

Cattle movements in Norway according to the Norwegian Livestock Register

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Background

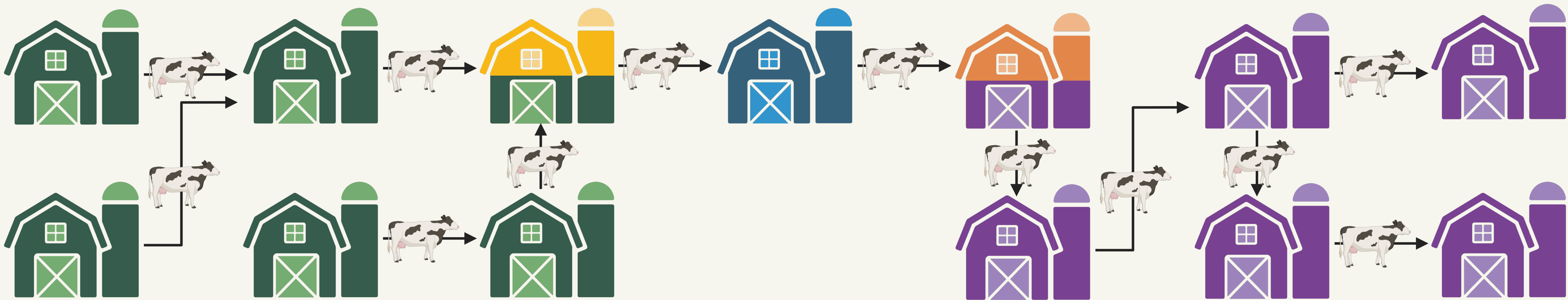
- Trading and moving cattle between herds is common around the world.
- Between-herd movements is a transmission route for many infectious diseases in cattle.
- Knowledge on cattle movements will inform the authorities and practicing veterinarians in their effort to control the spread of infectious diseases.
- No comprehensive reports on the cattle movements in Norway existed prior to this poster.

Aim

- For the Norwegian cattle population, we describe;
- the rate movements during the years 2010 to 2024;
 - network-metrics quantifying direct and indirect contacts between herds during the year 2024.

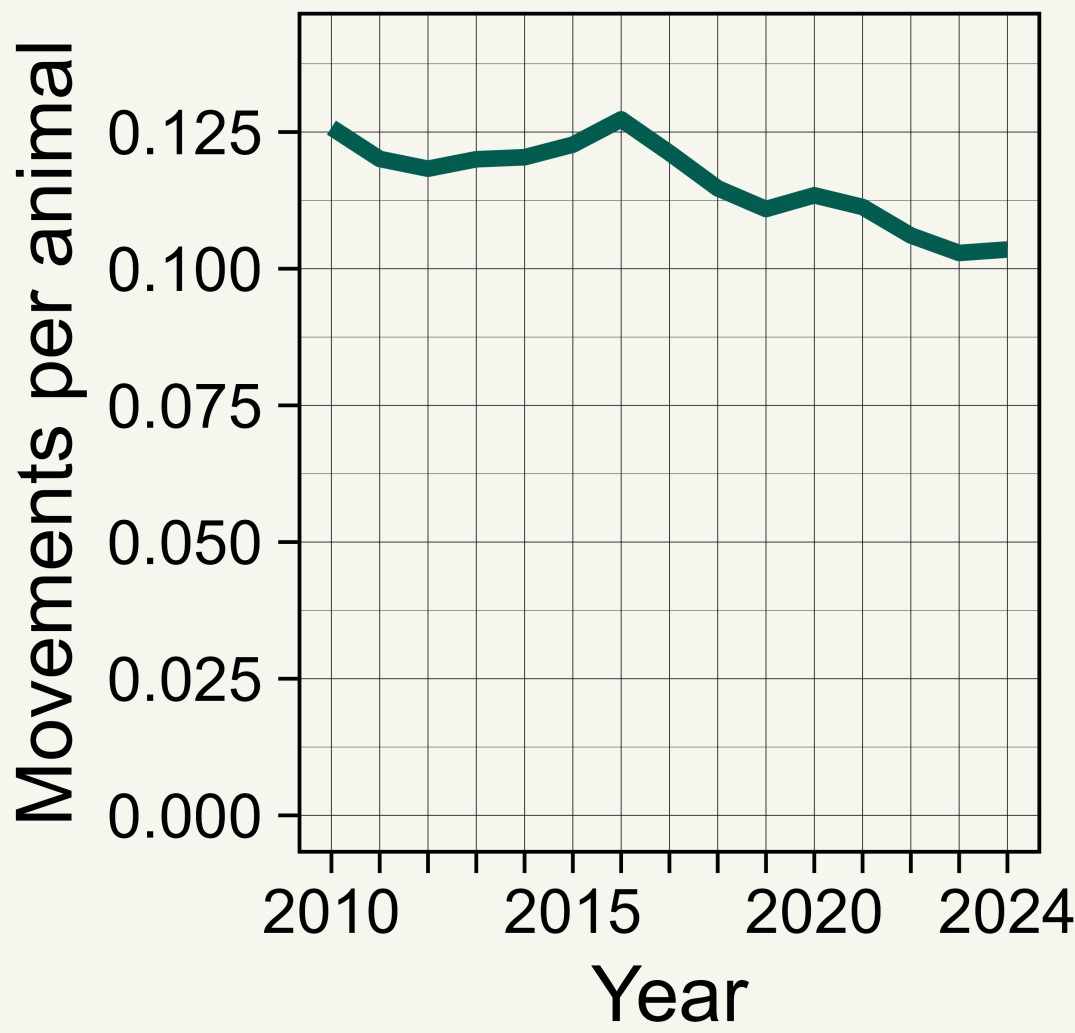
Materials & Methods

- The Norwegian Food Safety Authority collects records of livestock movements in the Norwegian Livestock Register.
- We retrieved all data in the database until 31/12/2024.
- Movement data were cleaned using the SimInf R-package, and network-parameters were calculated using the EpiContactTrace R-package.
- The total number of cattle years was approximated from annual records of the number of cattle in Norway.

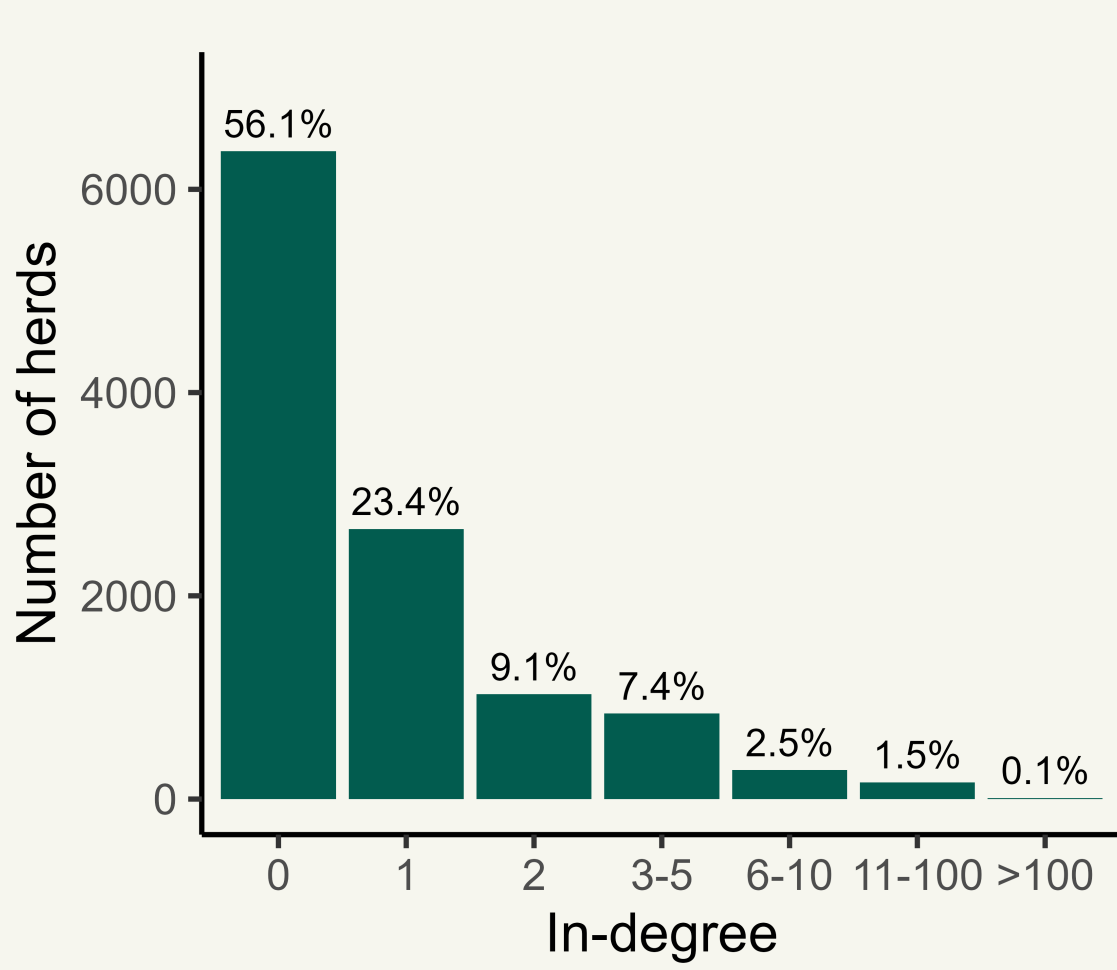


- For a given index herd (blue), during a certain period of time;
- the **in-degree** is the number herds that are direct inwards contacts (yellow);
 - the **ingoing contact chain** is the number herds that are direct or indirect inwards contacts (green);
 - the **out-degree** is the number herds that are direct outwards contacts (orange);
 - the **outgoing contact chain** is the number herds that are direct or indirect outwards contacts (purple).

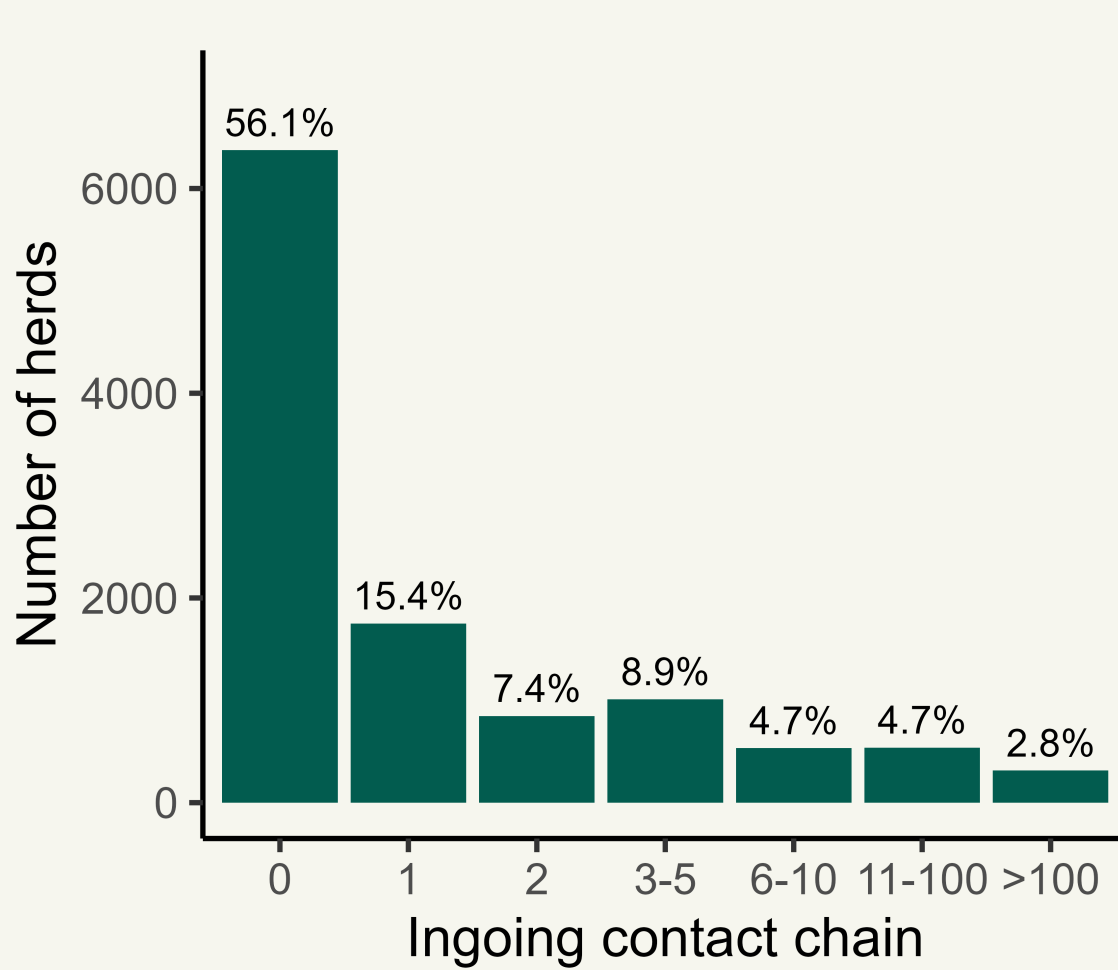
Results



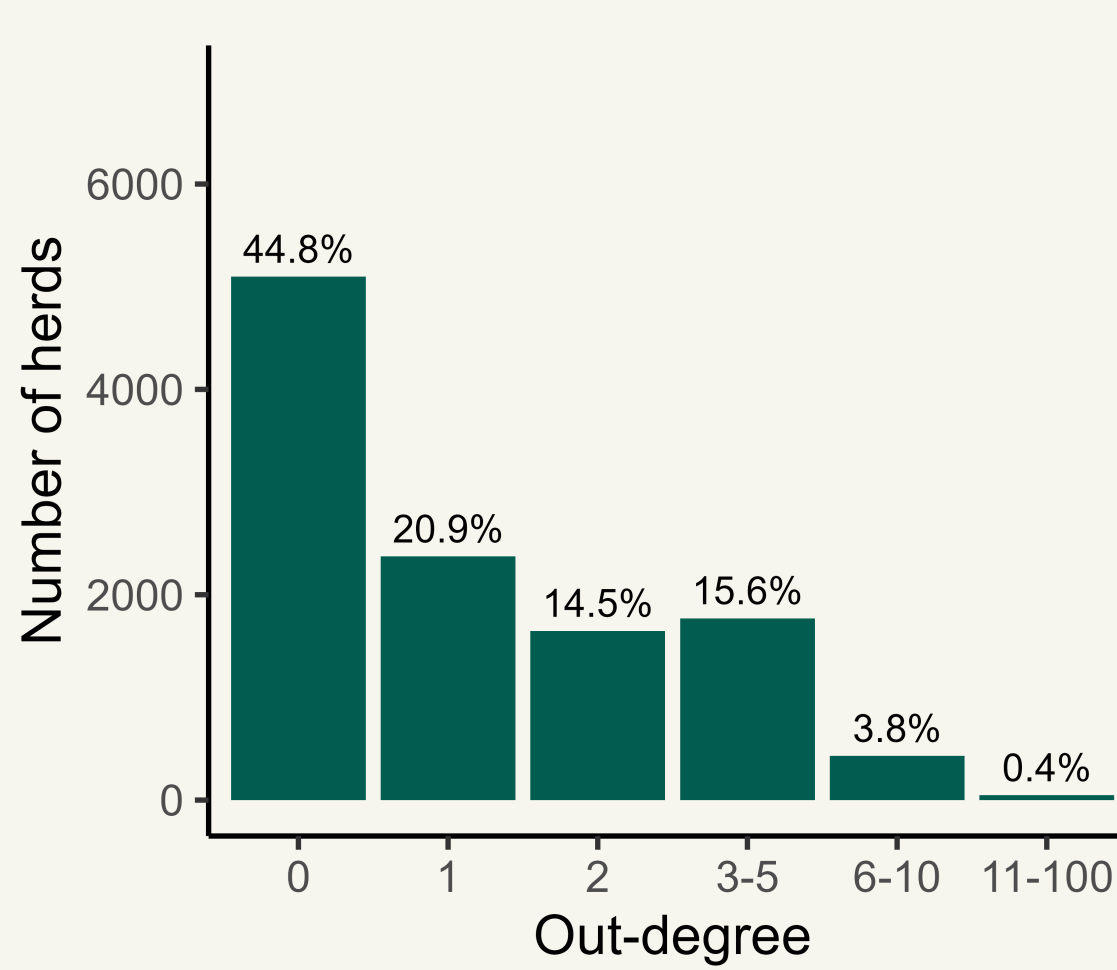
Movements per cattle year each year from 2010 to 2024.



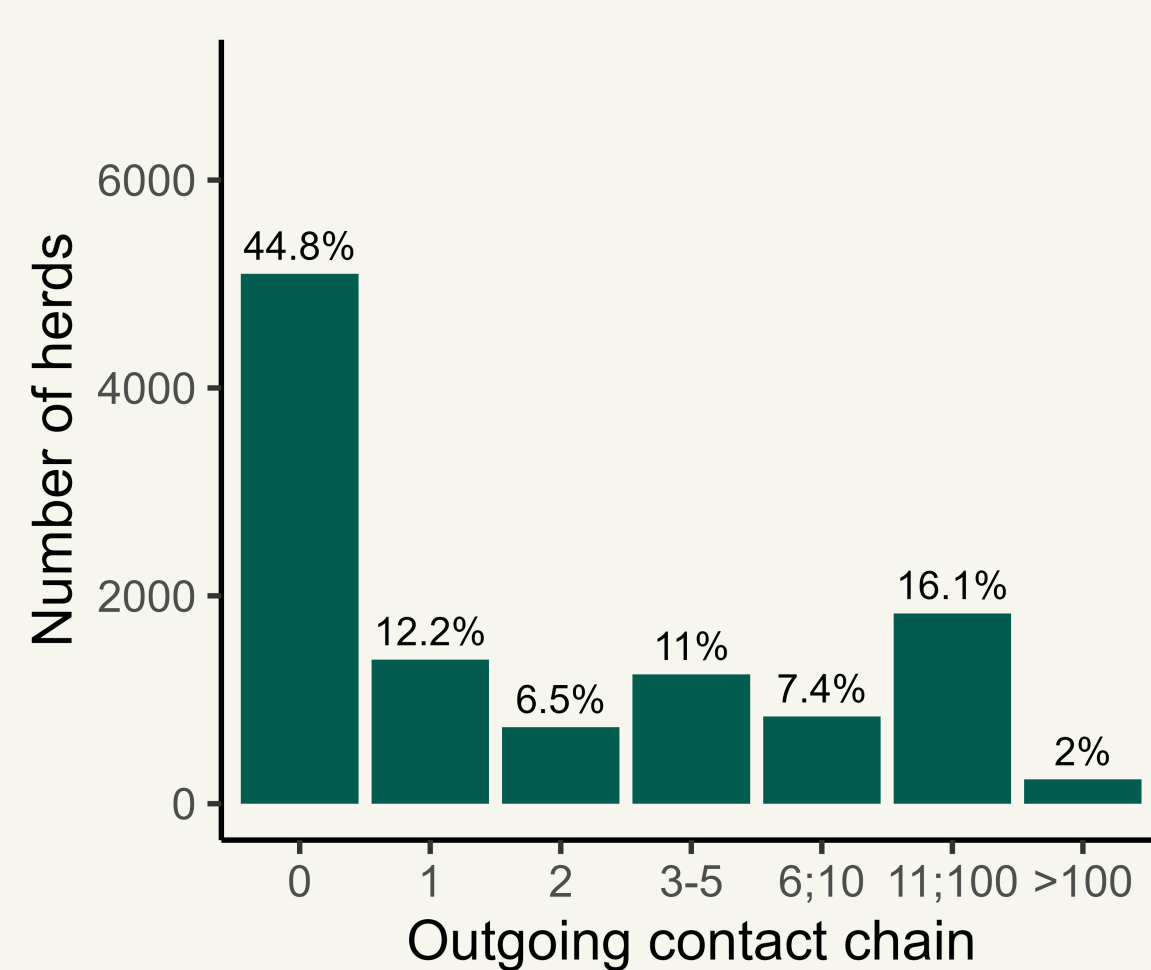
Bar chart of the **in-degree** for Norwegian cattle herds during 2024.



Bar chart of the **ingoing contact chain** for Norwegian cattle herds during 2024.



Bar chart of the **out-degree** for Norwegian cattle herds during 2024.



Bar chart of the **outgoing contact chain** for Norwegian cattle herds during 2024.

Discussion

- The data needed substantial cleaning, wrangling, and imputations before it was suited for analysis.
- The results are sensitive to the extent of data cleaning and the data quality in the Norwegian Livestock Register, and we will report on this in a peer-reviewed paper.
- The frequency of movements and network metrics was lower than reported from other European countries.

Conclusion

- The rate of movements decreased from 2015 and onwards, reaching 10.4 movements per 100 cattle years in 2024.
- A substantial proportion of herds had no ingoing or outgoing contacts during 2024.
- Movements between herds make the Norwegian cattle population vulnerable to the spread of infectious diseases; however, to a lesser extent than cattle populations in other European countries.

Acknowledgements & Funding

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References

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Widgren, S., et al., SimInf: an R package for data-driven stochastic disease spread simulations. J Stat Soft. 2019; 91(12)
Nøremark M, Widgren S. EpiContactTrace: an R-package for contact tracing during livestock disease outbreaks and for risk-based surveillance. BMC Vet Res. 2014;10:71)