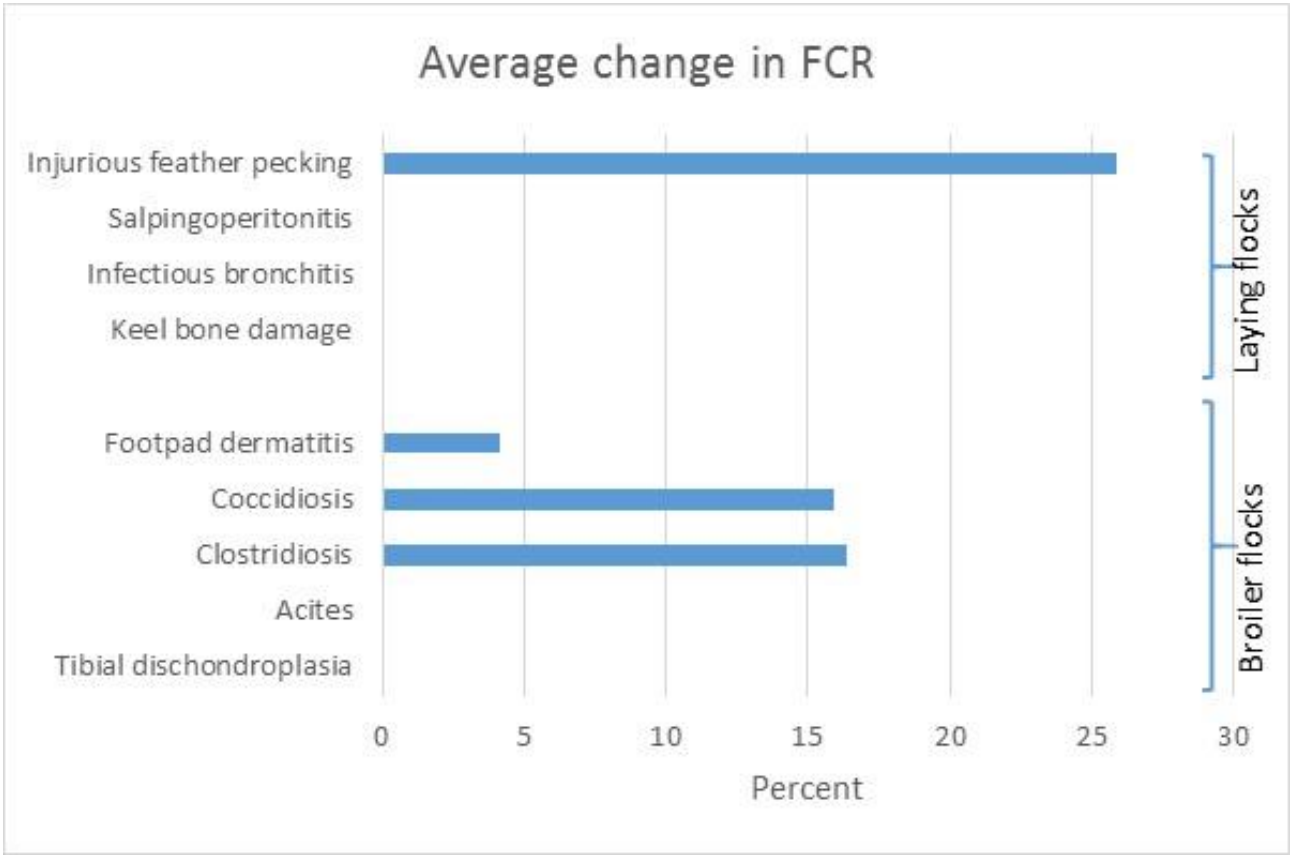
Impact – feed conversion ratio (FCR)

- Birds eat more food, when stressed by a disease, to add body mass or produce eggs



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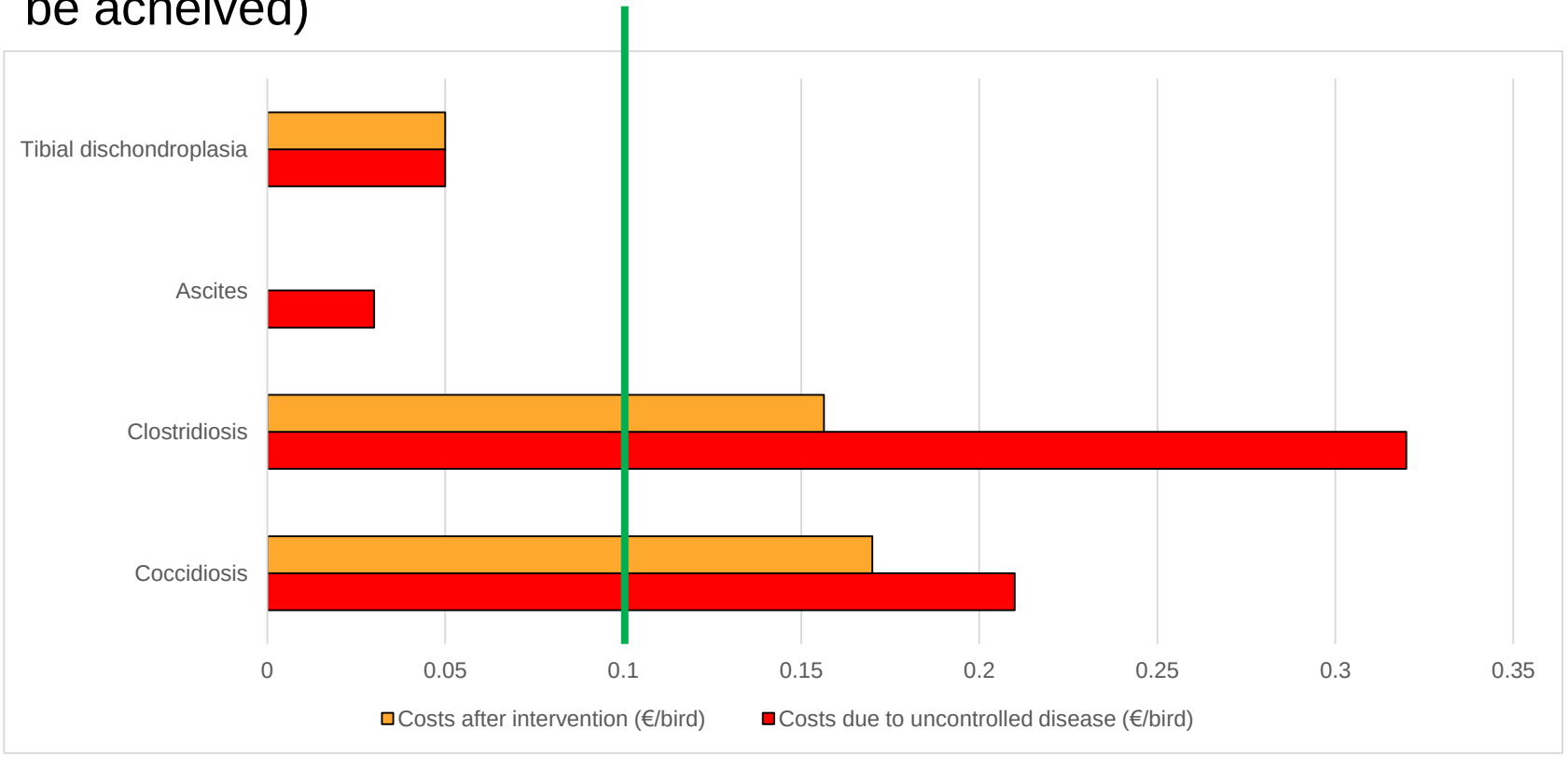
Impacts - financial

- Application of physical impacts to the standard broiler and layer cost models
- Excluded costs:
  - additional carcass disposal costs
  - additional vet/ medicine costs
  - labour costs for increased monitoring/inspection
- Losses represent losses per surviving bird, i.e. accounting for losses from changes to mortality
- Losses are higher for laying hens because diseases are impacting over a longer production period

Financial losses - broilers

- Typical commercial broiler profit (2013) was around 10 €Cents / bird
- Most efficacious interventions used - (reflects high-end of what can be acheived)



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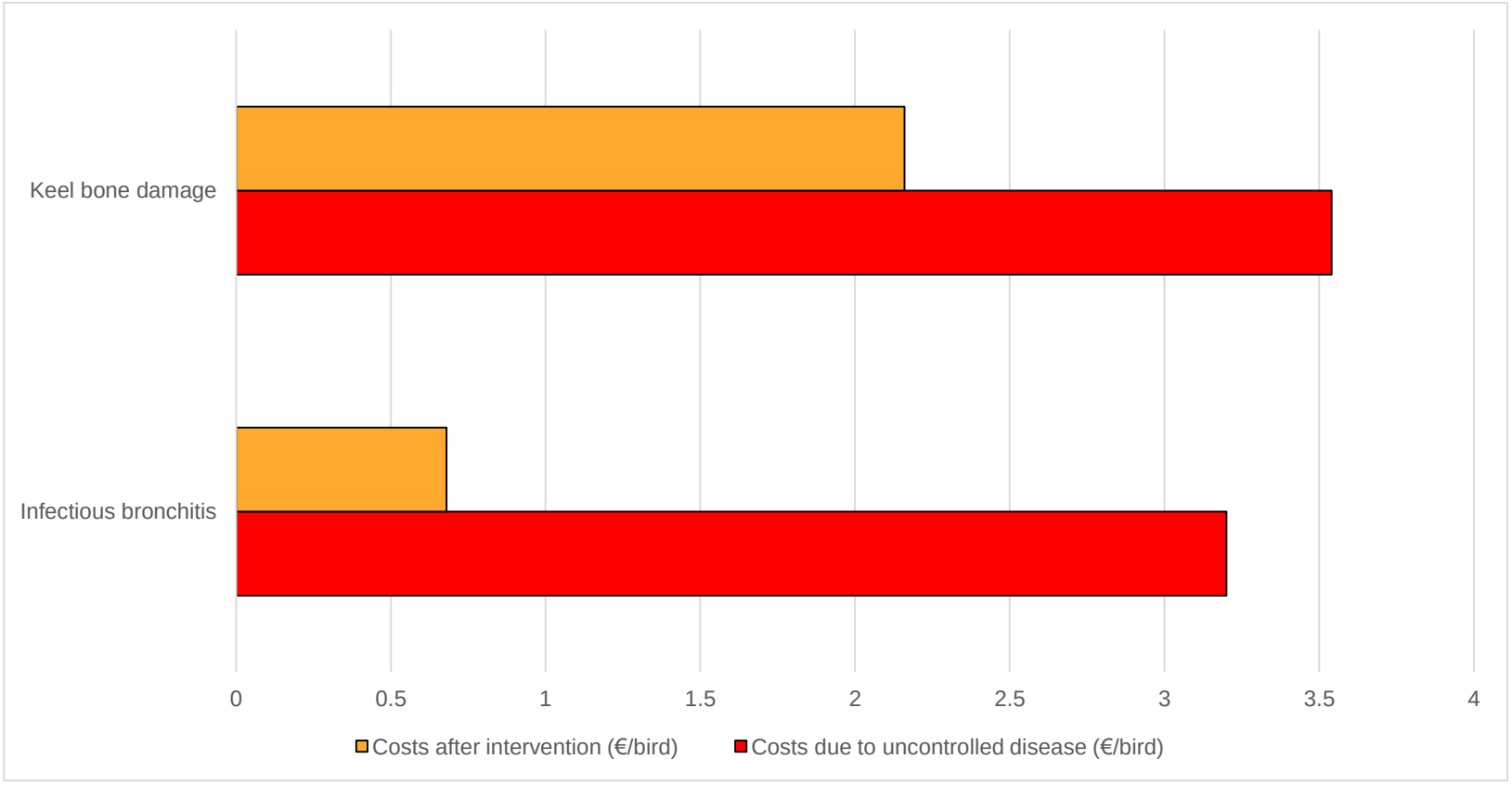
Financial losses - layers

- Laying hens typically generate a margin of around €6 per bird



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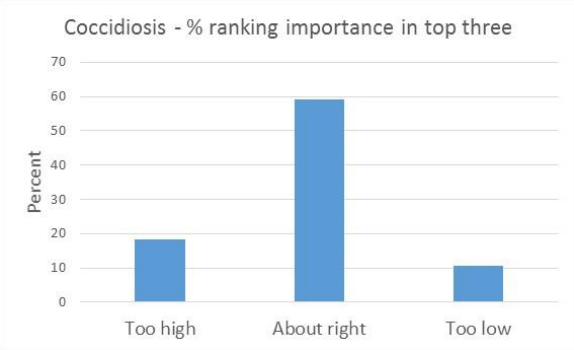
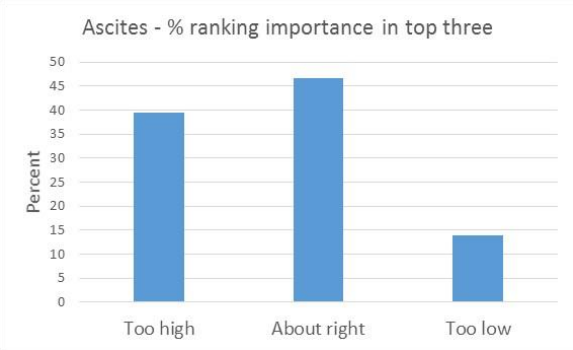
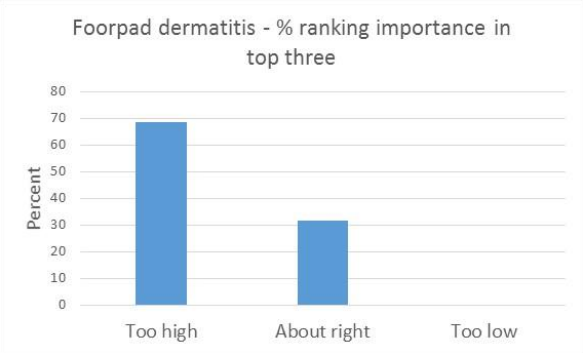
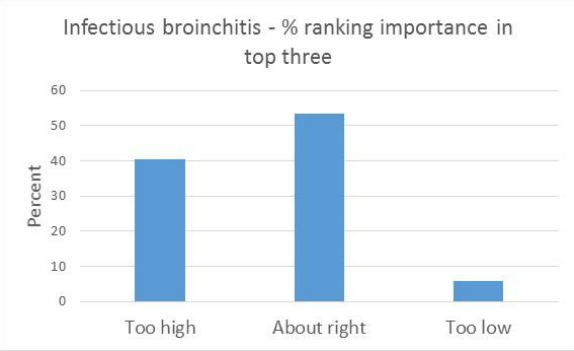
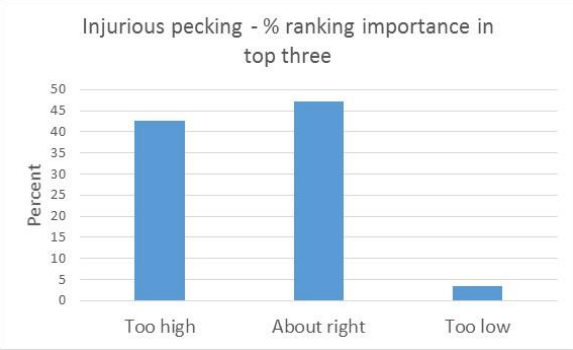
How reasonable are the Net Margin impacts?

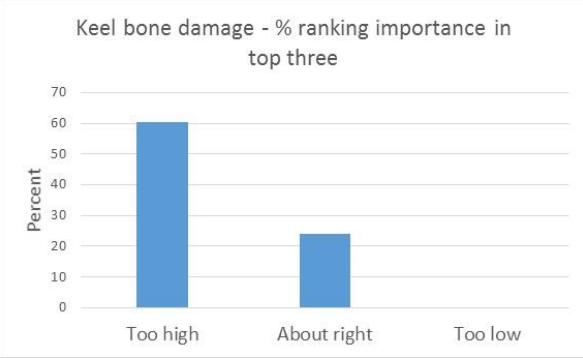












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Bio-economic modelling

- 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

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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

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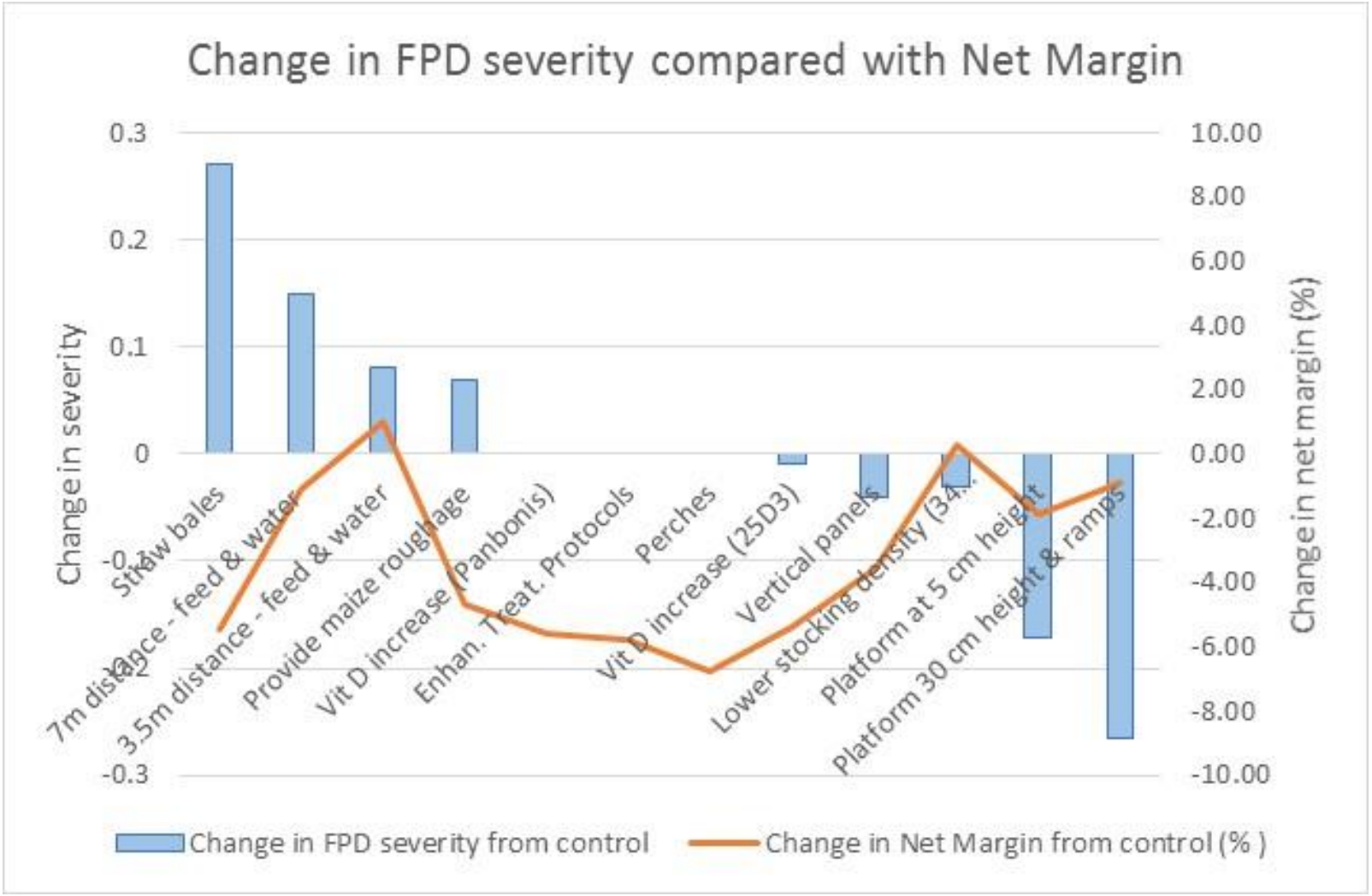
Financial impacts – per Kg liveweight



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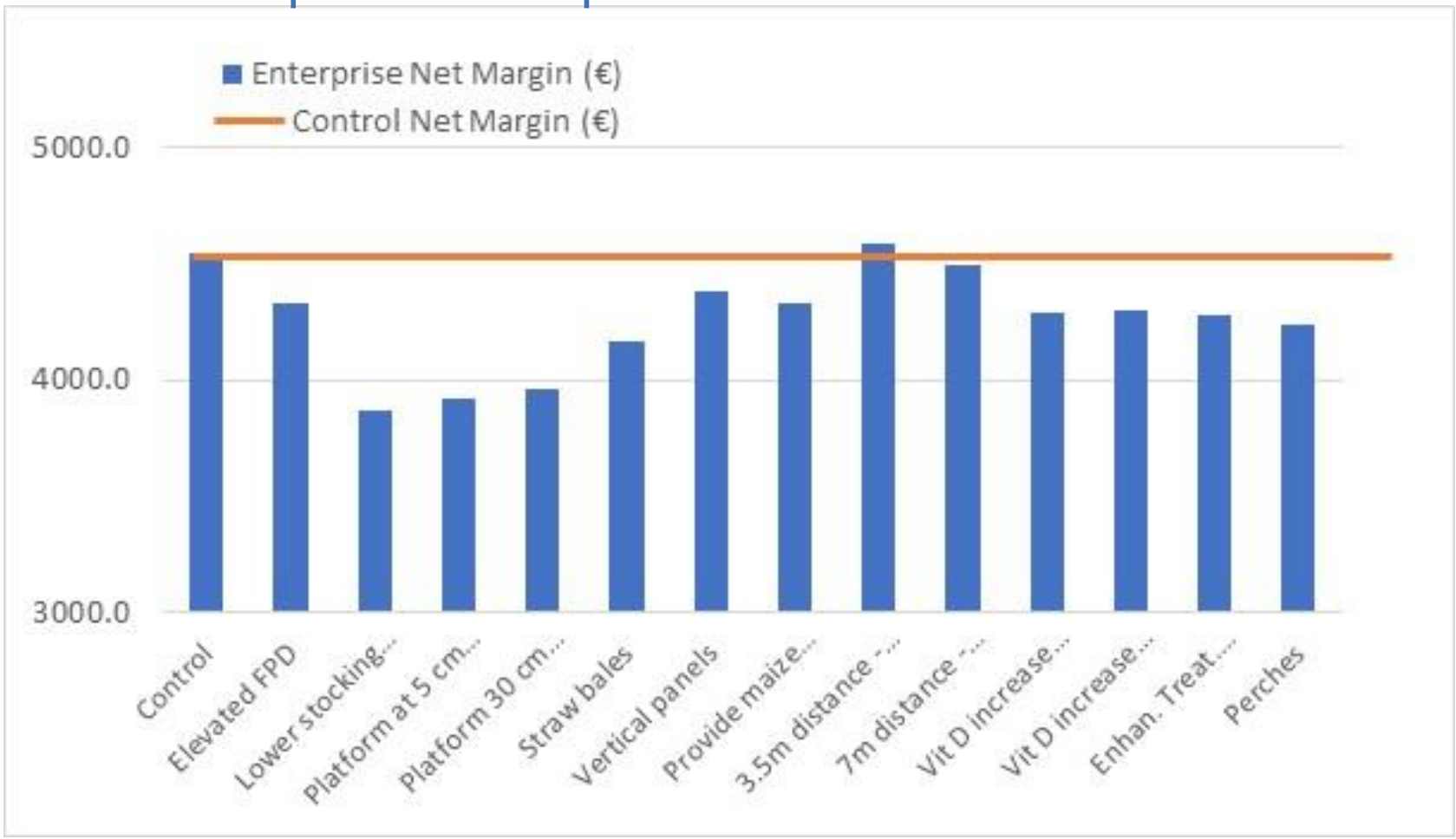
Financial impact – enterprise level



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Summary

- Production diseases can cause major financial losses to poultry farms if not controlled effectively
- Diseases with the highest incidence are enteric (coccidiosis, clostridiosis – almost endemic)
- Efficacy of interventions varies by the context
  - Beneficial interventions available for all diseases (CBR>1)
  - For FPD some effective interventions, but not economically rational to use them.

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Data availability

Production disease	Mortality	FCR	Physical output	Down-grades
Broilers				
Tibial dischondroplasia		X		
Acites				X
Clostridiosis				X
Coccidiosis	X			X
Footpad dermatitis				
Laying flocks				
Keel bone damage		X		X
Infectious bronchitis	X	X		
Salpingoperitonitis		X	X	X
Injurious feather pecking	X			

Note: X signifies absence of data

- Even expressing disease effects as changes to physical parameters, there are major gaps in available data
- Where are commercial producers and their advisors, getting their data?
- Poultry diseases researchers need to ‘raise their game’

Thank you for your attention

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A review of the financial impact of production diseases in poultry production systems

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