NASJONALT SENTER FOR DISTRIKTS MEDISIN
Norwegian Centre for Rural Medicine

RURAL RESILIENCE

– how can registers be useful
Report from the workshop 18–19 August 2026

Norwegian Centre for Rural Medicine /
UiT The Arctic University of Norway

Workshop report, October 2026

2026

How can register data provide knowledge about local communities, health services and resilience in rural areas? The report summarises the presentations, group work and discussions from the workshop.

UiT Norges arktiske universitet

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1 INTRODUCTION

Like most other countries, Norway has undergone a continuous process of urbanisation and centralisation over the past 50 years. People move from north to south, from countryside to town, and within municipalities from the periphery to the local centre. Even so, 29% of Norway's population lives in rural areas, and half of the municipalities have fewer than 5,000 inhabitants (1). Register-based research has become increasingly important for building knowledge and for planning health services and societal development in Norway.

The Norwegian Centre for Rural Medicine (NSDM) is an interdisciplinary centre of expertise that promotes professional development, research and education among doctors and other health personnel in rural areas. On 18–19 August 2026, NSDM brought together register research communities and users of register data for a workshop to explore how register-based research can contribute to knowledge about local communities and health services in rural areas. The workshop focused in particular on the classification of rural areas, the development and use of centrality indices, how register data can be used to describe and develop resilience in rural areas, the importance of register data in analyses of education and competence, and access to and outcomes of health services.

Speakers from Norway, Belgium, New Zealand and Spain presented topics from different perspectives, which were then discussed in group work and plenary sessions. Results from the group work were recorded and shared on post-it notes. This report summarises the results of the workshop and is intended to inspire further work and collaboration.

NSDM will host a follow-up workshop in 2027 to further develop and concretise the input and ideas from the workshop.

2 CENTRALITY INDEX – WHAT IS RURAL?

To say anything about rural areas, we first need to define the term. Most of us have a picture of what rural means. Senior researcher Jesse Whitehead, a human geographer at the University of Waikato, New Zealand, discussed this in his presentation and

introduced the concepts of “the imagined rural” and “the technical rural”. “The imagined rural” is the subjective experience of something having a rural character: landscape, mountains, cultivated fields and nature. “The technical rural”, which can be used in register-based research among other things, is defined by objective criteria. Jesse Whitehead argued that the criteria used to define rural should be stable and not vary too much over time if they are to be used in research. In both New Zealand and Norway, population density and distance to key services (workplaces, shops, etc.) have been chosen as the basis for developing tools to classify rural areas (2, 3).

Jesse Whitehead described how they developed a new classification, the GCH (Geographic Classification for Health). The change in New Zealand’s rurality scale was initiated by local rural doctors who felt that the quantitative description of their population’s health did not match their own experience.

The GCH was developed by combining objective criteria (population and distance) with judgement. Eight different proposals were drawn up and presented to users (residents, researchers, clinicians and politicians), and the one that “made the most sense” was finally chosen (2).

The new scale radically changed what was known about rural health services in New Zealand. Using the GCH, the researchers found that people under the age of 30 in the most rural areas have roughly twice the mortality of those living in cities. This has had major consequences for national political priorities and decisions.

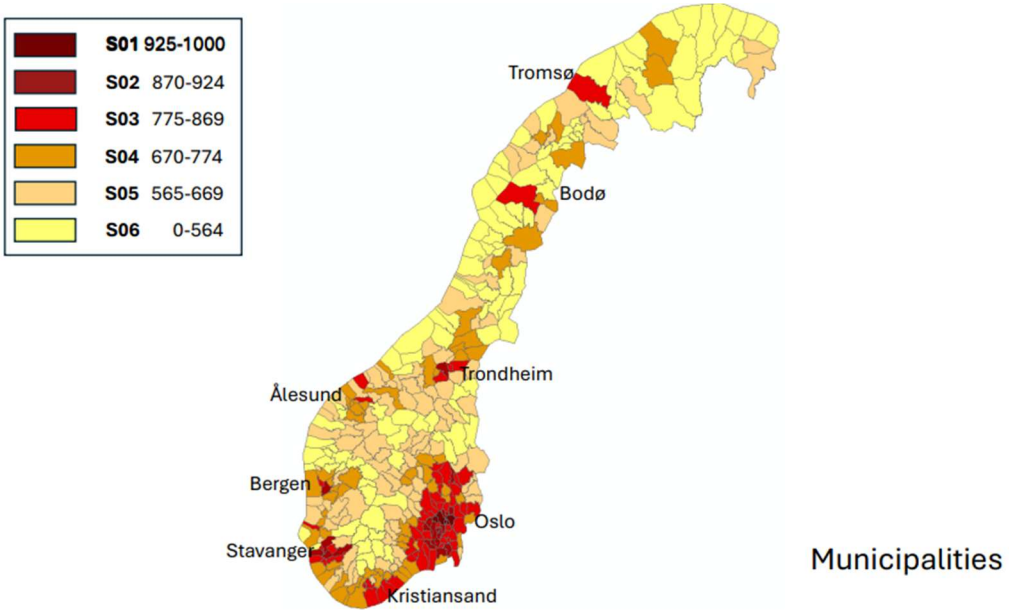
Source: Jesse Whitehead, University of Waikato

He also asked why we do research, and answered the question himself: “impact”. Whitehead described a chain running from funding and research, via dissemination and “storytelling” in the media, to legislation and policy. He described how the process involved a wide range of actors in complex interaction and collaboration.

Source: Jesse Whitehead, University of Waikato

2.1 The Norwegian centrality index

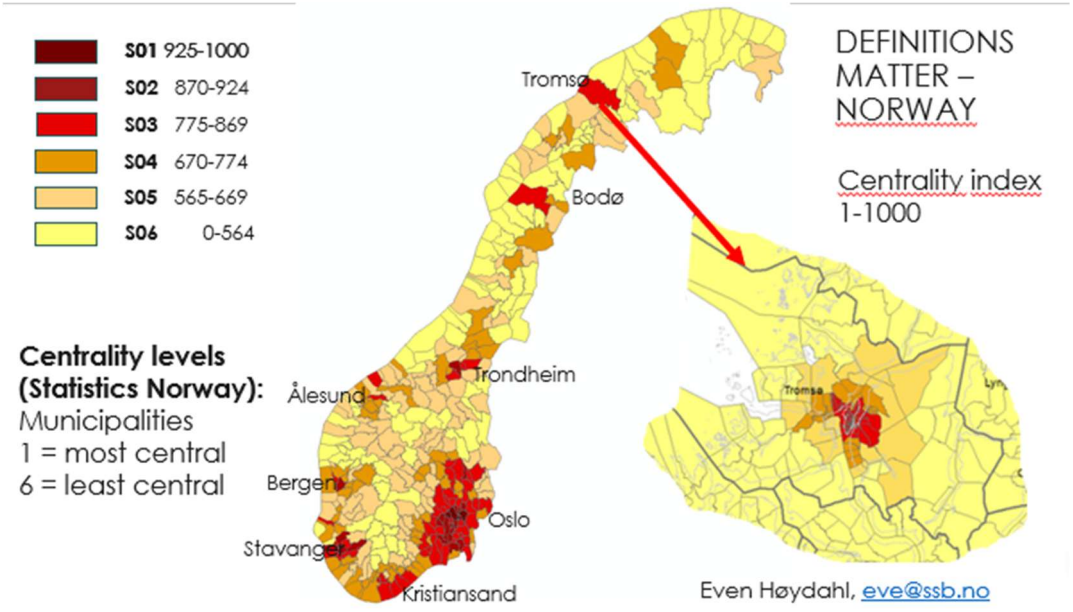
In Norway, the centrality index was developed by Statistics Norway (SSB) for use in statistical analyses (3). All municipalities are given an index value from 0 to 1000 based on population and travel time to centres with workplaces and services. A higher index indicates greater centrality. The 357 municipalities are divided into six centrality classes, from class 1 (most central) to class 6 (least central). Oslo and its closest neighbouring municipalities are in class 1, the largest cities outside Oslo are in class 2, and the least central municipalities in rural Norway are in class 6.



Even Høydahl, Statistics Norway

The smallest geographical unit used by Statistics Norway in its statistical framework is the basic statistical unit (grunnkrets). The municipalities are divided into approximately

13,500 basic statistical units. Senior adviser Even Høydahl from Statistics Norway showed that scaling the centrality index down to the basic statistical units within municipalities gives a more nuanced result. For example, Tromsø, with a centrality index of 803 (centrality class 3), has several outlying areas with considerably lower centrality (245–564). Hammerfest, with a centrality index of 682 (centrality class 4), has several outlying areas with an index of 35–74. This is a good example of "the modifiable areal unit problem", which is discussed in section 2.3.



2.2 All classifications of centrality have strengths and weaknesses – purpose matters

Even Høydahl considers the centrality index a good measure of centrality that can be used in analyses. It nevertheless has weaknesses. For example, passenger-only boats are not included when travel time is calculated, and local conditions are not taken into account.

Fact box: The centrality index – strengths and weaknesses

After Even Høydahl, Statistics Norway

Potential and strengths

- A good measure of centrality
- Defines peripheral and rural areas
- Can be used in analyses
- Continuous values (0–1000)
- Geographically detailed (13,500 basic statistical units)
- Comparable across the whole country

Weaknesses and limitations

- Car ferries are included, while passenger-only boats are excluded
- The 90-minute cut-off may be too restrictive in peripheral areas
- Distance decay is based on national averages across service types
- May not reflect local conditions or specific services
- For access to hospitals, travel time is a better indicator than the centrality index
- Only available for Norway, which limits its use in comparative studies

Jo Ulrik Lien from the Ministry of Local Government and Regional Development showed how the centrality index on its own is a poor tool for identifying municipalities in need of support, using Frøya and Meløy as examples. The **District Index (**0–100) was therefore developed, based on four dimensions: centrality, population growth, employment growth and industry structure. Among other things, the index is used in the revenue system for municipalities and for regionally differentiated employer's social security contributions (4).

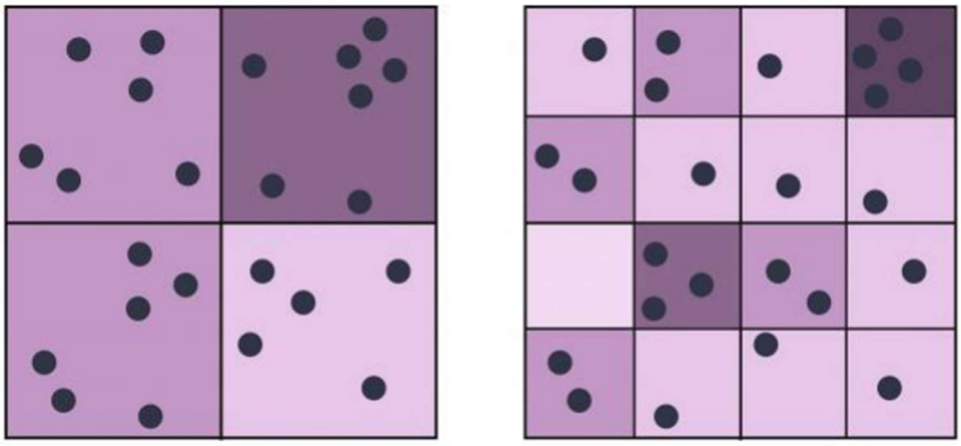
Most workshop participants agreed that the purpose must be made clear when developing scales that define rural. The centrality index is used for statistics, the District Index to assess support schemes, and the GCH to assess health services (access and outcomes). *"Complexity must be taken into account for them to be useful"* (post-it). Jesse Whitehead pointed out that centrality indices can be used politically, and that politics should be kept out of the development of such tools for as long as possible.

"Different countries have different centrality indices/scales, which makes international comparisons difficult" (post-it). The contexts also differ greatly. Professor Sara Willems from Belgium, for example, described a study that used a 10-minute walk as the distance threshold for measuring access to general practitioners. In Norway, Statistics Norway uses 90 minutes by car to describe access to workplaces and services. There have been attempts to harmonise centrality classes. In 2024, the Nordic countries developed a "grid-based Nordic territorial typology" to study different types of spatial

phenomena in the Nordic region. The study divides all the Nordic countries into seven typology classes based on different degrees of centrality (5).

2.3 Scale affects the information

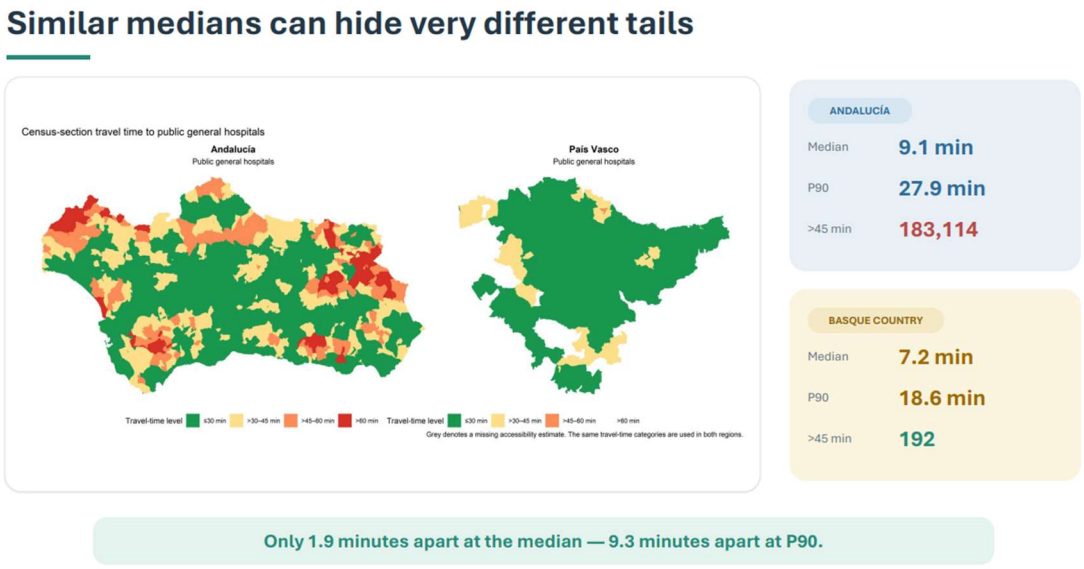
One of the challenges with centrality indices is scale. If a coarse scale is chosen, for example regions, local variations may be hidden through aggregation. If a finer scale is used, for example basic statistical units in Norway, it becomes difficult to obtain statistically robust data. Jesse Whitehead called this “the modifiable areal unit problem”.



Source: GISGeography (https://gisgeography.com/maup-modifiable-areal-unit-problem)

Larger, central municipalities in Norway have outlying areas with a rural character. Information about these outlying areas becomes invisible in the “noise” from the population centres. The issue also arises when municipalities merge. One example is Vest-Lofoten municipality, which will be established in 2028. The new municipality consists of the present Vestvågøy municipality (centrality class 5) with approximately 11,500 inhabitants and Moskenes (centrality class 6) with approximately 1,000 inhabitants. If the new municipality’s centrality index is used as the scale, detailed knowledge about the Moskenes community will become invisible after the merger.

Researcher Diego Díaz-Milanés from Universidad Loyola Andalucía in Spain said that *“centrality is the territorial lens, and accessibility is the consequences for the population”*. He described how important scale is for interpreting results, and showed examples of how different scales can reveal the consequences for the population of changes in health services in a region. He was concerned with the “tail” of the distribution and questioned the use of the median in analyses. Andalusia and the Basque Country, for example, have almost the same median distance to hospital (9.1 and 7.2 minutes respectively), but in Andalusia 183,000 people live more than 45 minutes from a hospital, compared with 192 people in the Basque Country.



Source: Diego Díaz-Milanés, Universidad Loyola Andalucía

3 WHAT CAN REGISTER DATA BE USED FOR – OPPORTUNITIES AND LIMITATIONS

Fact box: What are register data and register-based research?

Register data

Register data are information from administrative registers that is primarily collected for administrative purposes (such as case processing, control or service provision), but which is also processed and made available for statistical and scientific studies.

Register-based research

Register-based research is research that uses information stored in administrative registers, health registers or other databases established for purposes other than the specific research project.

Source: NSDM, synthesised from information from Statistics Norway, the Norwegian Institute of Public Health and AI

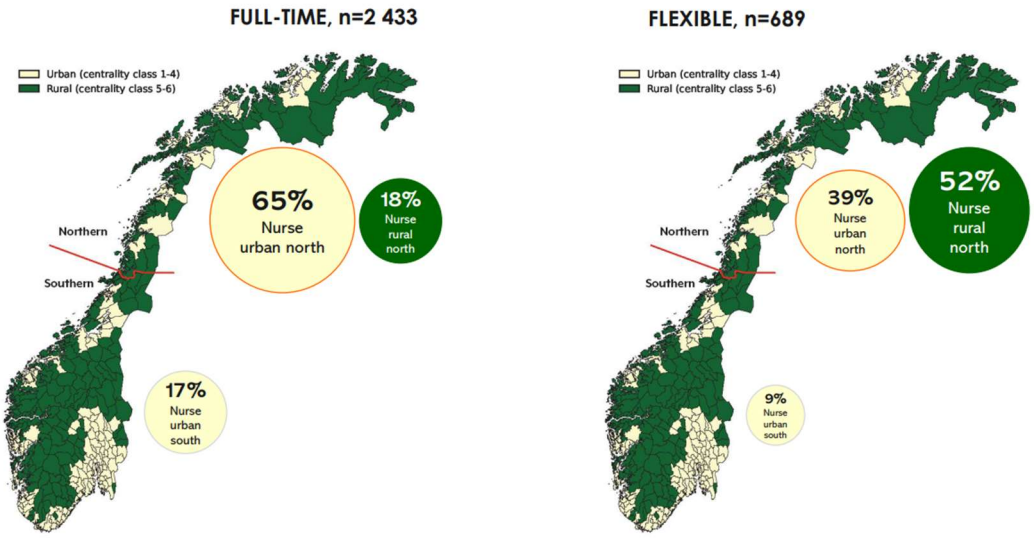
Norway has comprehensive registers with high-quality data. Statistics Norway, the Norwegian Institute of Public Health, the Norwegian Directorate of Health and others collect detailed data on society and the population, and much of it is publicly available.

Register data are based on numbers. Data quality can vary, and to use and interpret the data it is important to know how they were collected and to be aware of the sources of error.

Register data can tell us something about reality, but they do not give a complete picture. "*Registers can challenge and test assumptions, but the dynamics beneath the numbers may tell a completely different story*" (post-it). Professor Marit Aure, a social scientist at the Department of Social Sciences, UiT The Arctic University of Norway, argued that *"Data can describe how things are, but not why"*. She used demographic data as an example: "*Registers can tell us who they are, who leaves and what they do, but not why*". To find out why, quantitative methods must be combined with other methods. The groups agreed: "*Combining qualitative and quantitative research gives us a broader perspective on the questions"* (post-it).

Senior engineer Sasikiran Kandula from the Norwegian Institute of Public Health (FHI) presented results from an analysis of inequalities in vaccination coverage against common respiratory diseases (unpublished data). The results suggest considerable variation between regions and municipalities. Finding out why requires other methods, and studies to explain the variation are under way.

Professor Birgit Abelsen from NSDM presented a study showing how register data can be used to generate useful knowledge about how decentralised education affects the recruitment and retention of the workforce. The study compared flexible study programmes (decentralised/part-time) with full-time programmes for nurses. The results confirm that making education available in rural areas and exposing students to rural areas during their education has an effect (6). As expected (and hoped), the results raise new questions. In the group work, participants asked whether it is possible to find out if the different educational pathways led to different learning and possibly different health outcomes. The participants also called for economic calculations.

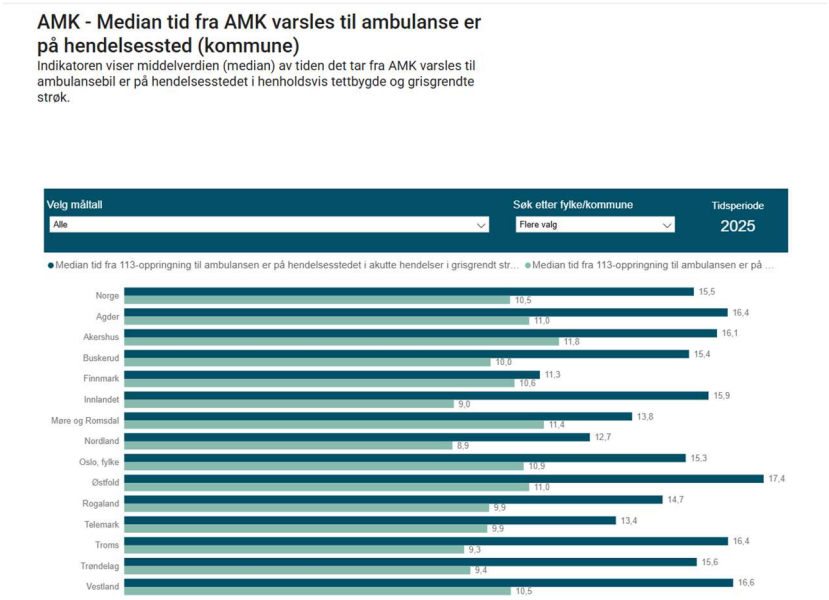


Source: Birgit Abelsen, NSDM, UiT

Register-based research can provide knowledge that helps us ask the right questions. "*Data lead us to the right questions*" (post-it). Professor Johan Håkon Bjørngaard from Regforsk, NTNU, presented a study on perinatal mortality in small and large maternity

units. The study illustrates the importance of asking the right questions and taking sources of error into account, such as triage of pregnant women, living conditions and maternal morbidity (7). Bjørngaard concluded that "*It is better to get an approximate answer to the right question than an exact answer to the wrong question".*

Several participants pointed out that register data are also important for planning health services and society in general, and that they can be used to evaluate interventions and organisations. Department director Karianne Johansen from the Norwegian Directorate of Health explained that the Directorate manages around 100 active national quality indicators based on the central health registers, medical quality registers and data from Statistics Norway (8). She went on to say that data from the specialist health service (the Norwegian Patient Registry, NPR) are mostly of good quality, whereas the information from the municipalities (the Norwegian Registry for Primary Health Care, KPR) is more limited and of poorer quality. Today, KPR contains information on decisions and services, but says less about function, care pathways and the content of the services. Another challenge is that results for several of the quality indicators cannot be shown for small municipalities for reasons of anonymity. Dr Cato Kjærvik nevertheless argued that linking data from the specialist health service (NPR) and the municipal health service (KPR) is one of the most promising ways of using register data to increase knowledge about health services in rural areas.



Source: Norwegian Directorate of Health: https://www.helsedirektoratet.no/statistikk/kvalitetsindikatorer/akuttmedisinske-tjenester-utenfor-sykehus/median-tid-fra-amk-varsles-til-ambulanse-er-pa-hendelsessted-kommune

3.1 "*Numbers matter – small numbers too*"

Much register-based research relies on statistical analyses that require datasets of a certain size. The data from smaller rural municipalities are often too small to yield statistically significant results, and they can also raise challenges regarding privacy and confidentiality. The same applies to small local hospitals. Small numbers can

nevertheless provide important knowledge: "*Small numbers can show patterns and trends that are important for decision making*" (post-it). Small numbers can also be crucial for planning and evaluating services. In smaller municipalities, such numbers can easily become political fuel and create tensions. Analytical competence is important, perhaps above all in smaller municipalities. Many municipalities lack this competence (chief municipal executive Rachel Berg).

Researchers Sara Magelssen Vambheim and Janice Shu Li Wei from the Centre for Clinical Documentation and Evaluation (SKDE) presented a study from Helgeland in which they examined discharge practices from the hospital to the municipalities in its catchment area. For the large municipalities, the numbers and trends were stable over time, whereas for the small municipalities they could vary considerably. Such numbers can also provide important information, but analysing and interpreting them requires good local knowledge and an understanding of the mechanisms that govern discharge, and of the systems and processes that affect the data. "*Identifying questions that can be answered by small data requires in-depth knowledge of the context"* (post-it).

How small numbers can be used was also discussed in the group work. "*Aggregated small data from many smaller municipalities can tell a different story than when viewed separately*". By combining data from several municipalities, the number of observations can be increased and more valid data obtained. The groups felt it is important to consider which datasets can be combined, and that data should be aggregated from areas that resemble each other.

Researcher Diego Díaz-Milanés, chief municipal executive Rachel Berg and consultant/researcher Cato Kjærvik in group work

4 VISUALISATION AND USER INTERFACES

> *"It is not the tool that makes the decision. The tool makes policy alternatives, trade-offs and consequences for the population visible" (Dr Diego Díaz-Milanés).*

Registers and research create knowledge about reality (with the limitations discussed above). For the knowledge to be useful, it must be understood and interpreted, regardless of whether it is based on research findings or directly on register data.

Research articles are read by academics, but those who are meant to use the results – politicians, administrators and managers – rarely read such articles. The results from registers and research must be presented in an appropriate, understandable and manageable way. At the workshop we were shown different ways of visualising register data: interactive maps and flexible dashboards with graphs, charts and tables.

Professor Sara Willems and Professor Nico Van de Weghe from Ghent University, Belgium, showed how their study of access to general practitioners in a region can be presented using interactive maps. They showed how maps can illustrate, simply and intuitively, the consequences that relocating services has for the population's access to them. It is also possible to combine several maps with different information, such as access and population data. In this way, a richer picture can be obtained of how access to services and the need for them are related.

Díaz-Milanés and colleagues have developed RESACCESS Spain, an open web application with maps that visualise access (distance) to various health services for the population in different age groups, and how this is affected by changes in the health system, such as the closure of services at local hospitals. The tool also makes it possible to see how natural disasters and road closures affect access in different regions (9).

The Norwegian Directorate of Health has developed a dashboard for the regular GP scheme. Through the scheme's contractual framework and remuneration system, detailed data on the GP scheme are available (list size, competence, stability, etc.), which are very useful for municipal planning and accessible for research (10). Rachel Berg, chief municipal executive in Alstahaug municipality, stressed that equal access to data is not enough: municipalities also need analytical capacity, shared methods and decision support. Data competence varies greatly between rural municipalities.

5 PREPAREDNESS AND RESILIENCE

What can registers contribute to knowledge about preparedness in rural areas? The workshop did not provide a single answer, but several presentations pointed to possible contributions.

Fact box: What is resilience?

Researcher Daniel Lungu from SHARE, University of Stavanger, presented two definitions of resilience:

Resilience is …

- "the capacity of health systems to proactively foresee, absorb, recover from, and adapt to shocks such as pandemics, climate change, geopolitical conflicts, and cyberthreats" (11)
- "capacity to adapt to challenges and changes at different system levels, to maintain high quality care" (12)

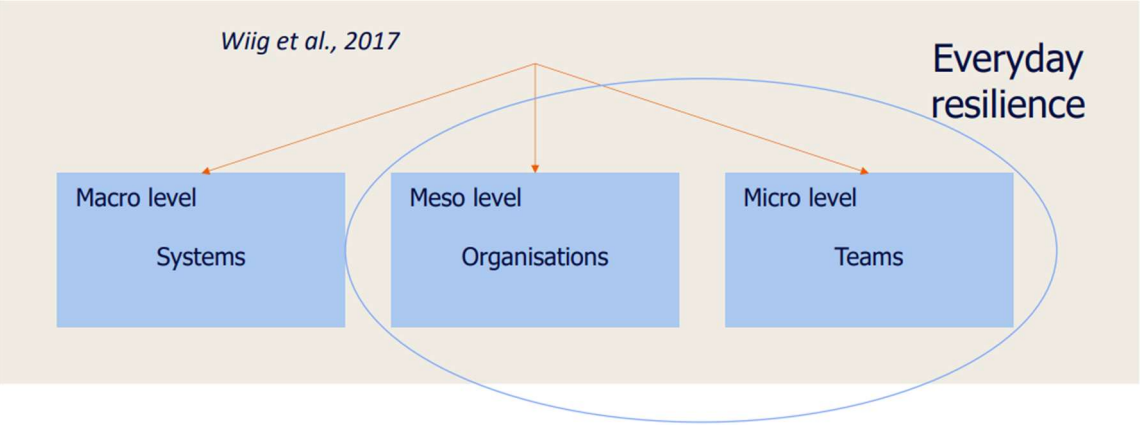
In her presentation, Division director Helen Brandstorp from the Norwegian Directorate of Health described how health services and emergency preparedness are organised in Norway. Both the health services and preparedness are based on a decentralised and flexible system. Norway has 357 municipalities with a high degree of autonomy and extensive responsibility for health services and emergency preparedness. The four principles underpinning emergency preparedness in Norway support this decentralised, flexible system: organisation in a crisis should be as similar as possible to everyday organisation, lines of responsibility should not change, crises should be handled at the lowest possible level, and all parties are obliged to cooperate. Many workshop participants were particularly concerned with collaboration and the importance of everyday life for preparedness. Resilience is a prerequisite for good preparedness: *"relationships are the key to resilience" and "are created in everyday life"* (post-it).

Annette Leinan, head of health services in Gamvik, described the strengths of smaller local communities: local knowledge, short lines of communication, interdisciplinary collaboration, pragmatism, flexibility and a culture based on problem-solving. In her view, preparedness is about understanding vulnerability. Gamvik municipality uses the preparedness principles to create a learning organisation that develops a systematic and proactive approach rather than an ad hoc and reactive one.

She argued that the most important factor in preparedness is *"not a new procedure, but a governance model that turns incidents … and deviations into organisational learning, risk understanding and strategic decision-making"*.

Professor Marit Aure from UiT argued that coastal communities are part of our national defence and that preparedness builds on everyday resilience. "*It [preparedness] is not something that suddenly appears, but is created in people's everyday lives"*. She questioned what kind of knowledge registers can contribute and described how registers can tell us who lives there, who is arriving and how they make a living, but cannot explain why. Nor do registers describe how people are connected, or whether they can imagine a future in the area. She concluded by saying that *"if vibrant coastal and rural communities are part of Norway's preparedness, this is not a question of regional policy, but a question of political will"*.

Daniel Lungu from SHARE touched on the importance of everyday resilience when he divided resilience into three levels: macro (systems), meso (organisations) and micro (teams). The latter two create "everyday resilience".



Researcher Susanna Andersdatter Siri from the Centre for Sami Health Research (UiT) described a study of individual resilience in the Sami population. The results suggest that cultural identity is of great importance. She argued that Sami values are protective factors both for individual resilience and for the community's ability to deal with challenges (13, 14).

Both Marit Aure and Daniel Lungu discussed whether resilience can be measured. SHARE has developed a scoring tool, the RHCA (Resilience in Healthcare Capacities Assessment), to measure resilience in healthcare organisations. It consists of 33 questions with a five-point response scale covering ten capacities, including communication, coordination, competence, leadership, learning and risk awareness. The tool has been developed, tested and validated for use in hospitals. The researchers are now further developing it for elderly care (15).

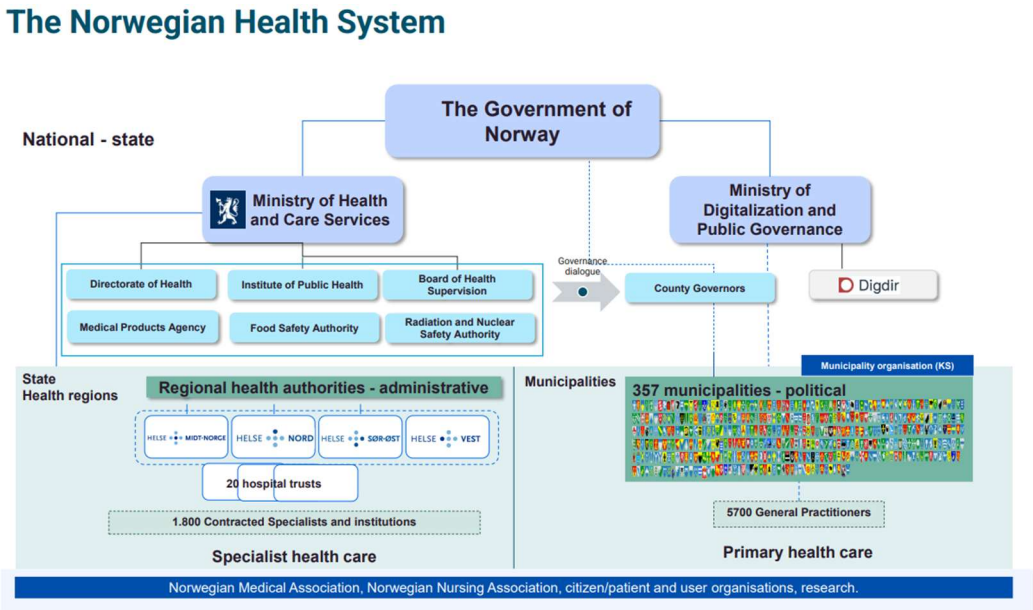
Daniel Lungu believed that it is possible to measure resilience in health services in rural communities, but was unsure whether preparedness capacity can be measured, given its complexity. Marit Aure argued that resilience is about understanding the conditions that enable municipalities to deal with challenges, and that it is therefore difficult to develop an index of rural resilience.

In the group discussions it was pointed out that "*levels of resilience – individual, group and community – require different methods and approaches to be measured"* (post-it).

In line with this, Anders Svensson, municipal chief medical officer in Bø i Vesterålen, argued that smaller rural communities are resilient as long as the crisis is local, but that it becomes more demanding when a crisis requires collaboration with actors the municipality does not normally work with – that is, "outside everyday life". He also argued that there is a gap between municipal emergency planning and national and regional preparations.

Rachel Berg suggested the same when she said that hospitals' planning processes and plans are not sufficiently aligned with those of the municipalities. She highlighted the

need for data that can help municipalities understand local disease patterns, future needs for health services and preparedness requirements at the municipal level.



A complex system that requires coordination and collaboration. Source: Dr Helen Brandstorp, Norwegian Directorate of Health

6 EDUCATION AND RECRUITMENT

A shortage of qualified personnel is one of the greatest challenges facing health services, both in Norway and internationally. Researcher Anders Svensson from NSDM gave a presentation describing the evidence on what influences the recruitment and retention of health personnel in rural areas and reflected on what it means. Recruiting health personnel to rural areas is a “wicked problem”, meaning that many interdependent factors affect it. It is therefore difficult to document the effect of individual measures (16). But some things we do know: people from rural backgrounds are more likely to work in rural areas after completing their education, and positive rural exposure during undergraduate education and education targeted at rural practice are effective.

The study on nursing education presented by Birgit Abelsen from NSDM (see above) confirms what is known about the importance of local origin and education for recruitment and retention. Involving the local community is crucial both for recruiting health personnel and for getting them to stay (17). Associate professor Bente Norbye from UiT explained how decentralised nursing education can be built: local recruitment, close contact between the educational institution and the applicants, a local admissions quota and recruitment of students from Sami areas. It is important to develop services locally and to invest in students with knowledge of rural areas (18).

7 THE WAY FORWARD

The workshop "*Rural Resilience – how can registers be useful*" brought together 30 participants from research and knowledge communities in four countries, national authorities, municipalities and users of register data to discuss how register data can be used to increase knowledge about rural areas.

In total, 21 speakers presented different perspectives on rural areas and on methods for creating knowledge and using register data in rural areas. In group and plenary discussions we discussed the strengths and weaknesses of different centrality indices, how register data can and should be used, how data can be presented to make them accessible to users, and the resilience of local communities and health services in rural areas.

The participants brought commitment, knowledge and experience from different backgrounds and professions. This led to lively discussions on everything from the use of AI in visual presentations to how small numbers can be used in municipal planning. Many discussions ended without a conclusion, and several questions remained unanswered. There is a need to meet again.

The workshop identified several possible collaborative projects:

- Further develop centrality indices to provide better knowledge about rural areas, for example with different granularity depending on the purpose*
- Develop and test a tool for measuring resilience in rural health services
- Explore how dashboards can provide better information about small municipalities and rural areas while protecting privacy
- Develop interactive maps showing access and the consequences of changes in service provision or infrastructure in different countries
- Analyse migration patterns within municipalities and what it takes for a local community to survive over time
- Explore the relationships between individual, organisational and community resilience
- Link NPR data and KPR data to follow patients across the interfaces between the specialist health service and the municipal health service

NSDM is planning a follow-up workshop on 10–11 March 2027. The topics for the workshop will be developed in collaboration with the participants of this year's workshop.

*The Norwegian Directorate of Health is working on this issue in a pilot project. The Directorate uses basic statistical units to achieve finer granularity when examining living conditions in municipalities (19).

REFERENCES

1. Kommunal- og distriktsdepartementet. Regionale utviklingstrekk 2023. Oslo: Kommunal- og distriktsdepartementet; 2023. Available from:

https://www.regjeringen.no/no/dokumenter/regionale-utviklingstrekk-2023/id2995607/

2. Nixon G, Whitehead J, Davie G, de Graaf B, Crengle S, Fearnley D, et al. Defining rural in Aotearoa New Zealand: a novel geographic classification for health purposes. N Z Med J. 2022;135(1559):24–40.
3. Høydahl E. Ny sentralitetsindeks for kommunene. Oslo: Statistisk sentralbyrå; 2017. Report No.: 2017/40.
4. Kommunal- og distriktsdepartementet. Distriktsindeksen 2025. Dokumentasjonsrapport. Oslo: Kommunal- og distriktsdepartementet; 2025. Available from: https://www.regjeringen.no/no/dokumenter/distriktsindeksen-2025/id3125252/
5. Stjernberg M, Vasilevskaya A, Penje O. Towards a grid-based Nordic territorial typology – a new tool for analysis across the urban-rural continuum. Stockholm: Nordregio; 2024. Report No.: 2024:9.
6. Lindberg MH, Abelsen B, Norbye B, Johnsen N, Olsen IP. Educating nurses for rural healthcare: register-based sequence analyses modelling career paths of nurses from full-time and flexible study programmes. BMC Med Educ. 2026.
7. Asheim A, Nilsen SM, Opdahl S, Risnes K, Magnussen EB, Carlsen F, et al. The effects of hospital delivery volume and travel time on perinatal mortality and delivery in transit: causal inference with triangulation. Epidemiology. 2025;36(3):425–35.
8. Helsedirektoratet. Nasjonale kvalitetsindikatorer (NKI) [Internet]. Oslo: Helsedirektoratet; [cited 2026 Oct 11]. Available from: https://www.helsedirektoratet.no/statistikk/kvalitetsindikatorer
9. Díaz-Milanés D. RESACCESS Spain [Internet]. Interactive web application (Shiny), version 1. Universidad Loyola Andalucía; [cited 2026 Oct 11]. Available from: https://diediamil.shinyapps.io/RESACCESS_Spain_Shiny_v1/
10. Helfo. Fastlegestatistikk [Internet]. Helfo. [cited 2026 Oct 11].Available from: https://www.helfo.no/Fastlegeordninga/fastlegestatistikk
11. OECD. Health system resilience [Internet]. Paris: OECD; [cited 2026 Oct 11]. Available from: https://www.oecd.org/en/topics/health-system-resilience.html
12. Wiig S, Aase K, Billett S, Canfield C, Røise O, Njå O, et al. Defining the boundaries and operational concepts of resilience in the resilience in healthcare research program. BMC Health Serv Res. 2020;20:330.
13. Nystad K, Spein AR, Balto AM, Ingstad B. Ethnic identity negotiation among Sami youth living in a majority Sami community in Norway. Int J Circumpolar Health. 2017;76(1):1316939.
14. Nystad K, Spein AR, Ingstad B. Community resilience factors among indigenous Sámi adolescents: a qualitative study in Northern Norway. Transcult Psychiatry. 2014;51(5):651–72.
15. Ellis LA, Lyng HB, Haraldseid-Driftland C, Saba M, Clay-Williams R, Hibbert PD, et al. From theory to measurement: development and initial validation of the

Resilience in Healthcare Capacities Assessment (RHCA). Appl Ergon. 2026;135:104768.

16. Abelsen B, Strasser R, Heaney D, Berggren P, Sigurðsson S, Brandstorp H, et al. Plan, recruit, retain: a framework for local healthcare organizations to achieve a stable remote rural workforce. Hum Resour Health. 2020;18(1):63.
17. Holloway P, Bain-Donohue S, Moore M. Why do doctors work in rural areas in high-income countries? A qualitative systematic review of recruitment and retention. Aust J Rural Health. 2020;28(6):543–54.
18. Norbye B, Skaalvik MW. Decentralized nursing education in Northern Norway: towards a sustainable recruitment and retention model in rural Arctic healthcare services. Int J Circumpolar Health. 2013;72:22793.
19. Helsedirektoratet. Levekårssoner – bedre støtte til kommunene [Internet]. Oslo: Helsedirektoratet. [cited 2026 Oct 11].Available from: https://www.helsedirektoratet.no/forebygging-diagnose-og-behandling/forebygging-og-levevaner/folkehelsestatistikk-og-profiler/levekarssoner-bedre-stotte-til-kommunene

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