The 11th Fall Research Meeting

ABSTRACTS

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PART 2- POSTERS SORTED BY THEMES AT THE EXHIBITION

Pairing Peer Comparison Feedback and Professional Norms to Reduce Low-Value Services in Primary Care – A Randomized Controlled Trial

Raf van Gestel

Background
Low-value care is commonly provided in primary care, resulting in avoidable costs for the health care system and potential harm for patients. It remains unclear how to best encourage physicians to reduce low-value services.

Objectives
To test whether personalized information combining peer comparison feedback and professional norms can reduce the provision of low-value services in primary care.

Methods
Design: 12-month, nationwide, pragmatic, parallel-group randomized controlled trial.
Setting: Primary care physicians (PCPs) in solo practices from 1 November 2020 to 1 November 2021.
Participants: 1,816 PCPs with low and high baseline performance in low-value care provision.

Intervention
Personalized information letters containing peer comparison feedback and professional norms about vitamin D testing (n = 618) or generic prescribing (n = 597). No letter was sent to physicians in the control group (n = 601).
Measurements: Number of vitamin D tests in 100 patients, and the share of generic drugs per physician.

Results
After the 12-month intervention, there was an 18.2% reduction in average vitamin D testing, representing a mean reduction of-3.66 tests in 100 patients ([95% CI:-5.42 to-1.89]). The lowest 90% of low-value care providers contributed over 80% of this reduction. Average generic prescribing was not significantly increased through the intervention (mean difference: +0.57 pp [95% CI:-0.68 to +1.81 pp]). PCPs with high baseline performance did not increase low-value services.

Conclusion
Personalized information interventions can be a cost-effective tool for reducing low-value services in primary care. To enhance their effectiveness, health policymakers should target all providers instead of only those with low baseline performance.

Time to Spare and Too Much Care? Congestion, Treatment and Health Outcomes in the Maternity Unit

Simon Bensnes

The presentation does not have an abstract.

Does delayed response due to busy ambulances impact the risk of death and hospital service utilisation? A natural experiment involving 240 000 medical emergencies in Central Norway

Andreas Asheim, Lars Næss, Andreas Krüger, Oddvar Uleberg, Jostein Dale, Helge Haugland, Ole Erik Ulvin, Sara Marie Nilsen, Gudrun Maria Waaler Bjørnelv, Jon-Ola Wattø, Johan Håkon Bjørngaard

Background
Busy ambulances lead to longer response times in out-of-hospital emergency care. Whereas certain time-critical conditions could be affected by such delays, the impact on patient outcomes generally remains unclear. Measures of response time are commonly used as a performance indicators, and emergency medical services spend a considerable amount of resources to comply with response time targets

Objectives
This study aims to assess how the risk of death, use of hospital services, and morbidity are affected by delayed ambulance response due to busy ambulances

Methods
We studied individuals who had an out-of-hospital medical emergency that precipitated a call to emergency medical services in Central Norway from 2013 to 2022. Routinely collected data were linked with data from the region's hospitals to assess risk of death, not limited to in-hospital deaths. We also studied contacts with hospital services including costs measured with diagnoses related groups (DRGs). We addressed potential bias by multivariable adjusted estimates as well as using a natural experiment: In situations where emergencies occurred in the same geographical area at similar times but with differences in the availability of ground ambulances, we could compare outcomes for patients with different response times due to busy ambulances. Using two-stage linear regression, this allowed us to analyse delays in response time that were arguably unrelated to ambulance prioritisation due to the severity of the patient's condition.

Results
Among 151,004 individuals with 239,320 acute medical emergencies, 4.1% died within seven days. We found that an interquartile range of variation in the probability that a candidate ambulance was busy was associated with a 2.9-minute delay (95% confidence interval [CI] 2.8 to 3.0). Overall, a five-minute delay due to busy ambulances was associated with an adjusted risk difference of 0.0007 in the risk of death within seven days (95% CI-0.002 to 0.003) and a 0.01 for being hospitalised within 48 hours (95% CI 0.006 to 0.02). Within one year, the cost of hospital treatment increased by 655 euros (95% CI 205 to 1106) per 5-minute delay, while the differences in the other outcomes were minor.

Conclusion
We found no substantial increase in the overall risk of death among patients who experienced a delayed response due to busy ambulances. However, there was an increase in the risk of hospitalisation and in hospital costs, suggesting increased morbidity with ambulance delays

Does the Lack of Continuity of Care in General Practice Impact Service Utilization and Patient Outcomes?

Troels Kristensen, Peder Ahnfeldt-Mollerup, Christian Skovsgaard

Background
Continuity of care(COC) has been expected to be of great importance for patient outcomes in general practice. However, there has been a lack of long-term COC studies as many studies in the field has been constrained by short time periods and small sample sizes.

Objectives
Objective: This study intends to explore whether lack of long-term COC in general practice has an impact on health services use and patient outcomes such as mortality.

Methods
We use a staggered DID-approach based on logistic regression to investigate the importance of site discontinuity of care in terms of practice closures on odds for death for a cohort of all listed general practice patients (4,5 million) between 12-108 years in Denmark. The analysis period was 12 years from January 2007 to December 2018. 338,379 patients who experienced one or more practice closures where analyzed. These patients experienced 1,136,781 changes in registrations. Patient outcomes(death) were measured in a follow-up period from January 2019 to March 2022. The model was adjusted for patient age, gender, number of other shifts and other patient characteristics such as their Charlson index. Robustness checks where performed in terms of alternative outcomes (death during the analysis period). Besides the data was adapted to the jwdid and csdid approaches to explore the impact of discontinuity on the two measures of death and measures of the number of standard consultations, emails and telephone consultations.

Results
Our preliminary results show that practice closures have an negative impact on patient mortality during the 3+ years and use of health services. Males have higher odds for mortality than females and mortality increases with age across age bands from 13-24, ..,75-84, 85- years. Regional markers revealed a higher likelihood for death in some regions than others. Both socio economic markers such as unemployment, short education and morbidity markers such as the Charlson index revealed higher odds for death.

Patients with +2 shifts have higher odds for death than patients with 0-2 shifts. The robustness of most results was confirmed via the use of the csdid and jwdid approaches to estimate the ATT and event plots.

Conclusion
These results underscore the influence of discontinuity of care on patient mortality, aligning with expectations in the literature and among leading GPs. Prioritizing continuity of care should be a focal point in general practice, particularly when implementing health care reforms. Subsequent studies could explore additional outcomes such as referrals, hospital admissions and use of other health services like drugs.

Geography, Education, and the Widening Divide in US Midlife Mortality

Christopher Foote, Ellen Meara, Jonathan Skinner, Luke Stewart

Small-area variation in U.S. midlife mortality has been rising rapidly during the past three decades, with the county-level coefficient of variation increasing from 0.25 in 1992 to 0.33 in 2019. At the same time, there has been a sharp increase in the education-mortality gradient, with the gap in life expectancy between college and non-college graduates widening from 2.6 years in 1990 to 6.3 years in 2019 (Case and Deaton, 2023). We demonstrate that these two trends are symptoms of a fundamental shift in the geographic patterns of health and mortality. For college graduates, midlife mortality plummeted during this period across all regions of the country, and indeed the spatial variation in mortality for this group also declined. The story is different for non-college graduates comprising two-thirds of the population: Excess mortality became increasingly concentrated in specific counties, typically with high smoking rates, low economic connectiveness (Chetty et al, 2022) lagging income, and in rural areas. Thus a relatively small number of counties explains both the widening spatial variation in mortality and the increase in the education-mortality gradient. We do not find evidence that these geographic patterns can be explained by access to or quality of health care. To paraphrase Jack Wennberg, "geography is destiny" in the case of midlife mortality.

De-adoption of healthcare interventions post-COVID: Evidence from the Evidence-Based Interventions (EBI) programme in England

Joel Glynn, Tim Jones, Carmel Conefrey, Nicola Farrar, Leila Rooshenas and William Hollingworth on behalf of the OLIVIA project.

Background
The Evidence-Based Interventions (EBI) programme aimed to reduce the number of inappropriate procedures or diagnostic tests in the English NHS. We found little evidence of impact on de-adoption for the first 'wave' of procedures selected in 2019.

Objectives
In this study, we evaluated whether expected procedures counts fell or geographical variation in rates decreased following the programme's second wave of guidance for 12 procedures published in November 2020.

Methods
A retrospective observational study utilising routine hospital data on National Health Service funded elective treatment in England from March 2018 to February 2022 inclusive. We applied a controlled interrupted time series analysis to examine immediate and trend changes in expected EBI procedure counts following guidance publication. A 'synthetic' control group comprising procedures not targeted by the EBI programme was used to identify trends likely to be associated with the EBI programme rather than the COVID-19 pandemic. We compared geographic variation in intervention rates pre- and post-EBI.

Results
Among interventions targeted by the EBI programme for de-adoption, six of 12 had significantly lower than expected intervention counts by February 2022. In five of these six interventions, intervention counts were between 20% and 57% lower than expected due to a larger fall or slower recovery by the end of the COVID-19 pandemic (n=4) or decline intervention count post pandemic (n=1). The remaining six interventions had a similar or a greater-than-expected number of interventions by February 2022. Only one procedure had evidence of a substantial reduction in geographic variation in intervention counts post-EBI, although the reduction was not statistically significant.

Conclusion
We found evidence of a reduction in six of 12 of the Wave Two EBI interventions analysed. Even following a period of forced reductions resulting from the pandemic, half of the interventions analysed returned to levels at or above what would have been expected without the EBI programme. There was little evidence that the publication of national criteria reduced variation in use across England.

Evaluation of a national de-adoption programme to reduce low-value care: evidence-informed recommendations to guide de-adoption of low-value surgery

Carmel Conefrey, Nicola Farrar, Joel Glynn, Tim Jones, Josie Morley, Will Hollingworth and Leila Rooshenas, on behalf of the OLIVIA research group

Background
De-adopting low-value care is notoriously challenging- particularly for complex interventions like surgery, for which there is a dearth of evidence to guide de-adoption efforts. In 2019, the 'Evidence-based Interventions' (EBI) programme was introduced to the English NHS to de-adopt >40 surgical procedures deemed ineffective or cost-ineffective, providing a unique opportunity to study de-adoption of surgery on a national scale.
Objectives
The OLIVIA study aimed to evaluate the delivery, impact, and acceptability of the EBI programme, with a view to producing evidence-based recommendation to guide future de-adoption of low-value surgery.
Methods
OLIVIA comprised three work-packages:

- Work-package 1 quantitatively examined the EBI programme's impact on national procedure rates and variation (reported in a parallel abstract).
- Work-package 2 used qualitative interviews (n=119), document analysis of local/regional policies (n=300), and a national survey (14/42 commissioning groups) to investigate commissioning bodies' and healthcare professionals' (surgeons') responses to EBI recommendations and patients' experiences of care.
- Work-package 3 synthesized the quantitative and qualitative evidence to co-produce recommendations for future de-adoption initiatives, with input from 40 commissioners, surgeons, General Practitioners, and public representatives.

Results
Two overarching recommendations arose from the OLIVIA study:

- Future de-adoption research and interventions should be tailored to the specific rationale for discontinuing or limiting provision, as the barriers to de-adoption (and appropriate implementation strategies) can differ according to whether de-adoption has been prompted by safety concerns, limited or uncertain effectiveness, or cost-ineffectiveness.
- De-adoption of surgery requires close involvement of surgical specialists throughout the process: from identification of candidates for de-adoption, to formulation of de-adoption decisions and their implementation.

Eight further recommendations spanned different stages of the de-adoption process:

- Identifying areas for de-adoption: Identification of candidate procedures on the grounds of high-geographic variation needs accurate cross-setting data to consider how local context may explain activity.
- Formulating de-adoption decisions: Given common criticisms around the quality and generalizability of evidence underpinning de-adoption and distrust of government-imposed targets, surgical specialists should be involved in: i) translating evidence appraisals into de-adoption decisions, and ii) defining appropriate activity levels for that procedure.
- Implementation of de-adoption decisions: Strategies to support implementation should include:

a) Public communication about the justification for de-adoption, supported with accessible summaries of how de-adoption decisions were reached and information about whether consideration has been given to sub-groups for whom the procedure may represent higher-value care;
b) Guidance for how national de-adoption recommendations should be implemented by those with health care purchasing responsibilities at the devolved level (e.g. regional commissioners);
c) Guidance for non-surgical professionals to ensure consistent messaging throughout clinical pathways and optimal management of patient expectations;
d) Tools to inform patients about de-adoption at the point-of-care; and
e) Tailored actions to reassure patients not listed for surgery about continuity of care and a commitment to addressing their healthcare needs.

Conclusion
The OLIVIA study derived ten recommendations to improve de-adoption of low-value surgery, based on a comprehensive 3-year evaluation of a national de-adoption programme. The recommendations provide a bedrock for future interventions to de-adopt low-value surgery: an imperative for the sustainability of healthcare systems.

Reducing low value care and unwarranted variation through comprehensive person-centred medicines reviews; the iSIMPATHY project experience in Scotland and Ireland

Alpana Mair, Ciara Kirke, Iain Wilson, Stuart Law

Background

Problematic polypharmacy is common and increasing, resulting in patient harm, reduced quality of life and healthcare expenditure. The World Health Organization and iSIMPATHY partner countries have identified this as a priority for action. A previous project, SIMPATHY, provided a framework for achieving polypharmacy management across Europe, incorporating a change management approach.
Prior to the iSIMPATHY project, Scotland has embedded polypharmacy management in health policy and clinical practice since 2012, with clinical guidance, training, measurement and decision support tools in use. Clinical pharmacy roles in hospitals and general practice are well established and resourced.
Ireland has produced excellent polypharmacy research, including STOPP/START, however leadership and policy for medicines optimisation and pharmacy is limited and capacity and capability to optimise medication is limited and variable.

Objectives

The EU-funded iSIMPATHY project aimed to embed a single approach for appropriate polypharmacy management in Scotland, Northern Ireland and Ireland by:

i. delivering over 6000 comprehensive person-centred medicines reviews and
ii. training over 200 healthcare professionals.

Methods

Pharmacists were employed to deliver medicines reviews incorporating shared decision-making and assess their outcomes, supported by Scottish Polypharmacy Guidance and training. The project was led by the Scottish Government, with teams in NHS Scotland, the Health Service Executive (Ireland) and Medicines Optimisation and Innovation Centre in Northern Ireland supporting local implementation. Stakeholders participated in steering groups to embed the approach to health system governance. Reviews were delivered in GP practices in Ireland and Scotland, and in outpatient settings in Scotland to meet Health Board needs.

Results

At baseline, patients engaging in reviews in Ireland were older (mean 74.5 versus 66.7) and prescribed more medicines (mean 12.2 vs 10.9, $p<0.001$) despite similar numbers of long-term conditions. Medicines (in) appropriateness was more than twice as high (25.4 vs 12.5, $p<0.001$). The number of medicines was reduced by 1.2 (9.8%) and 0.9 (8.3%) with appropriateness improving by 63% and 75% in Ireland and Scotland respectively. Patients reported improved understanding, adherence and ability to perform usual activities and reduced side effects.
Savings associated with medication changes of €289 and €169 per review were achieved respectively, which alone overcame delivery costs of €145 and €78. Savings associated with avoided adverse drug reaction admissions of €69 and €71 were calculated. Healthcare resource cost avoidance of €2018 and €1717 were calculated based on interventions and QALY gain.
There was very positive experience of a cohesive project in Ireland, with pharmacists' capability rated highly and interest and enthusiasm from GPs, patients and professionals and leadership across the wider healthcare system. Lack of capacity in general practice, and of policy and resourcing to increase that capacity, limits the potential to deliver reviews on an ongoing basis.
Scotland has incorporated learning and findings into efforts to adopt as business as usual within NHS boards and in the development of resources to address low value prescribing, including clinical decision support and updated polypharmacy guidance.

Conclusion

Implementing a pharmacist-led shared decision making approach to medicines review was feasible, optimised medicines, reduced harm and improved patient experience. Investment in capacity to deliver this service would address unwarranted variation, harm and expenditure.

Defining, measuring, and reducing low-value care from the system perspective – proposing a new comprehensive definition and framework

Katharina Achstetter, Viktoria Steinbeck, Dimitra Panteli, Reinhard Busse

Background

Despite intensified efforts to address waste and inefficiencies in healthcare in the last decade, the ability of European health systems to identify, measure, and reduce low-value care varies. To address this issue, he European Union's Expert Group on Health Systems Performance Assessment (HSPA) selected value-based healthcare, with a focus on low-value care, as the work topic for 2023-2024.

Objectives

The aim of the Expert Group's work was to provide impetus for positive change towards addressing low-value care in health systems. To achieve this, specific objectives were to agree on a definition for low-value care that reflects European health system´s needs and experience, as well as to develop a framework towards distinguishing different types of low-value care from a system perspective as a basis for identifying and addressing it. Furthermore, to collect indicators used to measure low-value care in EU HSPA initiatives as well as implemented and promising measures to reduce it.

Methods

Literature review, survey among EU Member States participating in the EU´s Expert Group on HSPA, and consensus meetings.

Results

Coming from a system perspective, the definition of low-value care proposed by the Expert Group expands the traditional understanding of low-value care by adding the aspect of underuse next to over- and misuse to the overall concept. This emphasizes that healthcare services which are not provided or used despite being necessary can be a form of low-value care, impacting not only patient outcomes but also future health care costs. Moreover, this definition highlights that low-value care has negative effects and consequences not only for patients, but also on the workforce, the environment and the health system as a whole.

The conceptual framework distinguishes different types of low-value care for the areas of over- and misuse; underuse; and for unwarranted variation (e.g. geographical variation or between patient groups), which can signal either under- or overuse of healthcare.

Indicators for identifying low-value care within HSPA are used in several European countries covering prevention, diagnostics, treatment, and medication as well as other areas. Simultaneously, there is a lack of indicators for specific areas (e.g., mental health care, and end-of-life care). Additionally, countries reported methodological obstacles in measuring low-value care, mostly relating to data access and data quality.

Lastly, successful multicomponent measures to reduce the extent of low-value care focusing on both healthcare professionals and patients were reported by country experts and identified in the literature, comprising, for example, financial incentives and education.

Conclusion

By proposing a new, more comprehensive definition of low-value care, showcasing indicators in use and potential areas for extending measurement, while also highlighting reduction strategies, this work hopes to help countries advance towards more efficient, sustainable, and patient-centered healthcare.

Low-value imaging: from concept analysis and imaging typology to definition

Bjørn Hofman

Background
There is a vast and vivid debate on how to define low-value care. So also, in imaging. A wide range of terms have been applied to denote low-value radiological procedures, such as justifiability and appropriateness. However, there is no agreed definition of low-value imaging.

Objectives
The objective of this study is a) to present an overview of the concept of low-value care, b) to provide a typology of imaging procedures that can be of low value, c) to investigate how well definitions of low-value care are suited to define the various types low-value imaging, and d) propose a definition of low-value imaging based on a)- c).

Methods
Literature search to identify definitions of low-value care. Standard concept analysis to study how the identified definitions of low-value care are suited to define low-value imaging. Using standard criteria for definitions, such as precision, non-circularity, applicability, (theoretical) justification, and distinctability, to assess definitions of low-value care suitable for defining low-value imaging.

Results
Definitions of low-value care comprise key characteristics, such as having a low benefit-risk-ratio, not being efficient (cost-effective), being relative (on a continuum), and ignoring patient preferences in specific circumstances. Low-value imaging is identified as imaging not changing the patient pathway, duplicate images, use of wrong modality, imaging where the descriptions are not assessed/used, too frequent controls, incidental findings of uncertain significance (but where follow up may be more harmful than helpful). These features direct the development of a definition of low-value imaging.

Conclusion
Guided by definitions of low-value care, and the analysis of how well they fit imaging, low-value imaging can be defined as imaging that does not change the patients' pathway, or results in more harm than benefit, or does not improve the health of the patient (compared to not taking the image). The definition can be made explicitly prospective (replacing "does not" with "is unlikely to") and retrospective (replacing "does not" with "did not").

An analysis of Emergency Department inappropriate admissions in the province of Bolzano (Italy)

Mirko Bonetti, Giuseppe D'Orio, Chiara Seghieri

Background
The Emergency Department (ED) overcrowding is a problem all over the world that causes a significant negative impact on quality and costs of care. Part of this problem is due to the increased number of people entering the ED with non-urgent problems which could be more appropriately addressed in other care settings. The data of the Italian Regional Performance Evaluation System shows that the Autonomous Province of Bolzano (Bolzano), a small area in northern Italy of about 540,000 inhabitants, has the highest ED admission rate among a network of 9 Italian regions (427 x 1,000 vs a network average of 329 x 1,000).

Objectives
The main goals of this study are: to analyse and compare variations in the ED admission rates for inappropriate or non-urgent visits among the 116 municipalities of Bolzano, and to identify the determinants of these variations.

Methods
Starting from the 2023 administrative care data of Bolzano, ED inappropriate admissions were defined as those admissions for residents over 18 years who were assigned a triage level of 4 (less urgent) or 5 (non-urgent), with no diagnosis of trauma, with arrival time from 8.00 am to 7 pm, weekend excluded, by private transport, and who were then discharged home. Age and sex standardized ED admission rates were calculated at municipality level together with the System Component of Variation (SCV), a robust indicator of variation. Geographic variations of the ED rates and the associated costs together with correlation analysis with context data were performed at municipality level.

Results
In 2023, 20% of the overall ED admissions in Bolzano was due to inappropriate visits. Among inappropriate admission rates in different settings (including elective surgery care, outpatient visits) ED rates showed the highest SCV (over 10). Inappropriate ED rates varied from 24.0 to 200.3 per 1,000 at municipality level (EQ=8.3). Patients' median age was 52 years and more than 90 % of the admissions were paid by the NHS. The most frequent reasons for inappropriate access to ED included diseases as disorders of back (20.6%), disorders of eye or ear (18.9%) and general symptoms involving respiratory system (13.6%). Travel distance, number and distribution of GPs and specialists were negatively and significantly correlated with inappropriate admissions ($p<0.0001$). Estimated costs for the ED with the highest rate was 5 times higher than the costs of the ED with the lowest rate.

Conclusion
Among the different care settings of the Autonomous Province of Bolzano, ED needs special attention to the challenge of increased service demand due to improper access. Additionally, results show high geographic variations in rates and associated costs. Geography (e.g. proximity to the ED) together with the organization and distribution of resources in primary and outpatient settings play a relevant role in explaining the variations. The results of this study might be helpful for healthcare managers and policy makers to find appropriate ways of meeting the needs at the ED as well as outside the ED.

Beyond Paychecks: Unraveling the Nexus of Nurse and Physician Wages and Mortality in Acute Care Settings – A Cross-Sectional Study using Routine Data

Aleksandra Vasic, Michael Simon, Sarah Holzer, Sarah Musy, Olga Endrich, Ulrike Muench, Michelle McIsaac, Jana Bartakova

Background
In Switzerland, over half of hospital expenses go towards staff wages, where nurses and physicians form the biggest occupational groups. Wages within the same profession and experience level can vary and disparities affect employees and employers with regards to job satisfaction, job seeking and leaving behavior, and staff retention. This leads to recruiting and retaining difficulties, further aggravating the existing global healthcare staff shortages. Job dissatisfaction, staff shortages and high turnover rates negatively impact patient safety outcomes, e.g., higher mortality rates, and produce additional costs. Given the significant investments in wages, understanding their influence on patient safety is crucial, yet insufficiently explored.

Objectives
To investigate the association between nurse and physician wages and 30-day mortality as a patient safety indicator in acute care hospitals.

Methods
This cross-sectional study used Swiss patient and hospital routine data from the year 2019, which we linked by matching the anonymized hospital identification number. For the descriptive analysis, frequencies and percentages were presented for categorical variables, along with central tendency and dispersion measures for numerical variables. A Generalized Additive Mixed Model (GAMM) was used to explore the association between nurse and physician wages aggregated at hospital level, and all-cause 30-day mortality. Sensitivity analyses were conducted by applying the same procedures to the data from 2018 and 2020.

Results
Our sample consisted of 1,015,995 adult patient admissions and 94,364 employees (69,112 nurses, 25,252 physicians) within 82 acute care hospitals. Patients 30-day mortality in the year 2019 was 2.3%. An association was identified between physician wages and 30-day mortality, indicating that higher wages reduced the mortality likelihood by 2% (OR 0.98 [95% CI 0.96 – 0.99], p = 0.001). However, no such association was found between nurse wages and 30-day mortality (OR 1.00 [95% CI 0.95 – 1.04], p = 0.900).

Conclusion
We found an association between higher physician wages and lower 30-day mortality, but none for nurses. We believe that there is an underlying mechanism between wages and patient safety indicators of interrelated factors, such as job satisfaction and staffing levels, and propose this interrelation to be further investigated. New results could lead to a more reasonable and efficient utilization of hospital resources and improve patient safety as the ultimate goal.

What insights into health care variation can PROMs offer?

Catherine Gerard

Background

Te Tāhū Hauora, a New Zealand crown entity, is developing a national patient-reported outcome measure (PROM) programme. A gap analysis identified that a PROMs programme should focus on general practice, with the goal of reducing inequitable variation in outcomes through better prevention, early detection, and improving primary and secondary prevention of long-term conditions.

A unique challenge in collecting PROMs data in New Zealand is ensuring the health experiences of both Indigenous (Māori) and non-Indigenous New Zealanders are captured in ways that are meaningful to each, while facilitating outcomes analysis and monitoring. This is particularly important as Māori are known to experience a range of health inequities, and reducing and ultimately eliminating these is a central aspect of New Zealand's health policy.

Objectives

In August 2023, a proof-of-concept was run to test two PROMs in a patient population who had recently visited their general practice, via the primary care patient experience survey. The purpose was to evaluate how these tools performed in different cohorts; compared to each other, and compared to other questions in the survey. The goal was to see whether PROMs could be used to monitor performance; to identify which populations with a self-identified long-term condition score lowest; and whether there is a correlation between PROM score and experience of care.

Methods

Hua Oranga is an Indigenous 'by Māori, for Māori' outcome measure developed in New Zealand. It contains 16 items that assess health outcomes across four domains of Māori health reflected by Te Whare Tapa Wha (a Māori health model that includes four cornerstones: physical, spiritual, family, and mental health). Te Tāhū Hauora worked with Hua Oranga leaders to digitally administer this PROM alongside the EQ-5D-5L as part of the national Primary Care Patient Experience Survey August 2023 quarterly survey round. Data collection will be repeated in August 2024.

Results

EQ-5D-5L data was collected from 25,066 people accessing primary health care; of these, 4,842 Māori completed all items in both the EQ-5D-5L and Hua Oranga. All patient identifiable information was removed from the survey data, meaning responses are anonymous and survey data cannot be linked to other datasets.

Analyses of the variation, including differences between districts, find that patient factors such as disability status and the presence of multiple long-term conditions were most predictive of EQ-5D-5L scores. This mirrors what we have found in the Atlas of Healthcare Variation, where much of the variation observed is driven by demographics, particularly ethnicity.

Conclusion

Analysing PROMs scores by patient demographic (age, ethnicity, gender, long-term conditions and disability status) and geography (district) in a large patient population offers a different insight into health care variation than administrative datasets. This presentation will share the analyses and discuss future options.

More than the sum of the parts: when healthcare variation data and clinical care standards combine to support appropriate care

Gillian Giles

Background

The Australian Atlas of Healthcare Variation series has mapped healthcare variation in Australia since 2015, publishing compendium Atlases covering nearly 90 topics as well as time series reports on clinical topics.

The Atlas's home at the Australian Commission on Safety and Quality in Health Care (the Commission) provides deep reach into government and connections with work that amplifies the impact of healthcare variation data.

The Atlas complements other Commission programs focused on improving appropriateness of care, such as safety and quality standards, clinical care standards and partnering with consumers.

An example is the relationship between the Atlas and the clinical care standards program. The Commission has developed clinical care standards for clinical conditions and procedures for which the Atlas has shown considerable variation, such as cataract surgery, colonoscopy and osteoarthritis of the knee. Clinical care standards contain a small number of evidence-based quality statements that describe the clinical care a patient should be offered for a clinical condition or procedure.

Appropriate care for heavy menstrual bleeding

The Heavy Menstrual Bleeding Clinical Care Standard was developed in response to the First and Second Atlases, which showed considerable geographical variation in rates of endometrial ablation and hysterectomy for women with benign conditions, such as heavy menstrual bleeding.

The standard, first released in 2017, aims to ensure that women with heavy menstrual bleeding are offered the least invasive and most effective treatment appropriate to their clinical need.

The connection between Atlas data and the standard came full circle in June this year when the revised standard was released at the same time as almost a decade of Atlas data on rates of endometrial ablation and hysterectomy hospitalisations for benign conditions.

For the first time, Atlas data highlighting variation was published alongside a clinical care standard that could be used to address this variation.

The Atlas data were encouraging. Australia's national rate of hysterectomy – high compared to similar countries – had dropped by 20 % since 2014- 15, while the national rate for the less invasive endometrial ablation had increased by 10 %. However, the data indicated inconsistencies in care across the country. Rates for both procedures were consistently higher in regional areas, while the hysterectomy rate for First Nations women was 9% higher than for other Australian women in 2021- 22.

Increased impact

Local health services are responding to the partnership between the Atlas and the clinical care standards program, which offers options to address possible unwarranted variation. One service in an area with consistently high hysterectomy rates used the Heavy Menstrual Bleeding Clinical Care Standard to audit care offered to women. The findings prompted a program to fast-track appointments for medical management of heavy menstrual bleeding to ensure women can access appropriate alternatives to hysterectomy.

Atlases of healthcare variation provide important data about geographical variation in health care, but they need to be part of a program of system change to improve care. Together, Atlas data and clinical care standards have sustained focus on appropriate care while providing the tools for health services to identify and address unwarranted clinical variation.

The Constructive Response to Practice Variation: Raise Decision Quality at the Frontlines of Care to Avoid Waste to the System, Harm to Patients, and Moral Injury to Professionals

Albert Mulley, Margaret Mulley

In 1938, Glover reported 10-fold variation in rates of tonsillectomy across geographic regions of England and Wales. Four decades later, variations in tonsillectomy and other surgical procedures were rediscovered by Wennberg et al in the United States, England, and Norway. Levels of variation were specific to procedures and associated with limited evidence and resulting uncertainty about the probabilities of treatment outcomes.

The recommended response that emerged in the 1980s was to reduce unwarranted variation reflecting professional uncertainty and bias, while honoring warranted variation reflecting patients' preferences. Decision aids to facilitate this approach measurably improved decision quality. This process of shared decision making has been enshrined in policies of multiple countries but has not been implemented at scale anywhere. Too often patients don't know what is realistically possible, and clinicians don't know what would be most valued by patients. This avoidable ignorance degrades the quality of decisions across the frontlines of care.

Primary care providers should be well positioned to raise decision quality. But primary care is in crisis in many countries necessitating new funding and operating models that expand capacity to listen to learn from patients with new roles on highly functioning clinical teams. Without such efforts to align policy with the complexity of frontline decision making, low decision quality upstream in primary care will continue to produce downstream cascades of financial waste, personal harm to patients, and moral injury to professionals who recognize that system and policy constraints keep them from their duty to care for patients.

At the 2016 WIC meeting in Pisa, we described essential capabilities needed by frontline teams to raise decision quality across primary and acute, mental and physical, and health and social care… and thereby serve as the learning front end of their local and regional health systems. Those capabilities were identified during 2010-16 together with more than 60 integrated care teams from more than 25 countries. During 2016-23, we iteratively co-created and delivered workshops conferring the identified capabilities to 6 cohorts comprised of 4-8 frontline teams across England. Each of the eight capabilities had four learning objectives linked to multiple metrics and management tools to make the learning practical and purposeful in addressing each of the four high priority topic areas for this year's WIC meeting. Some of the NHS England teams received regional and national recognition for raising decision quality while working with vulnerable populations.

To facilitate train-the-trainer spread and scaling of these capabilities, we designed an interactive workbook that will be complemented by a 6-episode podcast to help Directors of England's 42 Integrated Care Boards recognize the critical need to overcome sources of resistance to raising decision quality. To assess the potential to adapt this approach across cultures, contexts and borders, we will introduce the workbook and issue to WIC participants a pre-release version of the podcast which includes interviews with British WIC colleagues.

A national assignment on reducing low value health care in Norway

Marit Herder, Line Grongstad, Elisabeth Pedersen

Background
According to OECD, 10-34% of health service spending is inappropriate1, and a wasteful use of healthcare resources. This issue is particularly critical given the context of an aging population and a growing deficit of healthcare personnel. To address these challenges effectively, prioritizing services with documented effectiveness is essential.

Objectives
In 2023, the CEOs of the four regional health authorities (RHA) in Norway assigned Center for Clinical Documentation and Evaluation (SKDE) to establish and lead a national task group working with de-implementation of low value health care in specialist health care services. The group consists of assistant chief medical advisors from each Regional Health Authority and healthcare professionals from SKDE.

The main purpose of the assignment is to identify procedures of low value healthcare suitable for de-implementation, and to conduct a national process of de-implementation. Medical specialists in the identified areas, as well as representatives for users of medical services, are involved in the process. The medical directors of each Regional Health Authority are responsible to implement the necessary local changes in medical procedures and treatment.

So far, three procedures have been identified as suitable for de-implementation:

-Acromial resection and rotator cuff surgery for chronic shoulder pain
-Upper endoscopy in people younger than 45 years with no red flags
-Coronary angiography in patients with stable chronic heart disease and to whom CT coronary angiography is a diagnostic option.

The assignment is ongoing work, and we will present current status of the process of de-implementation for the three selected procedures.

Reducing unwarranted variation – can a "clinical dashboard" be helpful for hospital executive boards and top-level leaders?

Ole Tjomsland, Christian Thoresen, Tor Ingebrigtsen, Eldar Søreide, Jan C. Frich

Background
In the past decades, there has been an increasing focus on defining, identifying and reducing unwarranted variation in clinical practice. There have been several attempts to monitor and reduce unwarranted variation, but the experience so far is that these initiatives have failed to reach their goals. In this article, we present the initial process of developing a safety, quality and utilization-rate dashboard ("clinical dashboard") based on a selection of data routinely reported to executive boards and top-level leaders in Norwegian specialist health care.

Objectives
We used a modified version of Wennberg's categorization of healthcare delivery to develop the dashboard, focusing on variation in 1) effective care and patient safety and 2) preference- and supply sensitive care.

Methods
Effective care and patient safety are monitored with outcome measures such as 30-day mortality after hospital admission and 5-year cancer survival, whereas utilization rates for procedures selected on cost and volume are used to follow variations in preference- and supply sensitive care.

Conclusion
We argue that selecting quality indicators of patient safety, quality and utilization-rates and presenting them in a dashboard may help executive hospital boards and top-level leaders to focus on unwarranted variation.

Public Sector Contracting of Private Somatic Healthcare: Enhancing Decision-Making with Registry Data

Vigleik Jessen, Helena Maria Bertilsson, Asgeir Winge

Introduction

In Norway, the regional health authorities (RHAs) are responsible for delivering specialist health services to their population. Delivery of services is achieved through publicly funded hospitals, contract specialists and by engaging private providers. Private somatic care, which includes examinations and surgeries, is negotiated through contracts. The stated purpose of using contracted providers has been to reduce long waiting times and alleviate capacity challenges at publicly funded hospitals.

Central Norway RHA, one of Norway's four regional health authorities, has had a large expenditure on such contracts. The contract framework has used coarse categories of diagnoses and procedures, which may have limited their usefulness, and lead to poorer control over which procedures the providers have delivered within the contracts. Earlier analyses has used waiting times as a point of departure when determining demand. Data from national health atlases suggest that consumption levels for some treatments are high, exceeding the national average.

Aim

To detect and address potential overuse of supply- and preference-sensitive care provided by hospitals and contracted providers in the health region. Furthermore, to support more informed decisions when new contracts are to be signed in 2025.

Methods: A dashboard was prepared, showing diagnoses and procedures in routinely collected data from the Norwegian Patient Registry, which includes data from contracted private providers. We displayed consumption rates of selected procedures across hospital catchment areas, based on diagnoses, procedures, and diagnostic related groups (DRGs). Additionally, we showed the national average and the deviation from it for each procedure. Data displayed in the dashboard was discussed with clinicians to improve definitions.

It was essential to establish precise definitions and narrow the activity of interest to the exact procedures that were delivered and payed for in the current agreements. It was important for us to make these clarifications to prevent that the model was called into question under the argument that it did not show the actual activity of interest. Therefore, we have aimed to present variation figures and consumption rates at a level that the professionals would recognize and find relevant.

Results

In a prototype dashboard, we showed consumption rates of gastroenterology and ENT surgeries. Results were investigated with representatives of the professional community, who noted some instances of underestimated hospital activity. This was mainly due to DRG grouping, as some procedures like tonsillectomy could be classified into multiple DRG groups. We adjusted the definitions to improve accuracy. In the following, there was extensive dialogue with clinicians who recognized that this display of data provided an objective starting point for discussions around new contracts for all surgical procedures. Analysing and showing consumption rates appeared to provide more robust results than analyses of waiting list data.

Conclusion

The analysis model indicated that the current agreements increase consumption and contribute to unwarranted variation. Active use of data showing relevant procedures of interest, facilitates meaningful dialogue with professional communities and decision-makers by addressing overuse of supply- and preference-sensitive care. Activity data on services delivered by public hospitals, private hospitals and contract specialists, provide decision support to leaders when entering new contracts with health providers and facilitates reduction of unwarranted variation.

Improving general practitioners´ (GPs´) referrals to radiology. Implementation of a mixed-method intervention consisting of clinical support system, group-based course and feed-back (VeRaVest)

Aslak Bjarne Aslaksen, Mia Mowinckel-Nilsen, Stefan Hjørleifsson, Nicolas Øyane, Satya Sharma, Erik Vang

Background

The utilization of high-cost examinations like CT and MR in out-patient settings is increasing and radiology has been scrutinized as an index-speciality for overdiagnosis and overtreatment in medicine. The Norwegian health care system is tax-financed with a minor out-of-the pocket payment. The specialist care, included radiological services, is organized, and financed by the government. The primary health care is organized by the approx. 350 municipalities. The GPs are mainly self-employed with a contract with the municipalities. Radiological examinations are performed either in stately-owned hospitals or by private radiological institutions with contracts with the state. In a metaanalyses, Kjelle et al. (2022) reviewed papers reporting interventions to reduce low value imaging. Papers reporting best results on improving referral patterns were multicomponent interventions including education.

Objectives

We present interim results from a multicomponent intervention performed within the Western Norway Health trust.

Methods

We developed a multi component intervention consisting of the following three elements:

1. Referral guidelines for musculo-skeletal imaging embedded in the GPs´ electronic referral system.
2. Group based courses for GPs based on guidelines. The courses are based on principles of Quality improvement.
3. A web-page feed-back system where the GP can read their own referral practise over time and compare with their colleges (anonymously). They use these data in their courses to reflect over their own practice.

Results

An interim evaluation of the intervention showed that the GPs reported a high degree of satisfaction with the multicomponent intervention. 85,4 % of the GPs found the referral guidelines useful. 75,5 % of the GPs introduced changes in their referral practice after participating in the course. Some of the GPs own descriptions of introduced changes:

- Better assessment of indication before referral (especially MRI).
- More use of recommendations in the referral system before referral.
- More information to the patient about unnecessary examinations.
- Better quality of referrals, especially description of examination.
- Better clinical examination prior to referral.
- Other qualitative comments from the GPs were:
    - "I am more observant to more accurate and informative referrals".
    - "I had access to radiological guidelines and looked at them together with the patient. I experienced that the patients got an understanding of the limited value of radiological examinations".
    - "The referral guidelines will change my practice. It is useful to be reminded of these".

Conclusion

We have developed and implemented a multicomponent system for improving the referrals from general practitioners to radiology facilities, which seem to function satisfactory for the GPs and seems promising for improvement of their referral practice. A scientific evaluating with a step-wedged design with "hard endpoints" like number of referrals and the quality of the referrals is ongoing. Depending on the results from this evaluation, the intervention could feasibly be implemented nationwide in Norway and expanded to hospital care and to other topics like imaging of the central nervous system, thorax and abdomen based on international guidelines.

Intervention for reducing the overuse of upper endoscopy in patients <45 years: a protocol for a stepwise intervention programme

Susanne Sørensen Hernes, Mikkel Hoiberg, Frode Gallefoss, Christian Thoresen, Ole Tjomsland

Background
Utilisation rates for healthcare services vary widely both within and between nations. Moreover, healthcare providers with insurance-based reimbursement systems observe an effect of social determinants of health on healthcare utilisation rates and outcomes. Even in countries with publicly funded universal healthcare such as Norway, utilisation rates for medical and surgical interventions vary between and within health regions and hospitals.

Objectives
This paper describes a protocol for reducing the overuse of upper endoscopy in a Norwegian health region.

Methods
The protocol uses a combination of digital tools and psychological methods targeting behavioural change in order to alter healthcare workers' approach to patient care.

Conclusion
The aim of the planned intervention is to evaluate the effectiveness of a multifaceted set of interventions to reduce the overuse of upper endoscopy in patients under 45 years. A secondary aim is to evaluate the specific effect of the various parts of the intervention. At the end of the study, the climate effect of the intervention will be evaluated, based on estimations of the reduction of carbon dioxide emission of patient travel and number of procedures.

Ref: Hernes SS, Høiberg M, Gallefoss F, et al. Intervention for reducing the overuse of upper endoscopy in patients
<45 years: a protocol for a stepwise intervention programme. BMJ Open Quality 2024;13:e002649. doi:10.1136/ bmjoq-2023-002649

Examples of healthcare evaluation in Norway using national registries

Eva Stensland

Objectives

In 2009, Centre for Clinical Documentation and Evaluation (SKDE) was commissioned by the Ministry of Health and Care Services to establish, support, and develop infrastructure for clinical quality registries with the aim of improving Norwegian healthcare quality. To date there are 60 National clinical quality registries in Norway, covering a range of diseases and including all relevant patients across the country. These registries provide in-depth information about the diagnostic process and treatment for all patients, registered in a structured manner. The quality registries also include patient reported outcomes (PROs), which provides the patients' perspectives on the effect of a given treatment.

In 2015, we in SKDE was given another national assignment, namely, to produce health atlases visualizing the use of healthcare services in Norway. In this work, we use individual-level data obtained from national health- and administrative registries. The data are linked by serial numbers derived from the unique 11-digit personal identity number held by all Norwegian citizens.

The Norwegian Patient Registry (NPR) holds data on visits to specialist healthcare services i.e., public hospitals, contracted private institutions and specialists. The Norwegian Registry of Primary Health Care (NRPCH) contains information on the use of primary healthcare services such as general practitioners, out-of-hours services, home-based care, and nursing homes. These two national registries are the main sources of data in our work with developing health atlases.

Statistics Norway (SSB) is the national statistics office providing official statistics on Norwegian society. Of specific interest for us are demographic and socioeconomic data (e.g., residential information, level of education and income). We were recently given permission to use some of the data from SSB in our analyses. Such data linkage will broaden the scope of our investigation of whether the Norwegian overarching policy goal of equitable healthcare services regardless of place of residence and socioeconomic status is met.

In our research projects, a main goal is to enhance our understanding of the causes and consequences of unwarranted variation. The study populations are often identified by clinical quality registries. We then use linked data from the same national health- and administrative registries as in our health atlases (NPR and NRPCH), in addition to a broad range of data from SSB, the Cause of Death Registry and clinical quality registries.

For research purposes, quality information and PROs are extremely valuable for understanding the potential for improving healthcare services provided in Norway.

The presentation will provide examples of how we in SKDE use a collection of population-based registries for healthcare evaluation in Norway in our investigations. The presentation will aim to answer whether Norwegian healthcare providers are achieving the established Norwegian health policy goals of equitable healthcare services?

Uncovering Unwarranted Variation in Real-Time with Norwegian Registry Data: Insights from the Pandemic and Future Perspectives

Kjetil Telle

Every early morning during the COVID-19 pandemic, the Norwegian Institute of Public Health (NIPH) received information on health care use in the preceding day for every Norwegian resident. The information was automatically collected from clinical electronic records, and enabled real-time knowledge crucial for handling the pandemic, such as the proportion of population groups tested for SARS-CoV-2, infected, consulting a primary physician, being hospitalized or intubated, dying with COVID-19, or being vaccinated. A personal identifier (encrypted version) unique to every Norwegian resident enabled us to follow the same person across data sources and over time.

Linking individual health records with censuses revealed unwarranted variation in e.g. testing behaviour, infection rates, hospitalizations and deaths, as well as vaccination uptake. These near real-time statistics were used by the health services to target information to vulnerable groups, and to determine the geographic location of testing and vaccination facilities. For example, such statistics on testing, infections, hospitalizations and deaths among Norwegian residents with Pakistani backgrounds are believed important in containing their suffering from COVID-19. Statistics also revealed little or no reason for concern that health care workers or teachers were more infected than other occupational groups.

In the time of the pandemic, it was easy to convey the public health benefits of utilizing personal health records to produce updated knowledge for containing the pandemic. In normal times, the benefits may appear less urgent; and there could be valid reasons for legal frameworks and procedures required to use sensitive personal information to be more stringent. Nevertheless, the benefits of using health records to produce real-time knowledge to combat COVID-19 in Norway, illustrated that technical solutions embodying data protection and privacy can be implemented to produce real-time statistics to promote public health.

Fundamental privacy measures included handling of data on a restricted and secure platform, careful procedures and tracing of analysts admitted to use subsets of the data, absence of any directly identifying personal identifiers in the data, logging analyst's data usage, and careful procedures to ensure only fully anonymous statistics are extracted, etc. These measures must be enforced both legally and technically. To us it appears that the most demanding part of using individual health records, is not always legal or technical requirements, but rather an organization that can ensure proper documentation of compliance with the necessary privacy measures.

There are well-established regulations for linking and using individual level registry data for research in Norway, but access often takes a long time and updates are rare. Continuous access to near real-time data for producing near real-time statistics, like during the pandemic, enables timely policy responses. Also in normal times, this would be valuable to reduce unwarranted variation across groups with respect to e.g. vaccination uptakes, access to new pharmaceuticals, in-phasing of new procedures and medical devices, and out-phasing of old ones, or side effects.

When implemented thoughtfully, real-time linking of medical records and other individual data can be a powerful tool for revealing unwarranted variation and ensuring equitable access to high-quality healthcare for everyone.

Implementation of a common data model in Canada to support cross-jurisdictional health services and outcomes research

Lisa Lix

Background
To support and facilitate multi-regional research and data analytics, data need to be harmonized or made comparable across jurisdictions. This process can be time-consuming and complex as it requires a deep understanding of the local context and data production, The Observational Medical Outcomes Partnership (OMOP) Common Data Model (CDM) is a standardized structure for observational data that enables collaborative health research. Health Data Research Network (HDRN) Canada is currently conducting a pilot study to implement this standard at partner data linkage centres in several provinces.

Objectives
The study objective is to describe the process used to implement the OMOP CDM, methodological and technical challenges, and the approach to evaluate CDM implementation at multiple sites.

Methods
CDM working group members include technical staff from data linkage centres in four provinces and a national data coordinating centre, HDRN Canada operational and executive leads, and OMOP CDM consultants. The Project Working Group selected eight OMOP data tables to pilot and assess the CDM performance. The evaluation is collecting quantitative and qualitative information on Extract, Transform, and Load (ETL) processes, performance of the CDM in a multi-site observational case study to investigate variation in healthcare use and outcomes, and data quality measures.

Results
Initial steps have included collaborative learning about the CDM structure, importing open-source tools and licensed coding standards (i.e., Systematized Nomenclature of Medicine-Clinical Terms [SNOMED-CT], RxNorm) at data linkage centres, and defining the technical requirements for developing ETL processes and hosting OMOP data at data linkage centres. Creation of select OMOP tables has been accompanied by discussions about models for mapping clinical and prescription drug coding standards. A scoping review of evaluation strategies was undertaken and an evaluation framework was created using a mixed-methods design. This framework will combine quantitative metrics like data mapping completeness with qualitative insights gathered through interviews, surveys, and documentation review, to understand the user experience throughout OMOP CDM implementation and use case replication.

Conclusion
The benefits of standardizing health data for multi-site research and supporting the production of findable, accessible, interoperable and reusable (FAIR) national data underscores the importance of HDRN Canada embarking on this OMOP CDM implementation project. The lessons learned will benefit other multi-site data standardization initiatives.

Federated analysis of healthcare data: The Canadian Network for Observational Drug Effect Studies

Robert Platt

Background
Regulators require rapid and representative analyses of drug utilization and safety. In Canada, data are housed in provincial repositories and must be analyzed separately. The Canadian Network for Observational Drug Effect Studies (CNODES) was created in 2011 to provide such studies for Health Canada and other stakeholders. CNODES uses both common protocol-based analyses and common data model-based analyses.

Objectives
To describe current approaches for federated analyses of health data in Canada, and CNODES' experiences.

Methods
CNODES includes a coordinating centre, sites in seven Canadian provinces, and two international datasets. At the request of stakeholders, CNODES designs and conducts studies, primarily on drug utilization and safety. CNODES conducts studies using a common protocol, in which the protocol is designed by a central research team and then distributed to the sites for analyses. For more rapid studies, CNODES conducts studies using a variation of the Sentinel Common Data Model (CDM), which allows fully distributed analyses.

Results
CNODES has addressed over 100 queries from stakeholders since inception. Most studies have used a common protocol approach, while the CDM has been used in particular in collaboration with the US Sentinel System. In the presentation I will discuss the strengths and limitations of both methods, and discuss potential future developments.

Conclusion
Federated analyses of distributed Canadian data are a useful tool to provide rapid response to stakeholders' research questions. CNODES has effectively used both common protocol and common data model approaches to answer these questions. In the presentation I will discuss the strengths and limitations of both methods, and discuss potential future developments.

Explaining practice variation in induction of labor using a sociological model. Results of the VALID study

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Background
The use of childbirth interventions varies greatly between and within countries. Also in the Netherlands large practice variations in maternity care have been observed. In our VALID (VAriation in Labor InDuction) study we examine practice variation in one intervention in maternity care: induction of labor (IOL) at the level of maternity care networks (MCNs). In the Netherlands, MCNs are collaboration entities including local hospitals and midwifery practices, which are jointly responsible for providing care in their region.
As a first step in the VALID study we explored variation in the rates of IOL between all Dutch MCNs and found large variation: the percentages of IOL range from 14.3% to 41.1% between the MCNs. The next step is to get insight in the mechanisms that influence the decision-making on IOL, and how these mechanisms contribute to practice variation. To get insight in these mechanisms, we use a sociological model explaining practice variation. In this model three different levels (i.e. micro, meso and macro) are distinguished, at which variation may be found and where explanations for variation can be sought.

Objectives
To explore the different mechanisms that influence decision-making on IOL, how these mechanisms contribute to practice variation, and what variation in IOL is unwarranted.

Methods
A mixed methods multiple case study using both quantitative and qualitative methods to collect and analyze data from three MCN's with a high level of IOL and three MCNs with a low level of IOL. The method included surveys among women and healthcare providers in these MCNs, interviews with providers, focus groups with women, and analysis of guidelines (both local and national) and medical records data. Subsequently, a national expert meeting was organized to discuss all findings and to determine the mechanisms that result in unwarranted variation. Also, the findings were debated in the participating MCNs.

Results
We found that the attitude of women towards birth contributes to practice variation in IOL between individual women, but not to practice variation in IOL between MCNs. No association was found between whether a women receives care in a MCN with a low or high percentage of IOL and the intended decision for IOL. We found that translation of national guidelines to local protocols contributes to the variation between providers (meso level), while at the micro level the way risks are communicated (standardized or personalized) to women by providers play a role in the observed variation. At the expert meeting, it was agreed that variation due to differences in translation of guidelines and risk communication was unwarranted.

Conclusion
Taking all the collected data together it appears that mechanisms at the provider side of the model, like translation of guidelines and risk communication, contribute to unwarranted practice variation in the rates of IOL between MCNs.

Race and Ethnic Disparities in Hospital of birth for Very Pre-Term Newborns

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Background
In the past two decades, research has extended our understanding of newborn-level race and ethnicity disparities by measuring the contribution of racial/ethnic hospital concentration but much remains unknown.

Objectives
To evaluate whether very preterm (VPT) Medicaid insured Hispanic and Black infants in Texas were more likely to be born in hospitals with poorer neonatal outcomes than non-Hispanic white infants and to determine racial/ethnic differences in risk adjusted neonatal morbidity and mortality rates among all groups.

Methods
Retrospective analysis of the Texas Medicaid Newborn which includes all live newborns (2010-2014) linked with birth and death certificates, maternal and newborn facility, and professional claims/encounters through the first year of life (N=1,133,441). We included very preterm births with a gestational age between 22-31 weeks whose newborn hospitalization was paid by Texas Medicaid (n=23,653). The primary exposure was the self-reported ethnicity and race of the mother recorded on the birth certificate. The primary outcome was a composite measure including 27-day mortality and/or evidence of severe morbidity (bronchopulmonary dysplasia, necrotizing enterocolitis, retinopathy of prematurity, or intraventricular haemorrhage). Unadjusted relative risk (RR) and adjusted RR, were conducted using multivariable modified Poisson regression including infant's and maternal characteristics. For hospital-level analysis we computed risk-adjusted standardized mortality and morbidity rates (RSMR), ranked the hospitals from lowest to highest based on RSMR. We assessed whether the distributions of VPT infants among ranked hospitals differed by race/ethnicity, we tested the equality of distribution using a two-sample Kolmogorov–Smirnov equality of distribution test.

Results
The composite mortality and morbidity rate was the highest among Black infants (33.0%), who also had higher individual severe morbidity (25.8%) and mortality (9.1%) than the other race and ethnic groups. Across 113 hospitals in Texas, the state mortality-morbidity mean rate was 29.9% (95% CI 29.2-30.6). The RSMR for these hospitals ranged from 18.1% to 42.3%. Analysis showed a significant difference in infants' race/ethnic distribution across these hospitals. NH-White infants were more likely to be born in lower RSMR hospitals compared to Black and Hispanic infants. Kolmogorov-Smirnov tests show these differences in cumulative distribution were statistically significant. Thirty four percent of non-Hispanic White infants were born in top-quarter hospitals, with the lowest RSMR, while only 21% of Black infants and 28% of Hispanic infants were born in those hospitals. Inversely, only 26% of non-Hispanic White infants were born in hospitals ranked among the lowest quarter, highest RSMR, while 37% of NH-Black and 33% of Hispanic infants were born in these hospitals.

Conclusion
Black and Hispanic VPT infants in Texas Medicaid are more likely to be born in hospitals with higher RSMR.

Unlocking medical practice variations in the use of seclusion and mechanical restraint in mental healthcare in France: extent and contributing factors based on novel data

Esther Touitou-Burckard, Magali Coldefy, Charlie Bourin, Anis Ellini, Coralie Gandré, and the Plaid-Care consortium

Background
Coercive measures, such as seclusion and mechanical restraint (MR), are part of the therapeutic arsenal in mental healthcare systems around the world. In most countries, they are allowed only as a last resort, for the shortest possible duration, to respond to a crisis after all other de-escalation strategies have failed. Many international bodies have called for an end to these practices, and monitoring and reducing their use is a high priority on the global political agenda. However, there is a paucity of data on the extent of their utilization in many national settings, the variations in their use across care providers, and the factors contributing to these variations.

Objectives
In this context, our objectives were to provide estimates of the use of seclusion and MR in psychiatry at the national level in France – where it has not been previously documented and where novel data is available – and of its variation across hospitals, as well as to identify the factors associated with this variation.

Methods
This research is based on a conceptual framework derived from the literature on medical practice variations, adapted to the specificities of coercive practices, for which there is great uncertainty regarding the "right" level of use, if any, and numerous ethical challenges. Rather than a normative approach, a positive approach was adopted, which consisted of comparing the use of seclusion and restraint by hospital with average national practices. We leveraged the standardized register of seclusion and MR, which is mandatory for all hospitals providing involuntary psychiatric care to adult patients in France, and has been available in the French psychiatric claims data system since 2022. We linked these data with complementary databases providing information on the characteristics of hospitals that deliver involuntary care and on the characteristics of the areas they serve. Finally, multilevel logistic regressions were performed to identify patient, hospital and contextual characteristics significantly associated with the use of seclusion and MR.

Results
In France, in 2022, almost 30,000 people were secluded during an involuntary psychiatric hospital admission, of which almost 10,000 received MR. The share of admissions where seclusion was used varied from 0 to 78% (CV=51%) and the use of MR ranged from 0 to 36% (CV=92%) across hospitals. While patient characteristics were significantly associated with these variations (diagnosis of psychotic or bipolar disorder, male gender, lower socioeconomic status), a greater proportion of variations was linked to the characteristics of the hospitals and the areas they serve. In particular, a significant association was found with the size of the hospital and its specialization in psychiatry.

Conclusion
Seclusion and MR are frequently used in psychiatric care in France with significant variations across hospitals. This warrants further investigation, particularly given that patient characteristics account for only a small share of this variation. Public reporting of these issues is a necessary first step to improve medical practice in a field where mandatory monitoring is rare worldwide, despite the ethical implications.

Improving regional comparative analysis of quality and efficiency using a needs-based population classification system (PopGrouper)

Chrissa Tsatsaronis, Anika Kreutzberg, Karen Kinder, Maria Klemt, Wilm Quentin, Reinhard Busse

Background
Regional variations in health care provision have been documented across countries and conditions. To identify unwarranted variation in health care utilization and improve equity and quality it is crucial to understand the morbidity structure of regions and ensure their comparability. The PopGrouper is a needs-based population classification system which classifies persons into mutually exclusive groups with similar care needs (medical and economic homogeneity). As a result, patients in the same group have similar medical needs and costs, thus enabling regional comparisons of utilization, costs, and quality for groups of patients with similar health care needs. Initial results of regional comparative analyses using the PopGrouper were presented at the 2023 WIC Fall Meeting in Pisa.

Objectives
This work aims to evaluate the extent to which the PopGrouper can control for differences in morbidity-related care needs in regional comparative analyses, using stroke, congestive heartfailure, diabetes, breast cancer and depression as examples.

Methods
The analyses are based on German sickness-fund data from 2019 and 2020. The outcomes investigated include efficiency indicators (e.g., hospital bed days and costs) and quality indicators (mortality and other disease-specific outcomes). First, we visualize regional variations in disease prevalence, the distribution of PopGroups and the outcome parameters using age-sex standardized observed-to-expected ratios. Second, we estimate the effect of the PopGroup on the outcome parameters using Multilevel Generalized Mixed Models to account for the clustering of patients in regions and the different distributions of the outcome parameters. We quantify the overall degree of regional variance using intraclass coefficients (ICC). Finally, we rank regions by their PopGroup-adjusted performance on efficiency and quality indicators and compare healthcare cost and utilization patterns between the best and worst performing regions.

Results
At the time of submission, results are available for patients with stroke and congestive heart failure. The preliminary results show large regional variation in outcomes, with the largest variation observed in 30-day mortality for stroke patients (up to twice the national average in some regions). The PopGroup has a significant effect on all outcome parameters, with the largest effect on mortality. The predicted 365-day mortality rates range between 7% and 38% for stroke patients and between 5% and 45% for congestive heart failure patients across different PopGroups. Accounting for these differences in outcome parameters between PopGroups reduces but does not eliminate the regional variation in outcome parameters. Comparing the best and worst performing regions reveals that good performance on efficiency indicators does not always coincide with similarly good performance on quality indicators, and vice versa.

Conclusion
The PopGrouper sets itself apart from existing approaches to measure morbidity-related health care needs in Germany by defining mutually exclusive groups that consider multimorbidity and exhibit a high degree of morbidity differentiation. The current results indicate that the PopGrouper can make a significant contribution to controlling for morbidity-related care needs in regional comparative analyses, thus allowing for better conclusions about unwarranted variations in quality and efficiency of health care.

Access to Care Redefined: Integrating Physical and Virtual Access Measures to Reflect Hybrid Care with Telehealth

Tracy Onega, Fahui Wang PhD, Jennifer Alford Teaster MS, Lingbo Liu Ph

Background
Measuring access to care is a fundamental component of identifying service gaps, assessing care utilization, evaluating outcomes, and developing care delivery models to mitigate disparities. While access is a multidimensional construct, geographic measures, such as travel time, have long been employed to characterize potential access to care. With the expanding use of telehealth and other forms of digital medicine, virtual access, based on internet connectivity, must be incorporated into measures of physical access to reflect the growing reality of hybrid care.

Objectives
To develop national measures of healthcare access that integrates geographic and virtual accessibility to health care and identify gaps in both geographic areas and population subgroups that signal new dimensions of health care inequity (telehealth shortage areas).

Methods
We used four main data domains with national coverage: a) physicians/facilities (Centers for Medicare and Medicaid Services), b) population and sociodemographics (US Census), c) broadband and cellular availability (Federal Communications Commission), d) road networks and geographic boundaries (ArcGIS) to extend the 2-step floating catchment area (2SFCA) methodology to a new 2-step virtual catchment area (2SVCA) incorporating both spatial and aspatial factors. We measured and mapped 2SVCA at the level of census block groups. Factor analysis allowed us to characterize telehealth accessibility regionally and by population characteristics.

Results
Mapping of the 2SVCA measure compared to geographic access alone revealed areas with better accessibility due to telehealth potential and those with relatively poorer accessibility due to both limited geographic and virtual access. We observed the expected decrement of hybrid access when moving from more urban to more rural areas. We also noted population-specific differences in geographic v. virtual access; African Americans were disproportionately in areas of greater geographic accessibility, but lower virtual accessibility. Rural and frontier residents were disproportionately in areas with both types of accessibility the lowest.

Conclusion
The 2SVCA allows a population-based measure of healthcare access that better reflects the reality and nuanced patterns of both in-person (physical) and telehealth (virtual) care. Trends in health information technology and digital medicine point to the increasing need to incorporate virtual modalities into our measurement of access to both evaluate healthcare and evolve new models of delivery. Developing a reliable measure of hybrid access is critical to assess whether the increasing prevalence of telehealth may help alleviate the disparities in healthcare access in rural areas and for disadvantaged populations, or exacerbate the existing gaps.

Light and Shadow of Public Reporting in Korea: 25 years of achievements and future challenge

Soomin Kim, Jin Yong Lee

Since 2001, Korea has evaluated healthcare institutions through the Health Insurance Review and Assessment Service (HIRA) and publicly disclosed the results. All healthcare institutions, including clinics and hospitals, are assessed for their quality levels, and the results are regularly made public. Additionally, the government introduced a performance-based incentive system (Pay-for-Performance, P4P) linked to healthcare quality assessment results. The predominantly Fee-For-Service (FFS) model is being supplemented by performance-based payments to shift from volume-based to quality-oriented healthcare services. HIRA also conducts quality improvement programs to support healthcare institutions. This initiative has significantly impacted Korea's healthcare landscape.

Over the past 20 years, advancements in healthcare quality evaluation and public reporting have provided substantial benefits. The public can access the results of healthcare quality assessments anytime and from any location through HIRA's website or mobile application. These results help the public select hospitals, improving the reputation of healthcare institutions. Additionally, healthcare providers are encouraged to improve service quality, enhancing healthcare services in Korea. For instance, the prescription rate of antibiotics for colds decreased significantly from 73.3% in 2002 to 35.1% in 2021, and the incidence of pneumonia in hospitalized patients with acute hemorrhagic stroke dropped from 4.6% in 2016 to 2.4% in 2020. These evaluations enable healthcare institutions to offer patient-centered care, enhancing patient satisfaction. Furthermore, the evaluation results inform government healthcare policy decisions, contributing to a more effective health management system.

However, public reporting of healthcare quality assessments presents certain limitations. Data collection and reporting impose administrative burdens on healthcare institutions, particularly smaller ones. Concerns about data accuracy and consistency can undermine the reliability of the results. Some healthcare providers view the assessments as inaccurate or unfair, leading to conflicts with HIRA. Due to these complex reasons, in 2014, the Korean Heart Association boycotted the evaluation of healthcare quality for ischemic heart disease. Furthermore, managing vast amounts of patient data raises privacy concerns, posing challenges to data integration and utilization. One additional issue is the perception of HIRA as a "Big Brother." HIRA holds extensive patient data, and some providers feel dominated by its data and purchasing power. Nonetheless, Korea's stringent personal data protection regulations ensure that HIRA adheres to the Personal Data Protection Act, safeguarding data security. It is essential for providers to understand that the data is used responsibly. Building trust between HIRA and healthcare providers is crucial for maximizing the benefits of public reporting.

In conclusion, public reporting of healthcare quality assessments promotes high-quality service delivery and continuous improvement through financial and non-financial incentives. However, ongoing efforts are required to address the perception of HIRA as a "Big Brother," ensure data privacy, and enhance trust between HIRA and healthcare providers. Only through collaboration and mutual trust can the full potential of public reporting be realized, leading to a more transparent, effective, and patient-centered healthcare system in Korea.

Public access to information from clinical quality registries in Norway

Eva Stensland

Background

Over the past 20 years, Norway has focused on collecting information about the quality of specialist healthcare through quality registries. Today there are 60 National clinical quality registries, covering a range of diseases and including patients from across the country.

In 2009, Centre for Clinical Documentation and Evaluation (SKDE) was commissioned to establish, support, and develop infrastructure for clinical quality registers in their efforts to improve healthcare. Initially, the information collected in these quality registries was only available to the institutions and clinicians involved. The chairmen of the registries used the data for research and peer discussions.

Objectives

In 2012, the chairmen of the registries were commissioned to publish clinical results to the public. Some chairmen were reluctant to share results outside their specialist community, while others were more enthusiastic about the opportunity to share results.

In 2013, SKDE began publishing each hospital's results collected from different quality registries on our website. Initially, there was some discontent both among certain chairmen, a few clinicians and hospitals. In addition, some clinical results were questioned. Over time, the interest in results has increased among decision makers, clinicians, patients, and media.

The chairmen of the quality registries have done an excellent job of developing quality indicators in recent years. Today, our website contains results for all Norwegian hospitals for over 300 indicators covering a broad range of healthcare quality aspects. Such practice emphasizes the importance of transparency in healthcare and commitment to quality improvement.

Updating the Norwegian Child health care atlas – What has happened during the last nine years?

Bård Uleberg, Hanne Sigrun Byhring, Tove Johansen, Atle Moen, Gunnar Claus, Mattias Ugelvik

Background

Facing an aging population and an increasing deficit of healthcare personnel, it is necessary to prioritize services with documented effect. In 2015, as part of an effort to map geographic variation and overuse of specialist health services, the Norwegian Child health care atlas was published. The atlas investigated a range of health care services for children in the period 2011- 2014 and found substantial unwarranted variation. It was especially surprising that one in three children, in what is presumably one of the worlds healthiest child populations, was in contact with the specialist health service annually.

Some hospital trusts was encouraged to reduce activity in their pediatric departments by these findings, but there was no nationally coordinated policy towards reduced activity and geographic variation throughout the specialist health care service in Norway. In an updated atlas we seek to analyze what has happened in the nine years following the publication of the Norwegian Child health care atlas.

Objectives

The study will identify long-term trends and changes in geographic variation in health care use in the period following the publication of the Norwegian Child healthcare atlas, with particular focus on potential low-value services. The impact of the COVID-19 pandemic will also be described. Finally, we will identify some of the original analyses from the Child health care atlas for regular yearly updates in a new supplementary webservice under development at SKDE.

Methods

This study utilize data from the Norwegian Patient Registry and the Norwegian Registry for Primary Health Care for the years 2015-2023, in addition to the published data from the Child healthcare atlas (2011-2014). The study will describe geographic variation in health care use for residents in Norway aged 0 to 16 as age- and gender adjusted utilization rates for 21 different hospital referral areas.

Results

Preliminary results indicate a reduction by approximately 15.000 medical admissions for children over a nine year period, reducing the admission rate per 1.000 children from 35 to 28. During the same time period there was a minor increase in the outpatient activity. While some hospital referral areas has reduced their activity, other have increased. Hence, the geographic variation persists with a twofold difference between the areas with the highest and the lowest rates.

Conclusion

Publishing evidence of geographic variation does not lead to reduced variation and equitable health services alone. In order to achieve this, agreed-upon activity goals needs to be established, and coordinated efforts needs to be implemented. To support this processes, updated analyses monitoring the development activity and variation in utilization of health care services needs to be available.

Aeromedical Retrievals, Socioeconomic Disadvantage, Disease Burden, and Health Workforce across Rural and Remote South Australia

Dr Lee Puah, Dr Engida Yisma, A/Professor Martin Jones, Dr Marianne Gillam, Dr Zoe Schofield, A/Professor Fergus Gardiner

Background

Approximately 7 million Australians, constituting 28% of the population, live in rural and remote areas. Availability and access to appropriate healthcare remains a challenge in these communities. Moreover, the communities often face heightened levels of socioeconomic disadvantage, a factor that is associated with poorer health and contributing to the disparity in health outcomes compared to metropolitan communities. The Royal Flying Doctor Service (RFDS) provides primary care and emergency services to patients who live in areas that cannot be easily accessed by road or are situated too remotely for standard road ambulance services. There is limited research undertaken on comparative analysis of the geographical distribution of the aeromedical retrievals for preventable conditions, socioeconomic disadvantage, disease burden and health workforce in rural and remote communities. This project aims to address this knowledge gap by using RFDS data and existing publicly available data sources to compare aeromedical retrievals, socioeconomic status, availability of health professionals and health status across rural and remote areas in South Australia served by the RFDS.

Objectives

Our study will map the geographical distribution of aeromedical retrievals in rural and remote South Australia over the last five years and investigate the correlation between retrievals for preventable conditions and health workforce distribution, socioeconomic disadvantage and disease burden.

Project plan

We will conduct a cross sectional geographical analysis using data from five sources: (1) the RFDS aeromedical primary evacuation retrievals and inter-hospital transfers in South Australia, including ICD10 codes, locations and point of definitive care over the past five years; (2) the demographic and health status data obtained from the Australian Bureau of Statistic (ABS) based on census 2021; (3) the Index of Relative Socioeconomic Disadvantage from the ABS; (4) the public registration data of health professionals from the Australian Health Practitioner Regulation Agency (AHPRA); and (5) the Modified Monash Model (MMM) 2019 and the Australian Statistical Geographical Classification Remoteness Area (ASGS-RA) from the Australian Department of Health.

Outcome

The project will provide a map of aeromedical retrievals, disease burden, health workforce and socioeconomic status to provide localised evidence supporting the need for targeted resource allocation for preventive healthcare in rural Australia. The research findings will inform policy and planning efforts to improve health outcomes in rural and remote South Australia.

Geographic Variation in the Utilization of Specialist Healthcare for Patients with Substance Use Disorder in Norway; a Population-Based Registry Study

Per Arne Holman, Haji Kedir Bedane, Jørgen Gustav Bramness, Lars Lien, Knut Ivar Osvoll, Christian Thoresen

Background
Norway offers free access to specialized healthcare services for the entire population through tax-based insurance. Four regional health authorities (RHA) commission, fund, and predominantly provide these services to ensure equal access. One of a few notable exceptions is the interdisciplinary treatment of substance use disorder, where the state utilizes private institutions without catchment areas.

Objectives
This study aims to measure geographic variations in specialized healthcare utilization among patients with substance use disorder in Norway. We will investigate whether RHA procurement of capacity in the private sector improve equitable access to and utilization of services.

Methods
We analyzed data from the Norwegian Patient Registry for 2017–2021 for adult patients with substance use disorder. Patients belong to 22 catchment areas within four regions. Patients and activities are reported for diagnosis groups (F10-F19); alcohol, opiate, cannabis, and all other substances. Excluded F1122 and F17. Providers are either responsible for a catchment area or commissioned for the region. Outcomes measured were number of patients, outpatient contacts, admissions, bed days, and length of stay. Rates per 1,000 adult inhabitants were adjusted for age and gender. Geographic variations were measured using extreme quotient (EQ and EQ_95), coefficient of variation (CV), and systematic component of variation (SCV and SCV_95). There has been a general suggestion that SCV values above three are likely due to the result of differences in medical practice values, five to ten and greater than ten represent high and extremely high levels of variation between geographic units respectively. To demonstrate the effect of extreme values on measures of variation, we determined the EQ 5–95 and SCV 5–95, by excluding the fifth and the 95th percentile.

Results
We found 58,261 unique patients (13.85/1,000 inhabitants), 1,134,341 contacts (23.1/patient), 78,263 admissions (2.8/patient), and 2,774,319 bed days (99.7/patient) over five years. The geographic variations range from [18.4-114.7] in out-patient contact rate, [2.6-6.6] in admission rate, and [81.3-225.6] in bed-days per 1,000 inhabitants.
Out-patient contact rate had the highest variation: EQ [6.2], EQ_95 [3.6], CV [41.9], SCV [13.4], and SCV_95 [10.0]. Variation for admissions was EQ [2.6], EQ_95 [1.9], CV [23.5], SCV [3.2], and SCV_95 [2.2]. Variation for bed-days was EQ [3.5], EQ_95 [2.4], CV [26.1], SCV [5.2] and SCV_95 [2.5]. Variation in all measures was reduced for all three indicators when capacity from private hospitals was included, compared to hospitals with a catchment area. Looking at out-patient contacts and bed-days together, three catchment areas increased their capacity including private institutions by 3.5-4.9. Three areas only increased by 1.3-1.4. Most diagnose specific rates of all three indicators demonstrated extreme high variation, SCV> 10.

Conclusion
Variation in SCV_95 rate of out-patient contacts was high, but low for admissions and bed-days. With all catchment areas included variation were extremely high. RHA procurement of capacity in the private sector improved equitable access to and utilization of specialized health services for substance use disorder treatment

Understanding Variation in Broad-Spectrum Antibiotic Use for Community-Acquired Pneumonia: A Mixed Methods Study

Barbara Jones, Jian Ying, Peter Taber, Jorie Butler, McKenna Nevers, Makoto Jones, Tom Greene, Susan Zickmund, Charlene Weir, Matthew Samore

Background
The use of broad-spectrum empiric antibiotics in community-acquired pneumonia (CAP) is common despite a lack of evidence of benefit. Variation in antimicrobial use is widespread but poorly understood.

Objectives
To understand variation in empiric broad spectrum antibiotic use among emergency departments in the VA system, we integrated (1) quantitative analyses of national practice data to assess provider, facility, and geographic predictors of the use of antibiotics with killing activity against methicillin-resistant Staphylococcus aureus (anti-MRSA) and Pseudomonas aeruginosa (anti-PAER), and (2) qualitative interviews with emergency department providers exploring the process of antimicrobial decision-making.

Methods
We identified all hospitalizations for CAP occurring between 1/1/2006-12/31/2016 among 128 VA Medical Centers. We modeled each patient's probability of receiving anti-MRSA and anti-PAER antibiotics based upon patient factors by fitting machine learning models from 75 patient variables (age, demographics, comorbidities, initial vital signs and labs, and clinical risk factors for MRSA and PAER) and calculated the adjusted probability of anti-MRSA and anti-PAER antibiotic use. We examined provider- and facility-level predictors of anti-MRSA and anti-PAER use. We plotted density curves to visualize variation attributed to provider, facility, or Veterans Integrated Service Network (VISN). We interviewed 16 emergency department (ED) providers from a diverse sample of 8 VA facilities that included a cognitive task analysis and institutional change assessments to characterize the process of empiric antibiotic decision-making and potential sources of variation. Athematic analysis was conducted using a grounded theory approach conducted by two trained qualitative analysts.

Results
Among 215,803 CAP hospitalizations occurring from 128 VA emergency departments, 31% received empiric anti-MRSA and 29% received empiric anti-PAER antibiotics. Hospitalizations at upper-decile facilities had a 50% and 45% adjusted probability of receiving anti-MRSA and anti-PAER antibiotics, compared to 15% and 20% in the lower-decile facilities. Factors most predictive of anti-MRSA or anti-PAER use after adjusting for patient characteristics were high facility complexity level (33% and 30% in high-complexity versus 15% and 20% in low-complexity facilities) and urban designation (33% and 30% versus 25% and 26% at rural facilities). No provider factors were identified to have significant effect on practice, and variation in empiric anti-MRSA and anti-PAER use was almost completely explained by facility identity. In describing the decision-making process, interviewed ED providers reported strong considerations of the opinions of colleagues, admitting providers, and clinical leadership during antibiotic prescribing, and expressed high trust in both national clinical practice guidelines and local order sets.

Conclusion
Empiric use of anti-MRSA and anti-PAER antibiotics in CAP is explained almost completely by facility identity and is greater in high-complexity, urban hospitals. ED providers report strong local social influences during decision-making as well as trust in guidelines. Facility-level clinical champions and order sets that align with practice guidelines are thus important strategies for reducing inappropriate variation.

GPs' income variation in a fee-for-service system: a descriptive analysis using population-wide register data

Kristian Kraft

Background
General practitioners (GPs) are commonly remunerated by fee-for-service, capitation, or fixed salary payment. In Norway, a majority of GPs are self-employed and remunerated by a combination of capitation and fee-for-service. The fees are standardized at the national level and reflect health services claimed by the GPs, such as consultations and procedures, incentivizing GPs to increase the volume of health care

Objectives
We aim to explain income variation among Norwegian GPs by investigating which type of income (fees or capitation) that contributes to the income variation between high-income and low-income GPs. Also, we describe how the income groups differs in aspects such as fee utilization and consultation duration.

Methods
We utilize comprehensive administrative register data on all self-employed specialist GPs with at least 100 curative working days in Norway 2021 (N = 2415). For each GP we calculate their gross income from capitation and fees and divide them into following groups: high-income GPs (highest income quartile), low-income GPs (lowest income quartile) and the middle-income GPs (the remaining 50 %). We calculate different measures, including total income, income per patient, fee utilization and consultation duration, and compare between the income groups.

Results
In 2021, high-income GPs earned twice as much as low-income GPs (€338 000 vs. €170 000). This income difference can be broken down to three categories: high-income GPs have higher capitation income (15 %), they have higher expected fee income due to more patients (67 %), and they have higher fee income than the number of patients would suggest (18 %). High-income GPs earn €183 per listed patient in a year, while low-income GPs earn €131. Around half of this fee income difference per patient can be attributed to more frequent consultations per patient (and related specialist fees). Still, there is no difference in the time spent per patient in a year (39 minutes in both groups), due to high-income GPs' having shorter consultations (16 min vs. 20 min for physical daytime consultations). The remaining half of the income difference per patient can be attributed to increased utilization of procedure fees per patient (11.4 vs. 7.6 procedures per patient). High-income GPs use almost every procedure fee more per patient. The procedure fees that contribute most to the fee income difference per patient are prolonged consultation fee (6.7 %), systematic medication review (4.6 %), COVID-19 vaccination in evening/weekend (4.2 %) and talking therapy (3.9 %).

Conclusion
Our results show large income variations. Despite having more patients, GPs with the highest income in absolute numbers also have 40 % higher earnings per patient than low-income GPs. Although they do not spend more time on consultations per patient over the course of the year, they earn more from more frequent and shorter consultations. In addition, high-income GPs use more of almost every procedure fee per patient. The results indicate that there are systematic differences in the degree to which GPs adapt to financial incentives regarding their decisions on medical treatment, as well as their inclination to remember, interpret and correctly apply fees.

Assessing the value of health and social services system at the national level

Joanne Castonguay, Georges-Charles Thiebault, Maude Laliberté, Ariane Dubé-Linteau

Background

Quebec's healthcare system governance mechanisms are mostly oriented towards quantity of services. Access to services is difficult so it has traditionally been assumed that improving the quantity of services will improve access. The whole governance system is developed around the notion of quantity of services: management's objectives, financing and payment mechanisms, quality control and measurement systems. Moreover, while there are ethical considerations at all levels of the system, they are mainly documented at a clinical level.

The health and welfare commissioner's mandate is to assess Quebec's health system performance, inform the public and recommend improvements to the government .
Our value proposition is to: Clarify and inform the public about the context and challenges of the healthcare system performance; support the adaptability of the system to better meet the needs of the population and help unlock institutional barriers.

Objectives

Our health and welfare system's performance analysis framework is three-pronged: the value produced for the population; the contribution of governance mechanisms to the results and the ethical considerations presented. There exist little information or published frameworks on value assessment at the system level and none that encompasses health and social services. The same can be said for the assessment of governance mechanisms' contribution to the system's goals. And, we have not found frameworks that considers all three components, quantified performance, governance assessment and ethical considerations into performance analysis. Our research objective is to develop one.

Methods

Literature reviews: one on international experiences at measuring health system's value at the national level; one on limiting the number of indicators to assess health systems' performance; on governance evaluation in health and on the contribution of ethics to performance analysis. Production of an inventory of available and documented indicators for an exhaustive (all dimensions and all sectors) performance assessment. Nominal group methodology was used to elicit the values that participants believe should guide the healthcare system, and their vision of a high-performance healthcare system.
Two population-based surveys on population priorities and on users' experience in relation to their value expectations. Indicators selection and construct of value judgment including experts consultations.

Results

We have since adopted a definition of value and a framework for value assessment at the systemic level encompassing all dimensions of the system along the whole continuum of care and services, from prevention to long term and palliative care services. Our framework takes into considerations societal values such as equity and sustainability. We have also developed a limited set of indicators to assess the value provided by the health and welfare system to the population and a framework for governance assessment. This last piece has enabled us to make practical recommendations on the means to transform the system towards better value for the population.

Conclusion

We cannot pretend that our framework is stable or complete but we can share interesting findings on population's priorities and expectations and how to better assess the system's capacity to produce value for the population. We need more research and collaboration on Value based Health systems, on their assessment and on how to transform systems at the policy level.

Is geographical variation in the place of death a relevant measure in rural communities?

Michael Loynd, Sarah Griffin, Tim Wilson

Background

NHS Highland is the most remote and rurally challenged health area in the UK, with a population of 320,000 people across an area of 32,500 square kilometers. Around 3000 people across this region would benefit from palliative end of life care (PEoLC) annually. A recent Accounting for Value report highlighted geographical variation in where people die in NHS Highland. Given that in remote and inaccessible locations variations are likely to occur, we ask whether tracking the place of death is useful, instead we propose measuring the quality of someone's death, and variations in that outcome.

Objectives

To identify geographical variation in location of death for residents of NHS Highland at end of life:

- What is the impact of remoteness and accessibility on the likelihood of where someone dies?
- Are we using the resources we have available for end of life support as efficiently and fairly as possible? Gray et al (2017)
- Is it possible to provide the same process of care (e.g. place of death) in considering ethical factors of; justice, harm, beneficence, and respect for autonomy.

Methods

National Records Scotland (NRS) records of deaths were accessed for NHS Highland residents. Deaths were categorised as potentially benefiting from palliative care using ICD-10 as in Finucane et al., and Etkind et al. Deprivation and Urban-rural status were derived by Public Health Scotland lookups to Scottish Index of Multiple Deprivation and Scottish Government Urban-Rural classification. Hospice locations of death were identified by the word 'hospice' in the place of death. Otherwise, locations of death were categorised using grouping of locations codes, published by Public Health Scotland.

Results

In NHS Highland, your place of death is highly dependent upon where you live. It was identified that living in a very remote rural town, or area is associated with a higher likelihood of dying in a hospital and lower likelihood of dying in a care home or hospice. With whether you die in a community or acute hospital is also dependent on where you live. This is driven by geographical and rurality factors related to proximity to services.

Conclusion

Geographical variation in where people die is inevitable in very remote and inaccessible locations. For those living in remote and rural classified areas it is associated in a higher likelihood of dying in hospital, which may be low value care with increased risk of harm6. But the place of death does not necessarily correlate with the quality of death. It is impossible to tell if this inevitable variation in process represents inequity. This means that in rural areas, variations in PEoLC should be judged by measures of the quality of death (outcome) rather than the place of death.

PART 2 - POSTER SESSION

PART 2- POSTERS SORTED BY THEMES AT THE EXHIBITION

1. LOW-VALUE CARE
2. PUBLIC REPORTING OF HEALTH CARE VARIATION AND HEALTH PROVIDER PERFORMANCE
3. NOVEL DATA AND DATA LINKAGE METHODS FOR HEALTH CARE EVALUATION
4. ECONOMIC ANALYSIS OF UNWARRANTED VARIATION EXAMINES PRICES, SPENDING AND COSTS
5. SYSTEMIC CAUSES AND REMEDIES TO UNWARRANTED VARIATION
6. NEW RESEARCH IN POPULATION-BASED HEALTH CARE MEASUREMENT AND VARIATION

Neuroimaging in Norway, temporal and geographical variations

Ingrid Ø. Brandsæter, Eivind R. Andersen, Bjørn M. Hofmann, Elin Kjelle

Background
Geographical variations of diagnostic imaging are well documented. These variations in imaging are partly due to overutilisation because of low-value imaging (i.e. imaging that do not change the patient diagnosis or treatment). Two neuroimaging examinations, Computed Tomography (CT) of the head and brain Magnetic Resonance Imaging (MRI) are identified to be of low value for specific patient groups or clinical problems.

Objectives
To investigate the use and the geographical variation of neuroimaging in Norway from 2013 to 2021, with a focus on CT of the head and brain MRI.

Methods
Outpatient data was collected from The Norwegian Health Economics Administration (Helfo). Inpatient data was collected directed from hospitals or extrapolated based on inhabitants and outpatients in the hospital trusts. Missing inpatient data was estimated based on population distribution and the outpatient imaging use profile for each hospital trust. Data was collected from 2013 to 2021, and included patients' age and sex, NCRP-code, examination name, modality, hospital/imaging centre, and whether they were in- or outpatients. Data was analysed with descriptive statistics.

Results
On average, 782 of 10,000 inhabitants had a neuroimaging examination each year. Brain MRI was the most used examination during the study period, followed by CT of the head, and thereafter imaging of the cervical spine (MRI, CT and Conventional Radiography (CR)). The total use of neuroimaging examinations increased by 11.5% from 2012 to 2021. There were geographical variations, where the catchment area of South-Eastern Norway Regional Health Trust had the highest relative use of neuroimaging, followed by the Northern and Central Norway, while the Western Norway had the lowest relative use.

Annual average use of CT of the head and brain MRI were 242 and 275 examinations per 10,000 inhabitants, respectively. Head CT use was stable throughout the study period, and brain MRI had a 15% increase during the period, however, the utilisation decreased slightly in 2020 for both examinations. 71% of head CT examinations were of inpatients. For brain MRI, 43% was outpatient examinations performed at private imaging centres. There were geographical variations in the use of head imaging, the range from the area with lowest to highest use was from 158 to 308 head CTs per 10,000 inhabitants, and 170 to 404 brain MRIs per 10,000 inhabitants annually.

Conclusion
The total use of neuroimaging increased from 2013 to 2021, with substantial geographical variations. The use of head CT was stable, while the use of brain MRI increased throughout the study period. Geographical variations were observed for both MRI and CT, the area with the highest use had about twice as many examinations than the area with lowest use. Variations in the use of imaging spur reflections on the possibility of over- or underuse in different areas.

Laboratory medicine – small area variation

Kristel Ailin Guldhaugen, Tove Johansen, Janice Shu

Background
Laboratory Medicine is a discipline of medical science that analyses body fluids through the numerous existing laboratory investigations of biological samples. Laboratory investigations play an increasingly fundamental role in all branches of medicine, from oncology to chronic disorders.

This project is part of a Norwegian national initiative that aims to reduce unwarranted variation in the use of laboratory medicine, and to reduce the use of low value services within this field.

Objectives
The study will describe geographic variation in usage of laboratory medicine in the period 2018-2023, with particular focus on potential low-value services and differences in health expenditure per capita between geographical areas.

Methods
This study utilizes data from the Norwegian Patient Registry, the Norwegian Registry for Primary Health Care and The Norwegian Health Economics Administration for the years 2018-2023. The study will describe geographic variation in usage of laboratory medicine for residents in Norway aged 0 to 105 by comparing the age- and gender adjusted utilization rates for the 21 hospital referral areas and 357 municipalities. In addition, the study will describe differences in health expenditure per capita between the geographical areas and highlight the potential for redeploying resources from low value services in laboratory medicine.

Results
Results indicate substantial geographical variation both in the general use of laboratory services and in the use of low value services. There are large unwarranted variations in health expenditure per capita between the geographical areas. The potential for redeploying resources from low value services in laboratory medicine to services that benefit patients is high.

Conclusion
Publishing evidence of geographic variation alone does not lead to reduced variation and equitable health services. In order to achieve this, agreed-upon activity goals need to be established, and coordinated efforts need to be implemented. To support this process, analyses that describe activity and variation in utilization of laboratory services need to be available. This study provides such information. The next (currently ongoing) step is to define indicators and key measures to develop instruments to reduce unwarranted variations.

Current nursing home care staffing trends from Swiss long-term care- a time-series analysis of routine data from 2018-2022

Catherine Blatter, Michae Simon, Franziska Zúñiga

Background
Switzerland has one of the most advanced healthcare systems in the world, including institutional long-term care. Yet the prognosis of care staff shortage is a growing concern for healthcare providers. Despite its urgency, there is a lack of research on staffing trends in Swiss nursing homes.

Objectives
This analysis aimed to describe current nursing home care staffing trends in Switzerland using routine data.

Methods
We conducted a retrospective longitudinal analysis of administrative staff roster and resident claims data including all long-term care units in a multisite nursing home system in Switzerland. The study timeframe ranged from 2018-2022. We examined daily supply-demand-match (operationalized as number of staff availability adjusted by resident acuity), number of staff absences and deployment of pool staff. We calculated trends using time-series decomposition for all outcomes and described the overall effect by comparing the first and last study years using means and confidence intervals. We also performed structural and temporal sensitivity analyses.

Results
We linked data from 444'244 staff shifts and 325'127 resident days across five years. We observed a decrease of direct care supply-demand match from an daily average number of staff of 6.87 [95%CI 6.84 - 6.87] in 2018 to 1.40 [1.34- 1.48] in 2022 ($p<0.001$), meaning that for each year of the study, there was one less staff member available per day for the same resident case mix. Simultaneously, staff absences increased from an average number of daily sickness-cases of 11.08 [11.06- 11.09] to 14.65 [14.58- 14.71, $p<0.001$], and daily deployment of pool-staff increased from 3.20 [3.18- 3.22] staff members to 5.58 [5.51- 5.65, $p <0.001$]. Sensitivity analyses including indirect care staff in supervisory or leadership tasks, as well as disaggregation at the unit level, confirm the trends, albeit less pronounced, indicating a high between-unit variation. Temporal sensitivity analyses considering pre-COVID years 2018-2019 confirm the decreasing supply demand match as well as the increased pool staff deployment, but show a reversed trend in absences, all with weak effect sizes despite statistical significance.

Conclusion
We observed a statistically and clinically significant decrease in the available staff supply across the study years, along with an increase in staff members' short-term absences, such as sickness leave. The decreasing trend persists despite a significant increase in the deployment of pool- or agency staff. The results potentially reflect the vicious circle of limited staff supply leading to increased individual workload that itself poses a risk of resulting in a higher absence rate. Our findings also emphasize the existing reality of the predicted staff shortage in Switzerland. Despite utilizing pool- or agency staff, they fail to compensate in the current circumstances. The results underline the urgency to provide fast and novel solutions on the healthcare policy level, mainly offering financial incentives to invest in education and recruitment as well as improved working conditions.

Learning from Variation: A Mixed Methods Evaluation of Emerging Practice Changes for Pneumonia across the US Veterans Affairs Healthcare System

Barbara Ellen Jones, Chong Zhang, Jian Ying, McKenna Nevers, Makoto Jones, Jorie Butler, Susan Zickmund, Dan Scharfstein, Karim Khader

Background
For the past thirty years, medical therapy of pneumonia has been limited to antibiotics and supportive care, with little attention to viral pathogens and the host immune response. The COVID-19 pandemic exposed opportunities to refine this approach.

Objectives
To examine practice changes in antibiotic and steroid use for pneumonia emerging from the pandemic using mixed methods that integrate national practice data and qualitative interviews.

Methods
We evaluated all emergency departments encounters with a diagnosis of pneumonia and chest image consistent with pneumonia between 1/1/2015-4/30/2023 among 134 US VA Medical Centers. We fit mixed-effects logistic regression models to predict 1) no antibiotic use and 2) corticosteroid use. We visualized temporal trends in observed and modelled treatments using patient data from 1/1/2015~4/30/2016 (early model), and 1/1/2022~4/30/2023 (late model). The random effects of facility, which capture the variations by facility when all other factors (the fixed effects) were adjusted for, were examined in both the early and late period, and the change in treatment adjusting for case mix was calculated as the difference between the random effects estimated in the late and early models. Qualitative interviews were conducted (2023-2024) with front-line clinicians from 8 VA facilities surrounding their experience in the management of pneumonia, mental models of disease, and influences on practice. A grounded theory approach was used by two qualitative analysts in determining the themes.

Results
Among 337,499 encounters, the percentage receiving no antibiotics increased (7% to 16% from early to late period) with a dramatic increase in observed versus modelled trends (figure 1); the use of corticosteroids also increased (29% to 34%), but with minimal difference between observed and modelled trends (figure 3). There was widespread variation in change in both antibiotics and corticosteroid use (Figures 2 & 4). In semi-structured interviews, clinicians reported increased recognition and the ability to detect viruses as a major change to practice. Additionally they spoke of strong local influences on practices including from colleagues, local protocols, stewardship, and widely varied models of disease by facility and specialty.

Conclusion
Changes in practice for pneumonia have emerged from the pandemic, which may be related to recognition of viruses, advancing diagnostic technology, and changing models of disease, mediated by strong local social influences. Determining which of these practice changes have positive or negative impacts on outcomes is the subject of future work.

Geographical study of stroke incidence and mortality rate using Bayesian analysis

Janice Shu

Background
Stroke is an acute condition and requires immediate medical attention. Moreover, it has high morbidity which means that stroke patients put a heavy burden on the healthcare system. Studying geographical and socioeconomical effects on stroke patients enables us to build a healthcare system that provides equal and high quality services.

Objectives
The main focus of this study is to examine if there are any geographical variation in stroke incidence and mortality rates in Norway. In addition the socioeconomical variation in stroke mortality rates are investigates.

Methods
The study is based on population-based data linking four different national registries at the individual level. Stroke patients are identified by using the Norwegian stroke registry and the Norwegian patient registry. The socioeconomic status and place of residence for this population is then obtained from Statistics Norway. The mortality information is obtained from the Cause of death registry.

While stroke incidence and mortality have been studied extensively, there have been few studies that use models within the Bayesian framework. We investigate geographical variation of stroke incidence and effects of socioeconomic status with multi-level Bayesian spatial models, and rusj factors of mortality rate with Bayesian Cox proportional hazards model.

Results
There is little geographical variation in stroke incidence rates and mortality rates. However, there are other risk factors for stroke mortality such as type of stroke, income and education levels.

Conclusion
The power of a Bayesian spatial model is the ability to take into account probabilities of each areas and their neighbours in order to identify spatial trends. The areas used in this study are the 21 hospital referral areas. While we found no geographical variation in stroke incidence and mortality rates within Norway in this study, it would be interesting to further investigate for smaller regions, for example 357 municipalities, to better utilize the strength of the Bayesian spatial model.
For the risk factors of mortality, we have focused on socioeconomic factors in the study. By including some other potential factors, such as comorbidity, timeliness of treatment and type of treatment, we would also get a more comprehensive understanding of risk of mortality.

To what extent may variation of hospital activity and outcomes be explained by "Burden of Disease"? An integrated analysis of health services and Global Burden of disease data

Philipp Storz-Pfennig

Background
Burden of disease (BOD) initiatives have created unique datasets on mortality and morbidity while healthcare atlas projects and similar endeavours use data on healthcare activity and capacity. There currently seems to be curious little overlap between these approaches.

Objectives
The present analysis used results from the "Global Burden of Disease Project" (GBOD) and hospital activity data to estimate to what extent hospital activity might be explained by BOD and to explore future directions.

Methods
GBOD Data on burden (prevalence + incidence) and data on GDP and hospital capacity (beds) for 2000-2019 per country were used as presumptive predictors regarding hospital episodes (OECD, WHO) in the primary analysis. A secondary analysis used burden and activity data to explain outcomes (mortality, if appropriate). Disease groups could be constructed from 18 GBOD disease classes with available disease-specific OECD-hospital discharge figures. Regression models (panel regression techniques) were computed and the relative contribution of predictors assessed. Models used fixed effects for years to control for secular changes and additionally models with fixed countries effects were computed.

Results
In the primary analysis (adj. R2 = 0.59) BOD for all diseases contributed to the prediction of all hospital activity to the extent of 58%- 94% (Hospital beds: 4%- 40%, GDP/capita: 1%-13%), based on all years and areas, without noticeable time trends and highly significant coefficients. When using area specific fixed effects the coefficient for BOD was only marginally significant (p = 0.06). In the secondary model BOD is no longer significant when fixed country effects are used (p= 0.80) and mortality shows a strong positive correlation (0.52) to hospital activity. In disease specific models (adj. R2: 14%-71%) BOD contributed to the prediction of hospital activity (median for all areas/years) between 81% for stroke (> 50%: ischemic heart disease, cox arthrosis, prostate cancer) and negative values (e.g. low back pain) suggesting increased activity alongside lower BOD. With some diseases, contribution of BOD increased over time, e.g. in breast cancer (18-23%, median over countries 2000 vs. 2019) and colorectal cancer (23%-32%), while in some cases (e.g. dementia) the impact of GDP increased, while the impact of hospital capacity decreased, and the impact of BOD did not change.

Conclusion
While BOD is a sizeable predictor of hospital activity, other less clearly legitimate factors have a non-negligible impact. Even if some time trends seem benign, overall strong "idiosyncratic" effects persist and specification of models with available data is challenging- but showing interesting relations of diseases, areas and over time might be more important than "perfect" explanations. GBOD estimations represent highly "processed" data from sophisticated models and may be influenced by service data used in their estimation. Still, referring to BOD should be of interest to healthcare variation studies, not least due to a widespread reception of the former. Subnational figures (e.g. UK, Norway, US) are increasingly available and may be used with a less restricted choice of predictor variables and additional (e.g. outpatient) data. This may contribute to the sustainability of atlas and like projects.

Geographic Variation in Patient Mobility for Elective Hip and Knee Arthroplasty in Norway

Yohannes Tesfay

Background
Free choice of provider for elective specialist health services in Norway allows geographic patient mobility. Hip and knee arthroplasty are high-volume elective surgical procedures that expose many patients to this option of choosing a provider. Geographic variation in patient mobility has been demonstrated for these procedures.

Objectives
This study aims to investigate variation in patient choice of health care provider for hip and knee arthroplasty and to identify factors at the patient and health care-system levels associated with the variation.

Methods
National population-based individual data on all adult patients having publicly funded elective primary hip or knee arthroplasty from January 2014 to December 2018 were obtained from the Norwegian Arthroplasty Register, the Norwegian Patient Registry and the Statistics Norway. Travel times to all eligible hospitals from the city hall in the municipality of the patient residency were calculated in minutes by fastest mean of transport, either by road and by air. The choice of health care provider among a set of alternatives is investigated using the mixed logit model. The variables related to the attributes of the care providers (waiting time, surgical volume, and separation of elective care from emergency activity) and the combination of patient and alternative attributes (treatment within Regional Health Authority (RHA), travel time and residency of adult children within 45 min of a care provider) are included in this model. Individual-level parameters of travel time ware extracted from the mixed logit model and then centered. A multilevel model is fitted to investigate the variation in patient preference for travel time across geographic regions and other patient characteristics.

Results and Conclusion
The marginal utility associated with high wait time is negative, while the estimated coefficients of high surgical volume, treatment within RHA, residency of a child near treatment unit all have positive values. This indicates patients' preference has a positive association with care providers near their child's residency, with high surgical volumes, located within the boundaries of their RHA and offering low wait time and travel time. In the three-level model, incorporating municipality and the geographic referral areas served by the health enterprises, 23% of the variation individual-level coefficients of travel time at the municipality level, 15% at the health enterprise level and the rest at the individual level. The findings reveal that advancing age, decrease in income level, higher education level, increase in comorbidity are associated with diminishing marginal utility for travel time. Gender, however, is not statistically significant as a factor.

Injustice Dimensions of Geographical Variation in Access to Rehabilitation Care

Miriam Chun, Hannah Steere, Mary Elizabeth Nelson

Background

Rehabilitation is a set of interventions designed to reduce disability and optimize daily functioning for individuals with health conditions due to aging, injury, or illness, thereby enhancing well-being and societal participation. In 2019, 2.4 billion people required rehabilitation, contributing to 310 million years lived with disability. Conflicts and humanitarian crises further increase demand. Despite its proven benefits in improving health outcomes, promoting independent living, and enabling education and employment, access to rehabilitation services shows geographical and demographic disparities.

Unequal Burden

Universal Health Coverage (UHC), as defined by the World Health Organization, aims to provide essential health services to all, including rehabilitation, without financial hardship. However, in many regions, rehabilitation is not integrated into primary health care and UHC, especially in low-and-middle-income countries (LMICs). Over half the population in these areas lacks necessary rehabilitation care, increasing poverty, social marginalization, and vulnerability to diseases and injuries3. Additionally, limited knowledge of financial benefits and long-term economic returns of rehabilitation services restricts funding at both secondary and primary care levels.

Africa's Barrier to Equity

In LMICs, poverty-associated conditions like poor safety measures, malnutrition, and high infectious disease rates increase disabilities, trapping individuals and caregivers in greater poverty from isolation and loss of productivity4. A major access barrier in LMICs is the shortage of skilled labor and hospital capacity constraints; many African countries have fewer than 0.5 rehabilitation professionals per 10,000 people and lack Physical Medicine and Rehabilitation (PM&R) education. This leads to limited rehabilitation competencies, inadequate recognition of rehabilitation needs, insufficient referrals and low value care. This gap hinders the cost-effective continuum of medical care required for individuals with disabilities.

Solutions

Since 2018, we have addressed these disparities through a two-year virtual PM&R training program for board-certified physicians in Sub-Saharan Africa, focusing on medical knowledge, workforce development, and advocacy to build relevant PM&R practices in their contexts.

Objectives

To understand the program's impact on participants' motivation and clinical behavior and 2) to assess their training resources and patient population, mixed-method surveys were conducted in 24 participants from Ethiopia, Ghana, Cameroon, and South Africa.

Results

Top three motivations for enrollment were enhancing clinical skills (n=17), training future PM&R specialists (n=14), and pioneering PM&R in their home countries (n=12). 86.3% of participants indicated the program prepared them for leadership roles. 59.1% reported significant career growth from the program. The most utilized PM&R skills in their patient population were stroke, spinal cord injury, traumatic brain injury, and amputee care. Half of the participants used program-acquired skills daily or several times a week. All agreed (54.5% strongly, 45.5% somewhat) that the program fostered advocacy for rehabilitation treatments.

Conclusion

This study highlights ethical challenges and injustices arising from geographical disparities in rehabilitation access. Addressing this gap with targeted workforce development and capacity-building initiatives using local primary care physicians is needed for effective collaboration and clear referral pathways. Enhanced support for these programs provides a useful ground to promote social justice and health equity globally.

Variation distance in outpatient care: Introducing the Unfair Distance Index for patient travel times

Vera Benedetto, Nicola Spezia, Sabina Nuti

Background
Proximity to health services- the distance between patients and points of care- is crucial for ensuring accessibility and continuity of care, especially for preventive and outpatient care that interest large segments of the population as chronic patients. Lack of proximity can act as a barrier to equitable healthcare delivery, making it a key goal for health systems with universal coverage to provide outpatient care close to patients' homes. This is particularly challenging in rural areas, where the demographic trends of a shrinking and aging population exacerbate disparities. To support health managers in addressing these differences, promoting equity, and ensuring environmental sustainability, patient travel times should be measured and considered in policy shaping and resources allocation.

Objectives
This study aims to introduce healthcare service proximity as a dimension of healthcare equity and environmental sustainability within the context of unwarranted variation. We propose and calculate a novel metric, the Unfair Distance Index (UDI), to capture the disparity in travel times for outpatient visits between urban and rural areas in Tuscany, Italy. Focusing on dermatological visits, this study analyses travel time variation to highlight disparities in healthcare access and evaluate their impact on equity and environmental sustainability.

Methods
The UDI was developed using 2023 outpatient administrative data from Tuscany. The index was calculated based on estimated round-trip travel times by car from each of the 273 Tuscan municipalities to the facilities where the visits are delivered, weighted by the number of examinations for each trip (323,433 examinations). After municipalities were grouped into urban and rural areas, the UDI was computed based on average travel times and standard deviations for each group to analyse travel time distribution. Gaussian distribution curves were employed to illustrate the variation in travel times compared to the average.

Results
Urban areas accounted for approximately 80% of visits. Preliminary results indicate higher variation in travel times for rural areas compared to urban areas. The average round-trip travel time in rural areas was higher (62 vs. 34 minutes in urban areas), with a standard deviation of 48 minutes, suggesting a broader range of travel distances. In contrast, urban areas had a standard deviation of 21 minutes, indicating travel times for most residents are closer to the average.

Conclusion
The initial findings highlight significant challenges for rural residents in accessing healthcare within proximity, marked by longer and more variable travel times. These disparities suggest a lack of resource allocation for rural Tuscan patients, with many needing to travel far to receive care. This issue is further highlighted when long travel times are combined with long waiting times and low service rates, offering a comprehensive understanding of healthcare access and underscoring the necessity for targeted interventions to enhance rural access. Furthermore, reducing travel time variation contributes to environmental sustainability by minimising carbon emissions from longer travel distances. Future research should focus on policy initiatives that prioritise reducing travel time disparities and promoting equitable healthcare access, fostering fairness and environmental stewardship across diverse geographical settings.

Impact of COVID-19 on Admission and In-hospital Mortality of Patients with Acute Myocardial Infarction in Korea: An Interrupted Time Series Analysis

Youngs Chang, Soo-Hee Hwang, Haibin Bai, Jieun Yun, Hyejin Lee, Jin Yong Lee

Background
Many studies have investigated that the COVID-19 outbreak caused a reduction in the number of patients who were hospitalized and visited emergency department for AMI.
However, these studies have several methodological issues. First, they did not use nationally representative data, which makes it difficult to measure overall effects. Second, since most of the studies were simple comparisons between before and after the pandemic, there was a limitation of applying time-series changes. Especially in an aging and rapidly changing society such as Korea, it is necessary to conduct interrupted time-series (ITS) analysis methods rather than simple comparisons between pre and post pandemic periods.

Objectives
The purpose of this study is to investigate the impact of COVID-19 on admission and in-hospital mortality of patients with acute myocardial infarction (AMI).

Methods
We constructed a dataset of monthly hospitalizations and mortality of inpatients with AMI from January 2017 to December 2021. Using an interrupted time series (ITS), we investigated how COVID-19 affected hospitalizations and in-hospital deaths of patients with AMI.

Results
ITS analysis showed that adjusted admission rates of AMI patients decreased due to COVID-19 ($P<0.001$). Reductions in admission rates were greatest among men, those aged 55 and older, and people with medical aid. COVID-19 did not affect inpatient mortality ($p=0.9608$), but in-hospital mortality decreased among men and those with medical aid.

Conclusion
Overall, we found that COVID-19 had an impact on admission rates of AMI patients but did not have a significant impact on in-hospital mortality. However, we also found differential impacts by gender, age, and socioeconomic status, indicating some may be more vulnerable. This highlights the importance of identifying and supporting these vulnerable populations to prevent poorer health outcomes.

Unwarranted region variation in maternal and perinatal outcomes in Aotearoa

Pauline Dawson

Background

Perinatal and maternal outcomes have significant regional variation within Aotearoa New Zealand , . With a total population of approximately 5 million people spread over 268,000 square kilometres and approximately 60,000 births a year such broad variation is referred to as the post code lottery .

Using national linked administrative data sets in Aotearoa New Zealand- the StatsNZ integrated Data Infrastructure (IDI), a composite maternal and perinatal mortality and severe mortality outcome was developed and calculated for small geographic population areas. These small area units (SA2) enable visualisation of data while protecting identifiability in sparsely populated regions. Comparison of administrative health regions (formerly known as District Health Boards) made up of these SA2 areas will be demonstrated in this presentation, to have broad variation even allowing for similar populations in regard to ethnicity, deprivation index and rural/urban geographic composition. This analysis will enable adjustment for confounding factors and identify where provision of services may differ.

National health system reforms were introduced in 2022 with the aim of achieving an equitable quality health care system but impacts on outcome are yet to be reported. Identifying variation differences in how services are being provided in regions with disparate outcomes will be critical in achieving this aim.

A pathology dashboard to inform diabetes diagnosis and management in rural, remote and socioeconomically disadvantaged populations in South Australia

Dr Marianne Gillam, Professor Libby Roughead, Professor Peter O'Loughlin, Professor Joy Rathjen, A/Professor Wayne Rankin

Background

Pathology testing is crucial for the diagnosis and management of diabetes, and pathology data provide objective insights into the quality of clinical practice and patient care. Diabetes remains one of Australia's greatest health challenges. Approximately 1.5 million Australians (5.6% of the national population) are living with diabetes, with type 2 diabetes accounting for almost 90% of cases. This is known to be an underestimate, with one Australian unaware of their diabetes for every four Australians with a diagnosis. Uncontrolled diabetes leads to complications that significantly increase mortality and morbidity associated with the disease, reducing the patient's quality of life. In 2018, diabetes was the underlying cause of death in 28% of Australians who died with diabetes, largely because of disease complications. Additionally, only 50% of people with diabetes are reaching target glucose levels. Australian evidence shows that 24% of kidney function testing of diabetic patients in primary care was not done in accordance with guidelines, and underuse of treatment occurred in a further 22%.

Objectives

Using data from SA Pathology, the state-wide public pathology service in South Australia, we will evaluate pathology use in diagnosing and managing diabetes in primary care to understand gaps in testing, and adherence to clinical guidelines and to explain the higher prevalence of the disease in geographically remote and socioeconomically disadvantaged populations.

Project plan

An epidemiological analysis of pathology services provided by SA Pathology for diabetes diagnosis and management will be undertaken, identifying concordance between referral practices and clinical guidelines. Evidence from the epidemiological analysis will be used to create a real-time data dashboard to promote quality referrals, serve as an education tool and inform primary care providers, health planners, and consumer organisations on the response to diabetes management. Workshops with key stakeholders will be held at each stage in the project to support and guide developments and dissemination of the dashboard, including pathologists, general practitioners, endocrinologists, consumer representatives, and local health departments.

Outcomes

Key outcomes of the epidemiological analysis consist of a comprehensive mapping of use of pathology in diabetes diagnosis and management in primary care in South Australia, including analysis by age groups, gender, socioeconomic status, and geographic location. The dashboard can be used to identify variations in diabetes diagnosis and management based on clinical guidelines and inform where measures such as educational activities and consumer engagement are needed to improve the quality of services and address health needs in the population. By mapping trends and areas where diabetes is poorly managed, current and future needs for health care and pathology services can be predicted. Further development will consist of linking the pathology data to other administrative data sources, including data on hospital morbidity, medicine prescriptions and health service use.

Socioeconomic and geographic variation in adjuvant chemotherapy among elderly patients with stage III colon cancer in Norway

Elin Marthinussen Gustavsen, Stig Norderval, Liv Marit Dørum, Aina Balto, Ragnhild Heimdal, Barthold Vonen, Eva Stensland, Ellinor Haukland and Beate Hauglann

Background
About half of the patients diagnosed with colon cancer are 70 years or older. Standard treatment for stage III colon cancer is major surgical resection followed by adjuvant chemotherapy (ACT). Norwegian guidelines recommend initiation of ACT within 6 weeks after resection.

Objectives
This study investigated socioeconomic and geographic variation in the provision of ACT to elderly patients with stage III colon cancer in Norway.

Methods
This population-based retrospective cohort study included patients aged 70 years or older diagnosed with stage III colon cancer between 2011 and 2021 who underwent major surgical resection. Individual data were obtained from national registries. Multilevel logistic regression analysis was used to model variation in the provision of ACT.

Results
Of 4 501 included patients, 603 (13%) and 1 182 (26%) received ACT within 6 and 8 weeks after resection, respectively. The provision of ACT decreased with increasing age and frailty. Odds of ACT within 6 weeks decreased for patients with low socioeconomic status (SES) compared to high SES (odds ratio (OR) 0.65 (95% confidence interval (CI) 0.48–0.89)), and decreased for patients living alone compared to those living with a cohabitant (OR 0.73 (95% CI 0.58–0.92)). Geographic variation was found between hospital referral areas (OR 0.41–2.54).

Conclusion
Our study found that provision of ACT to elderly patients with stage III colon cancer is associated with both SES and geography, indicating variation in adherence to treatment guidelines. Health authorities need to address these variations to ensure equal health care to this patient group.

Predicting patient outcomes and risk for revision surgery after hip and knee replacement surgery: comparison of modelling approaches using the Swiss National Joint Registry (SIRIS)

Léonie Hofstetter, Nathalie Schweyckart, Christof Seiler, Christian Brand, Laura C Rosella, Mazda Farshad, Milo A Puhan, Cesar A Hincapié

Background
Prediction of postoperative patient-reported outcomes and risk for revision surgery after total hip arthroplasty (THA) or total knee arthroplasty (TKA) can inform clinical decision-making, health resource allocation, and care planning. Machine learning (ML) algorithms are increasingly used as an alternative to traditional logistic regression (LR) prediction, but there is uncertainty about their superiority in overall model performance.

Objectives
The aim of this study is to compare the predictive performance of LR with different ML approaches for predicting patient outcomes and risk for revision surgery after THA and TKA.

Methods
A population-based historical cohort study will be developed using routinely collected data from all primary and revision THA and TKA procedures performed in Switzerland and registered in the Swiss National Joint Registry (SIRIS). Patients of age ≥ 18 years with surgery for primary osteoarthritis from 01 January 2015 up to 31 December 2023 will be included. Outcomes of interest will be 1) 12-months postoperative poor pain outcome (defined as <50% improvement of pain or <3 absolute reduction in pain on a 11-point (0 to 10) numeric rating scale) and poor satisfaction outcome, and 2) early revision within five years after primary surgery. Prespecified predictor variables will include demographic characteristics, comorbidity score, patient-reported health status measures, and surgical variables. Measures of overall predictive accuracy, discrimination, and calibration will be used to compare predictive performance, and decision curve analysis performed to evaluate clinical usefulness of models. The models will be internally validated using cross-validation, and externally validated using geographical validation.

Results
Up-to-date findings will be presented by the conference date.

Relevance
Prediction models as decision support tools may support preoperative clinical decision-making, health resource allocation, and care planning. No risk prediction model using Swiss data has been published in this area, and other studies comparing predictive performance of ML algorithms are poorly reported.

Healthcare epidemiology and costs of chiropractic care in Switzerland: a population-based study using health insurance claims data

Javier Munoz Laguna, Malin Muhlemann, Andri Signorell, Lukas Brunner, Thomas Bauer, Laura Rosella, Milo A Puhan, Cesar A Hincapie

Background
Musculoskeletal disorders are among the most burdensome and costly health conditions in Switzerland. Chiropractors are commonly seen for musculoskeletal pain conditions, however, little is known about the health care epidemiology and costs associated with chiropractic care in Switzerland. To aid health care decision making and resource allocation, better understanding of the health care epidemiology, and costs associated with chiropractic care is needed.

Objectives
To examine the health care epidemiology and costs of chiropractic care in Switzerland using nationwide health insurance claims data between 2017 and 2021.

Methods
This was a retrospective observational study using administrative health insurance claims data from Helsana-a large Swiss health insurance company covering approximately 15% of the Swiss population. Participants were Swiss residents with incident chiropractic care in one of the study index years-2018 or 2019. The study period was from 1 January 2017 to 31 December 2021-one year before and two years after each index year. As healthcare utilisation may vary considerably among chiropractic care cases, we characterised mutually exclusive participant subgroups based on additional health care use within 8 weeks of the chiropractic care index visit date. Descriptive statistics were used to summarise study population characteristics-gender, age, region, area of residence, health insurance model, health insurance deductible, comorbidities, health care use in index year, and spine surgery.
We estimated the cumulative incidence of chiropractic care utilisation among the source population during the two-year index period (2018 and 2019), that is, the number of persons with incident chiropractic care divided by the 'at risk' Helsana population. We described annual total health care costs-in CHF and EUR (exchange rate as of December 2021) overall and per person in the study population, including prespecified subgroups.

Results
Among 1,258,345 unique persons in the source population in 2018 or 2019, 30,660 persons had an initial chiropractic care visit in 2018 or 2019 (17,413 [57%] women; mean age 48.1 [SD, 18.4] years) and were included in the study population. The cumulative incidence of chiropractic care during 2018 and 2019 was estimated at 2.71% (95% Cl, 2.68% to 2.74%).
Mean annual total health care costs amounted to 173.2 million CHF (157.4 million EUR), with 7.8 million CHF (7.1 million EUR) associated with chiropractic care. Mean annual per-person total costs were 5,648 CHF (95% Cl, 5,559 to 5,737 CHF; 5,134 EUR, 5,053 to 5,215 EUR), with chiropractic care costs estimated at 255 CHF (95% Cl, 251 to 258 CHF; 231 EUR, 228 to 235 EUR) per person. Different chiropractic care case subgroups varied in their characteristics, healthcare utilisation and costs during the study period.

Conclusion
Our findings help advance fundamental healthcare epidemiology, economic, and health services knowledge and understanding about chiropractic care in Switzerland. Given the societal and high health system burden of musculoskeletal pain conditions treated by chiropractic providers, further studies on the health care variation, and economic evaluations of chiropractic care are warranted.

Unveiling the Connections: How Healthcare Availability Influences Morbidity

Doreen Müller, Claudia Kohring, Manas Akmatov

Research Idea

In health services research, there is ongoing debate about whether morbidity is related to the availability of healthcare services. Regions with a higher density of healthcare providers often report a higher prevalence of diagnosed conditions. This observation has led some researchers to argue that greater healthcare availability leads to more frequent diagnosis and treatment of diseases, which could suggest that the reported morbidity in these areas is partly an artifact of better access to medical care. For instance, individuals in these regions might undergo more routine check-ups and screenings, leading to earlier and more frequent detection of health issues.

To contribute to this discussion, it is essential to analyze the relationship between morbidity and healthcare availability systematically. One way to do this is by utilizing comprehensive datasets that can offer insights into both the supply of healthcare services and the prevalence of diagnosed conditions. One of them is INKAR (Indicators and Maps for Spatial and Urban Development), provided by the German Federal Institute for Research on Building, Urban Affairs and Spatial Development (BBSR), which offers extensive data on the regional distribution of healthcare resources, including the number of practicing physicians, hospital beds, and other healthcare infrastructure metrics. Hospital-related morbidity data can be obtained from the federal and state statistical office.

By linking INKAR data with regional statistics on primary diagnoses in hospitals, which are based on the residential principle, researchers can gain a more nuanced understanding of how healthcare availability influences morbidity. This approach allows for the examination of whether regions with more healthcare resources also report higher rates of diagnosed diseases requiring hospitalization due to better access to medical services, or if other factors might be at play.

For example, a region with a high number of hospital beds and physicians might not only have better access to healthcare but also a population that is more health-conscious and proactive about seeking medical attention. Alternatively, higher hospital-related morbidity rates in these areas could reflect underlying socioeconomic factors that also contribute to greater healthcare availability, such as higher income levels and better health insurance coverage.

In summary, understanding the relationship between hospital-related morbidity and healthcare availability requires a multifaceted analysis that considers both the supply of healthcare services and the demographic and socioeconomic context of each region. By leveraging comprehensive datasets like INKAR and linking them with regional hospital-related morbidity statistics, researchers can contribute valuable insights to this ongoing debate, ultimately informing better healthcare policy and resource allocation.

The Norwegian Healthcare Atlas for Mental Healthcare for Children and Adolescent

Oddne Skrede, Sweta Tiwari, Haji Kedir Bedane, Knut Ivar Osvoll

Background
The Healthcare Atlas for Mental Healthcare and Substance Abuse Treatment, published in 2020, pointed out large geographical variation in mental healthcare in Norway. In recent years, there has been a notable increase in consultation rates among younger population, particularly regarding Attention Deficit Hyperactivity Disorder (ADHD), for children and adolescents. Furthermore, the corona pandemic has influenced consultation rates of some psychiatric disorders among teenagers, such as depression [1]. Based on the overview given by the 2020 atlas, this atlas elaborates specifically on mental healthcare for children and adolescents.

Objectives
Mental healthcare in Norway is primarily organized and treated by specialist health services. Although primary health care, including school health services plays an important role in mental healthcare, there is a lack of comprehensive data registration. Using clinical activity data from both specialist health care services and primary health care for the years 2019-2023, we assess the geographical variation in mental healthcare for children and adolescents in Norway.

Methods
We used data from the Norwegian patient registry for the period 2019-2023. Patients were included based on the Multiaxial classification of child and adolescent psychiatric disorders and associated ICD-10 codes as main diagnosis and/or on axis 1 (axis 2 for development disorders). The Patient groups included depression (F32-33,F92), anxiety disorders (F40-41,F92.8,F93.0-.2), autism (F84), ADHD (F90), eating disorders (F50), adaption disorders (F43.0,F43.2,F43.8,F43.9), developmental disorders (F80-83,F88-89), and substance use disorders (F10-19, excl. F17). The rates are adjusted for differences in age and sex across referral area populations.

Results
Preliminary results indicate moderate geographic variation in outpatient care, with a two-fold difference between the referral areas with the highest and lowest rates. In inpatient care, the difference is larger. When stratifying by patient groups, substantial variation is observed in affective disorders such as anxiety and depression, as well as in adaption disorders. Conversely, eating disorders exhibit small variation. The patient rate for ADHD has increased substantially in recent years, and displays a two-fold geographical difference between the highest and lowest rates.

Conclusion
There is moderate variation in health care services in mental healthcare for children and adolescents in general, but large variation in outpatient care for disorders such as anxiety and depression. While differences in need justifies the different activity levels for some referral areas, the variation is unwarranted in general.

Is There Inequity in Formal Care Service Uptake Following Acute Hospital Admissions Among Older Persons in Norway?

Katrine Skyrud, Astri Syse, Siri Rostoft

Background
Population ageing and strained public resources will challenge the future provision of health and care services, in both primary and specialized settings.

Objectives
There is scarce research on the joint uptake across settings, and we aim to assess the uptake of formal long-term care (FCS), either home healthcare (HHC) or short- or long-term institutional care (IC), before and after (up to 6 months) an acute hospital admission for select diagnoses in a full-population sample including older Norwegian residents, focusing on inequities across sociodemographic characteristics. How acute health events impact on FCS uptake, depending on the nature of the acute event, where people transition from, and their sociodemographic characteristics, may provide vital information for healthcare planning and policy development to ensure sustainable and equitable health and care services going forward.

Methods
Multinominal logistic regression models were applied to Norwegian registry data on older persons (N=68 803) aged 75+ at discharge in 2021 who were treated for a select sample of acute events in the specialized healthcare system (N=94 748) to examine how prior FCS use and sociodemographic characteristics interact to influence further uptake in the short (within 4 weeks) and long term (at 6 months) post-discharge.

Results
Altogether, 52% of the sample were already recipients of FCS at the time of the acute event, 42% in HHC and 10% in IC. Within 4 weeks post-discharge, the shares decreased to 30% for HHC and increased to 38% for IC. At 6 months, the percentages were 42 and 15%, respectively, suggesting a substitution between HHC and IC. Multivariate models show that more frequent transitions into FCS were associated with older age, living alone, female sex, low household income, and low education. The ORs varied between 1.1 and 20.3. Marked variations were observed between the diagnostic groups, with trauma most commonly resulting in FCS transitions.
Among those who were already recipients of HHC, a larger share transitioned into IC within 4 weeks, and at 6 months, the uptake of HHC was up to 76% for those already being users. Otherwise, the patterns were largely similar as those observed for individuals without HHC at admission.

Conclusion
Acute hospital admissions are frequent among older individuals, irrespective of prior FCS uptake. Nevertheless, such admissions impact markedly on subsequent FCS uptake. We found that FCS uptake depends to some extent on sociodemographic characteristics, as FCS are disproportionally provided to sociodemographic disadvantaged individuals. As these individuals are likely to have higher needs, it does not appear to be a marked inequity in the FCS distribution in Norway. Going forward, it will be important to ensure that the FCS can continue to ensure equitable service provision as public resources become more strained. Research on the temporality of FCS uptake is also warranted to discern if the increased utilization after acute episodes is temporary or long-lasting, and if policy measures, such as more intense rehabilitation, could reduce long-term FCS needs. Lastly, future research should include hospital setting frailty measures to improve predictions of future FCS needs following acute episodes among older persons.

Disparities in Home Health Care Service Utilization and Intensity Among Immigrant Older Adults in Norway

Astri Syse & Michael Thomas

Background
Population ageing, increased immigration and strained public resources will challenge the future provision of formal old-age care. While immigrants are known to be positively selected on health in the short-term, health advantages typically deteriorate with increasing durations of stay in host countries. Despite the increasing diversity among older age populations in many Western countries, there remains a dearth of literature on the healthcare utilization patterns among immigrant populations.

Objectives
Utilising full population register data for Norway, we examine propensities to transition into home health care (HHC), as well as variations in HHC intensity (hours per day), by immigrant background characteristics (e.g., country group of origin and duration of stay). We also examine how immigrant background characteristics interact with broader socio-economic, family, and demographic characteristics.

Methods
Logistic and linear population average regression models were applied to Norwegian registry data on older persons (aged 60+, 2011-2016) to examine how immigrant characteristics and socio-demographic features influence HHC transitions and intensities. We observed around 200,000 transitions into HHC among 1.2 million individuals (17% transition) and 5.7 million person-years (3.5% transition). Of immigrants we observed 7,788 transitions, among 73,108 individuals and 313,650 person-years.

Results
Irrespective of their country group of origin, immigrants exhibited a lower likelihood of transitioning into HHC compared to native-born Norwegians. Transition rates tended to align more closely with those of the native-born population as durations in the country increased. Eastern European immigrants with shorter durations of stay showed the lowest likelihood of transitioning into HHC (OR=0.34). Among those who received HHC, only non-Western immigrants were observed to receive significantly fewer hours of care per day. Factors such as living alone, absence of children, and lower levels of education and income were generally linked to higher propensities for transitioning into HHC, although patterns differed for certain characteristics by immigrant group.

Conclusion
Disparities in HHC utilisation exist between immigrants and natives. Future research should discern if lower utilization denotes reduced needs or barriers related to access, navigation, and 'underuse' of services. Addressing these disparities is vital for equitable service provision in diverse older populations.

Factors Affecting Patient Satisfaction: Results from the Region-wide Surveys of Inpatients and Outpatients in Hong Kong

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Background
Patient experience surveys provide systematic feedback from patients regarding their encounters with medical services, helping to identify crucial areas for healthcare improvement. This study aimed to explore the factors affecting patients' satisfaction with overall service and the disadvantaged groups who may experience less positive healthcare experiences.

Objectives
This study utilized data from the regional cross-sectional surveys, including the 2019 Inpatient Experience (inpatients) and the 2021 Specialist Outpatient Experience (outpatients) Surveys in Hong Kong. Validated questionnaires designed for inpatient and outpatient experience were adopted in the relevant surveys. Generalized linear models were conducted in the data analysis.

Methods
This study utilized data from the regional cross-sectional surveys, including the 2019 Inpatient Experience (inpatients) and the 2021 Specialist Outpatient Experience (outpatients) Surveys in Hong Kong. Validated questionnaires designed for inpatient and outpatient experience were adopted in the relevant surveys. Generalized linear models were conducted in the data analysis.

Results
A total of 20,676 participants (inpatients: n = 8,275; outpatients: n = 12, 401) were included in the study. The overall satisfaction for inpatients and outpatients is commonly associated with waiting time (inpatient: β =-0.05, p <.001; outpatient: β =-0.08, p <.001), environmental cleanness (inpatient: β = 0.37, p <.001 outpatient: β = 0.22, p <.001), interaction with doctors (inpatient: β = 1.28, p <.001; outpatient: β = 1.60, p <.001), and being treated with respect (inpatient: β = 1.14, p <.001; outpatient: β = 0.43, p < .001). Inpatients' perceived involvement in medical decisionmaking was significantly associated with their levels of satisfaction (inpatient: β = 0.03, p = .04), while this association was not significant among outpatients (β = 0.009, p = .45). Older patients (inpatient: β=0.15, p < .001; outpatient: β = 0.18, p < 0.001), individuals with lower educational attainment (inpatient: β =-0.18, p <.001; outpatient: β =-0.19, p < .001), and those with better health status (inpatient: β = 0.18, p < .001; outpatient: β = 0.19, p < .001) were more likely to report higher levels of satisfaction.

Conclusion
This study revealed that doctor-patient interaction plays a crucial role in improving patients' overall satisfaction with healthcare services. Reducing the waiting time, providing clean environments, and treating patients with respect may also contribute to a positive patient experience. More discussions are needed to explore the underlying mechanism between involvement in decision-making and patient satisfaction within different contexts. Young adults and those with higher educational attainment and poor health status may have high expectations for patient services, potentially leading to a less unsatisfactory experience in healthcare. This underscores the importance of considering demographic and health-related factors in efforts to improve patient satisfaction and enhance the quality of healthcare delivery.

Delayed reperfusion treatment and left ventricular ejection fraction in ST-segment elevation myocardial infarction patients in Norway

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Background
In Norway about 56% of the patients with ST-segment elevation myocardial infarction (STEMI) received reperfusion within recommended time limits from the European Society of Cardiology (ESC) as implemented in Norway, during 2015-2018, either by pre-hospital fibrinolysis (the pharmacoinvasive strategy (PI)) within 30 minutes or by the primary Percutaneous Coronary Intervention strategy (pPCI) within 120 minutes. This proportion is far below the established national quality goal (Uleberg et. al. 2024). Following up on these finding, we set out to explore the relationship between delayed reperfusion and left ventricular ejection fraction (LVEF). LVEF is a measure of the hearts ability to eject blood from the left ventricle in each cardiac cycle. It is widely used as a parameter to predict clinical outcomes such as mortality, heart failure or other cardiac events following an acute myocardial infarction.

Objectives
The objectives of this ongoing study is to investigate myocardial damage measured as reduced LVEF (49-31%) and severely reduced LVEF (≤30%) for patients receiving delayed reperfusion 3 compared to patients receiving timely reperfusion, according to Norwegian time recommendations concerning reperfusion.

Methods
Logistic regression models are applied to investigate the association between delayed reperfusion treatment, and reduced and severely reduced LVEF compared to normal LVEF (≥50%). All analyses are adjusted for patient characteristics and socio-economy.

Results
Preliminary results suggest that the odds of reduced and severely reduced LVEF is 21% and 95% higher for patients receiving delayed reperfusion respectively, than for patients receiving timely reperfusion. Reduced and severely reduced LVEF is also associated to known risk factors like a previous myocardial infarction, high age, comorbidity, time from symptom onset to first medical contact, and to the socio-economic factors education and income.

Conclusion
Delayed reperfusion is a substantial risk factor for reduced and severely reduced LVEF. To avoid myocardial damage among STEMI patients in Norway further efforts to ensure timely reperfusion according to ESC and Norwegian guidelines and goals, are crucial. Studies investigating the effect of time to reperfusion related to LVEF more thoroughly, also comparing patients treated by the PI strategy and the pPCI strategy, are warranted and planned within this ongoing research project.

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