Influenza A(H1N1)pdm09 virus infections decrease growth performance of Norwegian finisher pigs

Jwee Chiek Er, Veterinary Epidemiologist
BVSc (Australia), MPVM (USA), PhD (Norway)

Veterinærinstituttet
Norwegian Veterinary Institute

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RESEARCH ARTICLE Open Access

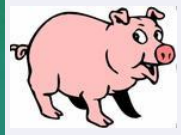
Adverse effects of Influenza A(H1N1)pdm09 virus infection on growth performance of Norwegian pigs - a longitudinal study at a boar testing station

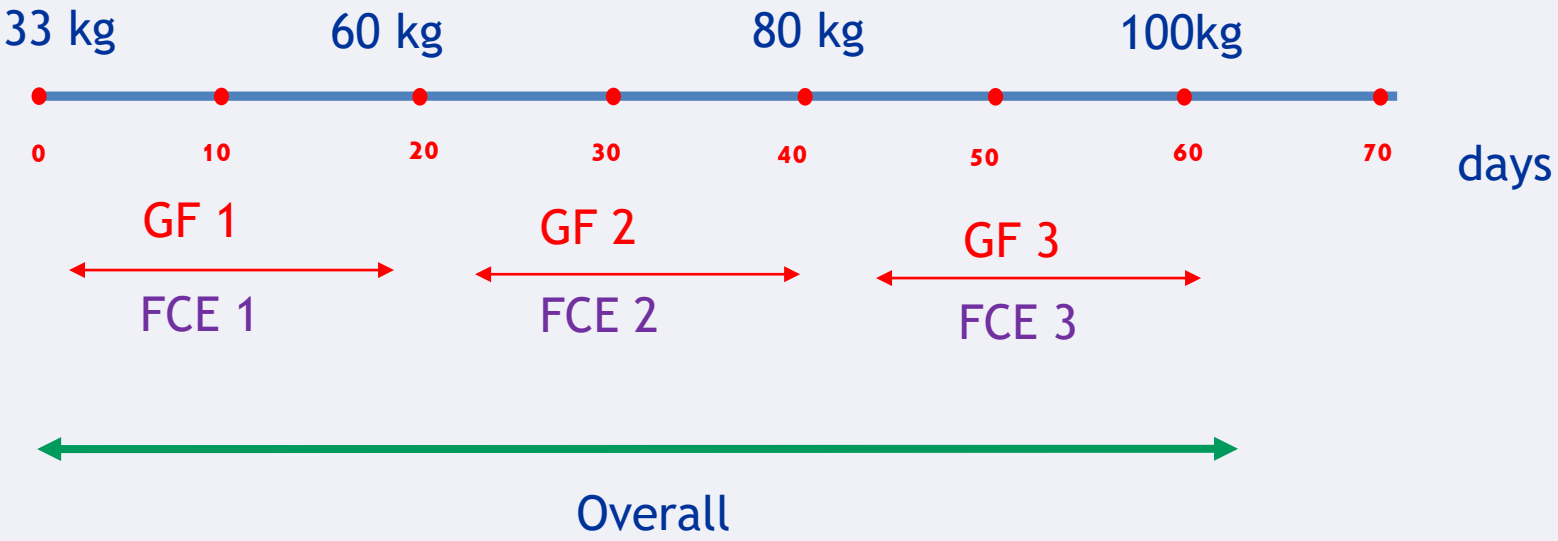
Chiek Er[1*], Bjørn Lium[1], Saraya Tavornpanich[1], Peer Ola Hofmo[2], Hilde Forberg[1], Anna Germundsson Hauge[1], Carl Andreas Grøntvedt[1,3], Tore Framstad[3] and Edgar Brun[1]

Longitudinal study

n = 1955 pigs (2009-2012) from 43 nucleus herds

Daily growth performance
- Daily feed intake
- Daily weight gain





1. Feed intake
2. Overall FCE
3. Age at 100 kg BW

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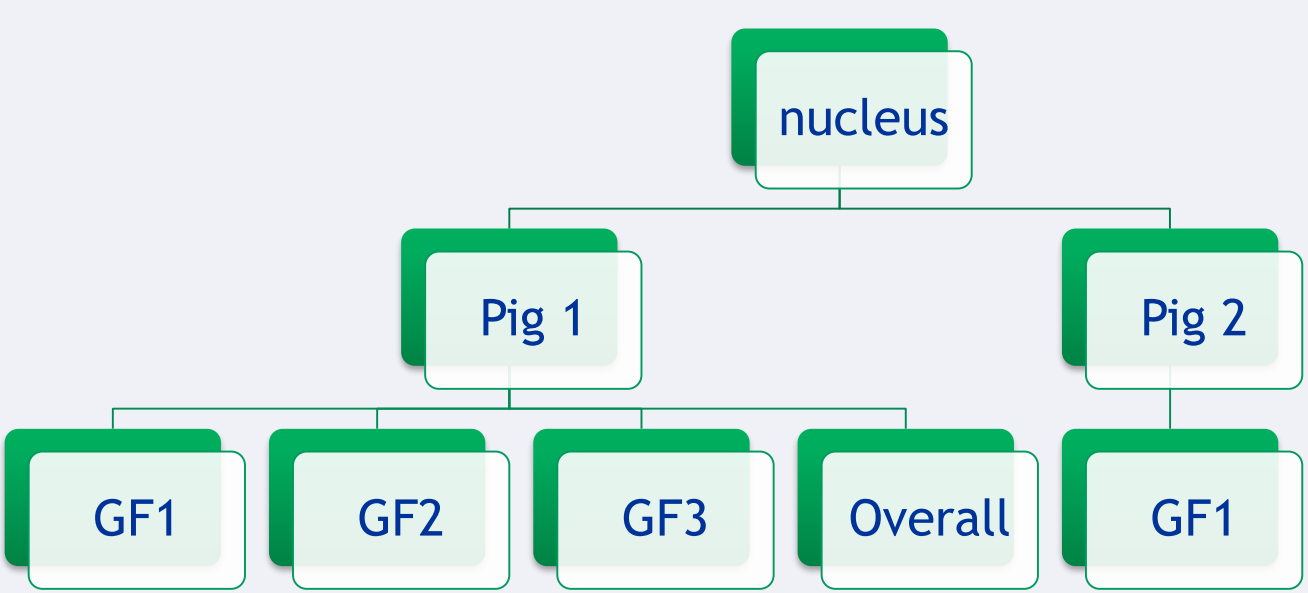
Growth data - Hierarchical structure



Multi-level random-intercept regression models

$$Y_{[i,j,k]} = \beta_0 + \beta_1 X_{1[i,j,k]} + \ldots\ldots + \beta_h X_{h[i,j,k]} + u_{[j,k]} + v_{[k]} + \varepsilon_{[i,j,k]}.$$

Y = Outcomes

1. Overall feed intake (OFI)
2. Feed conversion efficiency (FCE)
3. Age at 100 kg bodyweight

X = Predictors (Fixed effects)

1. Breed
2. Birthdate
3. Influenza infection
4. Growth phase of pig at infection

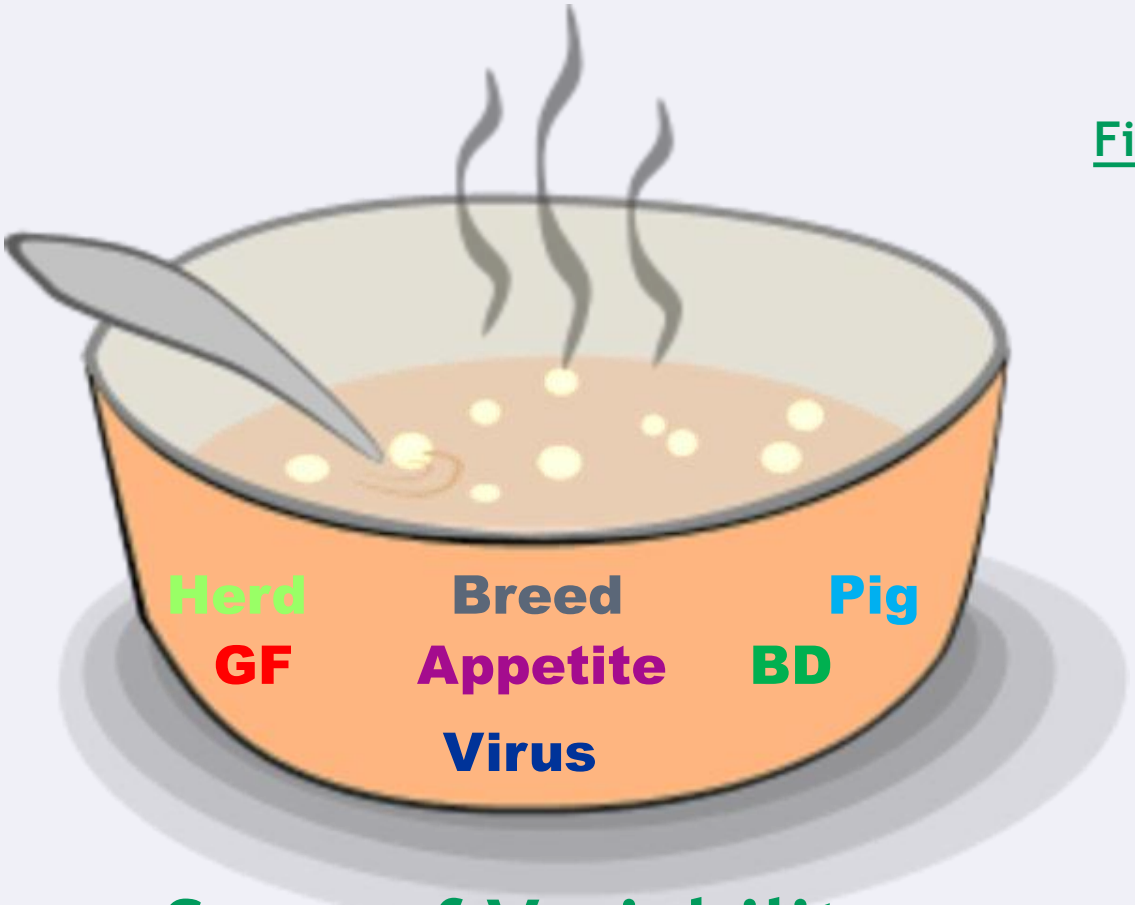
Random effects

1. Herd
2. Pig

Variance component analysis

Random

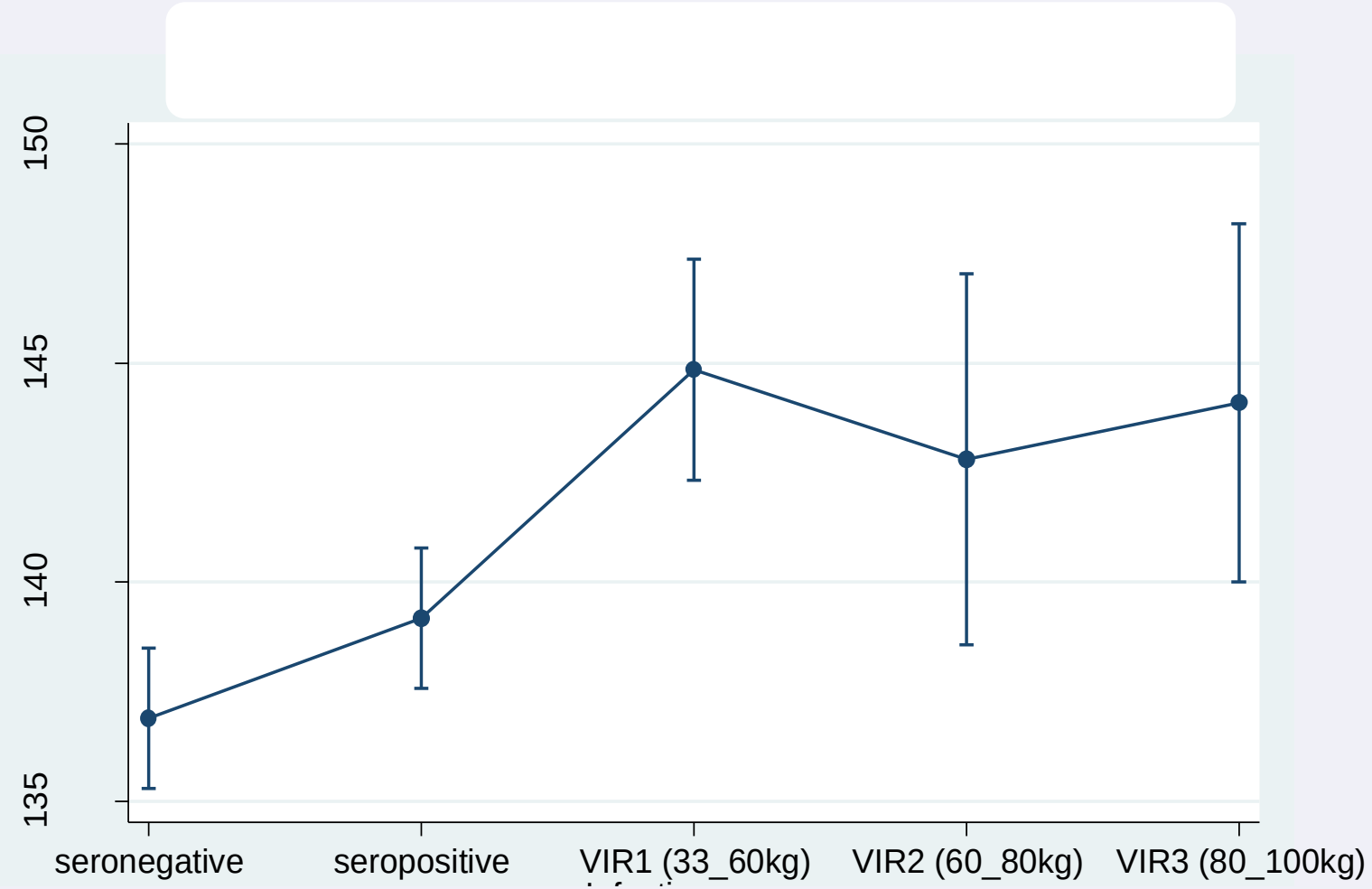
Fixed



Soup of Variability

1. FCE
2. Feed intake 33kg-100kg BW
3. Age at 100kg BW

Feed consumption from BW 33kg to 100kg



(n=pigs) 887 874 123 34 37

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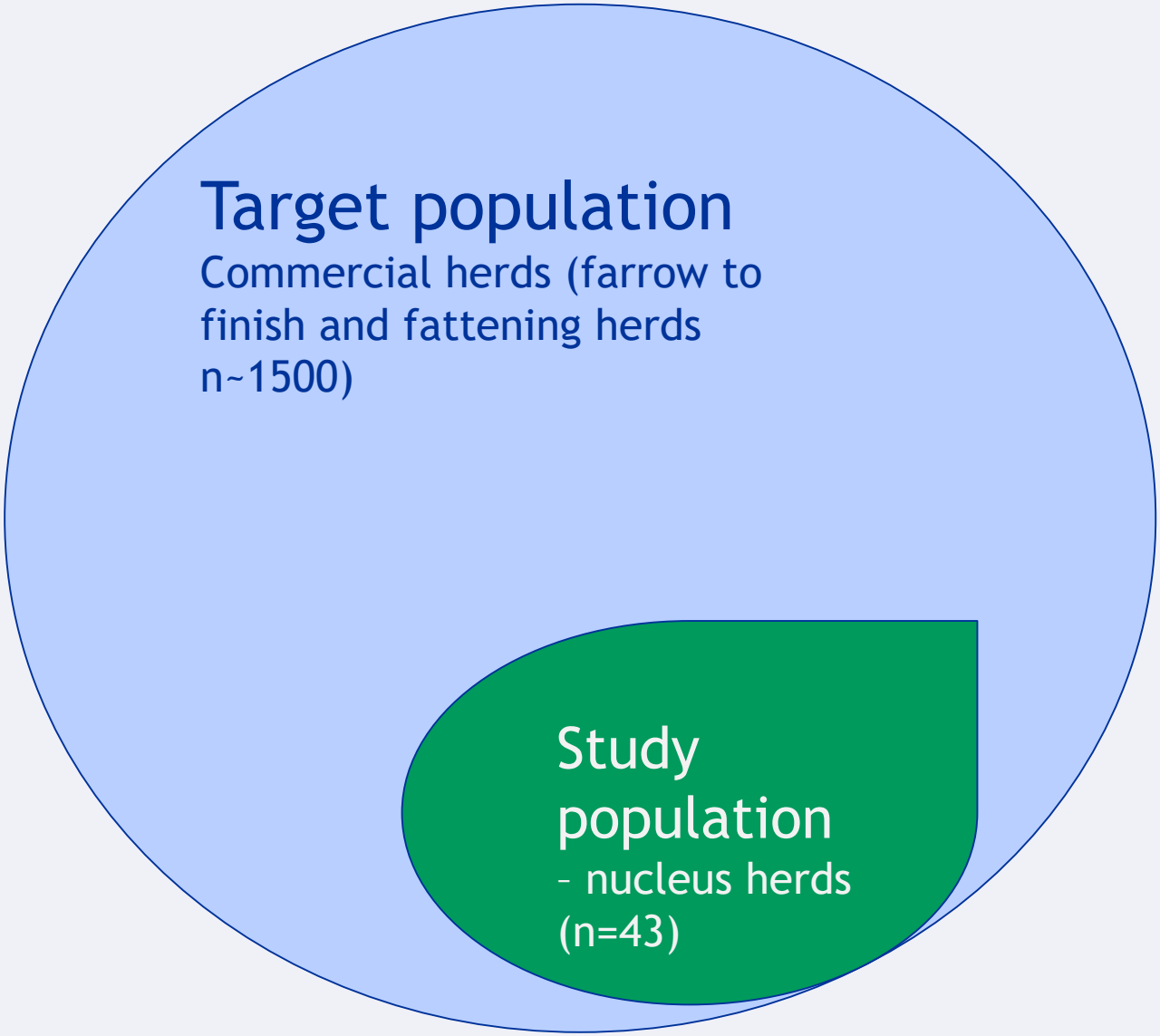

Paper 4

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Production impact of influenza A(H1N1)pdm09 virus infection on fattening pigs in Norway[1]

C. Er,*[2] E. Skjerve,† E. Brun,* P. O. Hofmo,‡ T. Framstad,† and B. Lium*

*Norwegian Veterinary Institute, P.O. Box 750, 0106 Oslo, Norway; †Norwegian University of Life Sciences, Campus Adamstuen, P.O. Box 8146 Dep., 0033 Oslo, Norway; and ‡Norsvin (Norwegian Pig Breeders Association), P.O. Box 504, 2304 Hamar, Norway

Key words: feed conversion ratio, feed efficiency, influenza, mixed linear regression model, stochastic

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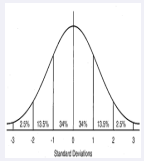
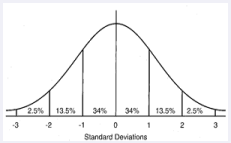
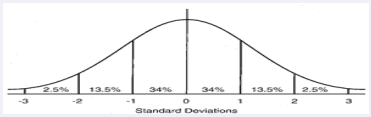
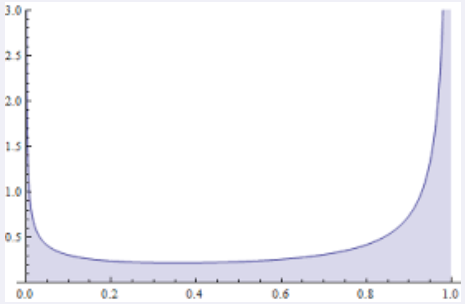
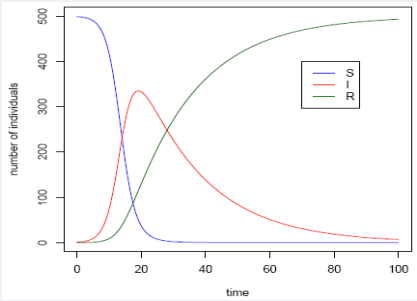
Stochastic models – variability inputs with probability distributions











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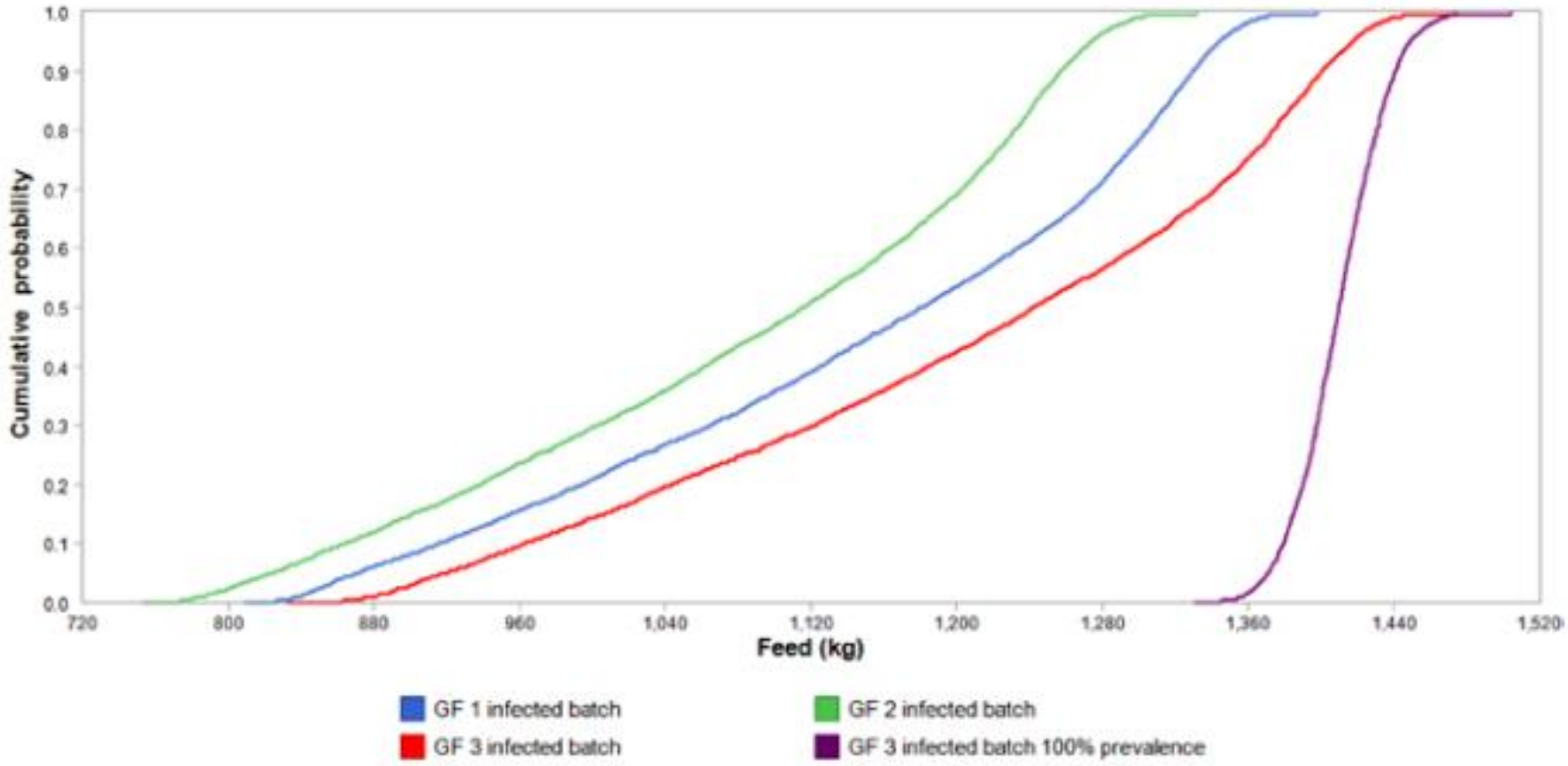
Cumulative probability plots of the additional feed requirement (kg) for an infected batch (n=150) of fattening pigs.



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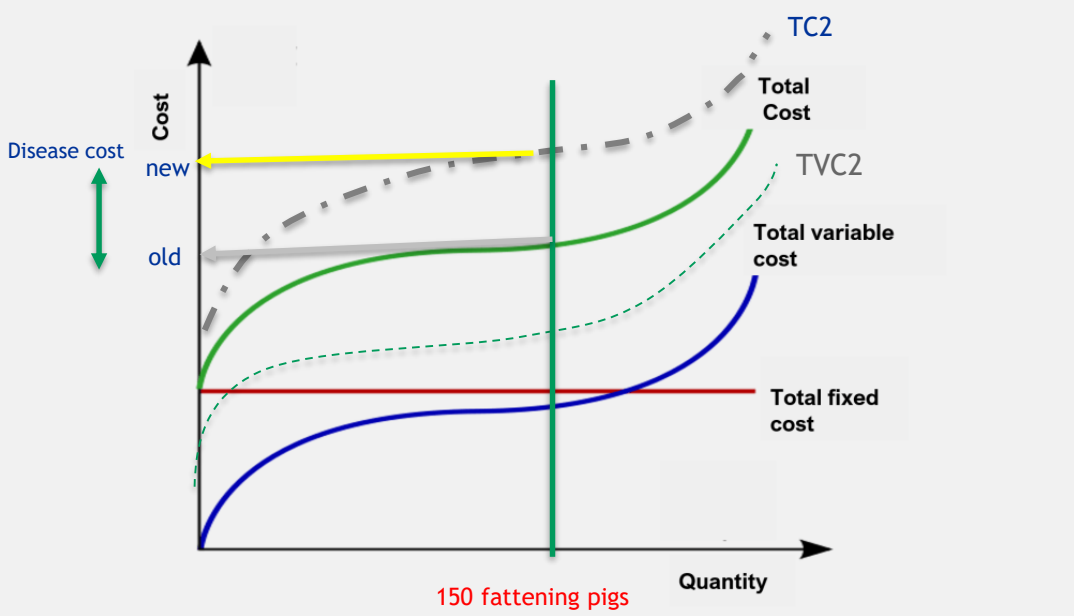
Animal diseases increase costs of production

- Feed
- Labour
- Veterinary expenses



Cost of disease control or biosecurity measures (e.g. vaccination program assumming it is effective) should not exceed the disease cost