

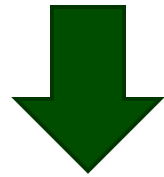


Ethical and practical trade-offs in AI- and sensor-based disease detection in dairy cattle

June 30th 2026 | Judith Roelofs & Ariëtte van Kneysel – Adaptation Physiology Group

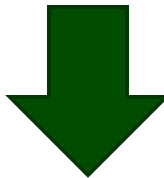
Precision livestock farming (PLF)

A **tool** for the **management** of individual animals (or the herd) by **continuous automated real-time monitoring** of health, welfare, production/reproduction, and environmental impact.



Sensor systems

Detect deviations at an early stage



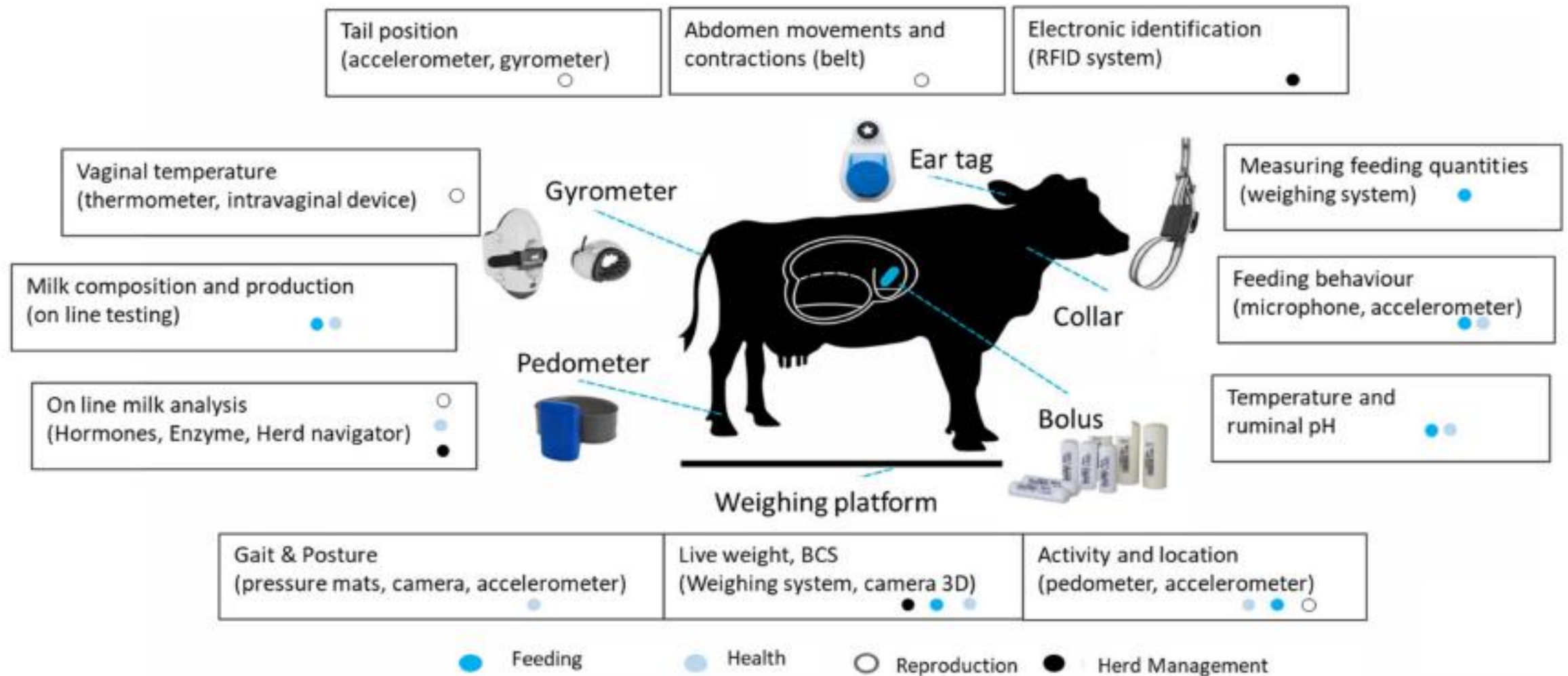
People

Improve animal health, welfare and efficiency



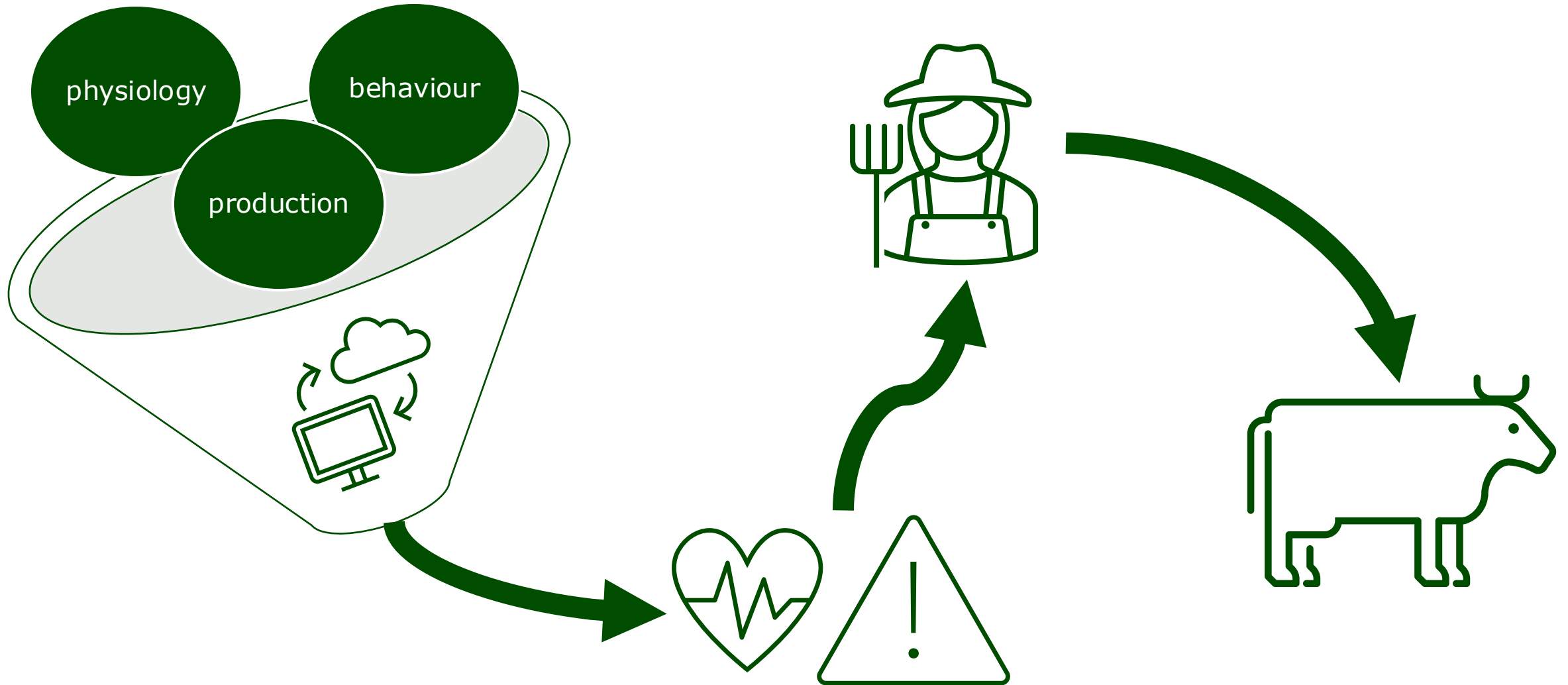
(Berckmans, 2014, 2017)

Use of sensors in dairy farming

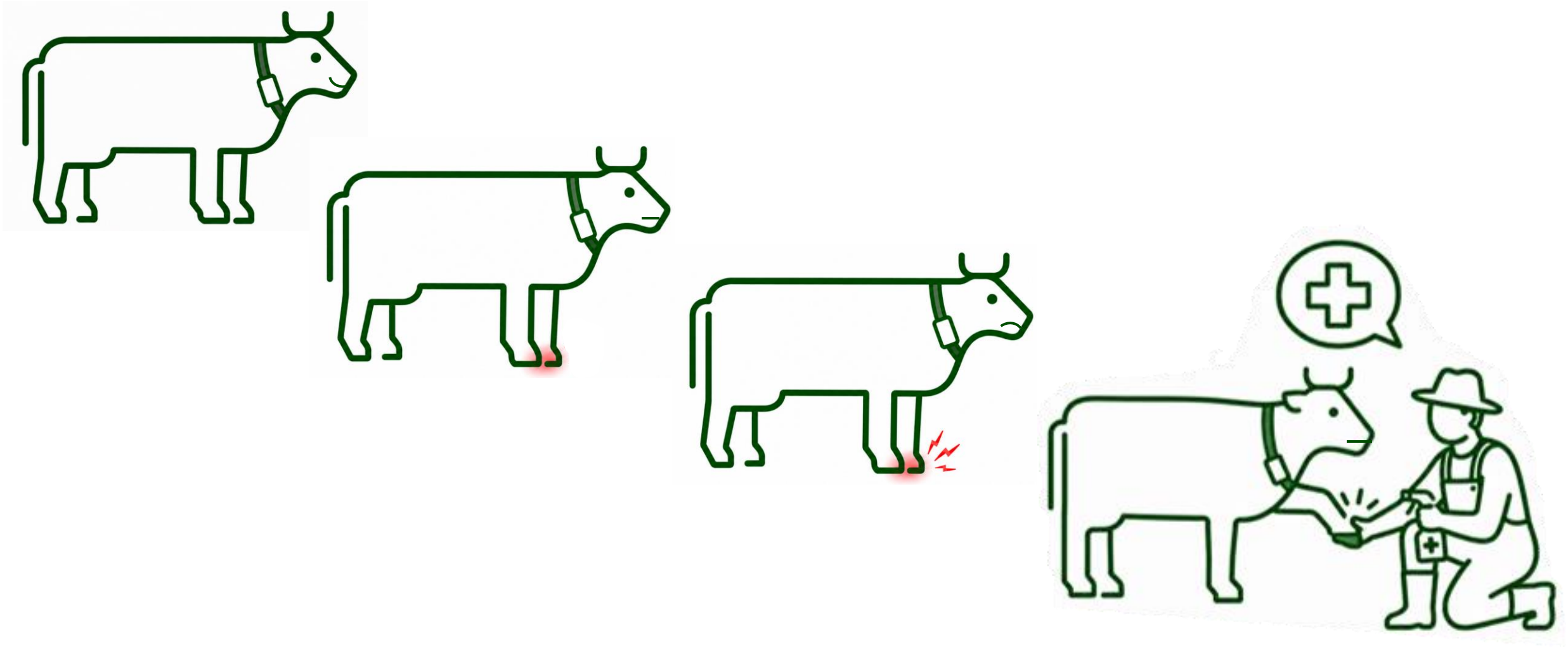


Tekin et al., 2021

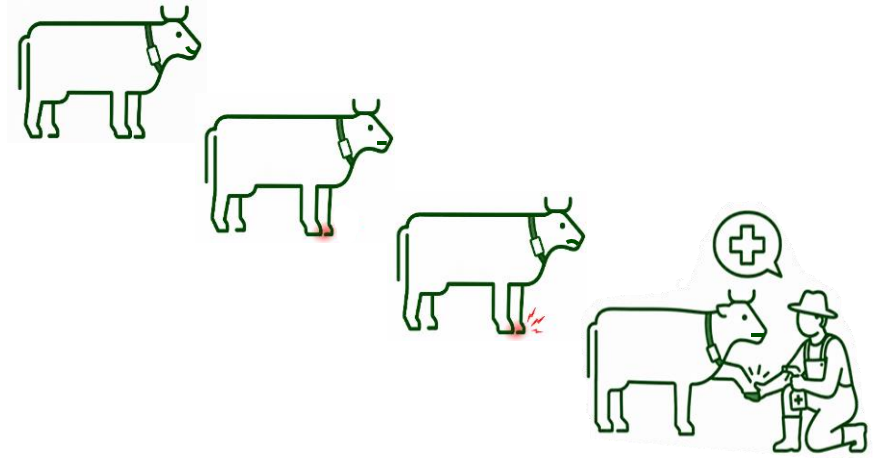
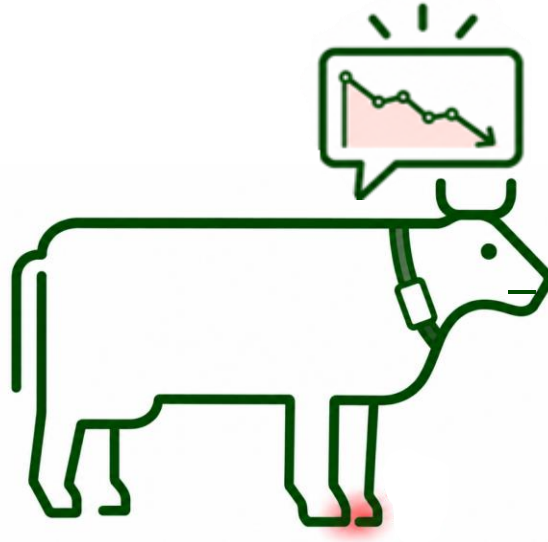
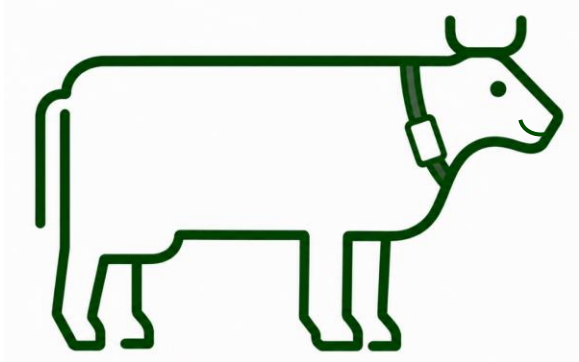
Sensors - information - decision - outcome



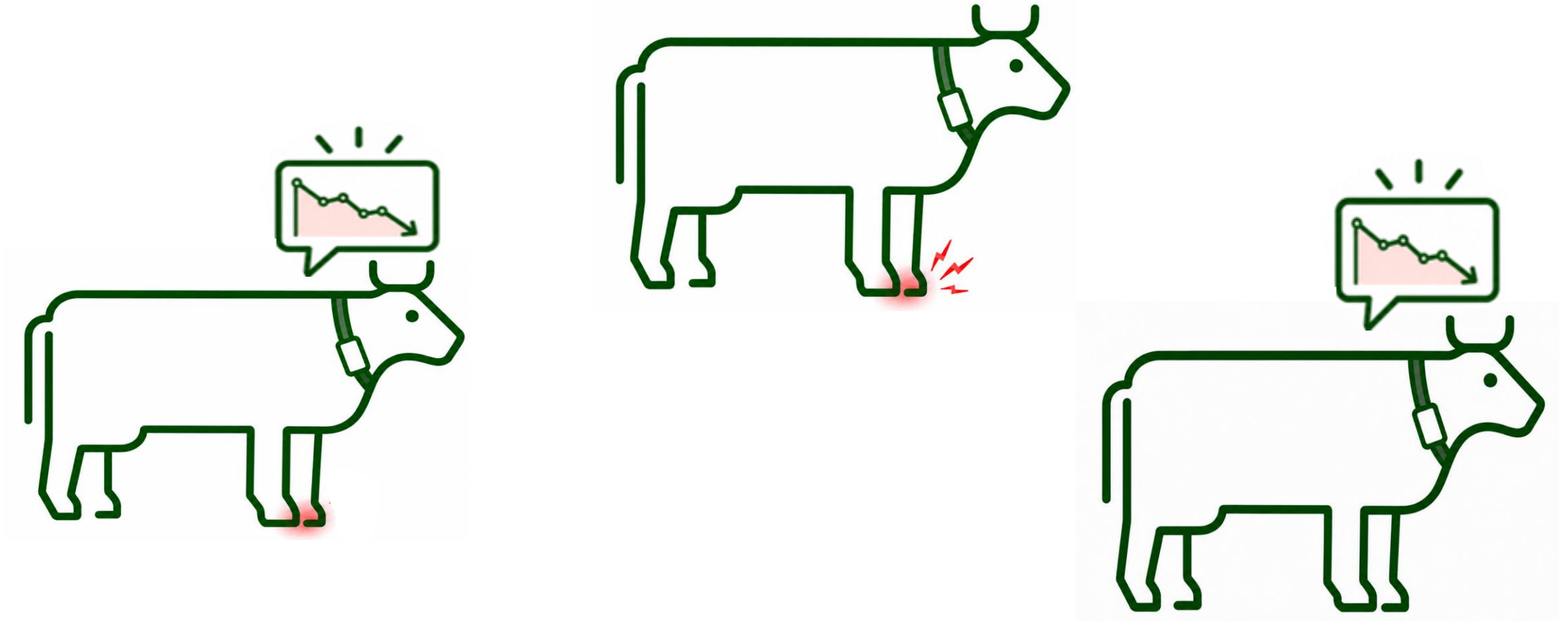
In a world without sensors...



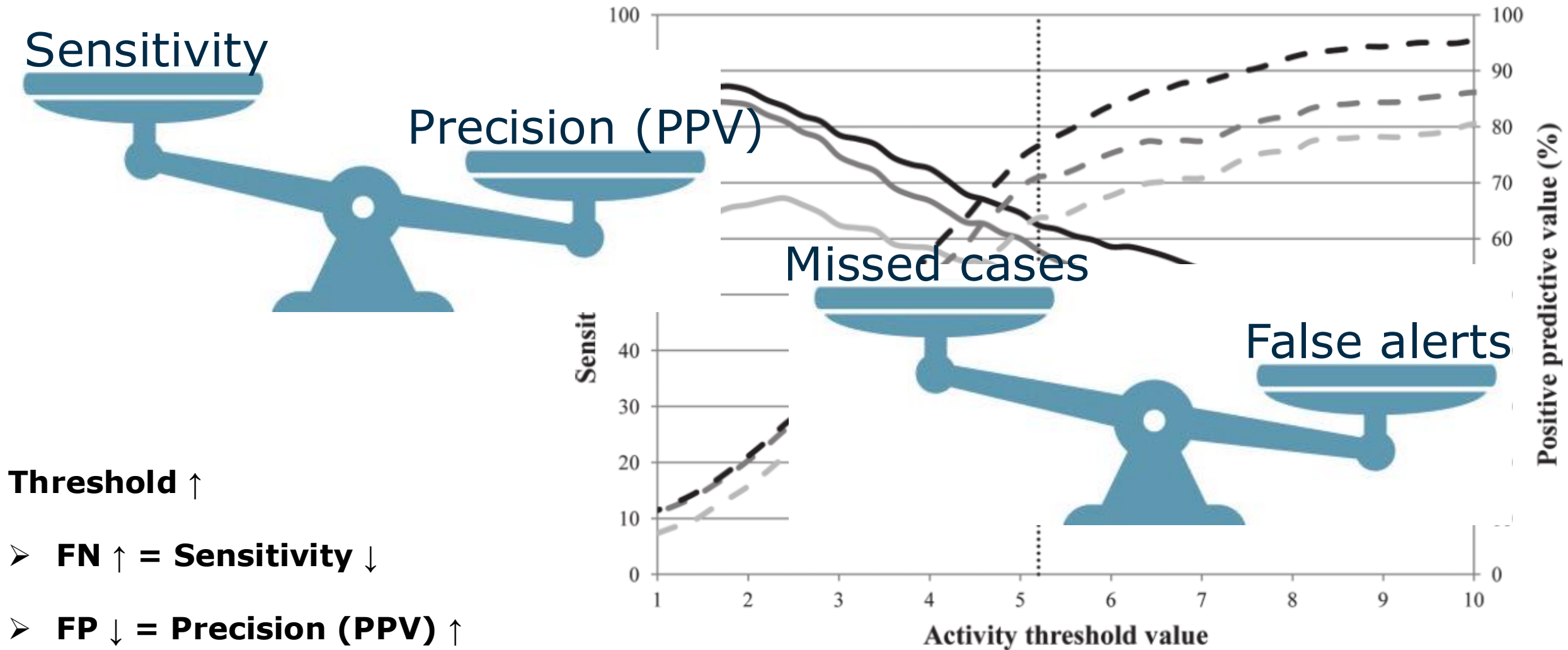
In a perfect 'sensor-world'...



However...the 'sensor-world' is not perfect...



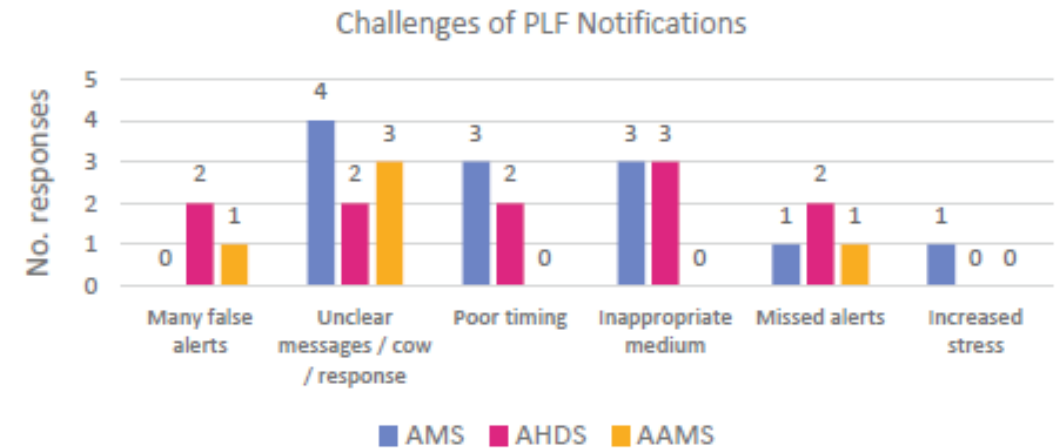
Performance metrics involve known trade-offs



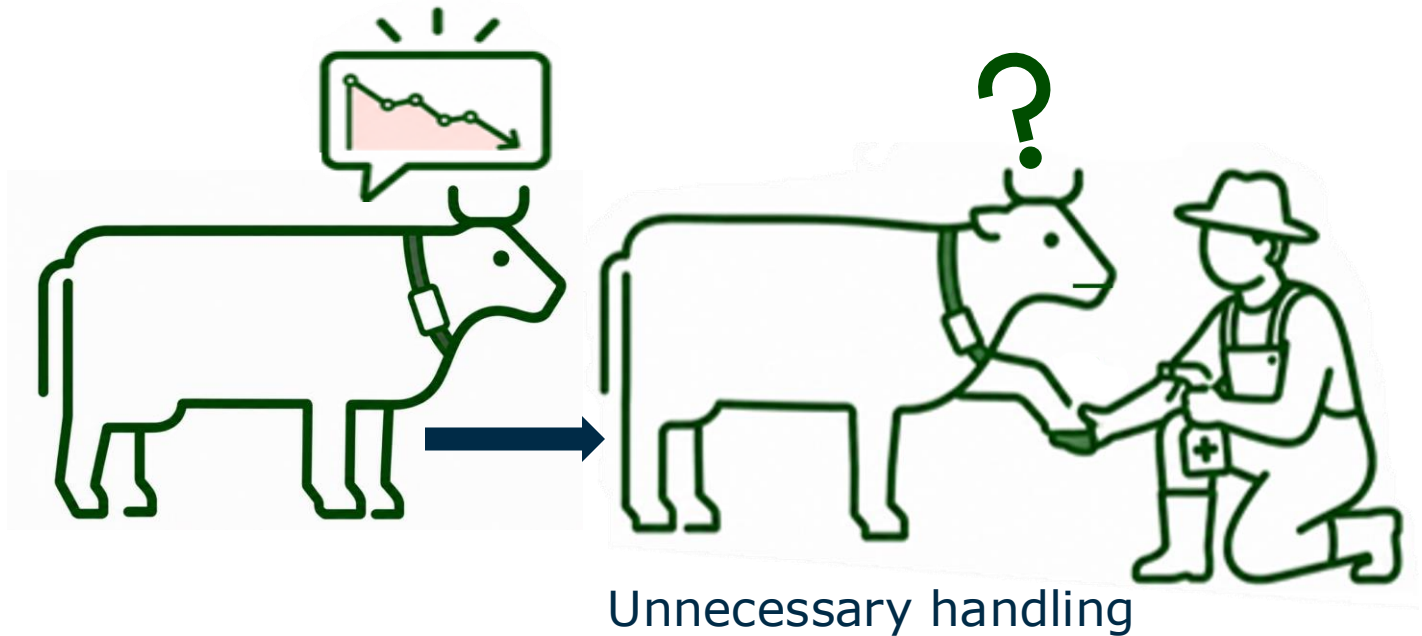
From alerts to farmer decisions

Islam & Scott et al. (2021)

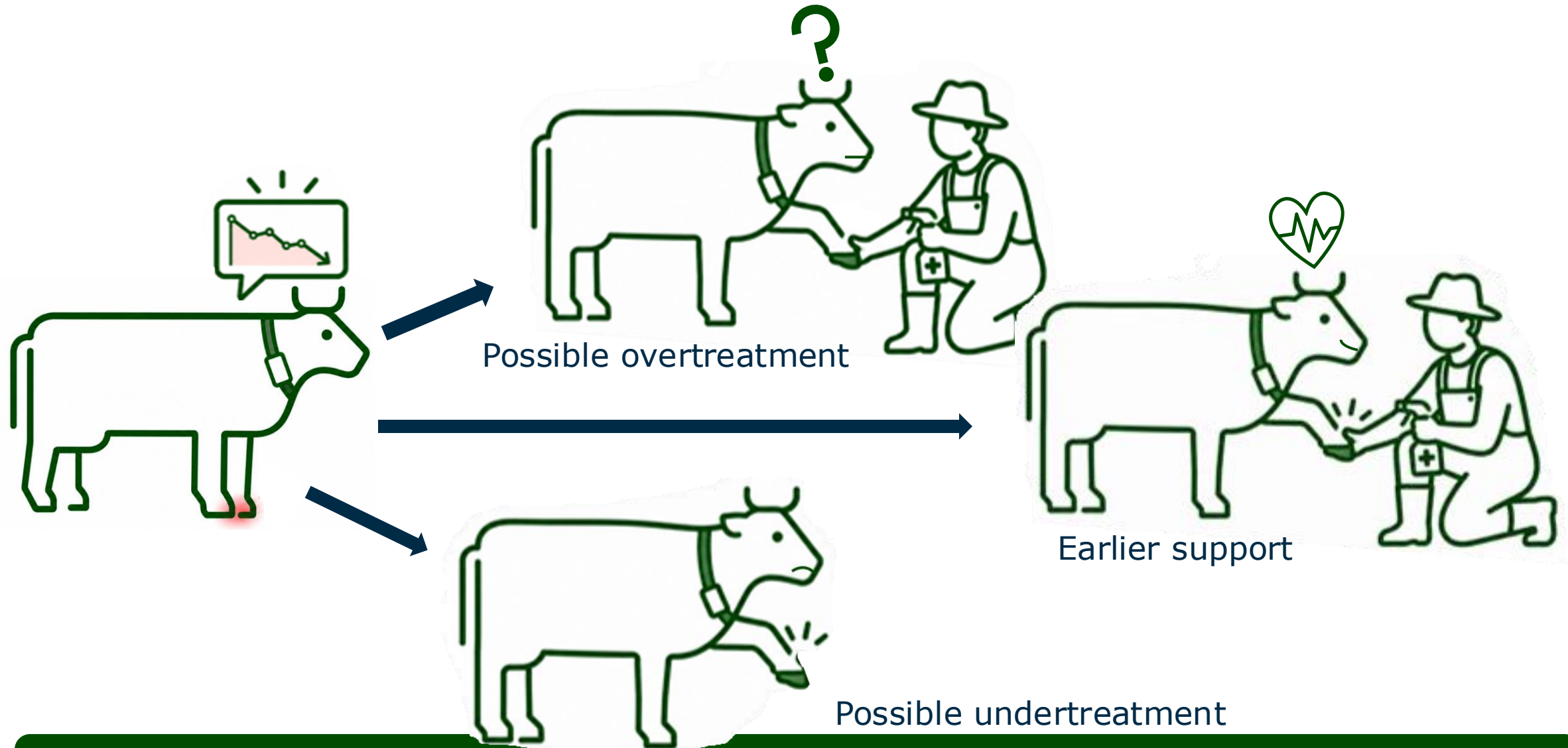
Usefulness of alerts depends on how alerts are **presented**, **interpreted** and **acted upon** by farmers.



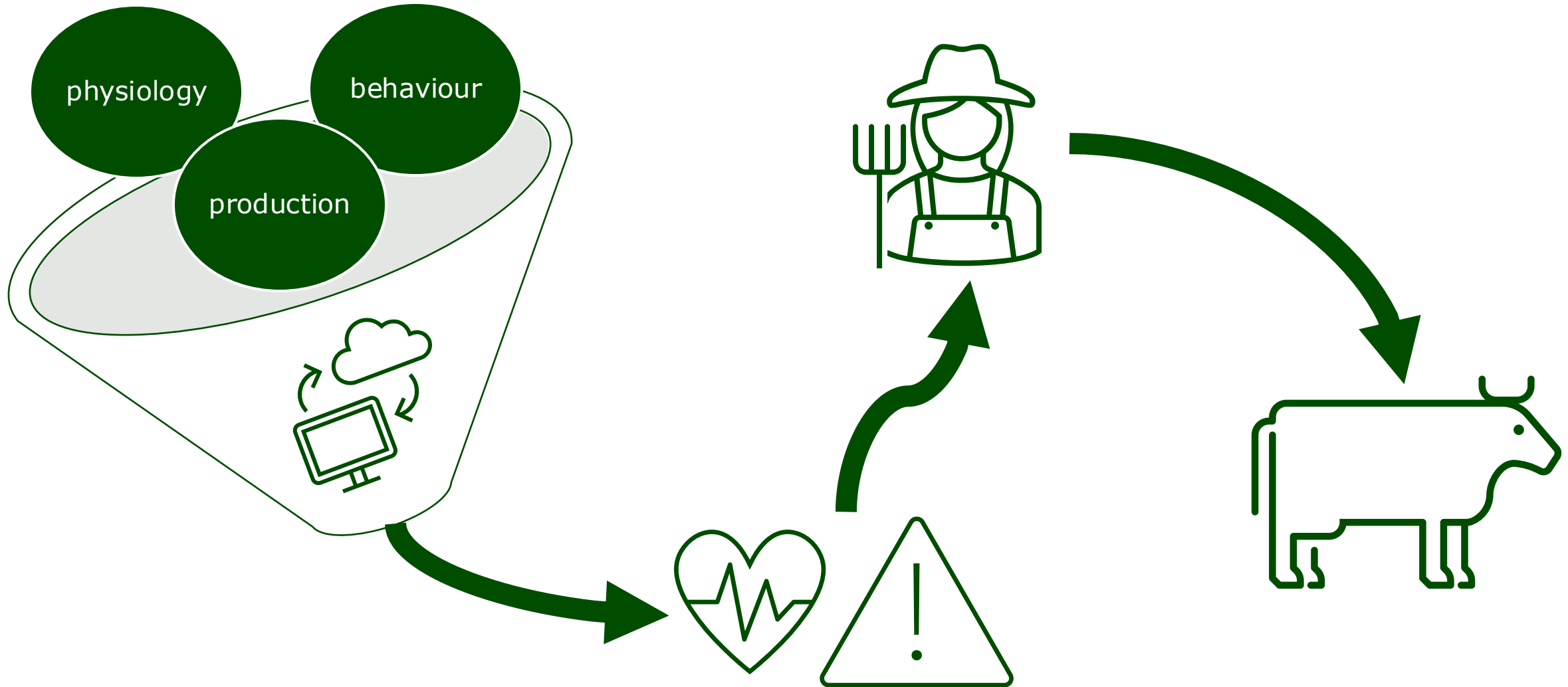
From alerts to farmer decisions to animal outcomes



From alerts to farmer decisions to animal outcomes



What makes a good detection system?





To ruminate on...



Technical performance is well quantified



Less is known about how technical performance translates into:

- Farmer decision-making
- Animal outcomes

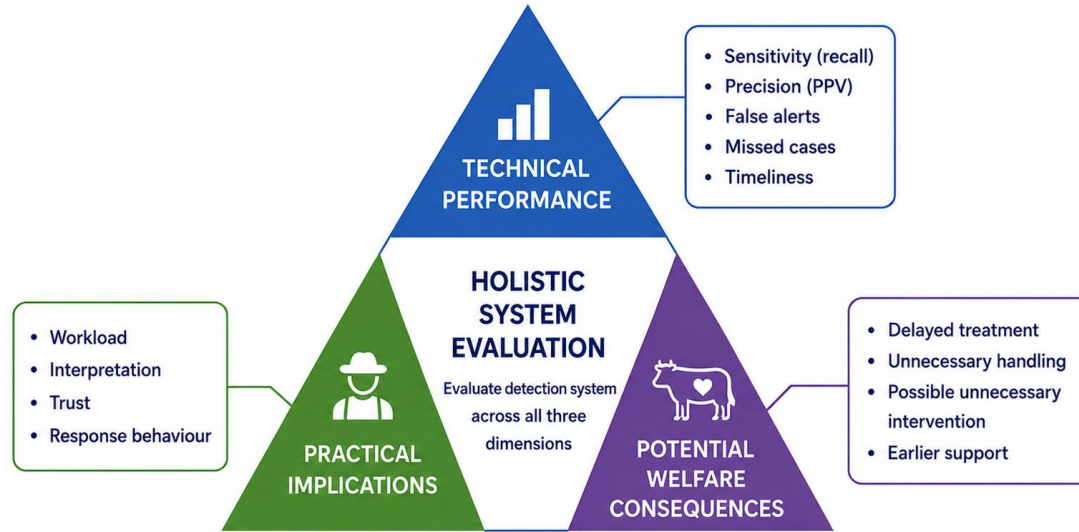


Future research:

- Moving beyond technical performance
- Quantify and validate the pathways from alerts to animal outcomes



Thank you!



Judith Roelofs
Ariëtte van Knegsel

WUR – Department of Animal sciences
Adaptation Physiology Group
judith.roelofs@wur.nl

